

# Food Safety Facts

A Fact Sheet for People Who Prepare Food

## Facts About Eggs

Bulletin #2257

The information in this fact sheet answers many of the questions consumers frequently ask about the quality and wholesomeness of eggs and egg-rich foods (such as quiche and baked custard).

### Handle with Care

Eggs are perishable and must be handled with care. If you handle them properly, you'll reduce your risk of food-borne illness and insure good quality eggs.

### Maintaining Shell Egg Quality and Wholesomeness

### Keeping Eggs Safe and Healthy

- 1 Buy eggs from a refrigerated display case. If the trip home will take more than 30 minutes or if it is a very hot day, put the eggs in a portable cooler for the trip, if possible.

Cold temperatures help maintain quality by slowing the loss of moisture and carbon dioxide from the eggs. The cold also slows the growth of any bacteria that might be present. Retail sales of eggs and the use of refrigerated display cases are governed by state regulations.

- 2 If the egg carton has an expiration date printed on it, such as "EXP May 1," be sure it has not passed when you buy the eggs.

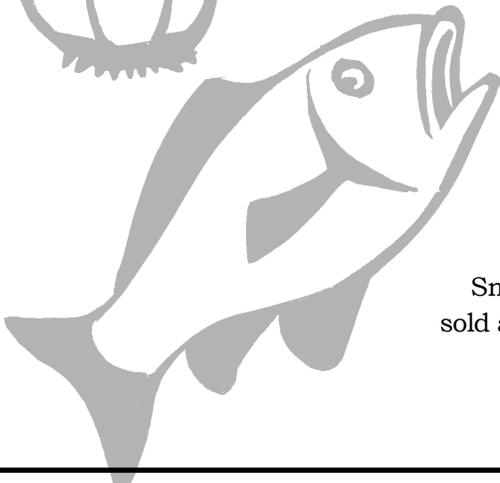
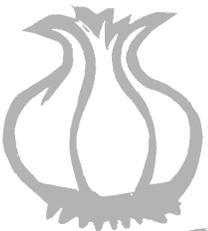
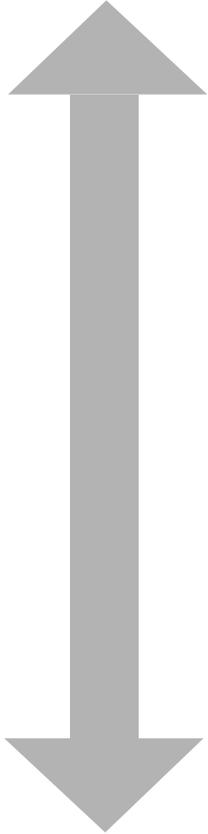
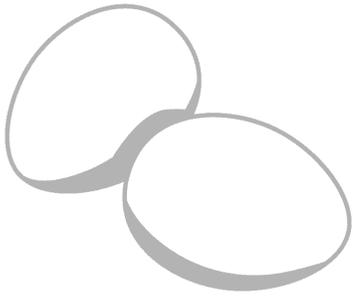
The expiration date on an egg carton has the same meaning as the "pull" or "sell by" date. It is the last day the store may sell the item as fresh.

An expiration date may or may not be required by state regulations or by individual food stores. It is not required by federal regulations. However, if it is used on a carton that also has a federal grade mark, the date cannot be more than 30 days from the date the eggs were packed into the carton. For example, eggs packed on January 1 may be labeled EXP JAN 30; packed January 2, EXP JAN 31; packed January 3, EXP FEB 1; and so forth.

- 3 Buy eggs that have clean, uncracked shells. Inspect the eggs in the carton before buying them.

If bacteria are present on the shell, they could enter the egg through a crack and contaminate the contents.

Federal regulations require that eggs with dirty, prominently stained, or cracked shells be kept out of stores. There are small tolerances for slight stains and



cracks, however, to allow for normal handling. For example, very small or light-colored specks or stains are allowed if the shell still has the overall appearance of being clean. Also, very fine hairline cracks in the shells of fresh eggs may escape detection during processing because they are very hard to see.

**4 Consider using pasteurized egg products when you're going to serve a large group or take eggs on a trip.**

When making and serving eggs to a large group, use pasteurized egg products if possible. They eliminate the risk posed by bacteria that may have been present and are easy to use. Pasteurized egg products are sold by food brokers or wholesalers, usually in large-size containers, and are not generally sold in regular food stores.

Pasteurized egg products are liquid, frozen and dried forms of eggs that have been separated from the shells and have undergone heat treatment for a short period of time. Commercial pasteurization kills bacteria but does not cook the eggs or affect their color, flavor or nutrients. The egg's ability to make baked goods rise is one function that might be slightly affected. Federal regulations require that egg products be prepared under inspection to ensure wholesomeness and proper labeling.

When taking eggs on a trip where no refrigeration is available, such as camping or boating, take dried egg products. They are lightweight, easy to pack, and can be reconstituted with clean water and used as you would use shell eggs. Small packages are often sold at sporting goods stores.

**5 Put eggs in the refrigerator as soon as possible, and keep them refrigerated until used. Then, remove only the number of eggs needed from the carton and return the carton to the refrigerator immediately.**

Egg quality can decline more during one day at room temperature than during one week in the refrigerator. Refrigerator temperatures (40 degrees or below) not only help maintain quality by slowing the loss of moisture and carbon dioxide from the eggs, but also keep bacteria that cause food-borne illness from growing. When cold eggs sit in a warm room, moisture from the air will condense on the shell surface and the eggs will look like they are sweating. This speeds up the loss of quality and can allow bacteria to grow.

**6 Do not wash eggs before storing them.**

Most eggs sold commercially have been washed, sanitized and sprayed with an oil coating to help preserve quality and wholesomeness. Washing eggs at home will remove the coating and, if done improperly, any bacteria present could be drawn into the eggs through pores in the shells. The extra handling also increases the chance of accidentally cracking the shells.

**7 Leave eggs in their original carton in the refrigerator.**

Moving eggs from their carton to a refrigerator storage area increases the chance of accidentally cracking the shells and transferring bacteria from your hands to the shells.

**8 Keep eggs away from foods with strong odors, like fish and onions.**

Strong odors can penetrate eggshells and may give the eggs an unpleasant smell or taste.

**9 If an egg accidentally freezes, keep it frozen until needed, then thaw in the refrigerator. If the shell cracked during freezing, discard the egg.**

When a raw egg freezes, its contents expand and may crack the shell. When thawed, an egg with an uncracked shell may be hard-cooked successfully, but other uses may be limited. Freezing causes the yolk to become thick and syrupy, so it will not flow like an unfrozen yolk and blend very well with the egg white or other ingredients.

**10 If you accidentally crack the shell of an egg before you plan to use it, break the egg into a clean container, cover tightly, refrigerate, and use within two days in a recipe that is baked.**

Do not use an egg if the shell is cracked; if the egg's contents are leaking through the shell; if the egg is stuck to the carton; or if the eggshell is dirty, very stained, or has foreign material sticking to it.

If bacteria are present on the shell, they could enter the egg through a crack and contaminate the contents.

**11 Use eggs within a reasonable amount of time. Raw shell eggs will keep in the home refrigerator without much quality loss for up to three weeks.**

Separated egg whites and yolks should be refrigerated in tightly covered containers and used within four days. Cover the yolks with cold water before storing and pour the water off before using.

Hard-cooked eggs, in the shell or peeled, should be stored in the refrigerator and eaten within one week after cooking. Hard-cooked yolks should be used within five days.

Eggs held in the refrigerator too long may develop a bad flavor. Over time, they will gradually lose quality and some of their functional

properties, such as the ability to thicken sauces and make baked goods rise. If organisms that cause food spoilage are present, eggs will spoil. The rate at which these changes occur depends on many things, including the temperature and how the eggs are handled and stored.

**12 Follow good hygienic practices when preparing eggs and egg-rich foods. Wash hands, utensils, equipment and work surfaces with hot, soapy water before and after they come in contact with eggs and egg-rich foods.**

Protect food, utensils, equipment and the work area from people with infections and respiratory illnesses, pets and house-hold pests.

Cleanliness during food preparation helps stop the spread of any harmful bacteria that might be present. Dirty hands, utensils, equipment and work surfaces can contaminate any food they touch and should be cleaned before food is handled. This will prevent cross-contamination of food—transferring harmful bacteria from one food to another, usually from a raw food to the same food after it is cooked, or to another raw food, or to another cooked food.

**13 Break eggs into a clean container before cooking or mixing with other ingredients. If any shell fragments or blood spots are present, remove them with a clean utensil. Do not add eggshells to beverages or other dishes.**

If any bacteria are on the surface of the eggshell, they can contaminate the entire dish and increase the risk of illness. Eggshells may also give the dish a gritty texture.

Blood spots, while unappetizing to see, are harmless. They do not



indicate a fertile egg. Blood spots usually occur when a blood vessel ruptures in the hen when the egg is made. Some breeds lay more blood-spotted eggs than other breeds.

Federal regulations require that eggs with large blood spots be kept out of stores. Small blood spots are permitted in Grade B eggs. Small tolerances for blood spots are allowed in Grades AA and A eggs, however, because very small blood spots can be difficult to see during processing, especially in eggs with brown shells. (Grades are explained on page 6.)

- 14** **When preparing and serving eggs and egg-rich foods, keep them out of the refrigerator no more than two hours total (not including cooking time). If serving time is more than two hours, as for a buffet, serve these foods from small dishes and refill them with hot or cold food from the stove or refrigerator.**



To serve eggs and egg-rich foods hot, serve immediately after cooking, or hold for serving at 140 degrees F or higher for a short time. To serve them cold, put hot foods into shallow containers and refrigerate immediately after cooking so they will cool quickly. Cold cooked foods can be held for serving at 40 degrees F or below for a short time.

Leftovers should be refrigerated in covered containers immediately after serving. Do not mix leftovers from the serving table with other food that is still on the stove or in the refrigerator. Use within four days.

If harmful bacteria have enough time at the right temperature, they will grow or form a harmful toxin, either of which could make people sick. Most harmful bacteria survive and grow fast at room temperature, between 40 and 140 degrees F. Most are killed at temperatures of

160 degrees F or higher. Their growth is inhibited at 40 degrees F or below.

If food has been held at unsafe temperatures for more than two hours, it may become contaminated with harmful bacteria that are not destroyed by ordinary cooking. Heating this food to 160 degrees F will not make it safe to eat after exposure for more than two hours at an unsafe temperature.

- 15** **Thoroughly cook eggs and egg-rich foods to minimize the risk of harmful bacteria, such as salmonella.**

Cooking eggs and egg-rich foods to an internal temperature of 160 degrees F will destroy any salmonella bacteria that may be present. Use a cooking thermometer whenever possible to find out when this temperature is reached. Otherwise, follow the rules of proper food handling and the cooking directions.

The cooking times and temperatures needed for food to reach 160 degrees F, and for bacteria to be killed, are affected by the types and temperatures of the ingredients and their degree of acidity or alkalinity (pH value), as well as the total volume of food cooked, the amount of bacteria that may be present, and the accuracy and efficiency of the cooking appliance used.

“Thoroughly cooked eggs” include eggs cooked until the whites and yolks are not runny, hard-cooked eggs, baked eggs, eggs used in recipes that are baked, and other egg-rich foods cooked to an internal temperature of at least 160 degrees F. Stirred (soft) custards, for example, reach serving consistency between 175 and 185 degrees F. Homemade ice cream and eggnog can be made with cooked, custard-type bases.

**16 Be aware that there is a risk of becoming ill if you eat raw eggs and foods that contain raw eggs, as well as lightly cooked eggs and egg-rich foods. If you are vulnerable to infections caused by bacteria like salmonella, avoid these foods.**

Although food-borne illness is not usually a major health problem for most healthy individuals, it can be very serious, even life-threatening, to people who are vulnerable to bacterial infections. These people include the elderly, whose immune systems weaken with age, infants, whose immune systems are not fully developed, chronically ill people with weakened immune systems, and pregnant women because of risk to the fetus.

Raw eggs are used in Caesar salad, homemade mayonnaise, uncooked hollandaise and béarnaise sauces, fortified beverages, and homemade ice cream and eggnog made with uncooked bases. Eggs in cookie dough and cake batter are raw until after baking. Raw eggs added to a previously cooked dish are not sufficiently heated unless the entire dish is reheated to 160 degrees F.

Lightly cooked eggs are eggs served soft-cooked, soft-poached, soft-scrambled, and sunny-side-up. French toast is also lightly cooked. If you choose to eat raw or lightly cooked eggs, use special care to reduce the risk of illness.

**17 Take care with hard-cooked eggs that are hidden for an egg hunt to prevent cracking. Hide them in places that are protected from dirt, pets and other sources of bacteria. The total time for hiding and hunting the eggs must not be more than two hours. Eggs must be refrigerated until they are eaten.**

Hard-cooked eggs will eventually spoil if not refrigerated and should not be eaten if they are exposed to room temperatures for more than two hours. Since cooking will remove some of the protective oil coating sprayed on the shells, bacteria can enter the egg through the pores or cracks in the shells.

## Understanding Shell Egg Quality and Wholesomeness

### The Egg Design

Nature designed the egg to fulfill one main purpose—reproduction. This design also helps protect the quality and wholesomeness of the egg on its trip from the hen to the kitchen—if everyone handles the egg properly.

The eggshell is nature's packaging for the egg's contents. Thousands of tiny pores form passageways through the shell. The cuticle or bloom is a protective coating that covers the shell as the egg is laid and blocks the pores. Two shell membranes are located between the inner surface of the shell and the egg white. An air cell forms between the shell membranes after the egg is laid, usually in the large end of the egg. Twisted, cordlike strands of egg white, called chalazae, are on opposite sides of the yolk and hold the yolk in the center of the white.

Most eggs sold today are infertile because there are no roosters housed with the laying hens. Fertile eggs are often found at roadside stands or health foods stores. There are no nutritional differences between fertile and infertile eggs. If fertile eggs are not incubated there will be no development of the embryo and no way to distinguish them from infertile eggs. If fertile eggs are properly incubated for a few days, development of the embryo or a blood ring should be visible when the eggs

**If you choose to eat raw or lightly cooked eggs, follow these tips:**

- Use only Grade AA or A eggs that have been refrigerated. Grade AA and A eggs must have clean, uncracked shells. (Grades are explained on page 6.)
- Wash hands in hot, soapy water before and after handling the eggs.
- Eat immediately. Or refrigerate the dish until served, keep it cold during serving and eat it the same day it is made.
- Discard leftovers.





**Egg Sizes:  
The Six Official  
U.S. Weight Classes**

|             | <i>Minimum ounces<br/>per dozen</i> |
|-------------|-------------------------------------|
| Jumbo       | 30                                  |
| Extra Large | 27                                  |
| Large       | 24                                  |
| Medium      | 21                                  |
| Small       | 18                                  |
| Peewee      | 15                                  |

are candled. Federal regulations prohibit their use as human food.

**Egg Quality**

Egg quality is defined by USDA grade standards that are based on factors such as the condition of the white and yolk, the size of the air cell, and the soundness and cleanliness of the shell. The color of the shell and the nutritional value of the egg are not quality factors.

When an egg is laid, the white and yolk are at their peak quality. A newly laid egg is warm. It immediately begins to cool, and its contents contract slightly. Some air penetrates the shell through the pores and the two membranes separate to form a small air cell. If broken open, the egg's contents would cover a small area; the white would be thick and stand high; the yolk would be firm, round and high; and the chalazae (twisted, cord-like strands) would be very prominent.

Over time, the white and yolk lose quality. The yolk absorbs water from the white. Moisture and carbon dioxide in the white evaporate through the pores, allowing more air to penetrate the shell, and the air cell becomes larger. If broken open, the egg's contents would cover a wider area; the white would be thinner, losing some of its thickening and leavening powers; the yolk would be flatter, larger and more easily broken; and the chalazae would be less prominent and weaker, allowing the yolk to move off-center.

Eggs sold today are fresh, usually moving from processor to retailer within a few days after being laid. Refrigeration and proper handling help maintain their quality. For eggs to be identified as fresh on the carton, federal regulations require that they have not been held in refrigerated storage more than 30 days.

Freshness affects the cooking quality of eggs. Very fresh, high-quality

eggs are best for poaching and frying because they hold their shape and look most attractive. However, when they are hard-cooked, the white may stick to the membranes inside the shell and the eggs may be difficult to peel. When hard cooking, buy eggs a week to 10 days ahead of time for best peeling results.

**Grading Eggs**

Federal regulations define three quality grade levels that apply to all eggs sold to consumers: Grades AA, A and B. Grades AA and A are mostly sold in grocery stores. Grade AA is the highest quality grade level. Processors who pay for USDA's voluntary shell egg grading service have their facilities and procedures federally approved and monitored and are authorized to use the USDA grade shields on their egg cartons. Other processors operate according to state regulations that conform to the federal regulations. These processors use terms like "Grade A," without the shield, on their egg cartons.

Cartons with the federal grade mark must also have a three-digit lot number printed on them. This number is the consecutive day of the year on which the eggs were packed. For example, a carton with number 031 was packed on January 31; 032, on February 1; 033, on February 2; and so forth.

**Egg Wholesomeness**

Bacteria occur naturally in the environment. While some are helpful, such as those used to make vinegar from apple juice, others are harmful. Salmonella, for example, is one harmful bacteria that may be found on foods of animal origin—raw meat, poultry, fish, milk and eggs. These harmful bacteria can be controlled so they do not cause illness. Salmonella bacteria can be killed by cooking raw meat, poultry,



fish and eggs, and by pasteurizing raw milk and liquid eggs.

Bacteria can adhere to the surface of the eggshell or hide in the pores, and can penetrate the egg contents through cracks in the shell or through the pores. Scientists strongly suspect that certain salmonella bacteria can be transmitted from an infected laying hen directly into the interior of an egg before the shell is formed (transovarian transmission). However, the risk of contracting salmonellosis from eggs contaminated with salmonella bacteria is very small, especially if the eggs are handled properly.

### The Processor's Role

Processors take steps to be sure that eggs are fit for human consumption.

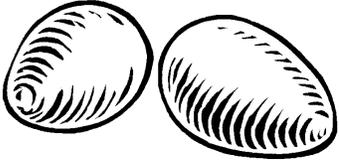
Most eggs are automatically washed, sanitized and dried. Washing removes dirt and bacteria from the surface of the shells. Washing also removes the natural protective cuticle, which many processors replace with a thin film of a colorless, odorless, tasteless, edible mineral oil.

The clean eggs then pass over a light in mass-scanning (candling) equipment, which detects unmarketable eggs. These eggs include "checks" (where the shell is cracked, but membranes are intact so contents do not leak), "dirties," incubator rejects, inedibles, loss, and leakers. Federal regulations prohibit restricted eggs from being sold as raw shell eggs.

Automatic scales weigh the clean eggs, packaging equipment puts them into cartons, and the cartons are placed into coolers until they are shipped. The size printed on the carton indicates the required minimum weight for a dozen eggs, not the weight of each egg in the carton. Extra large, large and medium are the sizes most often found in grocery stores. Most recipes are based on large eggs.

## Additional Information

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| <b>Safe Egg-Handling Practices</b>   | Meat and Poultry Hotline<br>10 a.m. to 4 p.m., Eastern time<br>Toll free: 1-800-535-4555<br>Washington, DC area:<br>(202)720-3333  |
| <b>Concerns and Complaints about Store-Bought Eggs</b>   | Local store that sold the eggs.<br>First the manager, then the company's consumer affairs officer or president.  |
| <b>State Egg Laws</b>  | Maine Department of Agriculture<br>Division of Quality Assurance<br>and Regulations<br>(207) 287-2161  |
| <b>Retail Egg Sales and Food Service and Food Manufacturing Egg Use</b>  | State and local health departments.  |
| <b>Grading of Shell Eggs and U.S. Standards, Grades and Weight Classes<br/>Inspection of Egg Products, Disposition of Restricted Eggs, Importation and Exportation of Egg Products and Restricted Eggs</b> | USDA-AMS-Poultry Programs<br>Standardization Branch<br>STOP 0259, Room 3944-South<br>1400 Independence Avenue, SW<br>Washington, D.C. 20250<br>Inquiries: (202) 720-3506   |
| <b>Importation and Exportation of Shell Eggs<br/>Domestic Disease Problems Affecting U.S. Egg-Laying Hens</b>  | U.S. Department of Agriculture<br>Animal and Plant Health<br>Inspection Service<br>National Center for Import/Export<br>Unit 40<br>4700 River Road<br>Riverdale, MD 20737-1231<br>Inquiries: (301)734-8896   |
| <b>Nutrition Labeling for Shell Eggs and Egg Products*<br/>Requirements for Specific Standardized Egg Products*<br/>Model Sanitation Codes for Retail and Food Service Establishments**</b>                | U.S. Dept. of Health and Human Services<br>Food and Drug Administration<br>Center for Food Safety and Applied Nutrition<br>*Div. of Regulatory Guidance (HFF-314)<br>**Div. of Cooperative Programs (HFF-340)<br>5100 Paint Branch Parkway<br>College Park, MD 20740-3835<br>Inquiries: 800-SAFEFOOD |



For more information  
about food safety, call  
USDA's Meat and  
Poultry Hotline:  
**1-800-535-4555**



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