An estimated 6.5 to 33 million people suffer from food-borne illness each year in the United States. The cost of medical care and lost productivity is estimated between $6 and $12 billion. Most cases of food-borne illness are unreported as the discomfort is often attributed to 24-hour flu, which has symptoms similar to those experienced in food-borne illness.

Only laboratory tests can identify the exact bacteria, mold, or virus that causes digestive tract distress, which is usually a combination of nausea, vomiting, cramps, diarrhea, and a general feeling of unease.

Individuals at highest risk for life threatening consequences from food-borne illness include pregnant women, unborn and newborn infants and toddlers, the elderly, and those with compromised immune systems from a serious illness such as cancer or AIDS.

Proper food care and storage, sanitary conditions during preparation, and cooking to the recommended temperature will eliminate the possibility of foodborne illness. Observe the following recommendations to assure safe food for everyone.

At the Store

1. Keep packages of raw meat separate from other foods, particularly foods eaten raw, such as fruit.

2. Use plastic bags to keep raw meat or poultry from dripping on other foods.

3. Buy packaged precooked foods in intact packaging showing no leakage or leakage from another damaged package.

4. Buy products labeled “keep refrigerated” only if they are stored in a refrigerated case.

5. Buy unpackaged deli meat or poultry only if there is no contact with other food.

6. Buy frozen foods only if they appear frozen to the touch.

7. Report problems with packaging, products, storage, or sanitation to store management. If the problem is not corrected, notify local health authorities.

8. Shop for eggs, milk, meat, and poultry last. Pack in ice chest if time from store to home will be longer than one hour, especially in hot weather.

Your Refrigerator

9. Keep your refrigerator clean using a solution of warm water and baking soda.

10. Use a thermometer to assure that refrigerator temperature is between 32°F and 40°F. Refrigerator freezer compartments should register about 0°F.

11. Keep raw meat and poultry separate from other foods. Use plates, plastic bags, or covered containers to keep meat and poultry juices from dripping on other foods or refrigerator surfaces.

12. Refrigerate products with “keep refrigerated” labels.

13. If refrigerator fails, keep door closed and hold food at 40°F, or cook within two hours.

Your Freezer

14. Maintain temperature at 0°F for best food quality.

15. Use freezer wrap, freezer bags, or aluminum foil over commercial wrap for freezer package.

16. If freezer fails, keep door closed. Refreeze meat or poultry still containing ice crystals. If freezer compartment fails, keep door closed and find other cold storage within two hours, or cook and serve food.
Wash Up

17. Wash hands with soap and comfortably warm water for 20 seconds before beginning food preparation, and after handling raw meat or poultry, touching animals, using the bathroom, or changing diapers.

18. Wash hands, counter, equipment, and utensils after handling raw meat or poultry. Sanitize cutting boards and utensils with a mixture of two teaspoons of chlorine bleach and one quart of warm water before using board and utensils on another food. This prevents cross contamination.

19. Wear clean plastic gloves over skin cuts, particularly when handling cooked products.

Before You Cook

20. Only thaw foods in refrigerator, under cold water changed every thirty minutes, or in microwave following the manufacturer’s instructions. Cook thawed food promptly.

21. Stuff meats just before cooking. Avoid buying fresh, pre-stuffed whole poultry.

22. Don’t taste raw or partially cooked meat, poultry, eggs, fish, or shellfish.

23. Marinate raw products in the refrigerator, not on counter. Do not reuse marinade.

24. Do not save and reuse breading or other coating mixes used to prepare meats and vegetables.

Get Cooking

25. Use a microwave temperature probe, if available. Cover raw meat or poultry to microwave. Check temperature in at least three of the thickest areas.

26. Use revolving microwave tray or rotate foods manually during cooking to assure more even heat penetration. Let food stand for recommended time before serving.

27. Use a meat thermometer to judge safe internal temperature of meat and poultry more than two inches thick: 160°F or above for meat, 165°F or above for poultry. Check temperature periodically rather than leaving the thermometer in the meat. The thermometer acts as a cooking nail and will almost always register higher right around the thermometer when it is left in place. Do not place thermometer near a bone, near the edge of the pan, or in fat when checking the temperature.

28. Clear juices and no pink in the center are signs of doneness in meat and poultry less than two inches thick.

29. When using smokers or slow cookers, start with fresh or defrosted foods rather than frozen ones, and chunks of meat rather than roasts or large cuts. Be sure the recipe includes a liquid. Check internal temperature in three spots to be sure food reaches 165°F.

30. Avoid interrupted cooking. Never partially cook products to finish grilling or roasting later.

31. Roast meat or poultry in oven temperatures at 325°F or above. For example, avoid cooking without a heat source—preheating the oven, putting in the roast, and turning off the oven. Never use exceptionally low temperatures such as 200°F for a long period. Use cooking bags rather than paper grocery bags which may be made of recycled paper and release noxious vapors when heated.

Serve It Safely

32. Serve cooked foods with clean utensils on clean plates. For example, never place barbecued chicken on the platter that held raw chicken. Cross contamination can easily occur.

33. Keep hot foods above 140°F.

34. In environmental temperatures of 90°F or warmer, hold cooked foods no longer than one hour before reheating, refrigerating, or freezing. Foods should be held no longer than two hours in environmental temperatures below 90°F.

Caring for Leftovers

35. Remove stuffing before cooling or freezing meat or poultry.

36. Refrigerate or freeze cooked leftovers in small, covered, shallow containers within two hours after cooking. Leave a 1-inch airspace around containers for quick chilling.
37. Cover and reheat leftovers thoroughly before serving. Bring sauces, soups, gravies, and “wet” foods to a rolling boil; all others should be heated to 165°F.

38. Date packages of refrigerated leftovers and use within safe period: one to two days for low fat foods such as fish, poultry, and meat and three days for casseroles and cooked vegetables.

39. Don’t taste leftovers to determine safety. Sniff and look for signs of mold if storage period is unknown.

40. When in doubt, throw it out. Discard outdated, unsafe, or questionable leftovers in garbage disposal or in tightly wrapped packages that cannot be consumed by people or animals. The possibility of foodborne illness is never worth the cost of replacing it or simply selecting something else to eat.

### Food-Borne Illnesses

<table>
<thead>
<tr>
<th>Name of Illness</th>
<th>What causes it</th>
<th>Symptoms</th>
<th>Characteristics of Illness</th>
<th>Preventative measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salmonellosis</strong></td>
<td>Salmonellae. This bacteria is widespread in nature and lives and grows in the intestinal tracts of human beings and animals.</td>
<td>Sever headache, followed by vomiting, diarrhea, abdominal cramps, and fever. Infants, elderly, and persons with low resistance are most susceptible. Severe infections cause high fever and may even cause death.</td>
<td>Transmitted by eating contaminated food, or by contact with infected persons or carriers of the infection. Also transmitted by insects, rodents, and pets.</td>
<td>Salmonellae in food are destroyed by heating the food to 140°F and holding for 10 minutes or to higher temperatures for less time; for instance, 155°F for a few seconds. Refrigeration at 40°F inhibits the increase of Salmonellae, but they remain alive in foods in the refrigerator or freezer, and even in dried foods.</td>
</tr>
</tbody>
</table>

**Perfringens**

| Examples of foods involved: stews, soups, or gravies made from poultry or red meat. | Clostridium perfringens. Spore-forming bacteria that grow in the absence of oxygen. Temperatures reached in thorough cooking of most foods are sufficient to destroy vegetative cells, but heat-resistant spores can survive. | Nausea without vomiting, diarrhea, acute inflammation of stomach and intestines. | Transmitted by eating food contaminated with abnormally large numbers of the bacteria. | To prevent growth of surviving bacteria in cooked meats, gravies, and meat casseroles that are to be eaten later, cool foods rapidly and refrigerate promptly at 40°F or below, or hold them about 140°F. |

| Onset: Usually within 12 to 36 hours. | Duration: 2 to 7 days. | Onset: Usually within 8 to 20 hours. | Duration: May persist for 24 hours. |  |
### Food-Borne Illnesses (continued)

<table>
<thead>
<tr>
<th>Name of illness</th>
<th>What causes it</th>
<th>Symptoms</th>
<th>Characteristics of illness</th>
<th>Preventative measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staphylococcal poisoning</strong> (frequently called staph)</td>
<td><em>Staphylococcus aureus</em>. Bacteria fairly resistant to heat. Bacteria growing in food produce a toxin that is extremely resistant to heat.</td>
<td>Vomiting, diarrhea, prostration, abdominal cramps. Generally mild and often attributed to other causes.</td>
<td>Transmitted by food handlers who carry the bacteria and by eating food containing the toxin.</td>
<td>Growth of bacteria that produces toxin is inhibited by keeping hot foods above 140°F and cold foods at or below 40°F. Toxin is destroyed by boiling for several hours, or heating the food in a pressure cooker at 240°F for 30 minutes.</td>
</tr>
<tr>
<td>Examples of foods involved: custards, egg salad, potato salad, chicken salad, macaroni salad, ham, salami, and cheese.</td>
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<td></td>
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</tr>
<tr>
<td><strong>Botulism</strong></td>
<td><em>Clostridium botulinum</em>. Spore-forming organisms that grow and produce toxin in the absence of oxygen, such as in a sealed container.</td>
<td>Double vision, inability to swallow, speech difficulty, progressive respiratory paralysis. Fatality rate is high, about 65% in the United States.</td>
<td>Transmitted by eating food containing the toxin.</td>
<td>Bacterial spores in food are destroyed by high temperatures obtained only in the pressure canner. More than 6 hours is needed to kill the spores at boiling temperature (212°F). The toxin is destroyed by boiling for 10 to 20 minutes; time required depends on kind of food.</td>
</tr>
<tr>
<td>Examples of foods involved: canned low-acid foods, and smoked fish</td>
<td></td>
<td>Onset: Usually within 12 to 36 hours or longer. Duration: 3 to 6 days.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Sources

- *Plate It Safe* by Karen Penner, Extension Food Specialist, Kansas State Cooperative Extension Service.
- *Keeping Food Safe to Eat*, HG #162, Agricultural Research Service.

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