



## Pharmacy

# Some foodborne pathogens can hasten progression of HIV

Tina Edmunds-Ogbuokiri, PharmD, FASCP

Infections from common foodborne pathogens are responsible for a large number of AIDS-related illnesses. These illnesses range from mild to very severe and even to life threatening. The human body ordinarily is well equipped to deal with these bacteria, but in patients who are immunocompromised such as those with AIDS and HIV, a far greater risk of serious illness exists. Once contracted, these infections, with their severe symptoms of vomiting and diarrhea, can be difficult to treat and may reoccur. This can weaken the immune system, hasten the progression of the HIV infection and prove fatal for persons with AIDS.

The progression of HIV can be hastened by gram negative enteric pathogens which are responsible for a large portion of foodborne illnesses. Monocytes and macrophages produce the cytokine human tumor necrosis factor alpha (TNF $\alpha$ ), in response to bacteria. This cytokine can cause activated expression of HIV-1. It has been suggested by several workers that TNF causes or contributes to the severe cachexia which is seen in the HIV wasting syndrome. It has also been determined that gram negative enteric pathogens, including those present in food, are triggering agents of other illnesses including reactive arthritis and Reiter's syndrome, possibly due to these induced levels of TNF $\alpha$ . Other studies have suggested that neurological conditions like Guillain-Barré can be triggered by *Campylobacter jejuni*. Therefore, these potent pathogens existing in food can greatly increase the level of morbidity and mortality by activation of HIV-1 infections, induction of reactive arthritis, Reiter's syndrome, and possibly Guillain-Barré syndrome.

The bacterial pathogens responsible for providing the most prevalent threat to persons with AIDS and HIV include *Salmonella enteritidis*, *Listeria monocytogenes*, *Campylobacter jejuni*, *Escherichia coli* and *Vibrio vulnificus*. *Salmonella* bacteria, especially *S. enteritidis*, are the most common causes of foodborne illness. Salmonellosis occurs almost 100 times more frequently in persons with AIDS than in healthy individuals. In AIDS patients, *Salmonella*

infections can be difficult to treat and are more likely to lead to serious complications. Symptoms of infections are flu-like with vomiting, nausea, abdominal cramps and diarrhea. These can appear in 6-48 hours after exposure and last up to one week. Foods most associated with salmonellosis include raw or undercooked meat, poultry, fish and eggs.

Listeriosis is caused by *Listeria monocytogenes* and can be acquired from a variety of foods, including soft cheeses that are unpasteurized, and some ready-to-eat foods like hot dogs or deli meats. *Listeria* infections in AIDS patients are usually severe and are often fatal. Symptoms are flu-like with chills, fever, headache, and possibly nausea and vomiting. These early symptoms can appear 2-30 days after exposure and result in bacteremia, meningitis or encephalitis.

*Campylobacter jejuni* causes campylobacteriosis which presents as an acute abdominal pain, diarrhea, nausea, headache, muscle pain, and fever. Symptoms can begin two to five days after eating contaminated food and last usually seven to ten days. This illness occurs 35 times more frequently in persons with AIDS. *Campylobacter* is most commonly found in raw or undercooked poultry, unpasteurized milk and non-chlorinated water.

*Escherichia coli* is a major cause of bloody and non-bloody diarrhea, resulting in as many as 20,000 cases and 250 deaths per year in the United States. Additionally, *E.coli* O157:H7 infection is the most common cause of the hemolytic uremic syndrome, the leading cause of acute kidney failure in children in the United States. The syndrome is associated with long-term complications including endstage renal disease, hypertension, and neurologic injury. *E.coli* is found in undercooked ground meat, lettuce, raw cider, raw milk, and untreated water.

*Vibrio vulnificus* is a naturally occurring bacterium in coastal brackish waters of the United States. *V. vulnificus* is present in high numbers in seawater that has a temperature greater than 20° C and salinity between 0.7%-1.6%. During the summer months, the incidence of infection rises dramatically. Patients with HIV are at an unusually high risk of infection that leads to severe morbidity and mortality in 45%-75% of patients. *V. vulnificus* damages the gastrointestinal wall and is

transported rapidly across to invade the blood stream and cause primary septicemia. Symptoms include fever, chills, skin lesions, nausea, vomiting, diarrhea, hypotension and shock. Raw oysters, other raw shellfish, and open wounds exposed to seawater are the primary source of *Vibrio*.

Food safety counseling for the HIV-positive patient should be provided to each and every patient as the risk from foodborne illnesses from these pathogens can be greatly reduced by a small number of precautions in the selection, preparation and storage of foods. It is of even greater importance as the knowledge of this risk seems to be lacking among the HIV population. In a survey published in *AIDS Care*, only 25% of HIV-infected patients reported receiving information on food safety, despite the fact that 74% of the subjects had modified their diet since learning of their HIV status (mainly for nutritional reasons). Therefore, the importance of food safety information for immunocompromised patients should not be underestimated. It is a powerful tool for decreasing illness and morbidity in HIV infection.

The critical points of counseling include shopping for safe foods, correctly storing food, proper cooking techniques and preparing safe leftovers.

### Shopping for safe foods

When shopping for raw and cooked perishable foods, it is very important to make sure the food is being stored at a safe temperature in the store. Perishable items should not be selected from a non-refrigerated aisle display. Torn or leaking packages should not be chosen. When ordering foods from the deli counters, make sure the clerk washes his hands between handling raw and cooked items, or wears plastic gloves. Cooked ready-to-eat items should not be touching raw items or displayed in the same case. Persons at risk may want to avoid the deli counter altogether. The sale of food products with damaged packaging, the unsafe displaying of products (such as cooked shrimp in the same bed of ice as raw seafood), workers with poor personal hygiene, and unsanitary store conditions can increase the risk of foodborne illness. Not only should these products or even stores be avoided, the conditions should be reported to the local health authorities.

See Foodborne illnesses next page



## Foodborne illnesses, from pg. 7

For persons with AIDS, it is especially important to read food labels to select foods that pose the least risk of food poisoning. For example, all milk and cheese products should have the word "pasteurized" on the label. Products that contain any raw or undercooked meat or dairy products should be avoided. Any "use by" and "sell by" dates should be observed. Of course, products should not be used past the expiration date.

Also, the order and manner in which items are placed in the shopping cart are important. It is a good idea to put packaged meat, poultry or fish into a plastic bag before placing the items into the shopping cart. This prevents drippings from coming in contact with other foods, reducing the risk of cross-contamination (bacteria from one food contaminating another food). The refrigerated or frozen items should be placed in the cart last, and taken home immediately. These cold items should be placed in the coolest part of the car for the trip home. If the items are held in the car for more than 30 minutes, store in an ice chest to keep cold.

For shelf-stable foods, cans that are dented, leaking, bulging or in cracked glass jars should not be purchased. All tamper-resistant safety seals should be intact and safety buttons down without making a clicking noise when pushed.

### Correct storage

Chilled and frozen foods should be placed in the refrigerator or freezer as soon as possible. Storage of foods in the car, office, or carrying them with you for even a few hours can raise the temperature of foods enough to allow the bacteria to grow. Refrigerator temperature needs to be at 40° F or below and the freezer temperature needs to be at 0° F. An important tool for the HIV/AIDS patient in achieving food safety is the purchase of several thermometers. This is extremely cost-effective advice, as it can lead to prevention of costly illness and/or hospitalization.

Proper storage in the refrigerator involves routinely checking the thermometer for the correct and safe temperature. Also, the patient needs to make sure thawing juices from meat and poultry do not drip on other foods. Eggs need to be left in their carton for storage and not placed in the door of the refrigerator. Ground meat, poultry, and fish can be stored in the refrigerator for one or two days, other red meats for three to five days. The refrigerator needs to be kept clean.

Proper storage in the freezer again involves routinely checking the thermometer for the correct and safe temperature. Freezing foods keeps food safe by preventing the growth of microorganisms that cause both food spoilage and foodborne illness. However, once the food begins to thaw, the microorganisms again become "alive" and can cause an illness if not properly thawed. Therefore, when thawing food always place the food in the refrigerator as bacteria multiply rapidly at temperatures of 40°F to 140°F.

For proper storage in the pantry, canned foods and other shelf stable products should be stored in a cool, dry place. These items should never be placed above the stove, under the sink, in a damp garage or basement, or any place exposed to high or low temperature extremes. Highly acidic foods such as tomatoes and other fruit can be stored up to 18 months while low acid foods such as meat and vegetables can be stored for two to five years.

### Safe cooking techniques

Hands, utensils, can openers, cutting boards, sponges and countertops should be washed with hot, soapy water before and after contact with raw meat, poultry or fish. It is especially important to wash all utensils and your hands with soap and hot water after handling one food and then handling another. This helps prevent cross-contamination. The kitchen towels and cloths also should be washed in hot water in the washing machine.

Plastic or glass surfaces should be used for cutting raw meat, fish and poultry as wooden cutting boards are difficult to clean thoroughly, allowing cross-contamination to occur. Different cutting boards for other foods such as fruit and bread is a good idea. Cutting boards need to be washed with hot, soapy water after each use, then air dried or patted dry with clean paper towels. Wooden, glass and plastic cutting boards should be sanitized with a solution of one teaspoon liquid chlorine bleach per quart of water. The surface is flooded with the bleach solution and allowed to stand for a few minutes, then rinsed and dried.

Properly cooking food allows the heat to kill the bacteria. The meat thermometer is an important tool to ensure complete cooking has occurred. Meat, fish, eggs, and casseroles should reach at least 160°F; whole poultry at least 180°F and poultry breast at least 170°F. Juices in done ground meat and poultry will run clear when thoroughly cooked. Cook the stuffing for turkey or chicken separately

from the poultry instead of inside the bird. Brown paper bags should not be used for roasting as they are not sanitary. Avoid very low oven temperature roasting methods (below 300° F) and long overnight cooking of meats, as this encourages the growth of bacteria before cooking is complete. When basting or applying a sauce during grilling or broiling, the sauce should be brushed on cooked surfaces only. Care needs to be taken to avoid contaminating fully cooked meat with a brush used on partially cooked food.

Any raw or undercooked meat, poultry, fish or eggs should not be eaten. This includes sushi, oysters on the half-shell and foods containing raw eggs like Caesar salad. Fresh fruits and vegetables should be washed and placed in the refrigerator to reduce spoilage. Pasteurized eggs should be used in place of shell eggs when making homemade ice cream, eggnog or mayonnaise. When cooking eggs, the yolks and whites are firm, not runny. Several cooking times and temperature for eggs include:

- Scrambled—1 minute at a medium stovetop setting (250°F for electric frying pans)
- Sunny side—7 minutes at medium setting (250°F) or cook covered for 4 minutes at 250°F
- Fried, over easy—3 minutes at medium setting (250°F) on one side, then turn and fry for another minute on the other side
- Poached—5 minutes in boiling water
- Boiled—7 minutes in boiling water.

Microwave cooking requires special precautions as a "standing time" is necessary after the cooking period to ensure an even temperature throughout the food. Additionally, many microwave dishes must be removed from the oven and stirred from time to time. Therefore, it is important to heat pre-cooked foods evenly and thoroughly, whether in an oven or a microwave to obtain sufficient heat uniformly.

### Preparing safe leftovers

Bacteria on food left out at room temperature will quickly begin to multiply at temperatures between 40°F and 140°F. This temperature range is called the "danger zone." Food will become unsafe in a matter of hours and therefore should not be left out for more than *two hours*. Leftovers should be divided into shallow containers to ensure rapid, even cooling. Airtight lids, plastic wrap or aluminum foil should be used to cover the containers. Leftovers need to be stored in the refrigerator at 40°F and used within three to four days.

To reheat leftovers, thoroughly heat in a conventional or microwave oven or on the stove top. It is very important when reheating in the microwave to cover, rotate and stir foods once or twice. All leftovers should be heated to 165°F. A meat



thermometer tested in several places of the food should be used to ensure all areas reach at least 165°F. Sauce, soup and gravy should be reheated to a rolling boil for at least one minute. Even though the food was once cooked, bacteria from the air or people's hands can contaminate the food.

#### Food safety while dining out

Dining out can also pose a serious threat of infection for the AIDS patient. Persons with AIDS need to avoid the same foods in the restaurants as they would at home. Always order food well done and do not eat anything medium or rare. To determine if meat is done, cut into the center of the meat. If it is pink or the juices are not clear (bloody), the meat should not be eaten. Fish should be flaky, not rubbery when cut.

Caesar salad should not be eaten as it has raw eggs. Fried eggs should be cooked on both sides, not sunny side up. Any scrambled eggs which are runny should be avoided.

Raw seafood should be completely avoided. This includes oysters on the half-shell, raw clams, sushi and sashimi. Lightly steamed seafood, such as mussels and snails, should also be avoided.

#### Food safety while traveling abroad

Persons with AIDS need to take additional precautions when traveling abroad as the same high standards of hygiene used in the United States are not applied everywhere. All water needs to be boiled before drinking. Only beverages made with boiled water or canned bottled drinks are safe to consume. Ice should be made only from boiled water. Any uncooked vegetables and salads should be avoided. All fruit should be peeled. Cooked foods need to be eaten only while still hot.

*Good rule of thumb: Boil it, cook it, peel it or forget it!!!*

#### Safe water

Additionally, drinking safe, clean water is especially important for persons with AIDS. Water can also be a source of microbes which can cause illness. Using bottled water instead of tap can be a good choice depending on the quality of the bottled water. Bottled water is regulated by the U.S. Food and Drug Administration (FDA) and is labeled bottled water only if it meets or exceeds federal, state and industry standards. For a list of the bottled water exceeding government standards, patients can call 1-800-WATER-11.

One of the microbes that can be present in water is *Cryptosporidium*, a single-celled microorganism residing in animals. The animals serve as carriers which enable it to contaminate the water supply. In humans, it can cause cryptosporidiosis, a devastating illness of explosive diarrhea and cramping after a 7 to 14 day incubation period. Death can be the end result, especially for an immunocompromised individual.

To make sure bottled water does not contain this organism, water should be treated with one or more of the following methods: reverse osmosis, micron filtration or ozonization. Reverse osmosis forces water under pressure through membranes that remove 90% of dissolved minerals and contaminants. Micron filtration is a process that moves water through extremely fine filters to remove the particles. However, a one micron filter is needed to adequately remove *Cryptosporidium*. Ozonization uses ozone gas instead of chlorine to clean the water without leaving a taste, color, or odor in the water.

Important points to remember for safe bottled water:

- Always check with the bottled water company to determine the processes they are using.
- Use safe, bottled or boiled water for ice cubes, concentrated fruit juice, coffee and tea.
- Water should be taken with you to restaurants, work and when you visit other people.
- Be careful of fruit juices, drinks made from concentrates and soda fountain drinks when out.
- All filters should be changed in the water purification systems according to the instructions to prevent a backwash of contaminants.
- All point-of-use water filters must be labeled "NSF-certified 53 for cyst removal" to ensure the removal of *Cryptosporidium*.

Additional information can be obtained by calling Centers for Disease Control (CDC) National AIDS Hotline-toll free 1-800-342-2437 (7 days a week, 24 hours a day).

#### REFERENCES

1. Archer, Douglas L. Food counseling should be given to all persons infected with the human immunodeficiency virus. *Journal of Infectious Diseases* 1990; 161:358-359.
2. Eating defensively—food safety advice for persons with AIDS; U.S. Food and Drug Administration: <http://www.thebody.com/fda/eating>.
3. Food safety for persons with AIDS; U.S. Department of Agriculture: <http://www.fsis.usda.gov/oa/pubs/aids>.
4. Altekruse et al. Emerging foodborne diseases; Centers for Disease Control and Prevention: <http://www.cdc.gov/ncidod/eid>.
5. Ross, Evelyn et al. Vibrio vulnificus and molluscan shellfish: the necessity of education for high-risk individuals. *Journal of the American Dietetic Association*. March 1994; vol.94#3:312-314.
6. Heathcock R. et al. Survey of food safety awareness among HIV positive individuals. *AIDS Care*. 1998 Apr;10(2):237-41.

*Tina Edmunds-Ogbuokiri, PharmD, FASCP, is Infectious Disease faculty at Xavier University of Louisiana College of Pharmacy in New Orleans and consultant clinical pharmacist at the HIV Clinic of the Medical Center of Louisiana.*

## Psychosocial, from pg. 10

Rarely did a week go by without discussing hospice care with someone or preparing significant others for the impending death of their loved ones. This is not to make death seem like an insignificant issue today, however the sheer volume of patients dying nine years ago made it seem more overwhelming.

#### The future

"In the future, authors will take a long time to get to the point. That way the book looks thicker"—Dilbert, 1997.

OK, so what's MY point (aside from seeing my name in print)? Clearly mental health services have changed in the past nine years and these have coincided with changes in the disease. (I know, you're thinking I must be some kind of genius to have figured this out!) There really is no point other than to share some observations of my experiences over this time frame. I can only speculate that most of the changes in mental health services are in some way connected to the shift in the mind set from viewing HIV as a terminal disease to now being a chronic disease, whether the evidence supports this or not. We're talking perception here. Clients seem less motivated to examine their lives and make major changes in personality and behavior. Therapy is less insight oriented and less existential for the same reasons. The provision of mental health services at HOP now seems to be more crisis oriented, with brief therapy being the order of the day. This is often an exciting and challenging method of providing therapy, and isn't unusual in the private sector of mental health treatment, with many managed care providers limiting clients to brief therapy. This also isn't necessarily a bad thing if you consider that many of the services offered nine years ago were so centered on death and dying. Now we just have to worry about the Borderline Personality Disordered client whose only goal is to disrupt and split the staff while maintaining the victim persona while all crumbles around him/her! That is a good thing, right?

Now, about my slides from the Smoky Mountains...

*Danny Sansovich is a Mental Health Specialist in the HIV Outpatient Program (HOP) of the Medical Center of Louisiana.*