Common sense in the kitchen

Like all living things, the bacteria that cause food-borne illness need food, air, water, warmth and time in order to thrive. Remove one of these essentials and growth will stop—or at least be inhibited.

by Diane Roberts

At some time in our lives most of us have experienced the discomfort and unpleasant symptoms of a food-borne infection or intoxication. In most instances the illness resulted from inadequate food safety practices during preparation of the suspected food.

Food safety is the science which aims to produce food which is safe for the consumer and of good keeping quality. Its application begins at the farm where food animals are raised and crops are grown, or wherever fish and shellfish are gathered; and it extends through the various processing procedures to the final stage of preparation in the kitchen. There is little the consumer can do about hygiene in the early parts of the food chain, so efforts must be concentrated at the ultimate stage of preparation before consumption.

Good food safety is basically common sense; but it only becomes common sense when the consumer has acquired some knowledge of the main sources of the agents of food-borne illness and how they can multiply and spread in the kitchen. The bacteria that cause food-borne illness, like all living things, have certain requirements for life: food, water, air, warmth and time. Remove one of these essentials and growth is stopped or at least inhibited. So the principle of food safety is to prepare food under conditions which do not permit bacterial growth in food or allow further contamination within the kitchen.

The consumer should be aware that most food entering the kitchen is not sterile but bears a varying load of assorted micro-organisms depending on the type of food and the treatment it has received. For example, fresh foods such as raw meat and poultry and vegetables will carry heavy bacterial loads. Some of these organisms will be capable, under the right conditions, of causing food-borne illness while others play a role in food spoilage. Certain foods, such as canned vegetables, fish and some meats, may have received heat treatment which has killed all bacteria present.

In general, food-borne illness results from swallowing large quantities of bacteria in food or of the toxins they produce. There are exceptions, where small doses of bacteria can cause infection; this depends on the organism concerned, the virulence of the strain, protective factors afforded by the food itself and the susceptibility of the individual.

There are two basic rules to remember when preparing food, and these should help to reduce the risk of food-borne illness:

- good temperature control throughout all kitchen procedures—keeping foods at temperatures sufficiently hot (above 60°C) or cold (below 10°C) prevents bacterial growth and multiplication; the zone between 10° and 60° is the so-called "danger growth in the kitchen.}

When there is a household refrigerator, in developing or developed countries, carelessness during storing and preparing can still result in food-borne illness.

A North African family at table. Even when there is a household refrigerator, in developing or developed countries, carelessness during storing and preparing can still result in food-borne illness.

Photo WHO/Zafar
Where there are no facilities for storing food at safe temperatures, cooked food should be eaten hot, immediately, and not stored;
- careful attention to cleaning procedures prevents cross contamination, that is, the spread of organisms from raw to cooked foods by direct contact or via hands, surfaces, utensils and cooking equipment.

In the industrialised countries, there are many sophisticated aids to help keep food safe—such as cold larders, refrigerators and freezers or a variety of cooking appliances, many with timing devices, that permit food to be cooked and served at a predetermined time. There are plentiful supplies of clean, safe water and of hot water for cleaning purposes. Yet we continue to see outbreaks of food-borne illness arising from carelessness in the catering kitchen and the domestic kitchen.

### How to keep food safe

1. Store raw and cooked foods separately
2. Do not keep perishable foods in the danger zone (between 10° and 60°C)
3. Thaw frozen meat thoroughly before cooking
4. Cook all food thoroughly; do not part cook or undercook
5. Serve cooked food immediately or—
6. Cool it rapidly (within one and a half hours) or—
7. Keep it hot until required
8. Reheat food thoroughly
9. Do not prepare food too far in advance of needs
10. Clean all surfaces, utensils and the hands thoroughly after preparing raw foods
11. If the water supply is of doubtful purity, boil all water used during food preparation or for cleaning equipment and utensils.

In developing countries, many of these facilities are not available. Food may be cooked over an open wood fire, water supplies are frequently impure and fuel is not always available to heat water to provide a safe means of food preparation and cleaning of utensils. This makes the rules of good food safety more difficult to apply. A hot climate, high humidity, lack of
refrigerator, local habits, poor sanitary facilities and a greater prevalence of intestinal pathogens and parasites all contribute to the spread of diarrhoeal diseases in these countries.

Safe and unsafe foods

The following foods and liquids can be considered safe:

- **Water** when boiled, filtered, chlorinated or bottled.
- **Milk** if pasteurised, ultra-heat treated, sterilised or boiled. Raw milk is frequently associated with outbreaks of food-borne illness even in the developed countries. Its use should be discouraged, or if it is the only type available it should be boiled first.
- **Ice-cream** provided the mix is pasteurised, cooled rapidly and kept cold until frozen.

**Canned foods**: most receive a heat treatment aimed at killing all bacteria present. Others receive a lesser process and should be stored in the refrigerator.

Bread, flour, jams and honey, pickles and most fruits and fats are generally safe because they contain insufficient available water to allow bacterial growth or have too great an acidity.

The foods which cause the greatest problems because they encour-

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<th>Sources of harmful bacteria in the kitchen</th>
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<tr>
<td><strong>Bacteria</strong></td>
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<td><strong>Salmonella</strong></td>
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<td><strong>Clostridium perfringens</strong></td>
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<td><strong>Staphylococcus aureus</strong></td>
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<td><strong>Clostridium botulinum</strong></td>
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<td><strong>Bacillus cereus</strong></td>
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<td><strong>Vibrio parahaemolyticus</strong></td>
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<td><strong>Escherichia coli</strong></td>
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<td><strong>Campylobacter</strong></td>
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Once cooked, it is best to serve such foods hot immediately, or to cool them rapidly (within one and a half hours) and refrigerate them until required, or to keep them hot (above 60°C). If reheating is necessary, this should be thorough until the food is piping hot throughout.

Take great care with handling and storing cold cooked meats. Storage out of the danger zone is essential to prevent organisms multiplying which may have survived the cooking procedure or reached the food from the hands of the food preparer.

Never place large bulks of hot food directly into the refrigerator as this will cause the temperature and humidity to rise and create an environment unsuitable for storing per-
ishable foods. Rapid cooling takes place if the food is broken down into small quantities, or if it is liquid, into shallow layers, and placed near a moving air current.

Salad vegetables and fruits which cannot be peeled should be well washed, preferably in water containing hypochlorite or other disinfectant. These foods are particularly hazardous in countries where crops are irrigated with sewage-polluted water, where night soil is used as fertiliser or where market stall holders may “freshen” produce by sprinkling it with water of dubious quality.

Don’t store cooked rice for long periods of time—not even for two hours or more—unless it can be kept out of the danger zone. The raw grain is often contaminated with spores of *Bacillus cereus* which can survive cooking and germinate and multiply in a bulk of rice cooling slowly at high ambient temperatures. An extremely heat-resistant toxin forms as this organism grows, and the toxin will not be destroyed by subsequent reheating of the rice.

Seafoods eaten either raw or cooked often give rise to incidents of both bacterial and viral gastroenteritis. Shellfish normally eaten raw, such as oysters, should only be obtained from reputable sources—preferably suppliers who use adequate depuration processes. Store frozen cooked prawns, shrimps and crabs in the cold until required.

Herbs and spices are not, as is quite widely believed, capable of destroying bacteria. On the contrary, most of them carry heavy bacterial loads, particularly of sporing organisms, and add a further source of contamination to a dish. They should be added to food at the beginning of the cooking period so as to receive the full benefit of the heat treatment applied. Adding herbs and spices after cooking can help to contaminate a previously safe dish, and this could be dangerous if it is not eaten immediately.

Very young children are most susceptible to food-borne illness. When preparing infant feeds from dried formulae, follow the manufacturers’ instructions carefully and prepare the feed not too far in advance of needs unless it is to be refrigerated immediately. Greater care is also needed in preparing foods intended for old and infirm persons or for pregnant women.