German Federal Institute for Risk Assessment

FAQ

8 August 2024

# Selected questions and answers relating to hygiene of food and consumables in times of the bird flu – How can I protect myself and my family?

→ Changes to the version dated 9 April 2024: Addition of new findings on the transmission of the bird flu virus from infected cattle to humans through contact with the animals and consumption of milk and meat

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Concerned persons are asking whether poultry, poultry products or other foods such as cow's milk can become contaminated with the bird flu virus (various subtypes of the avian influenza virus including H5N1 and H5N8). Here, the German Federal Institute for Risk Assessment (BfR) provides answers to these questions.

Generally, the transmission of the pathogen via infected food cannot be ruled out. However, infections of humans with the bird flu virus are rare, and direct and close contact with infected birds or other animal species appears to be the main transmission route to humans. The BfR does not have any data verifying that humans have been infected and became ill after ingestion of food that was contaminated with the bird flu virus.

As the virus is sensitive to high temperatures, no adverse health effects are to be expected if the food has been well cooked. Meat is considered well-cooked if all sides and the core reach a temperature of at least 70 °C for 2 minutes. This is evident when the poultry meat is no longer red or pink and no red juices are leaking out.

So far, there is no evidence suggesting that humans can be infected by raw eggs or raw sausage products containing poultry meat from infected animals. However, it has been proven that eggs of infected animals can contain the virus both on the shell and also in the egg white and yolk. As a precaution, anyone who wants to protect themselves against bird flu viruses and other pathogens that are possibly present in eggs and egg products should not consume raw egg products (whipped egg whites, tiramisu, etc.). The egg white and egg yolk of boiled eggs should be solid.

The consumption of pasteurised milk from cattle possibly infected with the bird flu virus is not expected to have any adverse health effects, as the virus - like other pathogenic microorganisms - is efficiently inactivated by heating.

**What is bird flu?**

The highly pathogenic avian influenza (bird flu, classical fowl plaque) is a disease that is highly infectious for birds and poultry, and these hosts suffer from serious disease courses. Bird flu is caused by various subtype A strains of avian influenza virus, including the subtypes A(H5N1), A(H5N6), A(H5N8) and A(H7N9), that can also cause serious illness among humans in some cases.

The subtype A(H5N1) has also been found in mammals, including in mink, cats, and sea lions. Since 2024, the virus has been spreading among cattle in the United States, too, where it predominantly causes udder infections.

The BfR provided more information about the subtype H5N1 in 2004 at

https://www.bfr.bund.de/cm/343/gefluegelpest_infektionsrisiko_fuer_den_verbraucher_durch_lebensmittel.pdf

and about subtype H5N8 in 2021 at

http://vm-webextern-m.bfr.bund.de/cm/349/current-avian-influenca-case-in-germany-virus-transmission-h5n8-from-poultry-food-consumption-is-unlikely.pdf

Further information is available on the websites of the Friedrich Loeffler Institute (www.fli.de), the Robert Koch Institute (www.rki.de), and the Federal Ministry of Food and Agriculture (www.bmel.bund.de).

**Where has the bird flu been detected so far?**

There is more information about the latest spread of bird flu on the homepage of the Food and Agriculture Organization of the United Nations (FAO) at https://www.fao.org/animal-health/situation-updates/en and the World Health Organization (WHO), at https://www.who.int/health-topics/influenza-avian-and-other-zoonotic#tab=tab_1.

The US Animal and Plant Health Inspection Service provides information regarding the spread of H5N1 virus in cattle and humans in the United States (https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock) as well as the Centers for Disease Control and Prevention (https://www.cdc.gov/bird-flu/spotlights/).

**Can the bird flu virus be transmitted to humans?**

It is difficult to transmit the bird flu virus to humans. The WHO received a total of 893 reports of human infection with avian influenza viruses of subtype H5N1 from 24 countries between January 2003 and July 2024 (WHO, Avian Influenza Weekly Update Number 957

dated 26/07/2024). This is a very low number in light of the huge spread and high infection density of the pathogen in the global poultry population and the associated frequent contacts between humans and poultry. Also, only few cases of human infection with the other subtypes have been reported (WHO, Avian Influenza Weekly Update Number 957 dated 26/07/2024).

**How can the bird flu virus be transmitted to humans?**

The bird flu virus is primarily transmitted by breathing in (inhaling) contaminated dust particles or droplets. The virus can possibly also be transmitted by smear infection with virus-contaminated excretions on mucous membranes. It is not yet clear whether the virus can also infect people via other transmission pathways such as the digestive system. Persons who have close contact with poultry or diseased mammals should take suitable precautions. Detailed recommendations about this are stated on the websites of the Federal Institute for Occupational Safety and Health (http://www.baua.de) and the Robert Koch Institute (http://www.rki.de).

**Can the bird flu virus be transmitted to humans through infected cattle and their milk or meat?**

Since March 2024, cases of H5N1 infection in cattle have been reported in several US states. In this context, a few H5N1 infections have also been detected in humans with close contact to the diseased cattle. The infected persons showed light signs of illness, predominantly conjunctivitis and low-grade respiratory symptoms. As of yet, there is no evidence of human-to-human transmission.

In diseased cattle, the involved virus strain is similar to a strain that is currently widespread worldwide, particularly in wild birds. In the USA, the virus was detected in milk samples and swab samples from the mouth and throat of sick cattle. The disease in cattle was mainly characterised by temporary fever, lethargy, reluctance to eat and a drop in milk yield. In cattle, the virus multiplies mainly in the udder and transmission of the virus between cattle appears to occur predominantly through the udder and contaminated milking equipment.

Outside of the USA, no evidence of H5N1 infections in cattle have been found to date. No H5N1 virus has been detected in milk samples from German cattle (https://www.fli.de/de/aktuelles/kurznachrichten/neues-einzelansicht/gefluegelpest-keine-hinweise-auf-h5n1-infektionen-bei-milchkuehen-ausserhalb-der-usa/).

According to the reports from the USA, the virus was also detected in in milk samples from sick cattle. The virus was also detected in commercially available pasteurised milk in the United States, although the virus was no longer infectious. It is not yet known whether humans can become infected by consuming H5N1-contaminated milk. However, previous human H5N1 infections were mostly due to close contact with sick animals or their excrements. The consumption of pasteurised milk from cattle possibly infected with the bird flu virus is not expected to have any adverse health effects, as the virus - like other pathogenic micro-organisms - is destroyed by heating. Nevertheless, milk from infected animals should not be sold. Raw milk should generally be heated before consumption, also to protect against other pathogens that may be present.

The virus was detected in the lean meat of an infected cow; no evidence of virus transmission through consumption of raw beef or beef products from infected animals has been found so far. Using burger patties artificially contaminated with virus, it has also been shown that cooking them to be “well-done” or “medium” completely inactivates the virus.

**Is there a risk of infection when preparing and consuming poultry meat and eggs?**

Based on the current knowledge, direct contact with poultry is the most important transmission route of the virus between poultry and humans. There is only little known about virus transmission by the consumption of raw poultry meat products from infected animals. However, with respect to the preventive consumer protection, care should be taken to comply with hygiene rules when handling or preparing raw poultry meat and poultry meat products. As the virus is highly sensitive to high temperatures, no adverse health effects are to be expected if the food has been well cooked. Meat is considered well-cooked if all sides and the core reach a temperature of at least 70 °C for 2 minutes. This is evident to consumers when the poultry meat is no longer red or pink and no red juices are leaking out.

In the case of eggs or egg products, it is possible to protect against these viruses and other possibly present pathogens by avoiding the consumption of raw egg products (whipped egg whites, tiramisu etc.), and by ensuring that the egg white and yolks of boiled eggs are solid.

**How can consumers protect themselves?**

Humans should avoid contact with wild birds. This particularly applies for died animals and for regions in which the bird flu virus was detected in dead wild birds. Visitors to countries in which the bird flu is widely distributed among poultry flocks should avoid direct contact with poultry and their excretions. It is advised to refrain from visiting poultry markets of poultry farms. Import bans on poultry or other birds, poultry meat, eggs and other poultry products, or feathers or untreated hunting trophies from affected countries into the European Union should always be observed to prevent further outbreaks of bird flu in domestic commercial livestock. When preparing poultry meat and raw eggs, the general hygiene regulations should be observed:

- Store and prepare raw poultry products and other food separately, especially if the latter is not reheated.
- Thoroughly clean equipment and surfaces that have come into contact with raw poultry products with warm water and detergent.
- Dispose of packaging materials, thawing water and similar immediately.
- Wash hands with warm water and soap.
- Cook poultry meals thoroughly. This means that all areas, even the core, must have reached a temperature of at least 70 °C for 2 minutes.
- In the case of eggs or egg products, it is possible to protect against these viruses and other possibly present pathogens by avoiding the consumption of raw egg products (whipped egg whites, tiramisu etc.), and by ensuring that the egg white and yolks of boiled eggs are solid.

In countries where the virus has also been detected in cattle, close contact with infected animals should be avoided. Raw milk should generally be heated before consumption, also to protect against other pathogens that may be present.

**Can animals and humans become infected with bird flu from animal or human drinking water?**

Surface water from waters with large populations of wild birds may, in principle, be contaminated with bird flu viruses. It should not be used as drinking water for breeding and commercial poultry if it has not been appropriately treated.

Drinking water in Germany is primarily collected from deep wells. This guarantees a high level of safety regarding microbiological risks. Wherever drinking water is collected from surface waters, complex technical procedures are used that comply with the tolerances and requirements of the Drinking Water Regulations. This reliably rules out contamination of drinking water with bird flu viruses. The German Federal Office for Environment provides more information about drinking water (https://www.umweltbundesamt.de/themen/wasser/trinkwasser).

**Can lettuce or vegetables transmit bird flu viruses?**

In principle, lettuce, vegetable and fruit farmed outdoors can become contaminated with bird droppings. These may contain bird flu viruses. To minimise the risk of transmission of viruses, bacteria and parasites to humans, lettuce, fruit and vegetables are roughly cleaned in the production facility before storage. The usual hygiene rules should be observed when preparing lettuce, fruit and vegetables at home: Before preparation or consumption, wash thoroughly to remove all earth and manure particles. Cooked vegetables also offer more safety against infection: The bird flu virus is inactivated if heated to above 70 °C for at least 2 minutes.

**How can consumers recognise the origin of eggs or poultry?**

The code number of the packing point must be stated on egg cartons. This may also contain information about the origin of the eggs. The eggs themselves bear the country code of the country of origin.

Poultry meat sold in retail shops bears the approval number of the slaughterhouse or meat processing facility, and poultry meat that was imported from non-EU countries the country of origin, on the packaging or label.

There are relevant legal regulations that govern the import and the trade of live poultry from livestock populations and their products. There are more recommendations about hygienic handling of poultry meat on the websites of the German Federal Institute for Risk Assessment (www.bfr.bund.de).

**Can humans become infected with the bird flu virus after eating shellfish and fish?**

It is known that viruses can be transmitted to humans after eating uncooked or inadequately cooked shellfish and thereafter cause gastroenteritis. These are usually norovirus and

hepatitis A virus that are very resistant to environmental influences. In contrast, influenza viruses are very sensitive to environmental influences. Examinations of samples from surface waters confirm the tendency that the infectivity of avian influenza viruses decreases proportionally to the salt content. Human infection with bird flu viruses after eating shellfish or fish is therefore unlikely and has not yet been proven. Cooking shellfish and fish offers additional protection against infection: The bird flu virus is usually inactivated if heated to above 70 °C for at least 2 minutes.

**Can poultry manure still be used as fertilizer?**

Poultry manure from healthy poultry livestock not infected with the bird flu virus from operations that lie outside the bird flu restricted areas can still be used. Poultry manure made of infected or potentially infected stocks must be 'decontaminated', i.e. disinfected. There are a series of effective procedures that are specified by the *Tiergesundheitsgesetz* (Animal Health Act) and related regulations.

**Can humans become infected with bird flu from objects like down jackets, pillows or quits produced with feathers or down from infected animals?**

Down is washed during production and then dried at 100 °C. Influenza viruses are very sensitive to heat and to the detergents used in soaps and washing agents. Based on the current knowledge, the methods used to produce down also inactivate bird flu viruses so that they are no longer infectious. An infection with the bird flu virus through objects that contain feathers or down is therefore very unlikely.

**About the BfR**

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. The BfR advises the Federal Government and the States ('Laender') on questions of food, chemicals and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

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