

Managing Nausea, Vomiting, and Diarrhea

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People with HIV/AIDS frequently experience symptoms that affect the gastrointestinal (GI) tract, made up of the oral cavity (mouth), esophagus (swallowing tube), stomach, intestines, and anus. The most common of these are nausea, vomiting, and diarrhea. Nausea refers to queasiness, feeling sick to the stomach, or having an urge to vomit, or “throw up.” Diarrhea refers to frequent, loose, unformed stools (bowel movements). Both may be accompanied by abdominal cramps. Nausea and diarrhea are not diseases themselves, but rather are symptoms that may be caused by a wide variety of conditions. Both are common in the population at large, but occur more frequently and may be more severe in people with HIV/AIDS.

Most people with HIV/AIDS experience nausea and diarrhea at some point during the course of their illness. Roughly one-third of people infected with HIV develop acute retroviral syndrome (ARS), a flu-like illness, one to three weeks following exposure to the virus; nausea and diarrhea are among the symptoms associated with ARS. At later stages of HIV disease, once the immune system is compromised and CD4 cell counts fall below 200 cells/mm³, people are susceptible to a range of opportunistic illnesses (OIs), several of which can cause nausea and diarrhea. Today, however, as improved combination antiretroviral treatment has reduced the incidence of OIs, adverse reaction to drugs is the most common cause of nausea, vomiting, and diarrhea in people with HIV/AIDS.

Of all the symptoms of HIV disease and the side effects of the drugs used to treat it, nausea, vomiting, and diarrhea are among the most distressing. Not only do they limit daily activities and have a detrimental effect on quality of life, they can also compromise an individual’s health by interfering with nutrition and medication regimens.

Nausea and Vomiting

Often, nausea and vomiting are signs that the stomach is irritated and trying to rid itself of something it finds disagreeable. This may be caused, for example, by excessive alcohol consumption, overeating, or consumption of contaminated food or water. Many different pathogens (infectious microorganisms) attack the GI tract and can cause nausea and vomiting (see “Pathogens that Cause Nausea, Vomiting, and Diarrhea,” below). In other cases, nausea is less directly related to the stomach itself; for example, in some people nausea accompanies migraine headaches, and women often experience nausea (morning sickness) during the first trimester of pregnancy due to hormonal changes.

Other possible causes of nausea and vomiting include head injury or brain damage (affecting the brain’s vomiting center), inner ear disorders, intestinal obstructions, liver disease (e.g., hepatitis, cirrhosis), pancreas dysfunction, myocardial infarction (heart attack) or congestive heart failure, endocrine disorders (e.g., diabetes), motion sickness, and emotional stress. In people with HIV/AIDS, nausea and vomiting are common side effect of many of the drugs used to treat HIV and associated conditions (see “Nausea, Vomiting, and Diarrhea as Drug Side Effects,” below).

Nausea and vomiting are often transient and resolve on their own. However, severe or persistent vomiting can cause dehydration, electrolyte loss, malnutrition, and weight loss (see “Dangers of Vomiting and Diarrhea,” below). Also, with prolonged vomiting the stomach acid in the vomitus can irritate the tissues of the esophagus and cause tooth damage. People should consult a health-care provider if they experience the following symptoms:

- persistent and repeated vomiting lasting for a 24-hour period or longer (less in young children)
- presence of blood in the vomit (vomitus may be bright red or resemble coffee grounds)

- vomiting accompanied by high or persistent fever, severe or prolonged abdominal pain, dizziness, or jaundice (yellowing of the skin and whites of the eyes, dark urine)
- inability to take necessary medications.

In order to treat nausea and vomiting, the underlying causes must be determined; however, measures to relieve symptoms may begin before the cause is known. Health-care providers typically will ask about the severity, frequency, timing (e.g., after meals or when the stomach is empty), and duration of nausea and vomiting, as well as what medications patients are taking and whether they are experiencing additional symptoms.

An upper GI series is a set of x-rays of the esophagus, stomach, and part of the small intestine; in this procedure, a person swallows a barium solution to make the organs more clearly visible. This test may be used to detect blockages, ulcers, and other problems. Endoscopy is the insertion of a flexible, lighted instrument through the esophagus to view the interior of the GI tract. In more complicated cases other tests may be done, including computed tomography (CT) scans, magnetic resonance imaging (MRI), and ultrasound. In addition, a physician may request laboratory tests to evaluate liver, gallbladder, kidney, and pancreas function. If an ulcer is suspected, a *Helicobacter pylori* bacteria blood test should be done.

Diarrhea

Diarrhea is one of the most common complaints of people with HIV/AIDS, occurring in at least 50% of cases. It is more common in people with advanced HIV disease. Diarrhea typically is defined as two or more loose stools per day. However, what can be considered diarrhea depends on a person’s usual bowel habits; some people normally have more frequent or more loose stools than others.

Enteritis is inflammation of the small intestine; gastroenteritis refers to inflammation of both the stomach and

the small intestine. Colitis is inflammation of the large intestine (colon). Normally when food is digested, nutrients are absorbed in the small intestine and water is absorbed in the colon, leaving a well-formed stool. Diarrhea occurs when water absorption is disrupted, when too much fluid is secreted into the intestines, or when digested food moves too quickly through the colon to allow proper extraction of water. Diarrhea may be due to problems in the small or large intestine. Small intestine diarrhea is typically higher volume (about two liters per day), while large intestine diarrhea is generally lower volume (about one-half liter per day).

Diarrhea may be caused by microorganisms (see “Pathogens that Cause Nausea, Vomiting, and Diarrhea,” below), food intolerances or allergies, chronic bowel disorders (including inflammatory bowel disease, Crohn’s disease, irritable bowel syndrome, ulcerative colitis, and celiac disease), and emotional stress. Many people experience diarrhea, cramps, and intestinal gas as a result of lactose intolerance, caused by the lack of an enzyme (lactase) required to digest lactose, a sugar found in milk; the condition is more common in people of African and Asian descent. Diarrhea also sometimes occurs when a person takes antibiotics that kill off normal intestinal bacteria.

People with HIV/AIDS may have diarrhea related to any of these causes. In addition, diarrhea is a frequent side effect of antiretroviral drugs (see “Nausea, Vomiting, and Diarrhea as Drug Side Effects,” below) and people with advanced HIV disease may have OIs that cause diarrhea. In some people with HIV/AIDS, diarrhea has no obvious specific cause and is attributed to HIV enteropathy, or intestinal disease caused by the virus itself (possibly related to HIV infection of intestinal lymphatic tissues or damage to the microvilli lining the intestines).

Improper digestion and absorption of fats also can cause diarrhea. A study by Michael A. Poles, MD, of the University of California at Los Angeles

(UCLA) Medical Center and colleagues found evidence of fat malabsorption in 30 of 33 HIV positive persons with diarrhea evaluated between 1995 and 1999; the rates of malabsorption were similar in people receiving combination regimens containing a protease inhibitor (PI) and those taking only nucleoside reverse transcriptase inhibitors (NRTIs). According to Dr. Poles, "Fat malabsorption is probably a significant cause of diarrhea in these patients, certainly worthy of an attempt at diagnosis and treatment." Often fat malabsorption is associated with pancreatic disease (the pancreas is a digestive organ that produces enzymes that help digest fats). However, the researchers did not find evidence of pancreatic disease in their study participants, and Dr. Pole suggested that antiretroviral drugs may have had a detrimental effect on fat absorption.

Diarrhea may be either short term (acute) or long term (chronic). Acute diarrhea can lead to dehydration, while prolonged diarrhea can result in malabsorption of nutrients from food, leading to weight loss and possibly severe wasting (see "Dangers of Vomiting and Diarrhea," below). People should consult their physicians if they experience:

- diarrhea lasting more than three days (less in young children)
- diarrhea containing pus or blood (bloody stool may appear black or "tarry")
- diarrhea containing fat, or steatorrhea (stool is foul-smelling and may appear "greasy" and float)
- a change in diarrhea frequency, volume, appearance, or odor
- diarrhea accompanied by high or persistent fever, severe or prolonged abdominal pain, dizziness, or jaundice
- weight loss of more than five pounds or two kilograms.

Like nausea, diarrhea is a symptom, and the underlying cause (or, often, causes) must be determined in order to treat it appropriately. Physicians typically will ask patients about possible exposure to pathogens,

frequency and length of diarrhea, normal bowel habits, and additional symptoms. Often a stool sample is taken to determine what type of microorganism or parasite, if any, is responsible. Blood or urine laboratory tests also may be conducted (sometimes microorganisms can be detected in the blood but not the stool).

As with nausea, x-ray tests may be done, although in this case barium is administered as an enema (by rectum) rather than swallowed. Endoscopic tests may be conducted in order to view the interior of the intestines; a colonoscopy is a procedure for viewing the entire large intestine by means of a lighted instrument inserted through the anus, while a sigmoidoscopy examines just the lower part of the colon. Physicians may take a biopsy sample of the intestinal lining to examine for pathogens, cell abnormalities, or tissue damage.

In as many as one-third of cases, diarrhea has no apparent cause; sometimes repeated diagnostic testing must be done before the cause(s) can be determined. Dr. Poles, a gastroenterologist (specialist in GI medicine), recommends a repeat gastrointestinal evaluation every six months if a cause was not found on the first attempt and diarrhea persists.

Pathogens that Cause Nausea, Vomiting, and Diarrhea

Common GI Pathogens

A wide variety of microorganisms—bacteria, parasites, viruses, and fungi—can cause nausea, vomiting, and diarrhea (see sidebar on page 32). These range from common bacteria and parasites that often cause food poisoning and traveler's diarrhea in the population at large, to opportunistic pathogens that typically cause disease only in people with compromised immune systems.

Food poisoning, which can lead to both vomiting and diarrhea, is caused

by food or water contaminated with microorganisms or toxins. Most pathogens that cause diarrhea are transmitted by the fecal-oral route (from feces to mouth), often due to improper hygiene when handling food. Traveler's diarrhea is a common name for food poisoning contracted while traveling, especially in developing countries with poor sanitation systems. (See sidebar on page 33 for tips on preventing GI infections.) While food poisoning and traveler's diarrhea are common in the general population, people with HIV/AIDS who have weakened immune systems are more likely to become ill due to food- and water-borne pathogens and also are more likely to develop bacteremia or septicemia (bacteria and/or bacterial toxins in the bloodstream). Although vomiting and diarrhea due to infection often clear up spontaneously within a few days, they may be more persistent and require treatment, especially in immunocompromised people.

The most common bacterial food poisoning culprits are *Salmonella* species (one of which, *S. typhi*, causes typhoid fever), *Shigella* species, *Campylobacter jejuni*, and *Escherichia coli* (especially the O157:H7 strain). People with bacterial GI infections typically have abdominal pain and watery diarrhea. Dysentery is a more severe form of infectious diarrhea associated with bloody or pus-filled discharge and usually accompanied by fever. Bacterial GI infections are treated with a variety of antibiotics; if the specific cause is unknown, some physicians treat presumptively with a wide-spectrum drug such as ciprofloxacin (Cipro) or TMP-SMX (Bactrim, Septra).

Antibiotic drugs themselves can promote the development of diarrhea caused by a toxin-producing bacteria called *Clostridium difficile*. This bacteria can proliferate when antibiotics kill off the friendly flora (naturally occurring organisms) that normally live in the intestines and keep harmful organisms in check. *C. difficile* infection usually is treated with metronidazole (Flagyl) or vancomycin (Vancocin), and other antibiotics are discontinued if possible.

Gastrointestinal Pathogens

Bacteria

Campylobacter jejuni
Clostridium difficile
Escherichia coli
Listeria monocytogenes
Mycobacterium avium and
M. intracellulare
Salmonella species
Shigella species
Staphylococcus aureus
Vibrio cholerae and
V. parahaemolyticus
Yersinia enterocolitica

Protozoans

Blastocystis hominis
Cryptosporidium parvum
Cyclospora cayetanensis
Encephalitozoon (Septata) intestinalis
Entamoeba histolytica
Enterocytozoon bieneusi
Giardia lamblia
Isospora belli

Viruses

Adenovirus
Astrovirus
Calicivirus
Cytomegalovirus
Norwalk virus
Picobirnavirus
Rotavirus

Fungi

Candida species
Histoplasma capsulatum

Two common protozoan parasites transmitted by contaminated food and water are *Giardia lamblia* and *Entamoeba histolytica* (the cause of amoebic dysentery). *Giardia* lives in animals as well as humans, and may be present in streams and rivers far from human habitation. Both *Giardia* and amoebas can be transmitted through oral/anal sex or other contact with feces during sexual activity. Unlike many bacterial GI infections, *Giardia* can last for months or longer, even in people with healthy immune systems. The usual treatment for giardiasis is metronidazole; this drug should not be taken with alcohol, including medications such as liquid

ritonavir (Norvir) that contain alcohol. Amoebas usually are treated with paromomycin (Humatin) and/or iodoquinol (Yodoquinol).

Viral GI infections (e.g., adenovirus, astrovirus, rotavirus) often cause symptoms such as fever, aches, and other flu-like symptoms in addition to nausea and diarrhea—thus the common misnomer “stomach flu.” They occur most often in children and immunocompromised people. These viral infections typically are not treated and are allowed to run their course; however, adequate hydration is necessary while diarrhea persists.

Opportunistic Pathogens

People with late-stage HIV disease and compromised immune systems are susceptible to several opportunistic pathogens that can cause diarrhea, including *Mycobacterium avium* complex (MAC), *Cryptosporidium parvum*, and cytomegalovirus (CMV). In fact, these OIs are responsible for some of the classic symptoms of AIDS (e.g., night sweats, severe wasting) frequently seen in the early years of the epidemic. These illnesses typically occur when a person’s CD4 cell count falls below 100 cells/mm³. The incidence of AIDS-related OIs has fallen dramatically with the widespread use of effective combination antiretroviral therapy. Often if people’s CD4 cell counts rise above 200 cells/mm³ with antiretroviral therapy, their immune systems are again able to control the pathogens.

MAC is caused by atypical bacteria and usually occurs in people with fewer than 50 CD4 cells/mm³. Symptoms include fever, night sweats, abdominal pain, diarrhea, and wasting. Recommended treatment for MAC is a combination regimen of at least three drugs, including either azithromycin (Zithromax) or clarithromycin (Biaxin). Primary prophylaxis with azithromycin, clarithromycin, or rifabutin (Mycobutin) is recommended to prevent a first episode of MAC in people with fewer than 50 CD4 cells/mm³. Long-term maintenance therapy to prevent recurrence is also recommended.

Opportunistic protozoan parasites include *C. parvum* (which causes

cryptosporidiosis), *Cyclospora cayetanensis*, *Isospora belli*, and the microsporidia species *Enterocytozoon bieneusi* and *Encephalitozoon (Septata) intestinalis*.

Cryptosporidiosis, which is transmitted through contaminated food and water (including tap water in some cities), is characterized by abdominal cramps, diarrhea, and wasting. People with fewer than 200 CD4 cells/mm³ may experience prolonged infection. Cryptosporidiosis cannot be cured, but may be treated with paromomycin and/or azithromycin; despite promising studies, in 1998 the U.S. Food and Drug Administration (FDA) declined to approve the experimental drug nita-zoxanide (Cryptaz) for this indication. *C. cayetanensis* and *I. belli* are treated with TMP-SMX or ciprofloxacin, and maintenance therapy may be needed. A variety of different medications may be used to treat microsporidiosis (including *E. bieneusi* and *E. intestinalis*), including albendazole (Albenza), atovaquone (Mepron), fluconazole (Diflucan), metronidazole, pyrimethamine (Daraprim), and TMP-SMX.

CMV is best known as a virus that attacks the eyes, leading to retinitis (inflammation of the retina) and blindness. However, it also can affect the GI tract, causing esophagitis (inflammation of the esophagus) and colitis. CMV colitis is characterized by ulceration of the lining of the colon. Symptoms may include anorexia (loss of appetite), fever, and abdominal cramps in addition to diarrhea. Although CMV infection is very common, the virus usually only causes symptomatic illness in people with fewer than 50 CD4 cells/mm³. CMV colitis may be treated with intravenous cidofovir (Vistide), foscarnet (Foscavir), or ganciclovir (Cytovene); in March 2001 an oral drug called valganciclovir (Valcyte) was approved (see “Valganciclovir” on pages 19–21 of the Winter 2002 issue of *BETA*).

Fungal pathogens rarely cause diarrhea. An exception is *Histoplasma capsulatum*, an atypical fungus that infects the colon and can cause fever, abdominal pain, diarrhea, and weight loss. Treatments include itraconazole (Sporanox) and amphotericin B (Fungizone).

Nausea, Vomiting, and Diarrhea as Drug Side Effects

Nausea, vomiting, and diarrhea are the most common GI toxicities, or side effects, associated with antiretroviral medications. Others include esophagitis, acid reflux (“heartburn”), intestinal gas (flatulence), abdominal cramps, abdominal bloating, and constipation. Although anti-HIV drugs may directly irritate the lining of the GI tract, studies suggest that the drugs actually cause nausea, vomiting, and diarrhea because the body regards them as toxins and tries to eliminate them. In addition, some antiretroviral drugs increase intestinal transit time, causing food to pass more quickly through the intestines and not allowing sufficient time for water to be absorbed by the colon.

The occurrence of nausea and diarrhea as drug side effects varies widely among individuals. Some people experience these symptoms frequently, while others experience them rarely or never. Severity also varies widely. People with late-stage HIV disease are prone to more severe symptoms, but people at any stage of disease may experience nausea and diarrhea as a side effect of medications.

Drug side effects can have a major detrimental effect on quality of life and on medication adherence. Andrea Tamarin, MD, from the Civil Hospital of Vicenza, Italy, and colleagues reported at the 11th European Congress of Clinical Microbiology and Infectious Diseases in April 2000 that among people with HIV receiving antiretroviral treatment, those who experienced severe or moderate diarrhea reported a significantly impaired quality of life compared with those without diarrhea. A 1998 study by researchers at the University of California at San Francisco (UCSF) Center for AIDS Prevention Studies found that concern about side effects was a major factor deterring people from starting antiretroviral treatment. Nausea, vomiting,

Preventing Gastrointestinal Infections

Persons with compromised immune systems should take extra care to avoid infectious organisms that can cause nausea, vomiting, and diarrhea. While there are different prevention measures for different pathogens, several commonsense measures can prevent many infections.

- Wash hands with soap and warm water after using the toilet or changing diapers.
- Wash hands well before preparing, handling, or serving food.
- If possible, avoid preparing food for others during bouts of diarrhea.
- In developing areas, do not drink, cook with, use ice made from, or brush teeth with water from taps, pumps, or fountains.
- In developed areas, consider boiling tap water or using a water filter that excludes *Cryptosporidium parvum* spores; reverse osmosis and absolute one micron filters are suitable for this use.
- Drink bottled water, carbonated beverages, or hot beverages made with boiled water (e.g., tea, coffee).
- Do not drink water from lakes, rivers, or streams (even in remote areas).
- Do not swallow water from swimming pools, hot tubs, or jacuzzis.
- Avoid raw fruits and vegetables unless they can be peeled or cleaned thoroughly with safe water.
- Avoid raw, rare, or undercooked meat, poultry, fish, shellfish, and eggs (and foods like Caesar salad dressing that contain raw eggs).
- Avoid unpasteurized milk and other unpasteurized dairy products.
- Exercise caution when eating in restaurants; some may fail to wash produce properly and may not bring water for hot drinks to a full boil.
- Avoid food from street vendors.
- Wash hands after gardening or coming into contact with soil.
- Wash hands after touching pets or farm animals (especially puppies, kittens, and other young animals); use care and wear gloves when cleaning up a pet’s feces.
- Avoid contact with reptiles such as snakes, lizards, iguanas, and turtles (including those sold as pets).
- Practice safer sex, including the use of latex or plastic barriers for oral/anal sex.

- muscle weakness
- confusion
- fever

Along with water, people with vomiting or diarrhea also lose electrolytes (minerals), especially sodium, potassium, magnesium, and chloride. Electrolytes are crucial for many bodily functions, and electrolyte imbalances can be life-threatening. For example, loss of chloride due to prolonged vomiting can lead to a condition called metabolic alkalosis, characterized by mental confusion and muscle spasms.

People with vomiting and diarrhea should immediately replace lost fluids by drinking. Because they contain important nutrients, sugars, and electrolytes, fruit juices, broth, energy or sports drinks (e.g., Gatorade), and ginger ale often are recommended over water. Bananas are a good source of potassium, and most soups contain sodium. Alternatively, an oral rehydration solution can be prepared by mixing a teaspoon of salt and eight teaspoons of sugar in a liter of water; rice water is also widely used for rehydration. Sip fluids slowly to avoid triggering further vomiting or diarrhea. Avoid drinks that contain caffeine, because caffeine is a diuretic that can cause further fluid loss due to increased urination. Oral rehydration usually can counteract the loss of fluids and electrolytes due to vomiting or diarrhea, but in cases of severe dehydration, intravenous fluids may be necessary.

Diarrhea that continues over a prolonged period of time can cause poor absorption of nutrients, leading to weight loss. Wasting, or involuntary loss of more than 10% of baseline body weight, occurs most often in late-stage HIV disease. Various dietary measures (e.g., commercial formulas such as Advera or Ensure) and medications (e.g., human growth hormone [Serostim], megestrol acetate [Megace], anabolic steroids) can help control wasting. In more severe cases, tube feeding (enteral nutrition) or intravenous feeding (parenteral nutrition) may be required. People who experience

weight loss due to diarrhea should consult their health-care providers.

Finally, vomiting and diarrhea can interfere with the effectiveness of anti-retroviral or OI medications. People experiencing vomiting may not be able to keep their pills down. In people with diarrhea, medications may pass through the GI tract too quickly to be absorbed completely into the bloodstream. This can result in low drug levels, which may lead to increased viral load and the development of drug-resistant pathogens. People who are unable to take their medications as prescribed should contact their physicians.

Managing Nausea, Vomiting, and Diarrhea

A number of different measures may be taken to reduce nausea, vomiting, and diarrhea. If these are caused by a pathogen, treating the underlying infection usually takes care of the symptoms. Other measures provide symptomatic relief, including dietary changes, over-the-counter (OTC) and prescription medications, and various alternative therapies. However, vomiting and diarrhea are natural mechanisms for eliminating harmful microorganisms and toxins from the body. If a pathogen is suspected, most experts recommend that symptomatic treatment should not be started immediately, but rather that vomiting or diarrhea should be allowed to run its course for a few days in an effort to rid the body of the infection. If vomiting and diarrhea are drug side effects, on the other hand, physicians may recommend symptomatic treatment as soon as possible to help the medication stay in the body for a longer period.

Practical and Dietary Measures

Often dietary changes alone can relieve nausea, vomiting, and diarrhea. Several of these are effective for multiple GI symptoms (see sidebar on this page). Even when ill, it is important to

Dietary Measures for Relieving Nausea, Vomiting, and Diarrhea

- Drink clear beverages such as fruit juices, broth, ginger ale, energy drinks, or herbal teas.
- Eat small amounts of food every few hours rather than 2–3 large meals per day.
- Eat slowly and sip beverages slowly.
- Suck on popsicles or frozen fruit juice.
- Try the BRAT diet: bananas, white rice, applesauce, and white bread toast.
- Eat bland, soft foods (e.g., pasta, mashed potatoes, jello).
- Eat dry foods like unbuttered toast, saltine crackers, and dry cereal without milk.
- Avoid greasy foods, fried foods, margarine, butter, and oils.
- Avoid spicy foods.
- Avoid dairy products.
- Avoid caffeine (in coffee, tea, soft drinks, chocolate, some pain medications).
- Avoid alcoholic beverages.
- Avoid acidic foods and juices (e.g., citrus fruits, tomatoes).
- Eat foods high in soluble fiber.
- Avoid foods high in insoluble fiber.

continue drinking clear liquids in order to avoid dehydration and electrolyte imbalances. As noted above, fruit juices, broth, energy drinks, and herbal teas are good sources of fluids. As symptoms subside, foods should be slowly reintroduced, beginning with simple, bland foods that do not irritate the stomach and intestines. A commonly recommended regimen is the BRAT diet, consisting of bananas, rice (white, not brown), applesauce, and toast (white bread, not whole grain). Experts often recommend eating small, frequent meals or snacks rather than 2–3 large daily meals.

Studies indicate that lactose intolerance is common in people with HIV/AIDS. People with lactose intolerance should avoid dairy products; some medications also contain lactose. Lactase replacement products (e.g., Lactaid) may be helpful. Some people find yogurt with live cultures easier to digest than milk. Dietitians often recommend that people with nausea or diarrhea try cutting dairy products out of their diet to see if their symptoms improve.

Foods with a high fat content are difficult to digest, and people experiencing nausea or diarrhea should avoid fatty or greasy foods (e.g., sausage, donuts, French fries, nuts, avocados), and minimize their use of margarine, butter, mayonnaise, oils, and dressings. Caffeine, sorbitol (found in some diet and sugar-free products), artificial fats (Olean, Olestra), magnesium-containing antacids, and high-dose vitamin C trigger diarrhea in some people.

Foods that are high in soluble fiber (see sidebar on this page) can reduce diarrhea by absorbing excess water in the digestive tract. Psyllium-based bulking agents (e.g., Metamucil, Citrucel) work in a similar manner. Soluble fiber appears especially effective in controlling drug-related diarrhea. Because soluble fiber may affect drug absorption, some experts recommend that it should not be consumed within an hour of taking medications. In contrast, foods high in insoluble fiber or “roughage” (see sidebar on this page) are passed along more rapidly by

the intestines and can worsen diarrhea; foods commonly recommended to relieve constipation (e.g., prunes, figs) should not be eaten by people with diarrhea.

People with abdominal cramps should avoid foods and beverages that produce intestinal gas, including beans, broccoli, cabbage, cauliflower, and carbonated beverages.

Dr. Poles recommends keeping a daily diary to record food consumption, medication doses, and symptoms. Using such a diary can help people with nausea and diarrhea determine when symptoms occur and how they are related to food and drug intake; such a diary also can provide useful information for health-care providers. For example, such a record can help indicate whether nausea is associated with a certain drug, or whether diarrhea is triggered by milk, fatty foods, or caffeine.

People use a variety of measures to avoid bouts of nausea (see sidebar on page 37). For nausea in the morning, some people find it helpful to keep dry crackers by the side of the bed and to eat a few immediately upon waking, before slowly getting out of bed. Some practical measures may be effective for some people and not others, so it is important to experiment and see what works. Strong odors (e.g., ripe cheese, tobacco smoke, perfume) are known to trigger nausea in many people, and should be avoided. If possible, avoid being around cooking odors; using a microwave oven can help keep odors to a minimum. If there is a pattern to nausea (e.g., it occurs one hour after taking a specific drug), try to eat more at times when nausea is minimal. Some dietitians recommend not eating favorite foods during periods of nausea, as this can produce an ongoing aversion to those foods.

OTC and Prescription Medications

A variety of different OTC (nonprescription) and prescription drugs are used to treat nausea, vomiting, and

Foods High in Soluble Fiber

- oatmeal
- cream of wheat
- white rice
- soft white bread and rolls
- pasta
- potatoes (without skin)
- plain crackers
- bananas
- peeled apples or applesauce
- peeled pears
- papayas
- mangos

Foods High in Insoluble Fiber

- fruit and vegetable skins
- dried fruits (e.g., prunes, raisins)
- seeds
- nuts
- whole grains
- corn
- wheat bran
- brown rice
- beans

diarrhea. Because many medications have the potential to interact with anti-retroviral and anti-OI drugs, people with HIV should report persistent GI symptoms to their physicians and not attempt to treat them on their own; in addition, physicians should be made aware of all drugs—including nonprescription medications—that their patients are taking.

Drugs for Nausea and Vomiting

Drugs used to prevent and relieve nausea and vomiting are known as antiemetics. These drugs work by different mechanisms. OTC antinausea medications include bismuth subsalicylate (Pepto-Bismol), dimenhydrinate (Dramamine, marketed for motion sickness), and meclizine (Bonine). Histamine blockers such as cimetidine (Tagamet) and ranitidine (Zantac) work by inhibiting a chemical that stimulates gastric secretion.

Prescription antiemetics affect brain mechanisms that control vomiting. Among these are drugs that block the action of the neurotransmitters dopamine, acetylcholine, and serotonin. Drugs used as antiemetics include prochlorperazine (Compazine), ondansetron (Zofran), dolasetron (Anzemat), domperidone (Motilium), granisetron (Kytril), lorazepam (Ativan), metoclopramide (Maxolon, Reglan), promethazine (Phenergan), and tropisetron (Navoban). Some of these drugs cause their own side effects including drowsiness, dry mouth, and tardive dyskinesia (involuntary muscle movement).

Antiemetic drugs may be given on a regular schedule to prevent nausea rather than waiting until symptoms occur. In general, these medications work best when taken 30–45 minutes before administration of a drug known to cause nausea. Antiemetic medications work differently for different people, and people with HIV/AIDS should work with their health-care providers to find the one(s) that are most effective; sometimes a combination of antiemetics works better than a single drug. If a person experiences nausea so severe that he or she cannot keep down an oral medication, some antiemetics are available in suppository (rectally inserted) and injectable formulations.

Antidiarrhea Drugs

A variety of drugs are used to control diarrhea. Mild diarrhea often can be treated with OTC medications including bismuth subsalicylate, certain antacids, and the clay-like agents attapulgite (e.g., Diatrol, Kaopectate)

Practical Tips for Preventing Nausea and Vomiting

- Keep dry crackers near the bed for morning nausea.
- Try chamomile, peppermint, catnip, or ginger tea, and fresh, dried, or candied ginger.
- Sniff a cut lemon.
- Eat salty foods such as pretzels; carry a small packet of salt when going out.
- Avoid trigger foods known to cause nausea.
- Avoid strong odors.
- Avoid stomach irritants (e.g., tobacco, aspirin).
- If there is a pattern to nausea, eat more during periods with less nausea.
- Do not eat and drink at the same time; drink liquids an hour before or after eating.
- Eat meals sitting up rather than lying down.
- Avoid lying down for at least an hour after eating; rest with your head higher than your feet.
- Keep the room temperature cool.
- Avoid eating in a room that is hot, stuffy, or filled with cooking odors.

and kaolin/pectin (e.g., Donnagel, Kaopectal). Many antidiarrhea drugs are antimotility agents that slow the movement of food through the intestines. The most commonly used drug in this

class is loperamide, available both as a low-dose OTC medication (Imodium AD, others) and as a stronger prescription formulation.

Other prescription antidiarrhea drugs include difenoxin/atropine (Motofen), diphenoxylate/atropine (Lomotil), and octreotide (Sandostatin). For severe, chronic diarrhea, narcotic drugs may be used, including paregoric (tincture of opium), codeine, hydrocodone (Vicodin), methadone, and morphine sulfate; narcotics decrease motility by reducing intestinal muscle contractions (peristalsis). Some antidiarrhea drugs may cause side effects including constipation.

Pancrelipase (Ultrase), a synthetic pancreatic enzyme, helps digest fats and is used for diarrhea due to fat malabsorption. Studies have shown that it is effective in treating HIV-associated diarrhea. Cholestyramine (Questran), a medication that binds bile acids, also appears effective for certain types of diarrhea; cholestyramine may decrease blood levels of other medications and should be taken at a different time.

As with antiemetics, antidiarrhea drugs may be used to prevent diarrhea before it occurs, and are most effective if taken 30–45 minutes before a medication known to cause diarrhea. Again, different medications work better for different people, and sometimes a combination may be most effective.

Alternative Therapies

Several alternative and complementary therapies may be used to manage nausea, vomiting, and diarrhea. These include herbal remedies, nutritional supplements, and Chinese medicine.

Herbal Remedies

For nausea and diarrhea, herbalists often recommend chamomile, peppermint, or catmint (catnip) tea, which relieve GI spasms. Ginger is used as an antiemetic in many herbal traditions. Ginger root can be eaten raw or steeped to make a tea; candied ginger and ginger ale also may be effective. Other herbs used to relieve nausea include anise, caraway, cinnamon, clove, cumin, goldenseal, nutmeg, and

raspberry leaf. Other herbs used for diarrhea include agrimony, bayberry root, black walnut, blackberry root, blueberry leaf and fruit (without the seeds), goldenseal, linden, meadowsweet, nutmeg, raspberry leaf, and slippery elm bark. In addition, several Chinese herbal formulas are available for both nausea and diarrhea. Some herbs can interact with antiretroviral medications; people should consult their physicians before taking herbal remedies.

One of the most effective herbal remedies for nausea is cannabis, or marijuana. While currently illegal under federal law, several U.S. states now permit the medicinal use of marijuana. Although few recent controlled clinical trials have been permitted by the federal government, medical cannabis is widely reported to control nausea and vomiting due to cancer chemotherapy and antiretroviral drugs; it is also used to relieve pain and stimulate the appetite.

A pharmaceutical formulation of tetrahydrocannabinol (THC, an active component of marijuana) called dronabinol (Marinol) is also available. In several early studies dronabinol was found to have an effectiveness similar to that of prochlorperazine in relieving nausea. Some people find that smoked marijuana does not make them as drowsy or "high" as dronabinol, probably because smoked marijuana works more quickly and people can use only as much as they need to relieve their symptoms. However, smoking is harmful to the lungs, and medical marijuana patients and providers are experimenting with alternative delivery systems.

Shaman Botanicals Normal Stool Formula (SB-NSF) is a relatively new antidiarrhea product that contains SP-303, an extract of the Amazonian *Croton lechleri* tree, which traditionally is used as a GI remedy by South American healers. Rather than decreasing intestinal motility, SP-303 appears to work by reducing the secretion of fluid into the intestines. Originally Shaman Pharmaceuticals attempted to develop SP-303 as a drug called Provir. Results of a Phase II, placebo-

controlled clinical trial of 51 participants with AIDS and chronic diarrhea were reported at the XII International Conference on AIDS in June 1998 and published in the November 1999 issue of the *American Journal of Gastroenterology*. After four days, participants taking SP-303 experienced a decrease in stool weight and frequency compared with those receiving a placebo.

Although clinical trials indicated that the compound was safe and effective, the FDA declined to approve it, asking for further studies (which Shaman said it could not afford to conduct). Shaman then created a new subsidiary, Shaman Botanicals, which markets SB-NSF as an herbal supplement (see www.shamanbotanicals.com or call 800-987-9920).

Nutritional Supplements

Various nutritional supplements have been used with some success to treat chronic diarrhea. Among the most common are probiotics, beneficial microorganisms that help restore a normal intestinal environment. These include the bacteria *Lactobacillus acidophilus* and a related species, *Lactobacillus bifidus*. Antibiotic drugs often kill off friendly flora, allowing the overgrowth of harmful bacteria (*C. difficile*) that cause diarrhea. This can be reversed by taking acidophilus capsules, yogurt with live cultures, or the yeast *Saccharomyces boulardii*. Small studies indicate that *S. boulardii* relieves chronic diarrhea in people with HIV/AIDS.

Some studies have shown that calcium supplements can help prevent diarrhea; calcium also is found in nondairy foods such as salmon, sardines, and tofu. At the 39th Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC) in September 1999, E. Perez-Rodriguez and colleagues reported that all 24 HIV positive participants in their study with nelfinavir-induced diarrhea reported improvement after taking 500 mg of calcium carbonate twice daily; 16 (67%) reported normal bowel movements.

Glutamine is an amino acid that is important for proper immune system

function and helps maintain healthy muscle and intestinal tissue. Some studies suggest that people with HIV/AIDS and other chronic illnesses tend to have low glutamine levels. L-glutamine is available in a powdered form for use as a supplement. Two studies presented at the 1st International AIDS Society Conference on HIV Pathogenesis and Treatment in July 2001 showed that L-glutamine appears to relieve diarrhea in people with nelfinavir-associated diarrhea.

Carla Heiser, MS, RD, and colleagues from Creative Clinical Solutions found that diarrhea was reduced in nine of 16 people treated with probiotics, soluble fiber, and L-glutamine; L-glutamine provided additional relief to five participants whose diarrhea could not be managed with probiotics and soluble fiber alone. The researchers concluded, "Dietary methods to treat HIV diarrhea are effective and clinically significant." Similarly, Fatima Huffman, PhD, RD, and colleagues from Florida International University reported that L-glutamine administered for ten days "significantly improved diarrheal severity and quality of life scores" in people with nelfinavir-induced diarrhea.

Chinese Medicine

Traditional Chinese medicine (TCM) also offers relief from nausea, vomiting, and diarrhea. In addition to herbal remedies (e.g., "curing pills") and probiotics, TCM practitioners use acupuncture and acupressure to treat nausea. Acupuncture involves the insertion of fine needles into predefined points on the body to improve the flow of qi, or vital energy; acupressure is a similar technique that uses finger pressure instead of needles. The primary acupuncture point for controlling nausea (pericardium 6, or P6) is located on the inside of the forearm about two inches below the wrist.

Although acupuncture has not been studied specifically as a treatment for HIV-related nausea, clinical trials have shown that the technique is effective for nausea due to other causes.

Andrew Vickers, MA, of the Research Council for Complementary Medicine in London conducted a meta-analysis (examination of results from multiple studies) of 33 acupuncture trials and concluded that acupuncture effectively relieves postsurgical nausea, pregnancy-related nausea, and nausea due to cancer chemotherapy; the analysis was published in the June 1996 issue of the *Journal of the Royal Society of Medicine*.

“Sea Bands” are elastic bands worn around the wrist to stimulate the P6 point; these are sold to prevent motion sickness, but some people find they help relieve nausea due to other causes.

Conclusion

Since the start of the AIDS epidemic, nausea, vomiting, and diarrhea have plagued people with HIV. In the past several years, effective combination antiretroviral therapy has dramatically reduced the incidence of OIs that cause these symptoms; today most GI symptoms in people with HIV/AIDS probably are related to the drugs themselves. Vomiting and diarrhea not only are uncomfortable and limit daily activities, but also can lead to serious consequences such as dehydration, wasting, and inadequate medication levels.

Fortunately there are many measures—including dietary modification, OTC and prescription drugs, and alternative therapies—that can help prevent or relieve nausea, vomiting, and diarrhea. Pathogenic organisms that cause GI symptoms should be detected and treated, and people should discuss the management of drug-related nausea, vomiting, and diarrhea with their physicians. Different people find different measures effective, so those suffering from these common symptoms should work with their health-care providers to find the combination of management strategies that best contributes to an improved quality of life.

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HIV ADVOCACY

GET INVOLVED

AIDS Treatment Activists Coalition (ATAC)

- ATAC is a dynamic new
- coalition of people working
- together to improve HIV
- research and treatment
- access in the U.S.

- ATAC encourages greater,
- more effective involvement
- of all people with HIV in
- decisions—made by the
- pharmaceutical industry,
- government, and others—
- that affect their lives. To
- bolster the ranks of treat-
- ment activists, the coalition
- is committed to identifying,
- mentoring, and empower-
- ing new activists in all
- communities affected by
- the epidemic.

ATAC Contact Information

- Web site:
- www.atac-usa.org

- Email:
- info@atac-usa.org

- Join the email listserv—
- send a blank message to:
- [atac-usa-subscribe](mailto:atac-usa-subscribe@yahoogroups.com)
- [@yahoogroups.com](mailto:atac-usa-subscribe@yahoogroups.com)