

# Low Microbial Diet and Food Safety Guidelines

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Your health care provider has recommended a diet based on safe food choices. This diet is prescribed when you have had a recent bone marrow transplant or have a low neutrophil count. A neutrophil is a type of white blood cell. Your white blood cell count tells how well your body can fight off infections. This diet may reduce the risk of illness from foods containing microbes. Microbes include bacteria, viruses, yeast or molds. Microbes can get into food by infecting the animal the food comes from. Microbes can also get into food when it is being processed or prepared. When they get into foods, they can cause infections, especially in people who are ill.

The first section of this booklet covers food safety guidelines. It tells you what you should do to keep your food safe. The second section covers diet guidelines. It tells you what you can and cannot eat. Do not make any changes in this diet until you have talked to someone on your healthcare team. This includes your doctor, nurse practitioner, dietitian, or nurse.

## FOOD SAFETY GUIDE

### What Makes Food Unsafe?

Harmful bacteria can attach to foods and grow. You cannot always see, smell, or taste them.

Germs are more likely on:

- Milk and other dairy food items that are not refrigerated.
- Undercooked and raw eggs and foods that have raw eggs (e.g., cookie dough and Caesar salad dressing).
- Undercooked or raw meat, poultry, and seafood.
- Certain fruits and vegetables (see fruit and vegetable listing on the Diet Guidelines).
- Unpasteurized or untreated juices (e.g., fresh-squeezed juices).
- Vegetable Sprouts (e.g., raw alfalfa, soy bean, radish sprouts).

### Buying Food that is Safe to Eat

- Do not buy canned foods if the can has dents or is swollen.
- Do not buy food in jars if the jar is cracked or the lid is not tightly closed.
- Check eggs by opening the carton to see if any are broken or cracked. Only buy eggs that are refrigerated in the store.
- Separate ready-to-eat and raw foods. Put raw meat, poultry, seafood and other raw foods in plastic bags before they go into your cart.
- Pick up your milk and other cold foods at the end of your shopping. This lessens the time they are not refrigerated.
- Check containers for the expiration date. Buy and use food before that date.

### Personal Hygiene

Clean hands and personal cleanliness are essential. Wash your hands with soap and water:

- Before preparing or eating food.
- After preparing raw poultry, meat, fish and seafood, and before preparing other foods.
- After using the restroom.
- After cleaning up a child.
- After blowing your nose, coughing, or sneezing.
- After handling garbage.
- After treating a cut or wound.

## **Food Safety at Home**

### **Storing Food Safely**

- Store food immediately after shopping.
- Put eggs inside the refrigerator; do not store them in the door. The temperature inside is more consistent than the door area.

### **Kitchen Cleanliness**

A clean area for preparing and eating food is necessary to prevent the spread of germs.

### **Counter Tops**

- Use paper towels or clean cloths instead of sponges to clean kitchen surfaces.
- Use an antibacterial cleansing spray to clean surfaces. Look for products that have bleach or ammonia. Examples are Lysol® Food Surface Sanitizer and Clorox® Clean-Up® Cleaner.

### **Cutting Boards and Equipment**

- Use nonporous cutting boards such as plastic, marble, glass or ceramic. Avoid wood or other porous surfaces.
- Wash cutting boards and knives with hot soapy water before using them for the next food.
- As an extra precaution, wash your cutting boards with a kitchen sanitizer. Throw out worn or hard-to-clean cutting boards.
- Use a produce brush to clean fruit and vegetables when appropriate.

### **Safe Food Handling**

- Thoroughly rinse fresh produce under running tap water. Rinse skins and rinds before cutting or peeling. Never use bleach or detergent to wash fresh fruits and vegetables.
- Rub firm-skinned fruits and vegetables under running warm tap water or scrub with a clean vegetable brush while rinsing with running tap water.
- Remove and throw away any damaged or bruised areas on produce.
- Cook all foods thoroughly.
- Separate raw meats from ready-to-eat food.
- Thaw foods by using only one of the following methods:
  - In the refrigerator one day before cooking.
  - In the microwave, using defrost setting. Cook right away.
- Cook to proper temperatures.
- Store at proper temperatures.
- Keep your refrigerator at 33-40°F.

- Keep your freezer at 0°F or below.
- Store leftovers in a shallow container. To cool them faster, put them in the freezer or refrigerator as soon as you finish eating. Use them within 2 days to prevent spoilage.
- Reheat leftovers to 165°F.
- Use a food thermometer to test the temperatures of cooked and reheated foods.
- Do not eat hamburgers and other meat products if the meat looks undercooked. Cook until the meat is grey and the juices run clear.
- Cook fish until it flakes.
- Cook egg whites and yolks until they are firm.

## GUIDELINES FOR A LOW MICROBIAL DIET

Food Group	Recommended	Not Recommended
<b>Breads, Grains, and Cereals</b>	<ul style="list-style-type: none"> <li>• All breads, rolls, bagels, English muffins, waffles, French toast, muffins, pancakes and sweet rolls</li> <li>• Potato chips, corn chips, tortilla chips, popcorn, and pretzels</li> <li>• Any cooked or ready-to-eat cereal purchased pre-packaged from a store</li> <li>• Rice, pasta, and other cooked grains</li> </ul>	<ul style="list-style-type: none"> <li>• Foods with raw (not cooked or baked) grains (e.g., uncooked corn, or raw oats)</li> <li>• Undercooked or raw brewer’s yeast</li> </ul>
<b>Milk and Dairy Products</b>	<p><u>Pasteurized</u></p> <ul style="list-style-type: none"> <li>• Grade A commercially available milk and milk products</li> <li>• Yogurts including those made with live cultures (e.g., Dannon®)</li> <li>• Sour cream</li> <li>• Puddings made at home or purchased pre-packaged from a store</li> <li>• Pre-packaged ice cream, frozen yogurt, sherbet, popsicles, ice cream bars and fresh homemade milkshakes</li> <li>• Eggnog</li> <li>• Commercially sterile ready-to-feed and liquid concentrate infant formulas</li> <li>• Dry, refrigerated, or frozen pasteurized whipped topping</li> </ul> <p><u>Cheese</u></p> <ul style="list-style-type: none"> <li>• Processed cheese slices and spreads, cream cheese, cottage cheese and ricotta cheese</li> <li>• Commercially packaged hard and semi-soft cheese such as: American, mild cheddar, pasteurized mozzarella, monterey jack, Swiss, and shelf stable pre-grated Parmesan (e.g., Kraft®)</li> <li>• Cooked soft cheeses such as brie, camembert, feta and farmer’s cheese</li> </ul>	<p><u>Unpasteurized</u></p> <ul style="list-style-type: none"> <li>• Dairy products, such as raw milk</li> <li>• Eggnog (homemade)</li> <li>• Yogurt (usually homemade)</li> <li>• Soft-serve ice cream or yogurt</li> <li>• Un-refrigerated, cream filled pastry products</li> </ul> <p><u>Cheese</u></p> <ul style="list-style-type: none"> <li>• Made from non-pasteurized milk</li> <li>• Not well cooked in foods</li> <li>• All mold-ripened cheeses and soft cheeses such as: Roquefort, Muenster, Stilton, Havarti, Edam, Gorgonzola, blue cheese, sharp cheddar, feta cheese. Soft cheeses such as: brie, farmer’s cheese, Camembert, or Mexican-style cheese (<i>Queso Blanco, Queso Fresco</i>) and goat cheese</li> <li>• Unpasteurized mozzarella</li> <li>• From delicatessens</li> <li>• Containing chili peppers or other uncooked vegetables</li> <li>• Un-refrigerated, cream filled pastry products</li> </ul>

Food Group	Recommended	Not Recommended
<b>Eggs</b>	<ul style="list-style-type: none"> <li>• Well-cooked eggs (white and yolk firm)</li> <li>• Pasteurized eggs, pasteurized egg substitutes (such as Egg Beaters), and powdered egg whites</li> </ul>	<ul style="list-style-type: none"> <li>• Undercooked or raw eggs, and non-pasteurized egg substitutes</li> <li>• Salad dressings containing raw eggs</li> </ul>
<b>Meat, Meat Substitutes, Poultry, Seafood</b>	<ul style="list-style-type: none"> <li>• Well-cooked meats such as: pork, beef, lamb, chicken, and turkey (See Food Safety Guidelines for temperatures.)</li> <li>• Cooked tofu (cut into 1-inch cubes and boiled for at least five minutes) or pasteurized tofu</li> <li>• Bacon that is crisp and made at home</li> <li>• Hotdogs if cooked at home and cooked until steaming hot</li> <li>• Commercially-prepared cold cuts sold in a sealed package such as salami, bologna, ham, and other luncheon meats that are cooked until steaming hot (discard within 48 hours of opening).</li> <li>• Thoroughly cooked fish and other seafood; includes shrimp, lobster, crabs, canned tuna, and canned salmon.</li> <li>• Canned meats (beef, pork, lamb, poultry, fish, shellfish, game, ham, bacon, sausage and hot dogs)</li> <li>• Canned and shelf-stable smoked fish (refrigerate after opening)</li> </ul>	<ul style="list-style-type: none"> <li>• Undercooked or raw meats, poultry, fish including rare or medium-rare items; smoked or pickled fish and meats that have not been further cooked; miso products, tempeh</li> <li>• Freshly sliced deli meats, meats from street vendors</li> <li>• Hard cured salami in natural wrap, i.e. beef jerky</li> <li>• Raw shellfish, raw fish (including caviar), sashimi or sushi, or ceviche (“lemon-cooked” or cured fish)</li> <li>• Raw or cooked mollusks (clams, mussels, oysters)</li> <li>• Smoked seafood such as salmon or trout labeled as “nova style,” “lox,” “kippered,” “smoked” or “jerky” unless cooked to 160°F or contained in a cooked dish or casserole</li> <li>• Refrigerated pâtés and meat spreads</li> </ul>
<b>Fruits and Vegetables</b>	<ul style="list-style-type: none"> <li>• Well washed (and peeled if needed) raw fruits and vegetables</li> <li>• Cooked and canned fruits and vegetables</li> <li>• Cooked frozen fruits and vegetables</li> <li>• Washed and peeled thick skinned, unblemished fruits such as citrus fruit, bananas and melons; well washed and peeled apples – thorough washing is important as slicing through the skin or rind can contaminate the inner fruit</li> <li>• Pasteurized juices and frozen concentrates</li> <li>• Commercially packaged dried fruits</li> <li>• Shelf-stable bottled salsa (refrigerate after opening)</li> <li>• Cooked vegetable sprouts (such as mung bean sprouts)</li> <li>• Fresh, well-washed herbs, and dried herbs and spices (added to raw or cooked foods)</li> </ul>	<ul style="list-style-type: none"> <li>• Unwashed raw fruits, vegetables or herbs</li> <li>• Any fresh or raw fruits and vegetables that cannot be thoroughly washed and peeled or cooked, e.g., blueberries, strawberries, raspberries, peaches, plums, and grapes that tend to get mold around their stems.</li> <li>• Any frozen berries, and other thin skinned frozen fruits</li> <li>• Non-pasteurized fruit and vegetable juices</li> <li>• Fresh fruit salsa or fresh vegetable salsa found in the grocery refrigerator case</li> <li>• Vegetarian sushi</li> <li>• Non-pasteurized items containing raw fruits or raw vegetables found in the grocery refrigerator case</li> <li>• All vegetable sprouts (alfalfa sprouts, clover sprouts, all others)</li> <li>• All salads from delicatessens or salad bars</li> </ul>

Food Group	Recommended	Not Recommended
<b>Beverages</b>	<ul style="list-style-type: none"> <li>• Boiled well water</li> <li>• Tap water and ice made from tap water</li> <li>• Commercially bottled distilled, spring and natural waters</li> <li>• Pasteurized fruit and vegetable juices</li> <li>• Bottled, canned or powdered reconstituted beverages</li> <li>• Instant and brewed coffee</li> <li>• Hot brewed teas using commercially packaged tea bags</li> <li>• Pasteurized soy milk</li> <li>• Commercial nutritional supplements (Ensure<sup>®</sup>, Boost<sup>®</sup>, Carnation Instant Breakfast<sup>®</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>• Unpasteurized eggnog or apple cider and other unpasteurized fruit or vegetables juices</li> <li>• Reconstituted protein powder beverages unless approved by your registered dietitian</li> <li>• Unpasteurized beer (e.g., microbrewery beers and those that are not shelf-stable)</li> <li>• Wine</li> <li>• Fountain beverages</li> <li>• Tea made with loose leaves</li> </ul>
<b>Nuts and Dried Fruit</b>	<ul style="list-style-type: none"> <li>• Factory packaged nuts, dried fruits, and raisins</li> <li>• Roasted nuts from a can or bottle</li> <li>• Nuts in baked goods such as peanut butter cookies</li> <li>• Commercially packaged nut butters (such as peanut butter, almond butter, soybean butter)</li> </ul>	<ul style="list-style-type: none"> <li>• All nuts or dried fruit that are sold open and in bulk, as in some health food or specialty stores</li> <li>• Raw nuts</li> <li>• Freshly made peanut butter, not commercially packaged.</li> <li>• Roasted nuts in the shell</li> </ul>
<b>Condiments/ Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Salt and sugar</li> <li>• Jellies, syrup, and jams (refrigerate after opening)</li> <li>• Individually packaged ground black pepper and herbs and spices added before the cooking process</li> <li>• Catsup, mustard, BBQ sauce, soy sauce, other condiments (refrigerate after opening)</li> <li>• Pickles, pickle relish, olives (refrigerate after opening)</li> <li>• Vinegar</li> <li>• Vegetable oils and shortening</li> <li>• Refrigerated lard, margarine and butter</li> <li>• Commercial, shelf-stable mayonnaise and salad dressings, including blue cheese and other cheese-based salad dressings (refrigerate after opening)</li> <li>• Cooked gravy and sauces</li> </ul>	<ul style="list-style-type: none"> <li>• Raw or unpasteurized honey, honey comb</li> <li>• Whole or fresh ground black pepper, unless thoroughly cooked in food</li> <li>• Fresh salad dressings (stored in grocer's refrigerated case) containing raw eggs or cheeses</li> <li>• Herbal and nutrient supplement preparations</li> </ul>

Food Group	Recommended	Not Recommended
<b>Desserts</b>	<ul style="list-style-type: none"> <li>• Refrigerated commercial and homemade cakes, pies, pastries and pudding</li> <li>• Refrigerated cream-filled pastries</li> <li>• Cookies, both homemade and commercially prepared</li> <li>• Shelf-stable cream-filled cupcakes (such as Twinkies<sup>®</sup>, Ding Dongs<sup>®</sup>) and fruit pies (such as Pop-tarts<sup>®</sup> and Hostess<sup>®</sup> fruit pies)</li> <li>• Candy and gum</li> </ul>	<ul style="list-style-type: none"> <li>• Unrefrigerated cream-filled pastry products (not shelf stable)</li> </ul>
<b>Eating Outside the Home</b>	<ul style="list-style-type: none"> <li>• All foods recommended on previous food groups must come directly off grill/stove – not served on steam table or heat lamps (i.e. freshly made pizza, hamburger directly off grill)</li> <li>• Single serving condiment packages (no pump serve containers)</li> </ul>	<ul style="list-style-type: none"> <li>• Non-pasteurized fruit juices/dairy products (i.e. juice bar establishments such as Jamba Juice)</li> <li>• Raw fruits or vegetables (salad bars), and desserts with fresh fruit</li> <li>• Delicatessen meat</li> <li>• Buffets/smorgasbords</li> <li>• Potlucks and sidewalk vendors</li> <li>• Softserve ice cream and yogurt</li> </ul>
<b>Take Out</b>	<ul style="list-style-type: none"> <li>• Freshly made pizza not sliced or reheated</li> <li>• Well done hamburger just off the grill</li> <li>• French fries just cooked</li> </ul>	<ul style="list-style-type: none"> <li>• Any food that is not freshly made to order</li> <li>• Fast food (eg. McDonalds, Subway)</li> <li>• Avoid reheated foods</li> <li>• Juice bar establishments (i.e. Jamba Juice)</li> </ul>
<b>Leftovers</b>	<ul style="list-style-type: none"> <li>• Refrigerate immediately after eating</li> <li>• Put in shallow dishes before refrigerating to allow for rapid cooling</li> <li>• Refer to Food Safety Guidelines for proper reheating</li> </ul>	<ul style="list-style-type: none"> <li>• Leftovers more than two days old</li> <li>• Any food that has already been reheated once</li> </ul>

ALWAYS REMEMBER: WHEN IN DOUBT, THROW IT OUT!

### Herbal Supplements:

Do not take homeopathic remedies or herbal products (e.g., Traditional Chinese Medicines). Because there are no federal standards for these products in the United States, their processing and storage may expose them to contaminants that may pose a health risk. Contaminants in these items can also cause an infection. The products themselves may have biologic activity that could interfere with or change the activity of a prescription medicine.

## Cooking Temperatures

Using tools such as thermometers and temperature charts can assist in cooking and avoiding potential food-borne illnesses.

	Safe Minimum Internal Temperatures
<b>Egg and Egg Dishes</b>	
Eggs	Cook until yolk and white are firm
Egg Dishes	160°F
Egg Sauces	160°F
<b>Ground Meat and Meat Mixtures</b>	
Turkey, Chicken	165°F
Beef, Hamburgers, Veal, Lamb, Pork	160°F
<b>Fresh Beef, Veal, Lamb</b>	
Well Done	170°F
<b>Fresh Pork</b>	
Well Done	170°F
<b>Ham</b>	
Raw/Fresh	160°F
Pre-cooked, cured ham	140°F
<b>Poultry</b>	
All Products	165°F
<b>Seafood</b>	
All, Raw/Fresh	145°F

### Leftovers:

- Leftovers should be reheated to an internal temperature of at least 165°F. Use a food thermometer to check the internal temperature.
- Sauces, soups, and gravies should be reheated by bringing them to a boil.
- When microwaving food or reheating leftovers, stir, cover, and rotate food for even heating. Heat food until it reaches at least 165°F throughout, as measured with a food thermometer.
- Be sure to let the food cool so you do not burn your mouth.
- Eat re-heated leftover foods within one hour.

Item	Cook Temp.
Poultry	165°F 15 sec.
Stuffed meat, poultry, or fish	165°F 15 sec.
Ground meat	160°F 15 sec.
Pork, Beef, Veal, Lamb	160°F 15 sec.
Fish	160°F 15 sec.
Shell eggs	160°F 15 sec.

## Safe Water

- Never drink from lakes, rivers, streams, springs or wells.
- If you are unsure if the tap water is safe, check with the local health department or boil or filter water. Use bottled water if you think the tap water may not be safe.

## Eating out at Restaurants:

Choose restaurants carefully. Local health departments inspect restaurants to make sure that they are clean, and that they follow safe food practices. You can find out how your local restaurant of choice did on recent health inspection by going to the your local Department of Health (DOH) web site; for example, (<http://www.nyc.gov/html/doh/html/rii/index.shtml>)

You can also ask your local restaurant about their food safety training rules. This is good to know when you are planning to eat out.

- Order all foods to be well done.
- Do not order foods that may have raw eggs (e.g., Caesar salad dressing, hollandaise sauce).
- Ask the wait-staff if you are not sure of the ingredients in your meal.
- Do not eat foods from buffets and salad bars.
- Request that foods are cooked fresh and not served from steam tables and heat lamps.
- Request single serving condiments. Open containers may be used by multiple patrons.
- Do not eat soft-serve ice cream and soft serve frozen yogurt. The dispensers may not be cleaned on a regular basis.
- Always order whole or personal pizza. Do not order individual slices since they are often stored under heat lamps.

## References and Additional Food Safety Resources

Food Safety and Inspection Service

[www.fsis.usda.gov](http://www.fsis.usda.gov)

[www.fsis.usda.gov/PDF/Cutting\\_Boards\\_and\\_Food\\_Safety.pdf](http://www.fsis.usda.gov/PDF/Cutting_Boards_and_Food_Safety.pdf)

Government Food Safety information:

[www.foodsafety.gov](http://www.foodsafety.gov)

U.S. Department of Health and Human Services Food and Drug Administration

[www.cfsan.fda.gov](http://www.cfsan.fda.gov)

Centers for Disease Control and Prevention

[www.cdc.gov/foodsafety](http://www.cdc.gov/foodsafety)

Centers for Disease Control and Prevention

Emerging Infectious Diseases

[www.cdc.gov/eid](http://www.cdc.gov/eid) .Vol.12, No. 6, November 2008

Partnership for Food Safety Education (Fight BAC!)

[www.fightbac.org](http://www.fightbac.org)



“Ask Karen” (FSIS’ Web-based automated response system-available 24/7)  
[www.fsis.usda.gov](http://www.fsis.usda.gov)

Fred Hutchison Cancer Center  
[www.fhcrc.org/](http://www.fhcrc.org/)

New York City Department of Health and Mental Hygiene Restaurant Inspection Information  
[www.nyc.gov/html/doh/html/rii/index.shtml](http://www.nyc.gov/html/doh/html/rii/index.shtml)

**For More information:**

Call your nearest FDA Office. Look for the number in the blue pages of your phone book.

Or call one of the FDA’s toll-free numbers:

(888) SAFE-Food (723-3366)

(888) INFO-FDA (463-6332)



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Cancer Center

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