

## **Food Safety: Grilling in the Great Outdoors**

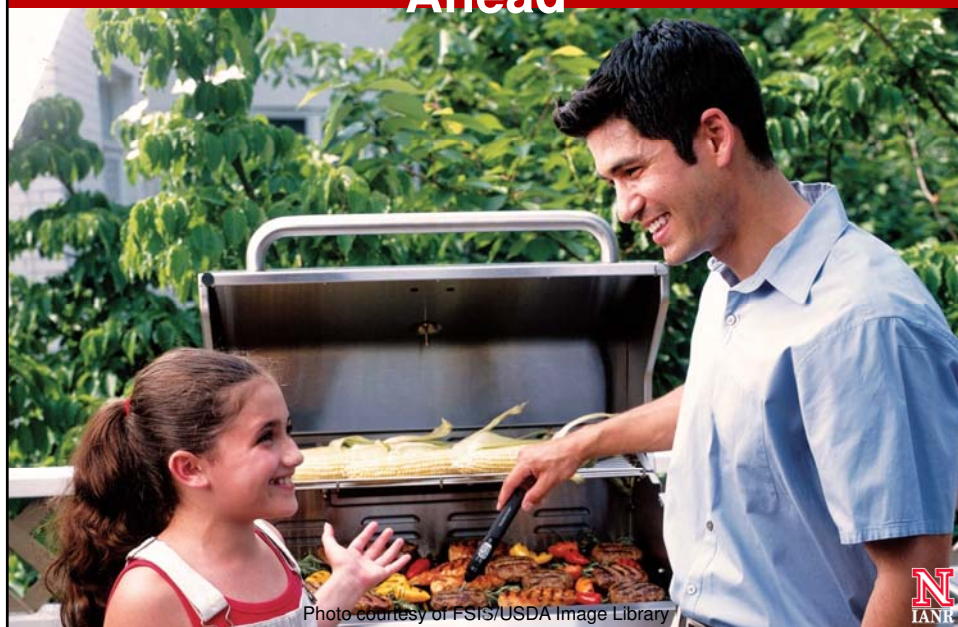
**Richard Collins, MD**  
**“The Cooking Cardiologist”**  
**Susan Buckley, RD**



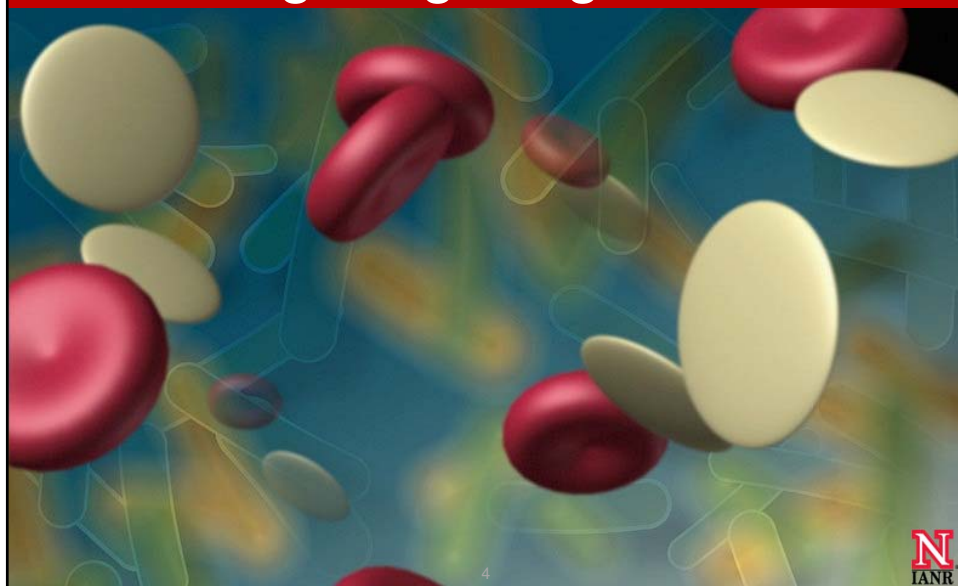
## **Quiz Time!**

- **The following quiz was compiled by University of Nebraska–Lincoln Extension educational programs**

## Safe Grilling Means a little Planning Ahead



**... foodborne illnesses increase during the grilling months!**



**Test your summer food safety  
savvy with this short quiz ...**



**Q 1: Why do foodborne illnesses  
increase during the summer?**

- A. Bacteria, including those that cause foodborne illness, tend to multiply faster when the temperatures are warm.**
- B. People are cooking and eating outside more, away from the refrigerators, thermometers, and washing facilities of a kitchen.**
- C. Both (A) and (B).**

**Q 1- Answer: C**

The combination of warm weather and outdoor meals can lead to increases in foodborne illness.



**Q 2: You're having a cookout in the backyard, and the hamburgers are ready for the grill. How can you tell if the burgers are done and safe to eat?**

- A. They have been cooked for at least 4 minutes on each side.**
- B. A thermometer inserted in the middle of the patties registers at least 160 °F.**
- C. They are brown in the middle and no pink is showing.**

**Q 2 - Answer: B**

You can't rely on timing or the appearance of meat to tell that it's done.



Photo courtesy of Cattlemen's Beef Board & National Cattlemen's Beef Association



**Q 3: The burgers are done, and you're ready to take them off the grill. Is it safe to put the cooked burgers back on the plate that held the raw meat?**

- A. Yes, as long as you wipe off the plate with a paper towel.**
- B. Yes, because the burgers are thoroughly cooked.**
- C. No, because any bacteria in the raw meat or juices could contaminate the cooked burgers.**

### Q 3 - Answer: C

Be smart. Keep  
foods apart.  
Don't cross-  
contaminate.



**Q 4: It's 3:00 p.m. and you just finished making fresh salsa for a party that begins at 6:00 p.m. Is it safe to leave the salsa out on the counter for 3 hours, until the party begins?**

- A. Yes, because the acid in the tomatoes will keep harmful bacteria from growing.**
- B. No, because bacteria grows rapidly in food at room temperature.**
- C. No, because your family might eat it all before the party starts.**



**Q 4 - Answer: B**

Never leave perishable food out of the refrigerator for more than two hours (or one hour if the temperature is over 90 °F).



**Q 5: You want to make some homemade ice cream, and the recipe calls for eggs. You've heard that raw eggs may be contaminated with *Salmonella*. What should you do?**

- A. Use an egg substitute product or pasteurized eggs instead of raw eggs.**
- B. Cook and chill the milk before adding the eggs.**
- C. Don't worry about it. It's never made you sick in the past, has it?**

## Q 5 - Answer: A

However, even if you're using pasteurized eggs or egg substitutes for your ice cream, both the FDA and the USDA recommend starting with a cooked egg base for optimal safety.



## Q 6: Which of the following is considered a perishable food item?

- A. Seafood
- B. Dairy products
- C. Cooked vegetables
- D. Peeled and/or cut fruits and vegetables
- E. All of the above



**Q 6 - Answer: E**

All of the answers are perishable foods. Some foods contain the right conditions and nutrients to support rapid microbial growth. These foods are called perishable.



Photo courtesy of National Center for Food Safety and Inspection Service



**Q 7: Unwashed hands are a prime cause of foodborne illness. How many seconds are recommended for hand washing?**

- A. 10 seconds**
- B. 15 seconds**
- C. 20 seconds**
- D. 25 seconds**

### Q 7 - Answer: C

Whenever possible, wash your hands with warm, soapy water for 20 seconds before handling food.



**Q 8: Since only the inside of melons (watermelon, cantaloupe, honeydew melons, etc.) is eaten, their outer rind does not need to be washed.**

**A. True**

**B. False**

## Q 8 - Answer: False

Though only the inside of melons is eaten, their outer rind still must be washed.

Bacteria present in soil can contaminate the skin of the melon.



When melons are cut, these bacteria are transferred to the part we eat and can grow to levels that cause foodborne illness.

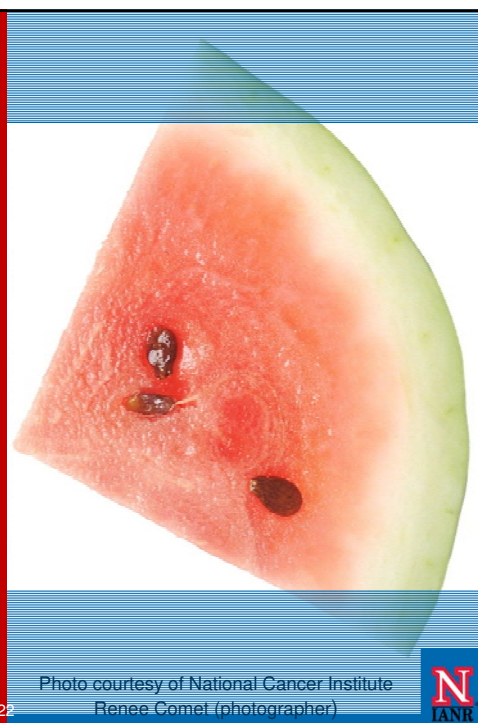


Photo courtesy of National Cancer Institute  
Renee Comet (photographer)

**Q 9: All raw beef, pork, lamb, and veal steaks, chops, and roasts should be cooked to a minimum internal temperature of 145 °F before removing them from heat source and then allowed to rest for at least 3 minutes before carving or consuming**

**A. True**

**B. False**

23

**Q 9 - Answer:  
True**

A “rest time” is the amount of time the product remains at the final temperature, after it has been removed from a grill, oven, or other heat source.



Photo courtesy of Cattlemen's Beef Board &  
National Cattlemen's Beef Association



24

USDA has revised its recommended cooking temperature for all whole cuts (steaks, roasts, and chops) of meat, including pork, beef, lamb and veal to 145 °F and then allowing a 3 minute rest time before carving or consuming.



25

Photo courtesy of FSIS/USDA Image Library

During the 3 minutes after meat is removed from the heat source, its temperature remains constant or continues to rise. This destroys pathogens and produces a product at its best quality.



2

This change does NOT apply to ground meats, including ground beef, veal, lamb, and pork, which should be cooked to 160 °F and do not require a rest time.



Photo courtesy of Cattlemen's Beef Board & National Cattlemen's Beef Association



The safe cooking temperature for all poultry products, including ground chicken and turkey, remains at 165 °F.



8 Photo courtesy of FSIS/USDA Image Library



## 3 temperatures to remember

Ground meats (including ground beef, veal, lamb, & pork):

160 °F with no rest time

All poultry (including ground chicken & turkey):

165 °F with no rest time

Whole cuts of meat (including pork, beef, lamb, & veal steaks, roasts, & chops):

145 °F with addition of a 3 minute rest time

## At the Grocery Store

- Cold items last: Shop for dry goods first, then hit the cooler aisles for milk, cheese, eggs, frozen items or meats
- Reusable shopping bags: Wash them occasionally in your washing machine
- Separate bags for produce and raw meat is a must



## Preparing the Meal

- Scrub melons, apples, carrots, etc. Scrub all fruits and vegetables you plan to eat raw
- Use a scrubber – like the kind for potatoes
- Occasionally run the scrubber through the dishwasher on the sanitary cycle



## Preparing the Meal

- Don't bother using soap or a produce-cleaning spray
- There are no data showing those work better than tap water, and soap film clings
- Anti-bacterial cutting boards aren't recommended either



## Preparing the Meal

- Melons, bananas, kiwi
- A knife can drag bacteria from the peel into the fruit
- Wash all produce right before you eat it, otherwise the bacteria you didn't rinse off will continue to grow



## Preparing the Meal

- The water that mists lettuce and other produce at the grocery store may make the vegetables fresher, but it doesn't clean it
- Rinse it with tap water at home and let it air dry or pat it dry
- Don't wash lettuce in a sink bath and don't wash pre-washed greens that come in a bag because it only makes them more susceptible to contamination

## MEAT

- Many experts discourage rinsing meat that will be cooked because bacteria gets splashed around the sink and counters
- If you are cooking meat to at least 145 degrees, those surface bacteria will be killed

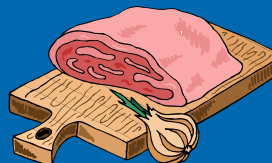


## Food Safety

- Wash your hands with hot soapy water for at least 20 seconds before preparing food
- Keep raw meat from coming into contact with other foods during preparation
- Wash your hands and all utensils and surfaces with hot soapy water after contact with raw meat
- Never chop fresh vegetables or salad ingredients on a cutting board that was used for raw meat without properly cleaning it first

## Preparing Meat

- If possible, use a separate cutting board for the sole preparation of raw meat, poultry and fish
- Carefully wash cutting boards and knives with hot soapy water and then sanitize with a solution of household bleach and water.
- Some can be cleaned in the dishwasher



## Storing Meat

- Store properly wrapped meat in the meat compartment or the coldest part of your refrigerator
- Place in plastic bag to prevent leakage
- Thaw meat in the refrigerator or microwave at reduced power setting
- Do NOT thaw meat on kitchen counter
- Keep refrigerator setting at 35 F to 40 F and freezer at 0F or below

## Marinade

- A marinade is a savory, acidic sauce in which a food is soaked to enrich its flavor or to tenderize it.
- Marinate food in the refrigerator, not on the counter.
- Poultry and cubed meat or stew meat can be marinated up to 2 days. Beef, veal, pork, and lamb roasts, chops, and steaks may be marinated up to 5 days.
- If some of the marinade is to be used as a sauce on the cooked food, reserve a portion of the marinade before putting raw meat and poultry in it.

## Marinade

- However, if the marinade used on raw meat or poultry is to be reused, make sure to let it come to a boil first to destroy any harmful bacteria.





## Cooler

- When carrying food to another location, keep it cold to minimize bacterial growth.
- Use an insulated cooler with sufficient ice or ice packs to keep the food at 40 °F or below.
- Pack food right from the refrigerator into the cooler immediately before leaving home.

## Cooler

- When using a cooler, keep it out of the direct sun by placing it in the shade or shelter.
- Avoid opening the lid too often, which lets cold air out and warm air in.
- Pack beverages in one cooler and perishables in a separate cooler



## Keep it Clean

- Be sure there are plenty of clean utensils and platters
- To prevent foodborne illness, don't use the same platter and utensils for raw and cooked meat and poultry.
- Harmful bacteria present in raw meat and poultry and their juices can contaminate safely cooked food.

## Precooking

- Precooking food partially in the microwave, oven, or stove is a good way of reducing grilling time.
- Just make sure that the food goes immediately on the preheated grill to complete cooking.

## Cook Thoroughly

- Cook food to a safe minimum internal temperature to destroy harmful bacteria.
- Meat and poultry cooked on a grill often browns very fast on the outside.
- Use a food thermometer to be sure the food has reached a safe minimum internal temperature.

## Meats

- Cook all raw beef, pork, lamb and veal steaks, chops, and roasts to a minimum internal temperature of 145°F as measured with a food thermometer before removing meat from the heat source.
- For safety and quality, allow meat to rest for at least three minutes before carving or consuming.
- For reasons of personal preference, you may choose to cook meat to higher temps

## Ground Meats

- Cook all raw ground beef, pork, lamb, and veal to an internal temperature of 160°F as measured with a food thermometer.
- Cook all poultry to a safe minimum internal temperature of 165°F as measured with a food thermometer.
- NEVER partially grill meat or poultry and finish cooking later

## Safe Temps

- **SAFE MINIMUM INTERNAL TEMPERATURES**

- · Whole poultry: 165 °F
- · Poultry pieces: 165 °F
- · Ground poultry: 165 °F
- · Ground meats: 160 °F
- · Beef, pork, lamb, and veal (steaks, roasts and chops): 145 °F and allow to rest at least 3 minutes.



## Reheating

- When reheating fully cooked meats like hot dogs, grill to 165 °F or until steaming hot.



## Keep Hot Food Hot!

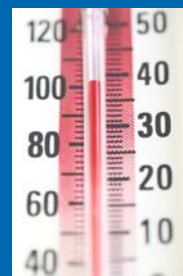
- After cooking meat and poultry on the grill, keep it hot until served -- at 140 °F or warmer.
- Keep cooked meats hot by setting them to the side of the grill rack, not directly over the coals where they could overcook.
- At home, the cooked meat can be kept hot in an oven set at approximately 200 °F, in a chafing dish or slow cooker, or on a warming tray.

## Serving the Food

- When taking food off the grill, use a clean platter.
- Don't put cooked food on the same platter that held raw meat or poultry. Any harmful bacteria present in the raw meat juices could contaminate safely cooked food
- In hot weather (above 90 °F), food should never sit out for more than 1 hour.

## Leftovers

- Refrigerate any leftovers promptly in shallow containers.
- Discard any food left out more than 2 hours (1 hour if temperatures are above 90 °F).





## Does Grilling pose a Cancer risk?

- Studies suggest there may be a cancer risk related to eating food cooked by high-heat cooking techniques as grilling, frying, and broiling.
- Based on present research findings, eating moderate amounts of grilled meats like fish, meat, and poultry cooked — without charring — to a safe temperature does not pose a problem.
- Be sure to marinade first!

## Grilling and Cancer Risk

Cooking meat at the high temperatures you use to grill—as well as broil and fry—creates heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs), compounds linked with some cancers.



## Grilling and Cancer Risk

- Animal and laboratory studies suggest that HCAs may damage DNA and spur the development of tumors in cells of the colon, breast, prostate and lymph system.
- At temperatures of 350°F and hotter, amino acids and creatine (a natural compound that helps supply energy to muscles and nerves) react to form HCAs.
- PAHs form when fat drips onto hot coals, creating smoke that settles on food; these compounds have been associated with increased risk of breast cancer.

## Grilling and Cancer Risk

- **Grill fish.** Beef, pork and poultry tend to form more HCAs than seafood because of their higher amino acid content and longer grilling times
- **Prefer meat or poultry?** Trim fat to reduce drips.
- **Flavor meats with marinades and rubs.** Research in the Journal of Agriculture and Food Chemistry showed that marinating red meat in beer or wine for two hours significantly reduced HCAs.
- Scientists believe the antioxidants in these marinades block HCAs from forming. Similarly, a Kansas State University study found that rubbing rosemary, an herb known for its high level of antioxidants, onto meats before grilling cut HCA levels by up to 100 percent. Herbs including basil, mint, sage and oregano may have similar effects.

## Prevent Charring

- To prevent charring, remove visible fat that can cause a flare-up.
- Precook meat in the microwave immediately before placing it on the grill to release some of the juices that can drop on coals.
- Cook food in the center of the grill and move coals to the side to prevent fat and juices from dripping on them.
- Cut charred portions off the meat.

## Enjoy!

- This is a special time of year to enjoy grilling in the great outdoors (we all KNOW what is coming!)
- Be safe, plan ahead and enjoy delicious, healthy grilled-to-perfection foods!
- Let's get grillin'

