

Salmonella Questions and Answers

AFIA is providing this question and answer document to assist in responding to questions regarding the recent outbreak of *Salmonella* Enteritidis in eggs and the ensuing recall of more than 500 million eggs by two farms in Iowa.

What is *Salmonella*?

Salmonella is a bacteria that is ubiquitous in our environment. Of the 2,200 serotypes existing both in and on humans and throughout most of our environment, the vast majority are not pathogenic to humans at normally found levels.

What is the difference in the many scientific names for *Salmonella*?

Currently, there are two recognized species: *S. enterica* and *S. bongori*, with six main subtypes found under *S. enterica*: *enterica* (I), *salamae* (II), *arizonae* (IIIa), *diarizonae* (IIIb), *houtenae* (IV) and *indica* (VI). These are further divided into serovars (serological variants) or serotypes.

Which serotypes of *Salmonella* are pathogenic to humans?

Two common serotypes are pathogenic to humans (cause Salmonellosis):

- *Salmonella* Enteritidis – can cause acute gastroenteritis in humans
- *Salmonella* Typhimurium – can cause food poisoning in humans

How do humans get these serotypes of *Salmonella*?

- *Salmonella* Enteritidis (SE) is the serotype that is the cause of the current egg recall, and is transmitted from the SE-infected laying hens to their eggs.
- *Salmonella* Typhimurium was the serotype found in the peanut and spinach recalls and can be transmitted by contamination from rodent or animal manure.

How do humans prevent *Salmonella* illness from eggs?

Egg recipes properly prepared in individual servings and promptly eaten are rarely a problem. Inadequate refrigeration, improper handling and insufficient cooking are all factors that have contributed to disease outbreaks. *Salmonella* is destroyed by heat. Eggs that have been handled and cooked properly should not cause human illness. Commercial products with eggs have undergone a pasteurization process that destroys *Salmonella*.

If an egg containing *Salmonella* has been kept refrigerated and someone who uses good hygiene practices serves it to you immediately after proper cooking, you'll simply have a nutritious meal. If the egg has been improperly handled, though, you might experience the foodborne illness called salmonellosis.

What is an adequate temperature to cook an egg?

Egg white coagulates between 144 and 149°F, egg yolk coagulates between 149 and 158°F and whole eggs between 144 and 158°F. Plain whole eggs without added ingredients are pasteurized but not cooked by bringing them to 140°F and maintaining that temperature for 3 and 1/2 minutes. According to the FDA Food Code, eggs for immediate consumption can be cooked to 145°F for 15 seconds.

If the eggs are to be used in a recipe with other food items, dilute the eggs with liquid or other ingredients, such as milk, or sugar (at least ¼ cup liquid or sugar per egg as in custard) and cook the egg mixture to 160°F, which will destroy harmful bacteria in a few seconds. Adequate cooking brings eggs and other foods to a temperature high enough to destroy bacteria that might be present.

What is the potential of *Salmonella* contamination from feed to animals and then to food?

There is very limited commonality between *Salmonella* serotypes found in feed, farm animals and humans. FDA says salmonellae found in feed are of three serotypes: *S. Montevideo*, *S. Cero* and *S. Seftenberg*

- There are two common salmonellae serotypes that are pathogenic to humans (cause Salmonellosis): *Salmonella* Enteritidis and *Salmonella* Typhimurium. It would be extremely rare for these serotypes to be found in feed or ingredients, unless they were contaminated by an outside source in storage.
- There are three common salmonellae serotypes found in feed that are not normally transfer to farm animals or humans. As a result, *Salmonella* is not recognized as a hazard reasonably likely to occur in animal feed manufacturing. However, recent publication of a Draft Compliance Policy Guide on *Salmonella* in feed details certain farm animal pathogens for which FDA will request feed to be recalled. This draft FDA guide can be found [here](#).
- Of the nine serotypes found in farm animals, only *Salmonella* Enteritidis has been known to transfer to human food and is found in poultry and is pathogenic to humans (cause of the current egg contamination).

Are modern agriculture practices to blame for the *Salmonella* outbreak?

No. Buying organic or local doesn't necessarily mean you're protected from *Salmonella* contamination. The source of the current outbreak is still under investigation and may not be found, but one likely culprit is rodents, which can be a problem for farms of any size. The particular strain of *Salmonella* associated with eggs—*Salmonella* Enteritidis—emerged in the late 1980s, when it moved from rodents to chickens.

Despite the hype, there's contradictory evidence about whether eggs laid by free-range or organically fed hens are less likely to contract the bacteria than eggs laid in larger farm settings. According to the USDA's Food Safety and Inspection Service, claims that chickens labeled kosher, free range, organic, or natural have lower *Salmonella* levels are unsubstantiated.

What is AFIA and the feed industry doing to help control *Salmonella*?

- AFIA has conducted two extensive Task Force studies on *Salmonella* and continues to work with scientists and FDA in identifying effective controls throughout the feed manufacturing process, where appropriate.
- AFIA introduced the first guidance for control of *Salmonella* in feed for the industry in 1990 which updated a 1970 USDA guide, continually monitors the science and updates the guidance as necessary, and the guidance is still effective today.
- AFIA's Pet Food Committee is releasing a *Salmonella* guidance document for the industry since pet food can be handled by humans in the home and it can potentially be a source of *Salmonella*. This Guidance document is also being provided to FDA.
- AFIA is currently working with USDA's Agriculture Research Service (ARS) to complete further research on *Salmonella* as it relates to feed.
- AFIA's Safe Feed/Safe Food Certification program has a component that addresses rodent control that is recommended for both feed and ingredient processing, which can be a transmission point for *Salmonella* into feed. In addition the SF/SF program addresses pathogenic microbial contamination where such microbes might occur in feed.

For more information or if you have additional questions, please contact AFIA's Richard Sellers at (703) 558-3569 or rsellers@afia.org.