

Protection against foodborne infections in private households

Many people are concerned about pesticides or other chemical substances in food. Handling food incorrectly can also endanger health, however, especially if it results in foodborne infections or food poisoning. Roughly 100,000 illnesses that may have been caused by the presence of microorganisms in food, in particular bacteria, viruses or parasites, are reported in Germany every year, and the real figure could be much higher. Foodborne infections are usually associated with stomach pain, diarrhoea and vomiting. Infections with hepatitis viruses could also lead to inflammation of the liver. Usually, foodborne infections and food poisoning are self-limiting diseases. For people whose body's defences are impaired with respect to foodborne infections or whose immune systems are not fully developed (small children, pregnant women, older people or people with existing illnesses), however, they can be life-threatening in extreme cases.

The following steps should be taken to ensure that these consequences do not occur:

- ▶ Avoid the contamination of food with pathogens
- ▶ Reduce the propagation of pathogens in food
- ▶ Prevent the survival of pathogens in food.

How do pathogenic germs get into the kitchen?

Pathogens can find their way into the kitchen through:

- ▶ Raw food, such as meat, poultry, fish, eggs, fruit, vegetables and herbs
- ▶ People, especially those with infectious diseases
- ▶ Pets, rodents and insects

How can the contamination of food with pathogens be avoided?

To avoid the contamination of food with pathogens, the transfer of microorganisms from (usually raw) food to other food must be prevented. This form of bacterial transfer is known as cross-contamination. The microorganisms may be transferred directly from one food to another if these foods come into contact with one another unpackaged. Indirect transfer via hands, kitchen equipment, work surfaces, knives or other kitchen utensils is also possible. Protection against cross-contamination should extend throughout the entire food chain, i.e. from purchasing, through storage and transport, all the way to preparation in private kitchens.



Cooking together is fun. Hygienic working helps here to protect yourself and others from infections and poisoning.

Other causes of foodborne illnesses are temperature errors that enable pathogens to survive and propagate in food. In addition to inadequate cooling during storage, inadequate heating during food preparation and inadequate reheating of prepared meals are of significance here. Other errors include keeping food warm for long periods at too low temperatures and cooling heated food too slowly.

In the following paragraphs, the German Federal Institute for Risk Assessment (BfR) has compiled some recommendations for consumers who want to protect themselves, their families and their friends from illness through the hygienic handling of food.

What do I have to consider when selecting food products?

Raw food of animal origin is contaminated with pathogens particularly often. Its consumption may pose a risk to the health of small children, pregnant women or people with weakened immune systems. The following foods are not recommended for these groups of people unless they are completely heated before consumption:

- ▶ Raw minced meat, even when prepared (e.g. steak tartare) and raw meat cuts such as carpaccio
- ▶ Raw pork sausage products, particularly spreadable, short-matured varieties (e.g. Mettwurst)
- ▶ Foods containing raw egg
- ▶ Unpasteurised milk and raw milk cheese
- ▶ Raw fish (e.g. sushi) or seafood (e.g. raw oysters)
- ▶ Smoked salmon and gravlax

As a precaution, expectant mothers and people with weakened immune systems should also refrain from consuming hot-smoked fish products (e.g. trout fillet, mackerel) and soft cheeses from pasteurised milk if these were produced with red or yellow smear (e.g. Handkäse, Harz cheese, Limburger, Munster, Tilsit cheese, Esrom cheese).

The consumption of raw sprouts or frozen berries has also been identified as a cause of foodborne infections. Those who wish to protect themselves from infection should only eat raw sprouts and frozen berries if they have been intensely and thoroughly heated beforehand.

Consumers should take note of the “best before” and “use by” dates when purchasing packaged goods. The best before date is the minimum date up until which the food will remain fit for consumption if stored properly. The manufacturer guarantees optimum quality (appearance, smell, taste, consistency) up to this date. The food can usually still be consumed after this date, but the manufacturer no longer guarantees this.



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To protect against, infectious diseases frozen berries should be fully heated prior to consumption.

In contrast to this, a “use by” date means that the food product must not be sold after this date. It should not be consumed after this date because a negative effect on health can no longer be ruled out. That is why products that are highly perishable from a microbiological point of view and could pose a direct danger to health after a short time (e.g. minced meat, fresh poultry) carry a “use by” date.

When shopping, consumers should also check that food packaging is intact. If packaging is damaged, there is always a risk of pathogens entering the food after packaging. In addition contents leaking from packaging could themselves be a cause of cross-contamination. Purchasing damaged or dented tins of food is not recommended because such tins may not be airtight. Cans with convex lids may contain pathogens that have formed gases and toxins.

What do I have to consider when transporting foods?

To prevent bacteria from propagating in food when the cold chain is broken, refrigerated and frozen food should be brought home as quickly as possible and placed in the fridge or freezer. When purchasing large amounts of groceries, these products should be placed in the trolley last. In summer, it is also advisable to transport particularly perishable foods in coolers when travelling long distances. Alternatively, consumers should shop for groceries early in the morning or late in the evening. The same precautionary measures apply when perishable prepared foods are to be brought to parties or celebrations. Warm foods purchased outside the home and intended for consumption within the home should be transported quickly and consumed immediately, because any pathogens contained could propagate very quickly at temperatures below 60 °C.

What do I have to consider when storing foods?

To avoid contamination of food during storage, it should be kept in sealed containers or completely covered. This also guarantees that neither domestic pets nor insects can access the food. Food stored over long periods should be checked for pest infestation several times a year. Food with pest infestation must be disposed of.



Food should be protected from contamination during storage. Closable containers can be helpful.

Because the propagation of most bacteria can be slowed down or even stopped by refrigeration, perishable foods should be stored in the fridge until consumption or preparation.

The following should be taken into consideration here:

- ▶ Store cut vegetable salads and cut fruits, particularly melons, in the fridge until consumption
- ▶ Even in the fridge, store foods in sealed containers or completely covered
- ▶ Place meat, poultry and fish on the lowest shelf in the fridge (right above the vegetable compartment) or in a special compartment (0 °C compartment) so that meat juices cannot drip onto other foods and because this area is the coldest
- ▶ Follow cooling recommendations on packaging or use the food on the day of purchase if the cooling temperatures cannot be adhered to, e.g. 2 °C for minced meat
- ▶ Set the fridge temperature to no more than 7 °C (lower than 5 °C is ideal); check the temperature regularly in different parts of the fridge
- ▶ Do not open the fridge more often than necessary and do not leave it open
- ▶ To make sure that cool air can circulate adequately between the foods, do not overfill the fridge
- ▶ Defrost fridges without automatic defrosting occasionally according to the manufacturer's instructions
- ▶ Check foods for the shelf life specified by the manufacturer and for spoilage at least once a week (people with weakened immune systems should consume foods as quickly as possible after purchase and long before the specified best before date)
- ▶ Use up highly perishable foods as soon as possible after opening the packaging. This also applies to food remaining in open cans or jars and to dry products dissolved in liquid, such as powdered sauces and powdered milk
- ▶ Clean the inside of the fridge several times a year

If perishable foods are offered outdoors over longer periods at barbecues, picnics or garden parties, these also need to be adequately cooled.

What do I have to consider when preparing food?

Contamination of food during preparation can be avoided as follows:

- ▶ Keep pets away from foods and do not stroke them during food preparation
- ▶ Before starting food preparation, attend to personal hygiene (clean clothes, clean hands and fingernails, hair tied back if necessary and any hand jewellery removed)
- ▶ Avoid touching your mouth, nose and hair
- ▶ If possible, prepare food with clean utensils rather than with your hands

If sufficient cool storage space is available, the following sequence is recommended for preparing food:

- ▶ First, prepare dishes that are not to be heated up before consumption (e.g. desserts and dressed salads)
- ▶ Then prepare plant-based foods for raw consumption, e.g. lettuce or chopped vegetables
- ▶ Lastly, prepare raw foods of animal origin (e.g. meat, poultry)

If it is not possible to keep to this order for organisational reasons, thorough cleaning of work surfaces and kitchen equipment and washing of hands is necessary between the work steps.

Cross-contamination can be prevented by means of the following measures:

- ▶ Never use the same kitchen utensils for handling raw and cooked foods
- ▶ Use one chopping board for cutting meat and poultry and a different one for fruit and vegetables
- ▶ Do not cut cooked or heated foods on chopping boards on which raw food was cut beforehand unless the chopping board has been thoroughly cleaned
- ▶ Wash hands immediately after contact with raw food

In general, chopping boards made of plastic can be cleaned in the dishwasher at a high temperature (above 60°C) and are therefore more suitable than wooden chopping boards for cutting raw foods. Chopping boards, whether made of wood or plastic, should always have a flat surface so that they can be cleaned thoroughly. For this reason, chopping boards with grooves or recesses in which bacteria can attach and multiply should be replaced by new boards.



All kitchen utensils, such as knives and chopping boards that had contact with raw foods must be cleaned thoroughly before further use.

Whenever hands have come into contact with raw food, there is a danger of pathogens being transferred to handles (e.g. kitchen taps, fridge door handles, stove knobs, spice jars). They can then be transferred via the hands from there to other foods, consumption of which could subsequently cause illness. It is advisable to fit the kitchen sink with a single-lever mixer tap so that it can be turned on without direct hand contact.

Raw food of plant origin, such as fruit, vegetables, fresh herbs, sprouts and lettuce, can also be contaminated with pathogens. For this reason, these foods should be carefully washed during preparation or before consumption, ideally under running water. If the plant-based foods are washed in the sink, this should be cleaned thoroughly in advance and rinsed with sufficient clean water. The risk of infection can be minimised by peeling, especially in the case of certain vegetable types for raw consumption that grow close to the ground (e.g. cucumbers and carrots). To prevent existing pathogens from propagating, fruit (particularly melons), vegetables and lettuce should be consumed promptly or placed in the fridge after chopping. In addition, those who wish to protect themselves from illness should only eat raw sprouts and frozen berries if they have been intensely and thoroughly heated beforehand.



Thorough heating of raw foods of animal origin can prevent foodborne infections. A meat thermometer can be used to check whether the necessary temperature (at least 70°C) was reached for at least two minutes at the core of the food.

What do I have to consider when heating, warming and cooling foods?

The following aspects need to be considered to protect yourself from food-related illnesses:

- ▶ When preparing and warming foods, ensure that they are heated adequately (to at least 70°C for two minutes in the centre of the food; if you are unsure, check the temperature with a meat thermometer)
- ▶ When preparing food in the microwave, make sure that it is completely heated and stirred occasionally
- ▶ Keep hot food at or above a temperature of 65°C or cool it to or below 7°C within a few hours (divide large quantities over several shallow containers for this purpose)
- ▶ In dishes containing both raw and cooked ingredients, cool the cooked ingredients adequately before adding the other ingredients
- ▶ Store leftovers of cooked meals in the fridge and use them up within two to three days

Cooking foods to core temperatures of 70°C to 100°C kills most existing pathogens. With certain species of bacteria, resistant particles (spores) can germinate rather than be killed off by cooking. Surviving germs and bacteria that enter food after heating (e.g. during seasoning) can propagate at temperatures between 10°C and 60°C. Certain species of bacteria form heat resistant bacterial toxins when they propagate. These bacterial toxins can cause illnesses, even if the food is adequately cooked after being contaminated. This is why the temperature range at which bacteria can propagate should be avoided by keeping food hot or cooling it as quickly as possible after cooking.

What do I have to consider when preparing eggs?

Raw eggs can contain pathogens in the inside or on the shell. Special care must therefore be taken to ensure that raw eggs are handled in a hygienic manner.

Notes on preparing eggs:

- ▶ Keep raw eggs in the fridge at a maximum temperature of 7°C to reduce the propagation of Salmonella
- ▶ Heed the specified shelf life
- ▶ If possible, do not use eggs with very dirty or cracked shells in food preparation
- ▶ Avoid using raw eggs in dishes that are to be consumed without being heated further (e.g. desserts, mayonnaise, bakery products with fillings or toppings that are not heated)
- ▶ People whose defences against foodborne infections are impaired or whose immune systems are not fully developed (particularly children, sick people and the elderly) should only eat eggs after they have been completely heated, i.e. when the egg white and yolk are solid
- ▶ Consume egg dishes promptly or store them in the fridge at a maximum of 7°C
- ▶ Eggshells or raw eggs should not come into contact with other foods
- ▶ When breaking eggs, clean up sprayed egg white or yolk immediately with disposable kitchen towel
- ▶ Clean work surfaces thoroughly after breaking eggs
- ▶ Wash kitchen equipment that has come into contact with raw eggs immediately with hot water and washing up liquid or in the dishwasher
- ▶ After preparing raw eggs, wash hands thoroughly with hot water and soap and dry them carefully

What do I have to consider when preparing meat, poultry, fish and seafood?

Raw meat and poultry as well as raw fish and raw seafood could be contaminated with pathogens. For this reason, particular care needs to be taken to ensure that these foods are handled in a hygienic manner.

The following rules should be observed:

- ▶ Defrost frozen meat, poultry or fish before preparation so that the temperature required to kill pathogens is reached during cooking, even in thick pieces and at the bone
- ▶ Defrost frozen food in the fridge to reduce the propagation of bacteria on the surface of the food
- ▶ Continue preparing raw animal-based food immediately after it has been defrosted in the microwave
- ▶ To defrost food, remove the packaging, place the frozen food in a bowl and cover the bowl
- ▶ Dispose of thaw water and packaging carefully
- ▶ Clean surfaces, utensils and hands thoroughly after contact with thaw water
- ▶ If frozen foods are not to be defrosted before preparation in line with the manufacturer's instructions, follow these instructions exactly and check that the inside of these food is at an adequate temperature before consumption
- ▶ Do not wash poultry meat if possible, as germs can spread in the kitchen by doing so. If it does have to be washed in order to remove bone splinters or poultry excrement, for example, the sink and surrounding surfaces must be thoroughly cleaned immediately afterwards. If necessary, very moist meat surfaces can be dabbed with disposable kitchen roll which must then be disposed of immediately.
- ▶ Cook meat and poultry sufficiently and evenly before consumption until the meat juice that escapes is clear and the meat has taken on whitish (poultry), grey-pink (pork) or grey-brown (beef) colour
- ▶ If you are unsure, check the internal temperature using a meat thermometer (at least 70 °C for two minutes)
- ▶ Heat fish until the fish meat has lost its glassy appearance and can be broken apart easily with a fork
- ▶ Wash kitchen equipment used for preparation with hot water and washing up liquid or in the dishwasher
- ▶ After touching raw meat, poultry, fish or seafood, wash hands thoroughly with warm water and soap and dry them carefully

What do I have to consider when washing hands?

Pathogens can be transferred to food via hands which have not been washed properly. For this reason, hands should be washed thoroughly and dried carefully:

- ▶ After using the toilet
- ▶ After changing a nappy
- ▶ After contact with pets or their supplies
- ▶ After sneezing or blowing your nose
- ▶ After contact with waste
- ▶ After gardening
- ▶ Before preparing meals
- ▶ Immediately after handling raw meat, poultry, fish or eggs
- ▶ After handling raw vegetables
- ▶ Before eating

Thorough hand washing involves using soap and running water. It is therefore advisable to keep liquid soap next to the kitchen sink. Separate towels should be used for drying hands and drying dishes. These towels should be changed once a week, or more often if they are used very frequently, and washed at a temperature of at least 60 °C. Damp hand towels should be dried if they are not going to be washed straight away because this reduces the propagation of bacteria. If no clean running water is available to wash your hands (e.g. at picnics or when travelling), moist towels soaked in cleaning agents are an alternative.

What do I have to consider when cleaning the kitchen?

Cleaning the kitchen has the aim of reducing the presence of microorganisms on kitchen surfaces and equipment and thus minimising the occurrence of foodborne illnesses. As bacteria are too small to be seen with the naked eye, surfaces or hands that appear clean are not necessarily free of germs. Nevertheless, the use of a simple household cleaner is generally sufficient. The use of special disinfectants is only required if recommended by a doctor or health authority in the event of illness.

Dirty cloths, sponges and brushes used to clean dishes and the kitchen could spread pathogens in the kitchen and thus pose a risk. The more often raw food is prepared in the kitchen, the more often the cloths, sponges and brushes used should be cleaned or replaced. Bacteria can multiply very quickly at room temperature,

particularly on wet cloths and sponges. For the reasons specified above, sponges are not particularly well suited for cleaning in the kitchen because they dry very slowly and are often not changed frequently enough. Cloths (cleaning rags or dish cloths, tea towels) should be dried after use, changed as often as possible (at least once a week) and washed at a temperature of at least 60 °C. Washing up brushes made from plastic can generally be cleaned in the dishwasher.

The following points should also be considered when cleaning the kitchen:

- ▶ With regard to the kitchen layout, make sure to choose smooth, easy to clean surfaces and tidy the kitchen regularly
- ▶ After coming into contact with raw meat or poultry, raw eggs, fish or vegetables, surfaces and equipment should be washed thoroughly with very hot water and washing up liquid and then rinsed under running water if possible
- ▶ Keep the handles of drawers, fridges, dishwashers etc. clean
- ▶ Use disposable kitchen towels to wipe up food residues
- ▶ Use separate cleaning cloths for dishes, work surfaces and floors
- ▶ Dry surfaces and equipment thoroughly after cleaning, because bacteria cannot propagate on dry surfaces and some may even die off
- ▶ If possible, do not clean pets' cages in the kitchen
- ▶ Use separate brushes or cloths to clean pets' feeding and drinking bowls



Bacteria can propagate in damp cloths and sponges and transfer to dishes and surfaces during cleaning. Damp cleaning utensils should therefore be dried quickly and replaced frequently.

What do I have to consider additionally when cleaning dishes and cutlery?

Dirty dishes and cutlery should be cleaned promptly. Heavily soiled dishes and cutlery should be rinsed off before cleaning.

The following points should be considered when dishes are washed in the sink:

- ▶ Keep the sink, dishcloths and washing up brushes clean
- ▶ Have the water as hot as possible and use an adequate amount of washing up liquid (when washing large quantities of dishes, change the water from time to time)
- ▶ Rinsing the cleaned dishes under running water can further reduce the number of bacteria on the surfaces
- ▶ Dry dishes if the remaining water cannot run off quickly
- ▶ Dry dishes with a clean and dry tea towel (do not use a hand towel, because bacteria could be transferred to the clean dishes)

If dishes are cleaned in a dishwasher, wash programmes with temperatures of at least 60 °C should be preferably used for hygiene reasons. To ensure that the cleaning agent can work properly, the dishwasher should not be overfilled. The inside of the dishwasher itself should also be cleaned from time to time. Particular attention should be paid to the condition of the filter and rubber seals.

What do I have to consider when handling waste?

Waste containers should be emptied regularly. They should be cleaned at least once a week with warm water and a cleaning agent and then dried. After contact with waste, hands should be washed with warm water and soap and then dried carefully.

What do I have to consider with respect to infectious diseases?

The risk of food becoming contaminated with pathogens is particularly great in households in which persons with infectious illnesses live. Such people should therefore be careful to ensure good personal hygiene, particularly with respect to their hands. The use of alcohol-based hand disinfectant, particularly after visiting the toilet, may be necessary if this is recommended by a doctor or health authority. The same applies to the addition of disinfectants when cleaning the kitchen and bathroom. Surfaces that have come into contact with body fluids or excrement of the infected person should be cleaned thoroughly and disinfected if possible. Wearing disposable gloves can provide additional protection against infection.

The public domain is subject to legal regulations which may prohibit infected people from preparing food for other people under certain circumstances. Where possible, this should also be avoided in private households, particularly in the case of:

- ▶ Diarrhoea, vomiting and fever
- ▶ Purulent inflammation of the ears, eyes or nose
- ▶ Skin diseases

Inflamed areas of skin (wounds, rashes) are often contaminated with bacteria which could trigger illnesses after propagation in foods. For this reason, injuries to hands and arms should be covered with water-proof bandaging material while food is being handled.

Coughs and sneezes increase the likelihood of pathogens being excreted from the mouth and nose. For this reason, people should sneeze or cough into their sleeves rather than their hands and turn away from food when doing so. Ideally, paper tissues should be used for blowing the nose. These should be disposed of after a single use and the hands should be washed thoroughly with warm water and soap.