

# LESSON 6

## Keep It Straight, Don't Cross Contaminate

### GOAL

To understand that the risk of contracting a foodborne illness can be reduced by safely storing and handling food from the time it is received to the time it is served.

### OBJECTIVES

- To describe cross contamination.
- To identify health hazards associated with cross contamination.
- To identify potential sources of cross contamination.
- To suggest ways of preventing cross contamination.

### TEACHER BACKGROUND INFORMATION

#### Lesson 6 covers

1. Introduction to cross contamination
2. Storage
3. Food preparation
4. Equipment
5. Personal hygiene
6. Pests

**Approximate time to teach lesson:** 20–45 min.

#### Definitions

**cross contamination**—The transfer of pathogenic microorganisms from one food or surface to another.

**food-contact surface**—Items that come in contact with food, such as counters, cutting boards, utensils, plates, cups, flatware, and storage containers.

**Cross contamination** can occur at almost any point in the food flow. It can happen from food to food, person to food, equipment to food, poisonous materials/chemicals to food, or rodent/insect to food. When you know what it is and how it happens, cross contamination is fairly simple to prevent. Prevention starts with the principle of creating barriers between food products. Barriers can be physical or procedural. An example of a physical barrier is storing food in covered containers. An example of a procedural barrier is using separate cutting boards for different food products.

When discussing cross contamination, five areas should be addressed:

1. Storage
2. Food preparation
3. Equipment
4. Personal hygiene
5. Pests

## MATERIALS NEEDED

**Food Safety Infosheets.** These are well-illustrated, colorful, 8½ x 11-inch posters that describe specific incidents of foodborne illness. The posters are intended for food-service workers, although some describe illness occurring from home preparation or from farm or factory contamination of food. New posters are produced when incidents occur that offer useful teachable solutions. The Infosheets may be downloaded as PDFs at [www.foodsafetyinfosheets.blogspot](http://www.foodsafetyinfosheets.blogspot). An example of a Food Safety Infosheet, (Harvey's *E. coli* O157:H7 Outbreak Report Released, July 1, 2009)\* can be used in the activity, "Sharing Food Service Infosheets."

If students have a particular interest in food safety issues, an educational activity would be to have students explore the variety of Food Safety Infosheets available. Ask them to print 2 or 3 Infosheets that pertain to food service practices and share their content with the class.

- Three sets of sealed bags containing eight different white powders identified only by a number for the "Identifying Unlabeled Products" activity.\* (Note: bags need to be replaced periodically, when they become worn and leaky.)
- Three sets of laminated, magnetic storage area and food photos for the "Storing Food Correctly" activity\* (or use Slide 10).
- Color-coded cutting mats for the "Using Color-coding to Avoid Cross-contamination" activity\* (or use Slides 15 and 16).
- Copy of Infosheet "Harvey's *E. coli* Outbreak Report Released" for each student. A master is provided at the end of the lesson.

\*Directions for preparing or obtaining item(s) are on the *Ready, Set, Food Safe* website

### (Slide 1) **Lesson 6**

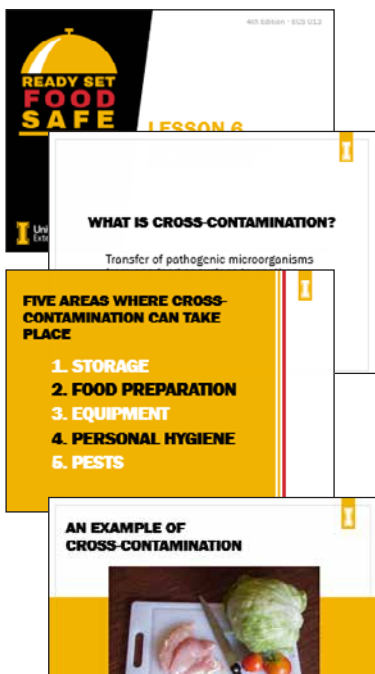
## **Keep It Straight, Don't Cross Contaminate**

1. (Slide 2) **Introduction to Cross Contamination.** Cross contamination is the transfer of pathogenic microorganisms from one food or surface to another.

(Slide 3) Five areas to be aware of to avoid cross contamination:

1. Storage
2. Food preparation
3. Equipment
4. Personal hygiene
5. Pests

(Slide 4) This picture shows a common source of cross contamination: a cutting board used first to prep raw poultry and then for food that will not be heated to destroy pathogens. Any food can be the recipient of cross contamination.





## 2. (Slide 5) **Storage.**

- Always store ready-to-eat foods and foods that will not be cooked before serving above raw meats, fish, and poultry. For example, prepared sandwiches and heads of lettuce should be placed above raw meat in the refrigerator. The ready-to-eat sandwiches should be situated above the heads of lettuce, which will be washed before serving.
- Keep raw meats on the bottom shelves in pans to catch drips.
- Many larger facilities have separate refrigerators for fruit/vegetables and meats.
- Place heavy items on lower shelves so employees don't have to lift extreme weights over their heads. This is for employee safety. For example, do not place a 5-gal pail of ice cream on the very top shelf in the freezer. If the frozen hamburger patties are placed on the bottom shelf, the ice cream may be placed on the second shelf. Here, both criteria for personal safety and food safety are being met.
- (Slide 6) Store all foods at least 6 in off the floor to help avoid pest infestation.
- (Slide 7) In storage areas, keep food products separate from cleaners, pesticides, and other hazardous items.
- Always label products.



## (Slide 8) **Identifying Unlabeled Products**

This activity illustrates the importance of keeping products in their original container or labeling them so that mistakes and cross contamination do not occur. Divide the class into three groups. Give each group a set of sealed bags of unlabeled powders to identify (#1–#8). Students should not open the sealed bags to touch or taste the products. Give the students 5–7 min to identify the products in each of the eight bags. Have one student in each group record their answers on a sheet of paper. Discuss the results with the class. Did every group have the correct answers? Ask students how this activity relates to food safety.

### Key to Unlabeled White Powders

- |                 |                    |
|-----------------|--------------------|
| #1 Pancake mix  | #5 Corn starch     |
| #2 Laundry soap | #6 Baking soda     |
| #3 Sugar        | #7 Counter cleaner |
| #4 Salt         | #8 Flour           |

## (Slide 9) **Storing Food Correctly to Avoid Cross Contamination**

Divide the class into three groups or use Slide 10 to do a whole class activity. Click on each of the nine foods on the top of Slide 10; it will move to the correct storage location. If using student groups, hand each group a set of laminated, magnetic storage area and food photos (three storage areas and nine food photos). Give students the following scenario:



You are a food-service employee for a restaurant that is famous for its hamburgers. In the morning the restaurant receives a food-supply shipment. Your job is to unload and put the food away. The following food arrives:

- Raw hamburger
- Mayonnaise in food-service-size jars
- Box of hamburger buns
- Box of lettuce
- Box of frozen hamburger patties
- Cheese
- Canister of ice cream
- Box of tomatoes
- 5-gal bucket of pickles

Have students place the magnetic food photos in the correct storage spot on the picture of food-service food-storage areas: dry storage, walk-in cooler, or walk-in freezer. Discuss each group's answers and compare to the key below.

### Key for Storing Foods

- Raw hamburger—refrigerator (walk-in cooler), bottom shelf, best if in a pan
- Mayonnaise—dry storage or, once opened, in refrigerator
- Box of hamburger buns—dry storage, upper shelf
- Box of lettuce—refrigerator, upper shelf
- Box of hamburger patties (frozen)—freezer
- Cheese—refrigerator, upper shelf
- Canister of ice cream—freezer
- Box of tomatoes—dry storage or refrigerator. A dry-storage produce area is best for produce subject to chill injury—tomatoes and bananas, for example. Very ripe tomatoes may need to be refrigerated.
- Pickles—dry storage or, once opened, in refrigerator

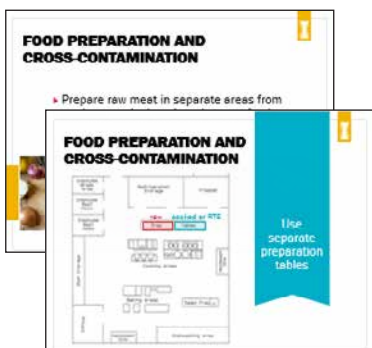
3. (Slide 11) **Food Preparation.** Prepare raw meats in separate areas from produce or cooked and ready-to-eat-foods.

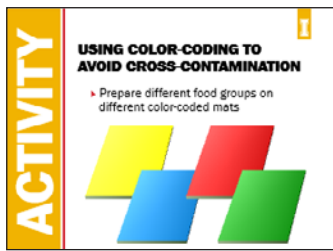
(Slide 12) Many food-service establishments have separate preparation tables for raw and ready-to-eat (RTE) or cooked foods. If there is not sufficient space for separate tables, prepare raw and RTE or cooked foods at different times so they do not cross paths. If possible, prepare RTE foods before preparing raw foods. For example, prepare the bread baskets for the customer tables before washing vegetables for salad preparation; coat raw chicken pieces with a spice mixture last.

### (Slide 13) “Preparing a Hamburger”

Show the video clip (3 min 7 sec) by clicking on the picture on Slide 13. Ken McKan uses UV light-sensitive powder to show how cross contamination can take place.

(Slide 14) Assign specific equipment per type of food product. For example, use one set of cutting boards, utensils, and containers just for poultry, another set for meat, and a third for produce.



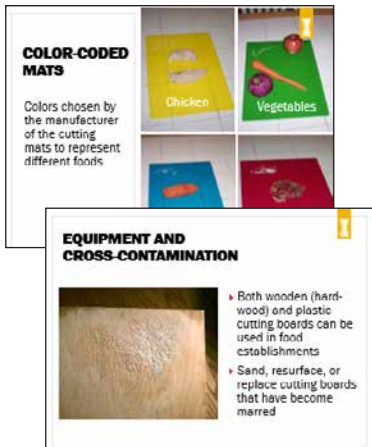


### (Slide 15) Using Color-coding to Avoid Cross Contamination

Show students the colored cutting mats (without showing the symbols on each). Discuss how food-service employees might match different food groups to use with the different-colored mats. Show students the manufacturer’s suggestions that are printed on the cutting mats.

- Red—meat
- Green—vegetables
- Blue—seafood
- Yellow—poultry

(Note: If you do not have colored cutting mats, this activity can be done using Slides 15 and 16. The pictures of the colored cutting mats display after a mouse click. With Slide 15, the students discuss what foods correspond to which mat, while (Slide 16) provides the answers.)



### 4. (Slide 17) Equipment.

- Both wooden and plastic cutting boards are allowed by the IDHW Food Protection Program. Wooden cutting boards must be hardwood, usually maple or teak. Pine and other softwood cutting boards are NOT allowed. Both plastic and wooden cutting boards can develop marred surfaces with repeated use. Sand and/or resurface them when they become marred. If they are badly marred and sanding isn’t possible, replace them. The cutting board pictured in Slide 17 needs to be sanded or discarded.

### Infosheet on Onion Dicer Prolonging Outbreak

(Slide 18) Hand out copies of the Infosheet from July 1, 2009, “Harvey’s *E. coli* O157:H7 Outbreak Report Released.” Students should read the Infosheet and discuss how the outbreak could have been prevented.

- (Slide 19) Use specific containers for each type of food product. Clearly label containers with their contents, such as “Raw Chicken” or “Tuna Salad,” so the containers are less likely to be used for something else. Make sure you have an adequate supply of containers on hand and keep them clean and sanitized between uses.
- (Slide 20) Clean and sanitize all work surfaces, equipment, and utensils after each task. After cutting up raw chicken, for example, it is not enough to simply wipe down the counter underneath the cutting board. Run the cutting board and utensils through a ware washing machine and clean and sanitize the countertop. Employees must know which cleaners and sanitizers to use for each job. When purchasing equipment, consider the cleanability of the equipment. Some equipment is easier to clean than others.
- (Slide 21) Towels should not be used to dry dishes or



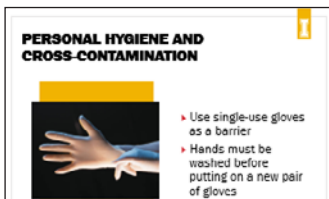
equipment in a food establishment. Cloths or towels used for wiping food spills must not be used for any other purpose. To comply, use disposable towels or use color-coded cleaning cloths that match a specific food preparation area or task. After each use, wet clothes or towels must be rinsed and stored in a clean sanitizing solution. A change in the *Idaho Food Code* (4.101.16) enacted in 2005 is that sponges may not be used on sanitized food-contact surfaces.



5. (Slide 22) **Personal Hygiene.**

Hands are the most common carriers of microorganisms in a food establishment. Employees should be trained to wash their hands at the beginning of their shift, after a break, between tasks, after they touch or handle raw foods, when changing gloves, and especially after using the restroom.

(Slide 23) Single-use gloves serve as a barrier. Employees should be trained on proper glove use. Gloves should be used only for the job at hand and changed each time a new task is started. Hands must be washed before putting on a new pair of gloves. If punctured or ripped, replace with a new, unused pair.



6. (Slide 24) **Pests.**

Animals, rodents, and pests are common sources of food contamination. Rodents and pests usually enter food establishments during delivery or when garbage facilities are not properly maintained. In order to control pests:

- Prevent insects and rodents from entering the food establishment.
- Eliminate food, water, and places where insects and rodents can hide.
- Be aware of the establishment's pest management program to help control insects and rodents that may enter the food establishment.
- Report infestations.

(Slide 25) A particularly egregious example of poor pest control is illustrated in the news story, "Rats Gone Wild":



NEW YORK (AP) — News video showing about a dozen rats running around a KFC-Taco Bell restaurant in Greenwich Village was widely disseminated Friday on TV stations and the Internet. The footage, taken from the sidewalk through a window, showed the rats running around the floor, between counters and tables and on children's high chairs. The establishment was not open at the time. (The complete story is available at [https://usatoday30.usatoday.com/money/industries/food/2007-02-23-rats\\_x.htm](https://usatoday30.usatoday.com/money/industries/food/2007-02-23-rats_x.htm)).

(Slide 26) **"Cross Contamination Review"**

Show video clip (1 min 25 sec) by clicking on the picture on Slide 26. Central District Health Department Environmental Health Specialist



Chad Waters reviews how to prevent cross contamination and introduces the concept of storing meat in a cooler according to final cooking temperature requirements.

### (Slide 27) UNDERSTANDING CHECK

(Slide 28) Ask students to give examples of ways to prevent cross contamination for each area below. (One example is given, but other examples can be listed.)

- (Slide 29) **Storage.** Example: storing ready-to-eat foods above raw meats.
- **Food preparation.** Example: using an assigned cutting board for a task.
- **Personal hygiene.** Example: washing hands between glove changes.
- (Slide 30) **Equipment.** Example: sanitizing a can opener.
- **Pest management.** Example: developing a pest management plan.

*Note: The pictures in Slides 30 to 32 are examples of bad practice taken by environmental health specialists in food establishments.*

(Slide 31) **Question:** Why shouldn't the door be propped open?

**Answer:** By propping the door open, insects and rodents are allowed to enter the establishment freely.

(Slide 32) **Question:** Why shouldn't an ice scoop be stored in an ice bin?

**Answer:** The bacteria on your hands can be transferred to the handle of the scoop and, if not stored properly, the bacteria can be transferred to the ice.

(Slide 33) **Question:** Why should all containers be labeled?

**Answer:** The contents of any container cannot be correctly identified if it has not been labeled. Even containers with water must be labeled.

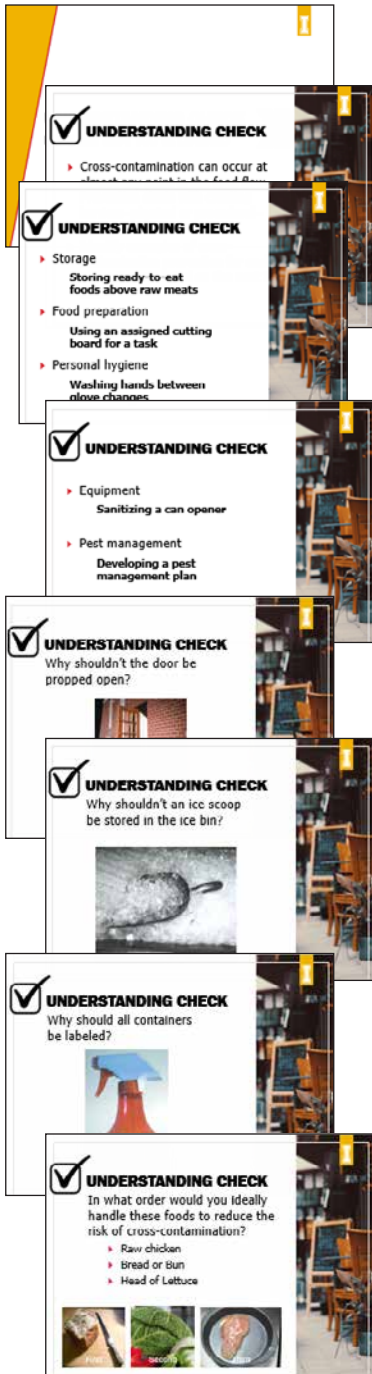
(Slide 34) **Question:** In which order would you ideally handle the following foods to reduce the risk of cross contamination? Raw chicken, bread/bun, lettuce.

**Answer:** An employee would handle the food that is least likely to contaminate other foods first:

- First: Bread/bun
- Second: Lettuce
- Third: Raw chicken

(Slides 35–38) **They Might Kill You/We Are the Microbes (4:37)**

This song discusses cross contamination and the importance of thorough cooking. It is a good summary song because it includes concepts from previous lessons such as time/temperature control for safety foods, specific microorganisms, and symptoms of foodborne illness.




**ACTIVITY**

**THEY MIGHT KILL YOU/  
WE ARE THE MICROBES**

Buddy you're a young man, dumb man, careless  
And you're gonna make someone quite sick someday  
You got spores on your plate  
They'll incubate  
There's trouble if you cross-contaminate

Microbes they might kill you  
Microbes they might kill you  
Microbes they might kill you



**ACTIVITY**

**THEY MIGHT KILL YOU**

Toilin' with the fast food, bad mood, careless  
It don't matter if those burgers stay pink inside  
Servin' up a storm  
With coliform  
O157's deadly if it don't get warm

Microbes they might kill you  
Microbes they might kill you  
Microbes they might kill you



**ACTIVITY**

**WE ARE THE MICROBES**

We're always the targets  
We evoke lots of fear  
Bombarded with chlorine, pH, gamma rays  
To make us disappear  
But we're naturally occurring  
Nature pulls our reins  
And when there's trouble  
We mutate into really virulent strains

We are the microbes, my friend  
And we'll keep dividing  
Till the end  
We are the microbes  
No time for chlorine  
Cause we are the microbes  
In your food  
We'll mess up your kidneys  
GI damage we'll do  
We go by *Clostridium*, *E. coli*, *Salmonella*  
Just to mention a few

**ACTIVITY**

**WE ARE THE MICROBES**

We like sprouts and lettuce  
Salami and stew  
You'll find us on chicken, soft cheeses, fruit juices  
and hamburgers too  
We are the microbes, my friend  
And we'll keep dividing  
Till the end  
We are the microbes  
We are the microbes  
No time for chlorine

We are the microbes, my friend  
And we'll keep dividing  
Till the end  
We are the microbes  
We are the microbes  
No time for chlorine



**THEY MIGHT KILL YOU/WE ARE THE MICROBES (“We Will Rock You/We Are The Champions” by Queen)**

Buddy you're a young man, dumb man, careless  
And you're gonna make someone quite sick someday  
You got spores on your plate  
They'll incubate  
There's trouble if you cross contaminate

Microbes they might kill you  
Microbes they might kill you

Toilin' with the fast food, bad mood, careless  
It don't matter if those burgers stay pink inside  
Servin' up a storm  
With coliform  
O157's deadly if it don't get warm

Microbes they might kill you  
Microbes they might kill you  
Microbes they might kill you  
Microbes they might kill you

We're always the targets  
We evoke lots of fear  
Bombarded with chlorine, pH, gamma rays  
To make us disappear

But we're naturally occurring  
Nature pulls our reins  
And when there's trouble  
We mutate into really virulent strains  
We are the microbes, my friend  
And we'll keep dividing  
Till the end  
We are the microbes  
We are the microbes  
No time for chlorine  
Cause we are the microbes  
In your food

We'll mess up your kidneys  
GI damage we'll do  
We go by *Clostridium*, *E. coli*, *Salmonella*  
Just to mention a few

We like sprouts and lettuce  
Salami and stew  
You'll find us on chicken, soft cheeses, fruit juices  
and hamburgers too  
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We are the microbes  
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No time for chlorine  
Cause we are the microbes

We are the microbes, my friend  
And we'll keep dividing  
Till the end  
We are the microbes  
We are the microbes  
No time for chlorine  
Cause we are the microbes  
In your food

## REFERENCES

- Food Safety Infosheets. 2010.<http://foodsafetyinfosheets.blogspot.com>.
- McSwane, D., N. Rue, and R. Linton. *Essentials of Food Safety and Sanitation*. Upper Saddle River, NJ: Prentice Hall, 1998.
- National Restaurant Association Educational Foundation. *ServSafe Essentials*. Fifth Edition. Upper Saddle River, NJ: Prentice Hall, 2008.
- Video clip “Cross-contamination Review” used from Central District Health Department Food Safety Videos, Part 4, <http://web.mac.com/idahofoodsafety/iWeb/CDHD%20Food%20Safety/WMV.html>.
- Video clip, “Preparing a Hamburger,” used from educational video, “Proper Hand Washing with Ken McKan,” (1997). Courtesy of Purdue University Cooperative Extension Service.

