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Practical dietary recommendations in HIV infection

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SUMMARY. Dietary interventions may be important to improve quality of life and slow disease progression. The interventions provided are characterized by: 1) individualization according to each person's assessment and tempered by clinical judgement and experience,2) integration into the overall health care plan to support and improve response to therapy, decrease nutrient interference with therapy, and encourage optimal nutritional status maintenance, and 3) initiation as early as possible in HIV infection, preferably during asymptomatic stages to improve and preserve nutritional stores.

Intervention plans should be client-oriented and involve the client in setting realistic and practical dietary goals. The diet counselor and other health care team members should assure that the nutritional interventions are well integrated into the overall health care plan. Diet counselors need to remain non judgmental to act as an effective resource for nutritional information and recommendation while working within the client's decisions and preferences as much as possible. In this way, an acceptable, realistic, and appropriate care plan can be most successfully implemented to complement and support the overall treatment plan.

INTRODUCTION

Difficulty in achieving and maintaining nutritional stores has been characteristic in HIV infection and disease. The processes of HIV infection itself along with complicating factors of opportunistic infection and neoplasm, drug and other therapies, and psychosocial and economic problems may cause or exacerbate nutritional depletion. Though nutrition-related research in HIV infection and disease has demonstrated many of the problems, there is little information available on the solutions. Usual methods of assessing and intervening in other disease states need to be adapted for specific application in HIV infection. Previously, we have relied upon significant weight loss and reduced serum albumin levels to determine a state of malnutrition. We now know that the downward cycle of malnutrition (that may ultimately result in death) may begin in asymptomatic stages of HIV infection, long before clinical signs and symptoms are documented. For these reasons, dietary intervention is an essential part of the overall health care plan and should be integrated from the initial antibody screening throughout the course and management of the disease. This chapter will present some of the general considerations and possible dietary interventions for an oral diet. In some cases, dietary intervention may require enteral and/or parenteral administration of nutrients. Clinicians are cautioned not to hesitate too long before initiating these and other nutritional interventions. Waiting for malnutrition to manifest itself by significant weight loss, clearcut biochemical changes, and clinical signs may mean the underlying pathophysiology has progressed to a point where nutritional repletion is difficult to achieve. Early nutritional intervention is of key importance in providing optimal care. Whether or not the lifethreatening malnutrition states can be effectively circumvented remains to be seen. At this point in time, the best clinical approach is one of prevention to support the overall longterm clinical control of HIV infection as a chronic, manageable disease.

PURPOSE OF DIETARY INTERVENTION

The goals of dietary intervention in HIV infection include the following points:

1. To meet the individual's needs for nutrients and maintain appropriate nutrient levels and stores in serum and body tissue to support body function including immune function and overall health.
2. To attain and maintain an appropriate body weight and lean body mass (along with physical activity, if possible).

3. To facilitate the normal growth and development in pediatric patients.
4. To maintain as normal a diet and lifestyle as possible through carefully planned realistic and practical interventions.
5. To provide flexible recommendations that allow for the trial of several types of meal patterns and diet compositions according to personal preferences and tolerances.
6. To prevent or delay the development of malnutrition due to wasting syndromes, drug therapies, and other variables.
7. To minimize undesirable interactions of nutrients with medical and other treatments.
8. To modify the diet for complications of HIV infection including old and new food allergies and intolerances.
9. To address nutrition-related symptoms and other special conditions by monitoring and modifying recommendations to adjust for changing needs.

The desired effects of the interventions include the maintenance and restoration of nutrient stores to allow for normal body functions including the ability to withstand infections, treatments, and disease processes. Dietary intervention is supportive treatment for the improvement of quality of life and optimally, the prevention of much of the malnutrition commonly seen in asymptomatic as well as symptomatic HIV infection. More research needs to be conducted on the aberrations in nutrient absorption, utilization, and excretion to further clarify specific dietary interventions as an effective support to the overall treatment plan.

INDICATIONS

Dietary interventions, including education, individual counseling, and recommendation of supplements are initiated during asymptomatic stages of HIV infection to develop appropriate eating habits early on. Medical treatments and acute and chronic phases require specific nutritional interventions. Even in terminal stages, nutritional interventions will be important to client maintenance and possibly even comfort.

BASIC PRINCIPLES

The dietary recommendations and interventions are characterized by a number of precepts. The reference point is a normal healthy diet of foods that is adequate in nutrients from varied sources. Special regard to infection or neoplasm, malabsorption, other gastrointestinal dysfunction, organ involvement and dysfunction, previous nutritional status deficits, and medications or other treatments may be given through individually tailored interventions on a case by case basis. Follow-up monitoring and adjustment are important to the continuity of care, as circumstances can change rapidly from an apparently well state to an acutely ill state. Educational interventions will focus on basic nutrition principles, food selection and procurement issues, menus, food preparation, and food safety, giving consideration to psychosocial, economic, language, and literacy factors. Counseling the individual will involve the client in discussions of rationale for recommendations to help in setting realistic personal goals with the professional diet counselor. Optimally, these discussions will take place in a multidisciplinary setting to better integrate the nutritional care outline into the overall treatment plan. Preprinted handouts provided in lieu of counseling or that do not allow for discussion or individualization of recommendations are discouraged. Handouts provided to complement counseling sessions should be suitable for the client's literacy level and in his or her first language. Nutritional fact and fallacy need to be explored with each client. Non-judgmental and understanding counseling techniques are especially important in working with HIV-infected individuals when few of the "answers" are known. There is an abundance of experimental and adjunct therapies, about which little valid and reliable information is currently available. A listing of considerations in preparing individualized practical dietary guidelines is listed in Table 1. Recommendations should be flexible and consistent with principles of good nutrition as well as with the overall treatment plan. However, some clients may prefer a more rigid outline to establish appropriate nutritional habits. If at all possible, involving the client's support system (family, friends, support services) in the development and/or instruction may improve compliance. Medical, therapeutic, lifestyle and cultural habits, and estimated nutrient requirements should be interpreted by the diet counselor and integrated to provide reasonable and practical advice for each individual. It does little good to recommend meal patterns and foods that do not fit into family or personal patterns since the recommendations may not be adopted or effective for the individual's circumstances. Also, recommendations not consistent with medical conditions may impede therapy progress and cause other problems. For instance, the recommendation for a highfat diet to increase caloric intake in cases of severe liver impairment may result in steatorrhea or other complications.

GENERAL CONSIDERATIONS

Energy needs are based on calculation with the Harris Benedict equation (Figure 1) or other methods (Figure 2) taking into account the HIV infection and any other medical considerations that are present. Increases in calorie, protein, and micronutrient requirements are well documented in stressed states of infection, fever, and malabsorption. A factor of up to 1.8 or 2.0 times the basal energy expenditure may be required. These calculations present a goal for

TABLE 1
CONSIDERATIONS FOR INDIVIDUALIZED DIETARY RECOMMENDATIONS

Anthropometrics	Weight for height
	Usual body weight compared to current weight
	Patterns of weight loss
	Body composition (fat and lean body mass)
	Skinfold measurements
	Arm muscle area (calculated)
Biochemical*	Plasma proteins (consider drug therapy, acute and chronic disease)
	Lipids (triglycerides)
	Vitamin/mineral measures
	Electrolytes
Clinical Exam	Physical exam (tongue, lips, oral mucosa)
	Nervous system, sight, organic brain dysfunction
Medical Diagnoses	Opportunistic infection, neoplasm
	Malabsorption, diarrhea (consider type)
	Malnutrition
Appetite	Symptoms (anorexia, nausea, diarrhea)
	Feeding problems (swallowing, chewing, self - feeding skills)
	Self-rating of appetite
Diet History (foods and fluids)	Food patterns (recall, frequency, interest)
	Intake versus requirements
Medications	Prescription
	Over the counter
	Adjunct therapy
Supplements (consider amounts)	Calorie-containing nutrient
	Non-calorie containing nutrients
	Non-nutrients (herbs, other supplements)
Lifestyle	Caffeine, alcohol, drug, tobacco use
	Sleep, exercise, stress and coping mechanisms
	Psychosocial issues (including cultural habits)
	Economic and food access issues
Motivation	Body image
	Internal versus external locus of control

* Biochemical measures should be interpreted with care. Some measures may not accurately reflect deficiency in HIV infection. An aberration in nutrient transport and utilization may be present. The use of the most sensitive indicators is recommended (i.e., prealbumin and retinol binding protein versus albumin)

calorie intake and should be tempered with clinical judgement and experience. The level of protein intake can then be calculated using a calorie to nitrogen ratio of 100-150:1 or 1.5-2.0 grams per kilogram of appropriate body weight (Figure 3). Protein calculations should include the attention to kidney and liver function as well as repletion needs. The remainder of calories should be distributed according to the client's tolerances for volume of food and fat. Malabsorption and a resulting decrease in basal energy expenditure seen in some patients may lower calorie requirements. A prevention of the reduction of basal metabolic rate due to a starvation response in severe malabsorption, as seen in some patients, may be important in preventing anorexia and a reduction in protein stores. Fluid requirements are based on a balance of intake with loss (Figure 4). Diarrhea, excessive sweating, and other problems may increase fluid and electrolyte needs. An oral diet is recommended for nutritional maintenance and repletion if at all possible. Oral diets that are balanced and varied can preclude problems of nutritional deficiencies and toxicities resulting from single nutrient emphasis and nutrient-nutrientinteractions (i.e., competition for absorption). This concept is referred to as the "dilutional effect," obtaining nutrients from a variety of sources to decrease or "dilute" the amounts of nutrients that may cause a problem in excess and take advantage of foods providing various ranges of densities for particular nutrients. For ex-am-ple, meats and milk are both good sources of protein. Meats are good sources of B vitamins and milk is a good source of calcium and vitamin D. By relying on both and other foods for protein intake, the client can take advantage of having good sources of both calcium and B vitamins

FIGURE 1
HARRIS-BENEDICT EQUATION

Males: 66.5 + 13.8(weight in kg) + 5.0(height in cm) - 6.8(age)
Females: 655.1 + 9.6(weight in kg) + 1.8(height in cm) - 4.7(age)

The number calculated from the above equations is then multiplied by an activity factor and an injury factor

Activity factors:		
	1.2	bedrest
	1.3	ambulatory and maintenance
Injury factors:		
	1.2-1.4	infection
	1.6	sepsis

Elevated temperatures will increase energy and protein needs further by approximately 7% for each degree fahrenheit above normal.

FIGURE 2
JEEJEEBHOY METHOD

30 - 35 kcal/kg UBW*	ambulatory with weight maintenance
40 - 45 kcal/kg UBW	malnutrition with mild stress
50 - 60 kcal/kg UBW	severe injuries and sepsis

* Usual Body Weight is used if the usual weight was appropriate; appropriate body weight varies from person to person, but includes an assessment of height, frame, and clinical judgement

FIGURE 3
CALCULATION OF PROTEIN REQUIREMENTS

Total calories x (1 gram nitrogen/100-150 calories) x (6.25 . grams protein/gram nitrogen)

Or:	1.0 to 1.5 grams protein/kg	repletion, no acute infection
	1.5 to 2.0 grams protein/kg	moderately stressed, infection
	2.0 to 3.0 grams protein/kg	severely stressed

FIGURE 4
CALCULATION OF FLUID REQUIREMENTS

First 10 kg body weight	100 ml/kg/day
Second 10 kg body weight	50 ml/kg/day
Rest of weight	20 ml/kg/day

without risking overconsumption of vitamins A and D if milk alone were relied upon for protein. A variety of nutrient-dense food (food that provides the most nutrients per calorie) is advised, especially in cases of inadequate caloric intake due to anorexia, difficulty chewing, nausea, or other problems that may lead to a reduced intake. If the client is unable to reach the approximate goal set for calories and protein, it may be desirable to counsel the consumption of high-protein and nutrient-dense foods in preference to those foods that are less protein and nutrient dense. Food sources of micronutrients are listed in Table 2. Nutritional supplementation should be evaluated by the diet counselor and client to individualize recommendations. The decision to recommend oral supplementation of nutrients should consider gastrointestinal tract function as well as drug therapy interactions. A balanced multi-vitamin, multimineral supplement may be recommended as a matter of course. If the client decides to take doses of vitamins and minerals (particularly single nutrients) at levels of greater than 3-5 times the RDA, it is advisable to monitor the serum values and other indicators to prevent nutritional imbalances. Fat-soluble vitamins (A,D,E,K) may have a lower minimum toxic dose, but care should be taken with both fat and watersoluble nutrients. Even the nearly innocuous betacarotene has recently been identified as having potential toxic effects in cases of liver dysfunction. Little research has been completed to allow for more specific recommendations. Nutritional parameter changes have been documented in Hiv-infected asymptomatic men. Normalization of serum pyridoxine and B12 values have been effected with supplementation of 25-50 milligrams of B6 (10-20 times the RDA) per day and monthly intramuscular injections of 1200 micrograms of B12 (totalling 13 times the RDA on a daily basis). Levels of supplementation to correct deficient serum values, and proof of benefits of normalization, have not yet been elucidated. Hiv-infected persons are especially vulnerable to drug nutrient interactions as a result of multidrug and long term drug regimens. These undesirable reactions can result in the defi~iency of nutrients, further compromising nutritional status, and the alteration of drug efficacy. Care should be taken to counsel for food and medication interactions to preserve nutritional status while not in-ter-fer-ing with appropriate drug action. For example, recommendation of folate supplementation while the client is taking dihydrofolate reductase inhibiting drugs may not only be ineffective in meeting folate needs, but may also decrease the effectiveness of the treatment. The recommendation in this instance is for folinic acid supplementation to bypass the antibiotic effect of inhibiting folate while maintaining drug efficacy. Some of the common potential drug-nutrient interactions are presented in Table 3.

DIET COMPOSITION

The composition of the diet for HIV-infected persons is figured much the same as in normal nutrition. From the estimated calorie and protein needs, the remainder of the calorie goal is divided between carbohydrates and fats. The amount of recommended fat in the diet may vary according to the individual. If no apparent symptoms are present, a diet emphasizing carbohydrates is appropriate. When a problem of early satiety is apparent, emphasizing

TABLE 2
FOOD SOURCES OF MICRONUTRIENTS

Micronutrient	Food Sources
Vitamin A	Liver, green and yellow/orange fruits and vegetables, fortified dairy products, eggs
Vitamin B6	Liver, meat, poultry, fish, dry beans, potatoes, broccoli, bananas
Folic Acid	Liver, asparagus, greens
Vitamin B12	Meats, dairy products
Vitamin C	Citrus fruits, tomatoes, green peppers, broccoli, spinach, cabbage, strawberries, papayas
Vitamin E	Vegetable oils, meat, eggs, whole wheat
Iron	Liver, beef, poultry, egg yolk, whole grains, greens, watermelon, dried beans, dried fruits
Selenium	Seafood, kidney, nuts, brown rice
Zinc	Seafood, liver, eggs, beef, corn, peas

carbohydrate sources over fat is encouraged. If steatorrhea is present, then a diet limiting fat, or at least long-chain triglyceride sources, is advocated. Low volume, low-calorie intakes without the presence of steatorrhea may indicate a need to emphasize fat as a dense source of calories within a smaller volume of food. Variations on diet recommendations are shown in Table 4. An outline for nutritionally adequate mixed and vegetarian diets is proposed in Table 5. Along with an estimation of energy and nutrient intake and requirements, an evaluation of activity level should be conducted. Activity should be encouraged, if at all possible, to improve and maintain lean body mass. Weight gain and perhaps even weight maintenance without activity may result in the loss of lean body mass and other nutritional stores while maintaining or adding to fat and fluid stores. Fluid requirements are of utmost importance and an understanding of the importance of fluid intake (preferably in the form of nutrient-containing foods and beverages) is essential at the outset.

MEAL PATTERNING

Establishing a routine or pattern for meals early on will be helpful in developing optimal consumption habits to build on in case of special conditions or problems that may arise. It is unlikely that a person will obtain all of his or her required nutrients in just one meal per day. A minimum of three meals and/or snacks per day is suggested to encourage adequate intake. Meal patterns should, however, fit into the client's lifestyle and physical activity as much as possible. Patterns are adjusted according to the client's ability to eat. For example, some people find that their appetite is best early in the day and tapers off in the afternoon. A pattern emphasizing the morning meals and snacks may be most appropriate in these cases. Calorie-containing supplements may be consumed before sleeping to keep from interfering with food intake during the day and allowing time for the appetite to return for the first meal and/or snack of the day. Examples of calorie-containing supplements are shown in Table 6. There are no rules for types of foods that should be consumed according to times of day (i.e., breakfast foods at breakfast time). If a person finds barbecued chicken appealing at the breakfast or morning meal and waffles for dinner or the evening meal, then it should be accommodated. The goal of dietary recommendations is often to maximize intake over the course of the day. Overall, flexible nutritional care plans with appropriate meal patterns are optimal bases on which to build for changing conditions and requirements due to infection or other complications.

ALTERNATIVE DIET STRATEGIES

If a client prefers to follow a particular diet strategy for any reason, the proposed pattern should be worked with to assure nutritional adequacy. Table 5 shows vegetarian patterns and strategies for assuring nutritional adequacy. A client choosing to follow a more restrictive diet, such as a macrobiotic diet, may work with the diet counselor to determine if any modifications need to be made to assure an

TABLE 3
SELECTED DRUG-NUTRIENT INTERACTIONS

Drug/Use	Interactions and Recommendations
AZT/ increased/HIV	Bone marrow suppression, nausea/vomiting, increased/ HIV inhibitor decreased appetite, diarrhea, dysgeusia, constipation, fatigue, abdominal pain, dyspepsia, possible weight gain, anemia, decreased hematocrit, decreased WBCs; erythropoietin available for compassionate use Diet: avoid raw foods and take special care with food safety issues with low WBCs; iron supplementation not effective for anemia
ddI/ HIV inhibitor	Mild headaches, lightheadedness, mild increase in liver function tests, weight gain, possible pancreatitis, increased uriç acid Diet: take with antacid (drug is alkaline pH dependet); no alcohol
ddC/ antiviral	Neurotoxic-peripheral sensory neuropathy (can ben painful), stomatitis, diarrhea, fever
Compound Q/ antiviral	Fatigue, pain, fever, sore muscles and joints
Acyclovir/ antiviral	Sore throat, diarrhea, metallic taste, CNS effects; Rare: nausea, vomiting, abdominal pain, anorexia Diet: insure adequate hydration, no alcohol
Amphotericin B/ antifungal	Nausea, vomiting, fever, metallic taste, weight loss, dyspepsia, diarrhea, cramping, epigastric pain, renal dysfunction; anemia, azotemia, hypokalemia. hypomagnesia; Rare: gastroenteritis
Pentamidine Isethionate/ PCP	IV: nausea, vomiting, diarrhea, sore throat, fruit - like breath, syndrome of inappropriate antidiuretic hormone (SIADH), metallic taste, anorexia, hypotension, nephrotoxicity, indigestion; Rare: acute renal failure, pancreatitis Aerosol: dry throat, altered taste, nausea, fatigue, dizzines Lab values: anemias, azotemia, increased liver function tests, increased creatinine, increased/decreased glucose (common in IV, rareaerosol); Rare: increased potassium, decreased calcium Diet: cleanse mouth before aerosol administration
Ganciclovir/ antiviral	Nausea, vomiting, anorexia, bone marrow suppression, renal toxicity, anemia, neutropenia, increased liver function tests, decreased platelets
Interferon - beta/ Kaposi's sarcoma	Nausea, vomiting, anorexia, fever, taste alterations, weight loss, herpetic / nonherpetic eruptions, stomatitis, paralytic ileus, dehydration, pharyngitis, SIADH; Rare: dyspepsia, vomiting, dyspnea, flatulence, hyperglycemic diarrhea, increased saliva, ulcerative stomatitis, abdominal fullness, çonstipation; Lab values: increased liver function tests, increased alkaline phosphatase, increased lactic dehydrogenase, decreased WBCs, decreased creatinine, decreased hemoglobin, decreased hematocrit, urinary protein Diet: Push fluids during initial treatments
Megace/ appetite stimulant	Increased appetite, weight gain, constipation, mild edema, possible rash

TABLE 3
SELECTED DRUG-NUTRIENT INTERACTIONS (Cont'd)

Drug/Use	Interactions and Recommendations
Foscarnet / antiviral	Increased thirst, nausea, anorexia, renal toxicity, possible decreased liver function, increased creatinine, decreased hemoglobin Diet: increase in hydration with 2 liters saline prior to administration may decrease chance of renal impairment (insure adequate hydration)
Somatostatin/ crypto - sporidium	Diarrhea, abdominal cramps, steatorrhea, mild hyperglycemia, nausea, vomiting, may decrease insulin requirements in diabetics; Rare: hyperdipsia, dry mouth, anorexia, galactorrhea, fever, throat discomfort; Diet: may require low-fat diet
Isoniazid/ MAI, TB	Hepatitis, acidosis, dry mouth, pellagra, pyridoxine deficiency, blood dyscrasias, fever, arthralgia, may act as MAOI, monitor diabetic; decreased B12, magnesium, calcium absorption; *Infrequent:* nausea, vomiting, epigastric distress, anorexia; Lab values: anemias, increased liver function tests, increased bilirubin, increased glucose, decreased folate; increased urinary B6 excretion Diet: increased need for folate, niacin, pyridoxine; give 25-50 mg/d B6; take with water, avoid alcohol and foods high in pressor amines, monitor calcium and phosphate
Septra or Bactrim /anti- protozoal	Anorexia, stomatitis, hepatitis, renal toxicity, pancreatitis, glossitis, decreased folate PCP, absorption, psuedomembranous enterocolitis Infrequent: nausea, vomiting, diarrhea, abdominal pain, mouth pain; Rare: sore throat, fever; Lab values: anemia, neutropenia, increased blood urea nitrogen, increased creatinine, increased liver function tests, increased bilirubin, decreased vitamin K (with prolonged use), increased urinary excretion of vitamin C Diet: insure adequate hydration, may require a folic acid supplement

TABLE 4
DIETARY MODIFICATIONS AND INDICATIONS

Modification	Indications
Reduced fat	liver, pancreatic insufficiency (MCTs may not be indicated with liver impairment)
Increased fat	difficulty in consuming volume of foods for adequate calories (with adequate liver and pancreatic function)
Increased protein	acute, chronic disease state with adequate liver and renal function
Reduced protein	renal, liver dysfunction with protein intolerance
Texture	mechanically soft or blended texture with sore mouth, difficulty chewing/swallowing
Salt	monitor sodium intake and excretion to keep balance with kidney or adrenal-induced sodium resorption problem
Fiber	increased or decreased according to bowel disease and function; in diarrhea sources of soluble fibers are emphasized and insoluble (crude) fibers are de-emphasized

TABLE 5
FOOD GROUP PLANS FOR MIXED AND VEGETARIAN DIETS*

Diet	Servings	Food Group	Serving Size
Mixed	2 - 4	Milk/dairy products	1 c. milk/ yogurt 1.5 oz. cheese
	2 - 3	Meat, poultry, fish, eggs, dried legumes, nuts/seeds	3 oz. meats 2 eggs 1/2 c. nuts/ seeds
	3+	Fruits	1/2 c. juice 1 average
	3+	Vegetables	1/2 c. veg/ juice 1 average
	4+	Breads/cereals	1 slice bread 1/2 c. grain/ pasta 3/4 c. cereal ready-to-eat
Vegetarian: Lacto-Ovo			
	3 - 5	Milk/dairy products	1 c. milk/ yogurt 1.5 oz. cheese
	4 - 7 per week	Eggs	1 egg
	2	Legumes**	1 c. cooked dried legumes 2 oz. nuts
	2	Nuts/seeds	1.5 oz. nuts/seeds
	6+	Breads/cereals	1 slice bread 1/2 c. grain/ pasta 3/4 c. cereal ready - to - eat
	3+	Fruits	1/2 c. juice 1 medium
	3+	Vegetables	1/2 c. cooked 1/2 c. juice
Vegan***	4	Enriched Soybean Milk+	1 c. soybean milk
	6	Fruits	1/2 c. juice 1/2 med. citrus 1 med. others
	2	Nuts/seeds	1.5 oz. nuts/seeds
	7 - 9	Breads/cereals	1 slice bread 1/2 c. grain/pasta 3/4 c. cereal (RTE)
	1 - 2	Dark green leafy veg	1 c. cooked
	2	Other vegetables	1/2 c. cooked 1/2 c. juice
	2	Legumes	1 c. cooked dry beans/peas 1/4 c. nuts 2/3 c. tofu

* Calorie-containing supplements may be included to compensate for deficient intake

** Legumes include cooked dried beans, peas, and lentils

*** Care should be taken to ensure adequate essential fatty acids and iodine as well as B vitamins (may be supplemented)

\+ Soy milk can be enriched by adding calcium lactate or other calcium supplement

This chart was adapted from "Nutrition and the Human Immunodeficiency Virus: Counter Attack AIDS" by Michele Cossette, PDt, Montreal, 1988.

TABLE 6
CALORIE-CONTAINING SUPPLEMENTS

Supplement	Characteristics
Compleat (1)	Blenderized whole foods, contains lactose, RTU
Compleat Modified (1)	Blenderized whole foods, lactose-free, RTU
Enrich	Lactose-free, contains fiber, chocolate and vanilla, caseinate and soy protein, corn oil
Sustacal with Fiber	Lactose-free, soy fiber, various flavors, RTU
Instant Breakfast (2)	Contains lactose, various flavors, uses milk
Puddings (2)	Contains lactose, various flavors, RTU* Sustacal, Delmark, Forta, others
Meritene (2)	Contains lactose, various flavors, RTU
Nutrament (2)	Contains lactose, various flavors, RTU
Citrotein	Lactose-free, various flavors, powder, contains egg white
Resource	Lactose-free, gluten-free, various flavors, powder/liquid, soy and caseinate protein
Resource Plus	High calorie, lactose-free, gluten-free, corn oil, caseinate protein, RTU
Ensure (3)	Lactose-free, vanilla and chocolate, RTU, soyprotein
Ensure Plus (3)	High calorie, lactose-free, various flavors, RTU, soy protein
Ensure Plus HN (3)	Lactose-free, high calorie, high nitrogen, vanilla, caseinate and soy protein, corn oil, RTU
Isocal (3)	Lactose-free, unflavored, RTU, soy and MCT oil
Isocal HCN (3)	High calorie, lactose-free, unflavored, RTU, soy and MCT oil
Isotein HN (3)	Lactose-free, powder, soy and MCT oil, RTU
Osmolite (3)	Lactose - free, unflavored, RTU
Osmolite HN (3)	Lactose-free, high nitrogen, unflavored, caseinate and soy protein, MCT and corn oil, RTU
Portagen (3)	Lactose - free, MCT and corn oil, powder
Sustacal (3)	Lactose - free, various flavors, RTU

TABLE 6
CALORIE-CONTAINING SUPPLEMENTS (Cont'd)

Supplement	Characteristics
Sustacal HC (3)	High calorie, lactose-free, RTU
Impact (4)	Polypeptide, nucleic acids, MCT, omega 3 fatty acids
Peptamen (4)	Lactose-free, peptide formula, MCT and sunflower oil, RTU
Reabilan (4)	Lactose-free, peptide formula, Soy and MCT oil, RTU
Vital High Nitrogen (4)	Lactose-free, elemental diet (peptides and free amino acids), whey, meat, and soy protein, safflower and MCT oil, vanilla powder
Vivonex TEN (4)	Lactose-free, elemental formula (amino acids), safflower oil (very low fat), powder
Polycose (5)	Carbohydrate liquid or powder, lactose-free
MCT Oil (5)	Fat-calorie supplement
PediaSure	Pediatric formula, vanilla, safflower, soy, and MCT oil, casein and whey protein, gluten-free, RTU or may be diluted

1 Polymeric formulas; blended foodstuffs, fiber, requires intact bowel function, not intended for oral use
2 Polymeric lactose-containing formulas, milk base, intact protein, intended for oral use
3 Polymeric lactose-free formulas, normal or high calorie and normal or high nitrogen content, intact or semipurified protein sources, isosmolar and hyperosmolar, tube or oral supplement
4 Elemental formulas, lactose-free, low residue, amino acids, di and tripeptides, hyperosmolar, designed for tube-feeding, palatability is poor
5 Supplemental nutrients, not nutritionally complete
* Ready to Use

adequate intake of nutrients. It is usually advised to complement proteins to provide a high biological value or complete protein in the place of the lower biological value or incomplete proteins found in grains, vegetables, and legumes if consumed alone. More complete proteins are furnished with the following combinations of foods:

Grains consumed with legumes

Examples: tortillas and beans
rice and beans
bread and bean soup

Grains and milk products

Examples: cereal with milk
bread with cheese
pasta with cheese
rice pudding

Once again, the keys to effective counseling are non judgmental and supportive interaction with the client to develop the most acceptable and adequate nutrition-care plan possible.

FOOD SAFETY

Another vulnerability for HIV-infected persons is food borne infections. An annoyance for an immunocompetent person, these infections, including Salmonellosis and Listeriosis, can be deadly to the immunocompromised person. Food safety education should be addressed as a matter of course within every nutritional intervention plan. Special care should be taken to address dining out as well as handling, preparation, storage of foods at home. Salmonella, Campylobacter, Shigella, Clostridium perfringens, Staphylococcus aureaus, and Botulism are among the more than 20 important targets of food borne illness prevention. Cooked foods should be heated to high temperatures (165 - 212 °F) to kill most hazardous bacteria. Temperature may be tested by inserting a meat thermometer into the center of the food (not touching a bone). Holding foods at cold temperatures (below 40 °F) or hot temperatures (above 140 °F) can reduce the bacterial growth between cooking and storing. Bacteria multiply rapidly at 40-140 °F. The time food is allowed to stand at these temperatures should be minimized. Leftovers should be

TABLE 7
FOOD SAFETY ISSUES*

Food	Handling Process
Hamburger	Cook until brown in center (170 °F)
Pork	Cook until brown in center (170 °F)
Ham	Fully cooked: keep refrigerated below 40 °F Cook before eating: 170 °F in center
Poultry	Do not stuff, thaw in refrigerator, cook in 300 °F oven or above, cook to 185 °F in center, store remainder in refrigerator or freezer at below 40 °F promptly
Lunchmeats	Watch for cloudy liquid (may be bacteria spoilage), once seal is broken keep use within 3 - 5 days
Eggs/egg foods	Do not use cracked eggs, raw eggs must be cookedei; work on very clean surfaces, hold at temperatures below 40 °F and above 140 °F.

* Raw protein foods such as sushi, steak tartare should be avoided
Adapted from The Safe Food Book, Your Kitchen Guide. USDA Home and Garden Bulletin Number 241.

heated thoroughly to cooking temperatures. Well-meaning persons delivering a hot meal and allowing it to stand may inadvertently endanger an HIV positive person's health. Family, friends, and others in the support system should be included in food safety education to prevent such problems. Meat, poultry, eggs, seafood and other protein foods should be adequately heat treated. When using a microwave oven, be sure that all parts of the food are cooked to the appropriate temperature. Some basic cooking temperature recommendations are outlined in Table 7. The most important tip is "if in doubt, throw it out!" The second point to be made is the importance of keeping all utensils, containers, towels and wash cloths, counter tops, cutting boards, and hands that come into contact with the food as clean as possible. Plastic cutting boards are recommended over wooden cutting boards because they are easier to sanitize. Plastic cutting boards may even be treated with dilute bleach solutions to completely sanitize between uses (especially after preparing raw meats). All utensils, boards, and hands should be thoroughly cleaned in hot soapy water before and immediately after each use. Careful cleaning is warranted between preparing different types of foods (i.e., meats and vegetables) to avoid contamination from one food to another. Fruits and vegetables should be thoroughly cleaned with special care taken on leafy vegetables with hard to reach crevices that can harbor bacteria. Shopping for safe foods is as important as preparing foods safely. Milk and milk products should be pasteurized. Since not all cheeses are processed from pasteurized milk, checking the label is important. It may be appropriate to avoid raw honey, homecanned foods, non-commercially prepared peanut butter, dented and rusted cans, and fruits and vegetables with broken skin barriers. In the grocery store, check to see that frozen foods are solidly frozen and refrigerated foods are cold. In cases of very low white blood cell counts, the client may be advised to refrain from consuming all raw foods (a neutropenic diet).

SPECIAL CONSIDERATIONS

During the course of HIV infection, it is common to encounter problems related to the disease process. Concerns include diarrhea, nausea and vomiting, eating and

swallowing difficulty, taste perception changes, anorexia, fatigue, dehydration, lactose intolerance, fever, difficulty breathing, and weight loss. These problems may require special dietary modification or a trial of different methods of control.

With regard to diarrhea, a common and difficult problem to overcome, it is prudent to consider the cause and type to provide the most appropriate nutritional intervention. Treating the underlying cause of the diarrhea is the most effective course of action. In addition to effective treatment of underlying infections, antidiarrheal drugs may be combined with nutritional strategies in the control of diarrhea. Of primary importance is the replacement of lost fluids and electrolytes. The dietary interventions should keep in mind the type of diarrhea present. For instance, it may not be indicated to restrict fat in cases of osmotic diarrhea. If fat intolerance due to pancreatic insufficiency is a problem (resulting in steatorrhea), then the restriction of fat is indicated. Fasting during episodes of diarrhea is not recommended. Feeding can assist the restoration and repair of the intestinal lining (and prevent villous atrophy) and less that optimal nutrient absorption is better than none at all. The BRAT diet (bananas, rice, applesauce, and tea or toast) is not recommended. Not only is this diet deficient in calories, protein, and fat, it excludes the use of formulas and other foods that may lead to further nutritional decline. Emphasizing sources of soluble fibers, such as pectincontaining bananas, oatmeal, applesauce, and potatoes within a balanced diet is a more appropriate course of action. Removing sources of crude fiber (husktype fiber, bran) and substances that can decrease the transit time of food in the gut (caffeine) may be helpful. If no underlying infection can be determined, the possibility of deficient enzymes, hypochlorhydria, and food sensitivity should be explored. Enzyme supplements may be trialed. Hydrochloric acid supplements have been used to enhance the effectiveness of some drugs requiring an acid medium to adequately absorb. These supplements may also assist in the digestive processes. Special care should be taken with such supplements, especially in cases of difficulty swallowing or hiatal hernia. Some clients may develop intolerances and allergies as a consequence of the effects of HIV infection. Newly developed gluten sensitivity has been treated in a few HIV infected persons. As with most of the palliative nutritional interventions, it may be a matter of trial and error to come up with the right combination for each client. Not only do the recommendations not work for all people, but the right combinations may not always work for the same person. Interventions for diarrhea and other nutritional related problems that have been tried successfully by some clients are outlined in Table 8 (next page).

TABLE 8
SYMPTOMS AND NUTRITION-RELATED STRATEGIES

Problem	Nutrition-Related Strategies
Diarrhea	> Increase intake of fluids/electrolytes > Decrease sources of "roughage" and increase "pectin/gum" fibers > Avoid irritants and substances that reduce GI transit time (i.e., caffeine, alcohol) > Reduce consumption of foods that cause gas,these foods vary from person to person, may included carbonated beverages, cabbage, onions, beans, bell peppers, cauliflower > If lactose is a problem use lactaid (r) in dairy products, try small amounts of yogurt and aged cheese to maintain intake from milk group > If fat is a problem, decrease intake of fried foods and use lowfat counterparts of others > Avoid overly sweet foods > Try small, frequent meals > Drink fluids between and not with meals > Combine tips with antidiarrheal medication
Mouth Pain/ Difficulty Swallowing	> Try soft foods that require little or no chewing > Blend foods to consistency of pudding by adding small amounts of liquid after cooking > Avoid hot or cold temperature extremes > Avoid smoking and alcohol > Keep lips moist with protective lip balm > Check with dentist for mouth care products > Check with physician, nurse for analgesic mouth swishes to use before eating
Decreased Calorie Intake	> Fortify foods with high-calorie condiments > Add extra ingredients when preparing foods, such as dry milk, cream, commercial calorie-containing supplements > Use calorie-containing foods/beverages preferentially over low and no - calorie foods/beverages > Eat by the clock: have a meal or snack every one or two hours > Prepare favorite foods in small quantities and freeze extra in small serving sizes > Keep easy to prepare and convenience foods on hand; order from take-out and delivery restaurants; take family/friends up on their offer to prepare foods > Eat more when appetite is good; enjoy meals with pleasant surroundings, with good company, with good music > Try mild exercise as recommended by physician
Nausea/ Vomiting	> Eat more when feeling better > Do not recline right after eating > Bypass favorite foods to prevent avoidance when feeling better > Try small, frequent meals > Eat drier foods with fluids between meals > Avoid greasy or overly sweet foods > Try cold temperature foods and saltier foods > If vomiting, replace fluids and electrolytes with broths, juices, ginger ale, and sports drinks
Taste Changes	> Experiment with spices and flavorings > Eat cold foods > Moisten foods with gravies, sauces > Use pleasant smelling aromas > Prevent mouth dryness by drinking juices, using lip balm, humidifying the air > Use less sugar if sweetness is a problem > Practice good oral hygiene