



NSW Food Authority

safer food, clearer choices

# Guidelines for food service to vulnerable persons

Guidelines to comply with the  
Vulnerable persons Food Safety Scheme  
of Food Regulation 2010 and Standard 3.3.1  
of the Food Standards Code

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## Definitions

**4-hour/2-hour storage rule** means the alternative to temperature control that is specified in the Food Standards Code. Where potentially hazardous ready-to-eat food has been kept between 5°C and 60°C for:

- up to 2 hours it can be refrigerated or used immediately,
- between 2 and 4 hours must be used immediately, and
- up to a total of 4 hours or more must be thrown out.

**2-hour/4-hour cooling rule** means the requirement to cool cooked food:

- within two hours—from 60°C to 21°C, and
- within a further four hours—from 21°C to 5°C.

**Allergen** means a naturally occurring substance within a food that might induce an abnormal immune response in a susceptible person.

**Allergy** means the symptoms produced by reaction to an allergen. Allergic reactions to foods vary greatly from mild gastrointestinal discomfort to skin rashes and potentially life threatening asthma and anaphylaxis.

**Authority** means the NSW Food Authority.

**Cleaning** means using a process to remove visible contamination such as food waste, dirt and grease from a surface. This process is usually achieved by the use of water and detergent. During the cleaning process, microorganisms will be removed but the cleaning process is not designed to destroy microorganisms.

**Cook chill - Extended Shelf Life (ESL)** means food that is given a cooking process equivalent to 90°C for 10 minutes. This process delivers a 6 log reduction of non-proteolytic *Clostridium botulinum*, and a refrigerated shelf life of more than 10 days.

**Cook chill - Short Shelf Life (SSL)** means a food given a cooking process equivalent to 70°C for 2 minutes. This process delivers a 6 log reduction in *Listeria monocytogenes* and has a refrigerated shelf life of no more than 10 days at ≤ 5°C including the days of production and consumption.

**Food Standards Code** means the Australian New Zealand Food Standards Code—the requirements that control the composition, level of contaminants and labelling of the food supply.

**Infant formula** means an infant formula product represented as a breast milk substitute for infants and which satisfies the nutritional requirements of infants aged up to four to six months.

**Infant** means a person under the age of 12 months.

**Monitor** means checking, observing or supervising in order to maintain control.

**NAFSIS** means Notification and Food Safety Information System. Under the *Food Act 2003* (NSW) all food handling businesses in NSW are required to 'notify' their details to the NSW Food Authority.

**Potentially hazardous food** means food that has to be kept at certain temperatures to minimise the growth of any pathogenic microorganisms that may be present in the food, or prevent the formation of toxins in the food, including:

- raw and cooked meats, or foods containing raw or cooked meat such as casseroles and curries,
- lasagne and meat pies,
- dairy products and foods containing dairy products (eg custard and dairy-based desserts),
- seafood and foods containing seafood,
- processed fruits and vegetables (eg salads),

- cooked rice and pasta,
- foods containing eggs, beans or other protein-rich foods (eg quiche), and
- foods that contain any of the above (eg sandwiches).

**Process** means, in relation to food, an activity conducted to prepare food for sale including chopping, cooking, drying, fermenting, heating, pasteurising, thawing and washing, or a combination of these activities.

**Ready-to-eat** means food that is ready for consumption, but includes food that may be reheated, portioned or garnished or food that undergoes similar finishing prior to service.

**Sanitise** means a process that destroys microorganisms so that the numbers of microorganisms present on a surface are reduced (not necessarily completely eliminated—that is sterilisation). Sanitising is usually achieved through the use of a commercially available sanitiser chemical and/or the application of heat.

**Shelf life** means the length of time up to which the food remains safe and suitable for consumption.

**Shelf stable** means non-perishable food with a shelf life of many months to years, and refers to unopened canned, bottled or packaged food products that can be stored before opening at room temperature. These foods may require refrigeration after opening.

**Vulnerable person** means a person who is in care in a facility listed below or a client of a delivered meals organisation.

**Vulnerable persons business** means a food business that processes or serves potentially hazardous food to six or more vulnerable persons in facilities such as:

- acute care hospitals,
- psychiatric hospitals,
- nursing homes for the aged,
- hospices,
- same day establishments for chemotherapy and renal dialysis services,
- respite care establishments for the aged,
- same day aged care establishments,
- low care aged care establishments,
- delivered meals organisations, and
- childcare centres (not currently implemented in NSW).

## Introduction

The Authority has prepared the *Guidelines for food service to vulnerable persons* to help industry prepare a food safety program that will comply with the NSW Food Regulation 2010.

The guideline explains the mandatory requirements detailed in current food legislation, which are listed as a **must**. These include the requirement to be licensed, implement a food safety program and comply with the Food Standards Code.

In addition, the guideline details the elements of a food safety program that will be looked at and assessed by the Authority during certification and audit, and provides suggested control measures to demonstrate compliance. These are listed as a **should**.

A business may choose to use an alternative method of compliance instead of the recommended control measures in the guideline, but must be able to demonstrate an equivalent food safety outcome.

The guideline is on the Authority's website at [www.foodauthority.nsw.gov.au](http://www.foodauthority.nsw.gov.au)

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# Part 1 - Licensing requirements

## A business serving food to vulnerable persons must comply with the Food Standards Code

- 1.1) A 'vulnerable persons' business must comply with *Standard 3.3.1 – Food safety programs for food service to vulnerable persons* of the Australia New Zealand Food Standards Code (Food Standards Code).

Standard 3.3.1 does not apply to a business serving fewer than six vulnerable persons.

### Must be licensed

- 1.2) A 'vulnerable persons' business must be licensed under the Vulnerable Persons Food Safety Scheme of the NSW Food Regulation 2010.

Under NSW legislation, childcare centres are not included in the definition of a 'vulnerable persons' business and do not need to be licensed.

### Must implement a food safety program

- 1.3) A 'vulnerable persons' business is required by Standard 3.3.1 of the Food Standards Code to implement a documented food safety program that effectively controls the hazards. In NSW this does not apply to childcare centres.
- 1.4) The food safety program must comply with the requirements of Standard 3.2.1 of the Food Standards Code. It must:
- (a) systematically identify the potential hazards that may be reasonably expected to occur in all food handling operations of the food business,
  - (b) identify where, in a food handling operation, each identified hazard can be controlled, and the means of control,
  - (c) provide for the systematic monitoring of those controls,
  - (d) provide for appropriate corrective action when that hazard, or each of those hazards, is found not to be under control,
  - (e) provide for the regular review of the program by the food business to ensure its adequacy, and
  - (f) provide for appropriate records to be made and kept by the food business demonstrating action taken in relation to, or in compliance with, the food safety program.

## Part 2 - Specific issues a food safety program should address

### Receival of food

#### *Approved supplier program*

- 2.1) All potentially hazardous foods should be received through a supplier who has been approved by the business. Types of approvals may include:
- (a) licensed with the NSW Food Authority, or
  - (b) HACCP accredited, or
  - (c) approved through a NSW state government food services contract, or
  - (d) issued with a NAFSIS notification number.
- 2.2) A list of approved suppliers should be kept by the business for audit. It should include the name, address, contact details and what the business receives from the approved supplier.

#### *Temperature control of received goods*

- 2.3) Potentially hazardous foods must be received under temperature control as follows:
- (a) cold food  $\leq 5^{\circ}\text{C}$ , or
  - (b) hot food  $\geq 60^{\circ}\text{C}$ , or
  - (c) frozen food to be hard frozen.

Potentially hazardous food not received within the above temperature controls must have corrective action applied to it and that corrective action must be documented.

Examples of corrective action for food transported for less than two hours are:

- (a) if temperature of food received is  $>5^{\circ}\text{C}$  but less than  $10^{\circ}\text{C}$ , refrigerate immediately and use within 12 hours, and
  - (b) if temperature of food received is  $>10^{\circ}\text{C}$  — reject or discard.
- 2.4) The temperature of a representative food from each delivery of potentially hazardous food should be monitored and recorded. Any corrective action taken for food that is not within specification must be documented.
- 2.5) All packaging of delivered foods should be intact, with no off odours or chemical taints detected. All product must be within the 'use-by' date.
- 2.6) Delivered foods should be placed in the appropriate storage area (freezer, coolroom or dry storage area) as soon as possible after receipt to ensure that no temperature abuse occurs.

### Storage

#### *Potentially hazardous foods*

- 2.7) Potentially hazardous foods must be stored in equipment (eg fridges/hot boxes/freezers) capable of maintaining the product temperature as follows:
- (a) cold food  $\leq 5^{\circ}\text{C}$ , or
  - (b) hot food  $\geq 60^{\circ}\text{C}$ , or
  - (c) frozen food kept hard frozen, or
  - (d) at a time and temperature that will not affect the safety and suitability of the food (eg '4-hour/2-hour storage rule'). Any alternative method of compliance must be documented and will be assessed during audit.

- 2.8) Storage temperatures of equipment used to store potentially hazardous foods should be monitored at least once a day (eg by recording coolroom temperatures). Corrective action may include maintenance of refrigeration units in coolrooms.
- 2.9) Raw food should be stored separate to, or physically below, ready-to-eat food to prevent contamination of the ready-to-eat food.

#### **Packaging materials and dry goods**

- 2.10) Only packaging that is suitable for contact with food and able to be effectively cleaned should be used to store food (refer to the Authority's factsheet *Food grade packaging* at [www.foodauthority.nsw.gov.au](http://www.foodauthority.nsw.gov.au)).
- 2.11) Packaging materials should be stored in a manner that prevents contamination by dust, vermin and chemicals.
- 2.12) All dry goods should be stored in a manner to prevent contamination from moisture, dust, dirt, pests and rodents.

#### **Stock rotation**

- 2.13) All stock should be rotated to ensure the oldest stock is used first (first in, first out principle). Prior to using any food or ingredients, the 'use-by' date of all stock must be checked and the product must be discarded if it has exceeded the stated date. Food may be used after the 'best before' date provided the quality is satisfactory. If there is any doubt, the food should be discarded.

### **Transport**

This section includes requirements for:

- transport of food from one facility to another
- transport of food to a resident or patient using a vehicle/trolley/insulated container where food is maintained under temperature control

- 2.14) Potentially hazardous foods must be kept under temperature control as follows:
- (a) cold food  $\leq 5^{\circ}\text{C}$ ,
  - (b) hot food  $\geq 60^{\circ}\text{C}$ ,
  - (c) frozen food kept hard frozen, and
  - (d) at a time and temperature that will not affect the safety and suitability of the food—any alternative method of compliance must be documented and made known to the business receiving the food.
- 2.15) Where food transport vehicles are used, they must be maintained in a clean and sound condition so that food does not become contaminated.
- 2.16) Where refrigerated, frozen or hot food is transported in vehicles, the units should be serviced regularly to ensure the vehicle will maintain food at the appropriate temperature. Records of maintenance activities should be kept.
- 2.17) The following should be regularly monitored to ensure temperature control is maintained for potentially hazardous foods:
- (a) the temperature of the transporting vehicle, or
  - (b) the temperature of the delivered food, or
  - (c) where the '4-hour/2-hour storage rule' is applied, that the time is not exceeded.

#### **Further processing of food**

- 2.18) See the relevant sections of this guideline for control measures applicable to further processing:
- (a) Part 3 – Menu design

- (b) Part 4 – Preparation of ready-to-eat foods that will not be cooked
- (c) Part 5 – Cook serve
- (d) Part 6 – Cook chill
- (e) Part 7 – Texture modified and puréed foods
- (f) Part 8 – Infant formula
- (g) Part 9 – Allergen control

### ***Thawing of food***

- 2.19) Food should be thawed safely so that:
- (a) wherever practical, food is thawed:
    - i in a refrigerator (maintained at a maximum of 5°C), or
    - ii in a microwave, and
    - iii not at room temperature for longer than necessary.
  - (b) thawing food does not contaminate ready-to-eat foods (eg thaw food in a dedicated refrigerator or on a bottom shelf of the refrigerator or coolroom to make sure that it does not contaminate ready-to-eat food).
  - (c) thawed food is used immediately, or stored in the coolroom (for potentially hazardous foods) for no longer than 48 hours.
  - (d) ensure that food products are entirely thawed before they are cooked (unless they can be cooked without thawing according to manufacturer's instructions).
- 2.20) Do not re-freeze thawed food unless it is safe to do so (thawed food has a limited shelf life because of excessive moisture on the surface will allow more rapid microbial growth).

## **Prevention of cross contamination**

### ***Equipment***

- 2.21) Cleaning equipment which may cause cross contamination, such as high-pressure spray cleaning equipment, should not be used to clean drains or other surfaces without being followed by a sanitising step of the whole area. Such cleaning should not be conducted during production periods.
- 2.22) The washing up of equipment, utensils, crockery and cutlery, and the unpacking, storage or refrigeration of raw materials, should be performed in locations especially designated for the purpose.

### ***Utensils***

- 2.23) Where possible, separate utensils such as knives, chopping boards or other equipment should be used for raw and ready-to-eat products. Otherwise, all equipment and utensils used for raw foods should be thoroughly washed and sanitised before they are used for cooked and pre-cooked prepared foods.
- 2.24) Equipment and utensils should not be a source of contamination such that:
  - (a) unsealed wood and timber should not be used in food preparation areas, and
  - (b) stationery including thumbtacks, pens etc should be stored away from food preparation areas.
- 2.25) All equipment should only be used for its intended purpose, and should be kept clean and well maintained.

### ***Personal hygiene***

- 2.26) Staff must practise good personal hygiene at all times.
- 2.27) There should be a procedure for food handlers suffering from a foodborne disease.
- 2.28) There should be an adequate number of suitable handwash basins in accessible and appropriate areas with an adequate supply of warm water, liquid soap, paper towels and waste bins for their food handlers.
- 2.29) Food handlers should avoid direct contact with ready-to-eat food and use utensils whenever possible. If it is not feasible to use a utensil then gloves should be worn. Hygiene programs should therefore include observations of food handling and handwashing practices of the kitchen staff.
- 2.30) Food handlers should wear hair covering while working in food production areas or if there is a risk of contamination. Staff who are serving food do not have to wear hair nets but should take all precautions to prevent hair from contaminating the food.

### **Food disposal**

- 2.31) Food may need to be disposed of because:
  - (a) of a product recall,
  - (b) the product is past the 'use-by' date or has become unsuitable, or
  - (c) the product does not comply with the requirements of the facility's food safety program.
- 2.32) Disposal should occur in such a manner that it cannot be consumed after disposal.
- 2.33) If food is to be disposed of but cannot be discarded immediately, it is marked clearly with 'ON HOLD' (or similar wording) for disposal, and separated from other food.

### **Support programs**

#### ***Maintenance programs***

- 2.34) Items requiring preventative maintenance (eg coolrooms, fridges, bain marie units, stoves, dishwashers) should be identified.
- 2.35) The business should specify who is responsible for preventative maintenance and the frequency of maintenance required, and retain copies of service reports.
- 2.36) Routine inspections to identify maintenance issues should be undertaken, and corresponding records kept. These routine inspections should look at the condition of all aspects of the premises including fittings, fixtures, equipment and utensils. Any identified issues should go onto a corrective action program with appropriate close-out dates. Some issues may require urgent action to effect timely rectification.

#### ***Cleaning and sanitation program***

- 2.37) Sanitation of all food contact surfaces by heat, chemicals or a combination of the two should be undertaken.
- 2.38) Where equipment and utensils are cleaned and sanitised in a dishwasher, the following should be done to ensure the dishwasher is working correctly:
  - (a) The dishwasher should be regularly maintained and serviced according to manufacturer's instructions
  - (b) A detergent and/or sanitiser appropriate for the equipment should be used in the dishwasher
  - (c) The dishwasher should be operated using the hottest water rinse cycle available (economy cycle should not be used as this is not designed to provide a high enough temperature for the time needed to sanitise)

- (d) A visual check should be done of equipment and utensils when removed from the dishwasher to ensure they are clean
  - (e) The dishwasher should be cleaned so that there is no accumulation of food residues
- 2.39) The business should keep a schedule that identifies all fixtures, fittings, equipment and areas of the production facility that require cleaning and/or sanitation (eg utensils, chopping boards, benches, sinks, light fittings, ventilation ducts, refrigerators, bain marie units, trolleys, cooking equipment, mincers, puree machines, dishwashers, floors, walls, ceilings, processing areas, storeroom, amenities, washrooms). The schedule should specify the frequency of cleaning and sanitation required, strength of chemicals to be used, contact times, temperature for use, and the suitability of chemicals for use in a food facility.
- 2.40) The facility should be inspected to check the standard of cleaning and corrective action taken when necessary. An inspection should still be undertaken even if a cleaning signoff sheet is used.
- 2.41) The hygiene inspection should ensure that any equipment or utensils used post cook or on ready-to-eat products are specifically addressed. This includes, food processors, blenders, meat slicers, crockery, cutlery and serving equipment.
- 2.42) All equipment and utensils used post cook or on ready-to-eat products should be able to be fully dismantled for cleaning, sanitation and inspection.

#### ***Pest control program***

- 2.43) A documented pest control program should be in place, with records of any pest control undertaken retained. It should demonstrate the following:
- (a) entry points are pest proofed (eg windows have fly screens, doors have weather strips),
  - (b) the premises are maintained in good repair (eg free of holes, cracks and crevices and any access or harbourage for pests),
  - (c) the premises are maintained in a clean condition with all foods covered to prevent the entry of pests into the food,
  - (d) for pest control chemicals used in food handling/storage areas, written evidence that the chemicals used are suitable for use in a food facility, and
  - (e) there are reports of activities from the pest controller that detail:
    - i. routine activities undertaken,
    - ii. type, location and size of any pest activity found (including if there was no activity found),
    - iii. what actions were taken to control identified activity (including what type of chemicals used), and
    - iv. what preventative measures the facility has undertaken to control any identified pest activity.

#### ***Food recall program***

A food recall program is required for central processing units or facilities producing food to be supplied to another facility and facilities producing extended shelf life cook chill.

- 2.44) There must be a documented recall procedure that:
- (a) outlines how the business traces its products and/or the ingredients used to make those products,
  - (b) details what actions the business will take to identify the affected products and recall them from the customer or client, and
  - (c) notifies the NSW Food Authority within 24 hours in the event of a recall being required.

- 2.45) Documentation in the food recall program should include a:
- (a) list of all customers and clients and records of where product is being distributed,
  - (b) list of government food recall officers at Food Standards Australia New Zealand (available at [www.foodstandards.gov.au](http://www.foodstandards.gov.au)),
  - (c) copy of the *Food Industry Recall Protocol* issued by Food Standards Australia New Zealand (available at [www.foodstandards.gov.au](http://www.foodstandards.gov.au)), and
  - (d) record of the batch codes or date mark applied to its products as well as the volumes produced (where applicable).

### ***Staff training program***

A documented training program should be in place with records of any training undertaken by staff. This program should demonstrate the following:

- 2.46) Staff are trained to ensure they have appropriate skills and knowledge in food safety and food hygiene commensurate with their duties such as:
- (a) in-house or on-the-job food safety training,
  - (b) induction programs for new staff,
  - (c) external courses (eg certificates of attendance), and
  - (d) refresher courses.
- 2.47) The level of staff training should be assessed as a component of the internal audit.

### ***Calibration program***

- 2.48) A calibration program should be implemented to:
- (a) identify all pieces of equipment used by the business which require calibration and are necessary for ensuring food safety (eg hand held thermometers, fridge, freezer and coolroom thermometers),
  - (b) document the frequency and responsibility for calibration (eg 6-monthly by an external contractor),
  - (c) specify the temperature ranges of calibration (ie hot and/or cold),
  - (d) document the acceptable margin of error and appropriate corrective action for non-compliance with this tolerance (eg discard or re-calibrate)<sup>1</sup>, and
  - (e) maintain calibration records.

### ***Internal audit program***

- 2.49) The food safety program should be audited by the business at least once a year to:
- (a) conduct a review of the entire food safety program to assess the accuracy and effectiveness of the program against current facility practices, and
  - (b) record any findings, including corrective actions taken for issues identified during the internal audit.

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<sup>1</sup> Standard 3.2.2 of the Food Standards Code requires a food business handling potentially hazardous food to have a temperature measuring device capable of measuring the temperature to +/-1°C

***Product identification/labelling***

- 2.50) The food safety program should state exactly how product is identified throughout all stages of the production process.
- 2.51) Examples of identification systems include labelling:
- (a) at receipt:
    - i. 'Use-by' date (as supplied by the manufacturer)
    - ii. 'Best before' date (as supplied by the manufacturer)
  - (b) during storage
    - i. 'Use-by' date (as supplied by the manufacturer)
    - ii. 'Best before' date (as supplied by the manufacturer)
    - iii. 'Manufactured on' date (as supplied by the manufacturer)
    - iv. 'Opened on' date (for product removed from original packaging)
    - v. Colour code to indicate as appropriate
  - (c) during frozen storage
    - i. 'Date frozen' whilst retaining the manufacturer's original 'use-by' date/ 'best before' date
- 2.52) Where a product cannot be identified it should be discarded.

## Part 3 - Menu design

Certain foods present a higher risk to vulnerable people due to increased potential for these foods to cause food poisoning.

These foods require specific control measures to be implemented to minimise the potential risks.

### Control measures for higher risk foods

- 3.1) The menu should be designed to ensure that safe food is served to all residents/patients.
- 3.2) The business should consider food safety risks in the development of the menu, and implement control measures to address the risks.
- 3.3) All higher risk foods and ingredients should be received through approved suppliers (see Section 2.1).

**It is not recommended that unpackaged foods be bought from delicatessens or retail stores as there is a high chance of cross contamination.**

- 3.4) For the food types specified in Table 1, the hazards should be managed through the implementation of control measures. Options are provided in Table 1.

### Modified diets

- 3.5) Where modified diets may be required, clinicians should be consulted on any dietary recommendations.
- 3.6) For highly susceptible patients or residents such as neutropenic patients (patients with blood neutrophil counts <1,000 cells/ $\mu$ L) a low microbial diet may be considered in accordance with therapeutic dietary specifications from NSW Health.

### Foods brought in from home

- 3.7) Facilities should have a policy around managing food brought in from home by friends and relatives.
- 3.8) The policy should ensure that the friends and relatives are made aware of the higher risk foods, and controls that can be commonly used for other foods that they may bring in for patients or residents.

**Table 1: Recommended control measures for higher risk foods**

Food type	Control measures – options for controlling hazards
<b>Meat and poultry</b>	<ol style="list-style-type: none"> <li>1. All meat and poultry are cooked in accordance with minimum recommended cooking temperatures (see Appendices 2 &amp; 3)</li> <li>2. Purchase packaged, whole portions of unsliced ready-to-eat meats and poultry and slice in central processing unit, kitchen or service departments and limit shelf life to 7 days after slicing and re-packaging</li> <li>3. Purchase meats pre-sliced from a licensed manufacturer with a <i>Listeria management program</i>. Apply a limited shelf life of no more than 7 days from date of packaging<sup>2</sup>. It is not recommended to purchase sliced meats from delicatessens or retail shops etc</li> <li>4. Use canned or shelf stable meats</li> <li>5. Purchase frozen cooked meats</li> </ol>
<b>Dairy</b>	<ol style="list-style-type: none"> <li>1. Serve dairy products made from pasteurised milk</li> <li>2. May serve soft cheeses with a shelf life limited to no more than 7 days from date of packaging<sup>2</sup></li> </ol>
<b>Seafood</b>	<ol style="list-style-type: none"> <li>1. All seafood is cooked</li> <li>2. May serve cold-smoked seafood, with limited shelf life of 7 days from date of packaging<sup>2</sup></li> <li>3. Use canned seafood or shelf stable seafood</li> <li>4. Purchase frozen seafood</li> </ol>
<b>Eggs</b>	<ol style="list-style-type: none"> <li>1. Do not use any cracked or dirty eggs</li> <li>2. Serve eggs that are cooked until the white is firm and yolk begins to thicken</li> <li>3. Use pasteurised egg in dishes which will not be cooked</li> </ol>
<b>Fruits, vegetables and salads</b>	<ol style="list-style-type: none"> <li>1. Inspect all fresh produce prior to use and remove dirty, cut, mouldy and bruised stock. Wash all fruit and vegetables under running potable water<sup>3</sup></li> <li>2. May serve packaged pre-cut vegetables, fruit and salads with a shelf life limited to no more than 7 days from date of packaging<sup>2</sup></li> <li>3. Wash and sanitise melons (eg rockmelons/cantaloupe, honeydew) in sanitisers appropriate for fresh produce</li> <li>4. Serve seed sprouts only if they are cooked</li> <li>5. Use canned or shelf stable pre-packaged fruit and vegetables</li> </ol>
<b>Juices</b>	<ol style="list-style-type: none"> <li>1. Serve pasteurised juices</li> <li>2. Inspect all fresh produce prior to use and remove dirty, cut, mouldy and bruised stock. Wash all fruit and vegetables under running, potable water prior to juicing. Serve freshly squeezed juice immediately after preparation</li> </ol>
<b>Pâté and dips</b>	<ol style="list-style-type: none"> <li>1. Serve shelf stable pâté, pastes and dips (eg canned)</li> <li>2. May serve pâté, pastes and dips that have been fully cooked with a shelf life limited to no more than 7 days from date of packaging<sup>2</sup></li> </ol>

Alternative control measures can be used where it can be demonstrated during audit that the measures adequately control the hazard, such as:

- (a) certificate of analysis from the manufacturer
- (b) product cooked in bag and not repackaged

<sup>2</sup> Applies to product that will support the growth of *Listeria monocytogenes* (defined as an increase of 0.5 log cfu/g or more during the shelf life of the food). Foods that **do not** support the growth of *L. monocytogenes* include:

- food with a pH value less than 4.4 (regardless of water activity),
- food with a water activity value less than 0.92 (regardless of pH),
- food with a combination of factors (eg pH < 5.0 and water activity < 0.94),
- frozen foods,
- food with a refrigerated shelf life of less than 5 days.

<sup>3</sup> Fruit and vegetables that will not be cooked may be sanitised in a sanitiser appropriate for fresh produce as an additional control measure

## **Part 4 - Preparation and storage of ready-to-eat foods that are not cooked**

Good hygienic practice is required during preparation of ready-to-eat foods such as sandwiches and salads. These foods are usually prepared with the intention of immediate service or service within 48 hours.

### **Preparation of ready-to-eat foods such as sandwiches and salads**

- 4.1) Prior to preparation, all food handlers should wash hands thoroughly with soap and warm water and dry thoroughly. Clean gloves may be used as an additional barrier.
- 4.2) Where practical, the preparation of ready-to-eat foods such as sandwiches should be kept separate from the handling of raw meats and poultry by being prepared:
  - (a) in a separate area dedicated to preparation of ready-to-eat foods, or
  - (b) at a different time with food contact surfaces cleaned and sanitised in between.
- 4.3) A procedure should be developed detailing how ready-to-eat foods are prepared, such as:
  - (a) all potentially hazardous ingredients use in the preparation of ready-to-eat foods are stored under temperature control prior to preparation
  - (b) the time out of temperature control is minimised during preparation (eg less than 1 hour)
  - (c) once preparation is finished, all sandwiches and salads are either:
    - i. served immediately, or
    - ii. placed into the coolroom and served within 48 hours.

### **Storage of opened packages of food, condiments and ingredients**

- 4.4) All potentially hazardous foods, including some condiments and ingredients, should be stored at 5°C or below.
- 4.5) All opened packages of food should be protected from contamination and used within their 'use-by' date and/or any instructions included on the label by the manufacturer must be followed (eg use within 2 days of opening), whichever is sooner. In the absence of label instructions, all opened and leftover food should be used within 48 hours. Some food may be suitable for up to 5 days if the facility can provide documented evidence of such shelf life (eg pH/ water activity values, microbial testing at the end of shelf life).
- 4.6) Preserved and acidified foods (eg jams, hard cheeses, beetroot, prunes) which need refrigeration after opening should be kept according to the manufacturer's recommendation for shelf life and storage conditions.
- 4.7) Products should be either stored in the original packaging or transferred to packaging suitable for food contact use and labelled appropriately (eg 'date opened'). If product is opened, then it should be covered to protect from contamination.

## Part 5 - Cook serve foods

Cook serve foods are cooked with the intention of immediate service or service within 48 hours. Cooking temperatures are not as stringent as required for cook chill as there is less time between cooking and serving for pathogenic bacteria to grow.

### Cooking temperatures

- 5.1) All potentially hazardous foods that are to be cooked, are cooked to an appropriate temperature to ensure the elimination of non-sporing pathogens, and to maintain as far as possible the nutritional value of the food (see Appendix 2).
- 5.2) Where temperatures are measured using a probe thermometer, ensure the probe is cleaned and sanitised prior to use. Store it in a clean and safe area after use.

### Cooling of cooked foods

- 5.3) Where foods are cooled after cooking, prior to serving, they must be cooled in accordance with Food Standards Code requirements (the '2-hour/4-hour cooling rule') such that the food is cooled:
  - (a) within two hours—from 60°C to 21°C, and
  - (b) within a further four hour—from 21°C to 5°C,unless the business can demonstrate that the cooling process used will not adversely affect the safety of the food.
- 5.4) All foods not served immediately should be stored under temperature control and used within 48 hours (eg meat used in sandwiches the next day).

### Plating and serving food

#### *Hot holding*

- 5.5) Where foods are kept hot after cooking, they should be kept under temperature control during plating—that is, foods to be served hot should be kept at 60°C or above.
- 5.6) Total time between plating and consumption should not exceed two hours (through application of the '4-hour/2-hour storage rule').

#### *Warming foods*

- 5.7) Foods that are warmed prior to serving (eg milk for cereal and babies bottles) should be served immediately

### Reheating cooked foods

- 5.8) Where previously cooked food is to be reheated, it should be reheated to at least 60°C and maintained at this temperature until served (as for hot holding above).

Where food has been stored for longer than 48 hours it is recommended that it is re-cooked to a higher temperature (see Part 6).

Where food has been texture modified or puréed after cooking, it is recommended that it is re-cooked to a higher temperature (see Part 7).
- 5.9) Food should be reheated in the minimum time possible (time to reach 60°C should be limited to no more than 1.5 hours).

#### *Leftover food*

- 5.10) Any food not consumed after serving should be discarded.
- 5.11) Food should only be reheated once, with any leftovers of the reheated food discarded.
- 5.12) Leftover food that has not been reheated or served may be placed back under temperature control and used within 48 hours, provided the '4-hour/2-hour storage rule' has been observed.

## Part 6 - Cook chill foods

Cook chill foods require special processing to ensure they are safe from pathogenic bacteria such as *Listeria monocytogenes* and *Clostridium botulinum*. Time and temperature control during cooling, storage and handling are critical to the cook chill system because bacteria can grow in the extended time between food production and consumption.

It is strongly recommended that you seek expert advice for help to determine cooking process, storage temperatures and shelf life, especially if you are making cook chill food with extended life.

Many factors will influence the safety of cook chill products such as cooking times and temperatures, size or amount of food you are heating, storage temperature, aseptic packaging, acidity, composition, consistency, moisture content and chilling process.

### General requirements for cook chill foods

- 6.1) All cook chill foods must be cooled after cooking in accordance with Food Standards Code requirements (the '2-hour/4-hour cooling rule') such that the food is cooled:
  - (a) within two hours—from 60°C to 21°C, and
  - (b) within a further four hours—from 21°C to 5°C,unless the business can demonstrate that the cooling process used will not adversely affect the safety of the food.
- 6.2) All cook chill foods should be consumed within the stated shelf life (including both the day of cooking and the day of consumption).
- 6.3) Cook chill foods should have a 'use-by' date to indicate the end of shelf life, not a 'best before' date.
- 6.4) Each batch should be clearly marked with the date of production and the 'use-by' date.
- 6.5) All cook chill foods that have not been consumed after reheating and serving should be discarded.

### Short shelf life cook chill (up to 10 days shelf life)

- 6.6) Short shelf life cook chill foods must receive a heat treatment to deliver a minimum 6 log reduction in *Listeria monocytogenes* (eg 70°C for 2 minutes or equivalent—see Appendix 3).
- 6.7) Short shelf life cook chill foods should be protected from contamination after cooking.
- 6.8) Short shelf life cook chill foods may have a shelf life up to 10 days including the day of production. However for a shelf life greater than 5 days validated evidence to support this shelf life should be available (eg microbial testing at the end of shelf life).
- 6.9) Short shelf life cook chill foods must be stored at 5°C or less for the duration of the shelf life.

### **Extended shelf life cook chill (more than 10 days shelf life)**

- 6.10) Extended shelf life cook chill foods must receive a heat treatment to deliver a minimum 6 log reduction in non-proteolytic *Clostridium botulinum* (eg 90°C for 10 minutes or equivalent—see Appendix 3) and be packaged aseptically (does not mean sterile filling, but where contamination is reduced to a minimum).
- 6.11) The shelf life of extended shelf life cook chill products must be validated and set in accordance with the manufacturer's documented specification for the cook chill equipment used.
- 6.12) To achieve an extended shelf life, rapid chilling to a temperature of 5°C or less within 90 minutes may be required by either tumble chilling or blast chilling or a combination. This should be done in accordance with the manufacturer's documented specification.

### **Reheating (re-thermilisation/re-generation) of cook chill foods**

- 6.13) Due to the extended storage time associated with cook chill foods, and the potential for pathogenic bacteria to grow during the shelf life, it is advisable to ensure that cook chill foods are reheated to a minimum of 70°C for 2 minutes (or equivalent) prior to serving.
- 6.14) Food should only be reheated once, and in the minimum time possible (time to reach 60°C should be limited to no more than 1.5 hours).
- 6.15) Once reheated, the food should be maintained at 60°C until served (as for hot holding).
- 6.16) Any leftover food should be discarded.

## Part 7 - Preparation of texture modified and puréed food

Texture modified meals are provided for residents or patients that have difficulty swallowing/chewing and may be thickened, minced or puréed. Good hygienic practice is required during the preparation of texture modified and puréed foods because the extra handling increases the potential for cross contamination.

Contamination of blenders and mixers has been identified during audits as a potential problem area because they are difficult to clean. Poor cleaning and sanitation of this equipment has led to outbreaks of foodborne illness in the past and close attention should be paid to this area.

In facilities where texture modified and puréed foods are prepared, the food safety program should include a procedure or set of work instructions for how this is done, including the dismantling, cleaning and sanitising of equipment.

The procedure should include the following steps to ensure that texture modified and puréed foods are produced safely:

- 7.1) Wash hands thoroughly with soap and warm water and dry thoroughly – clean gloves may be used as an additional barrier.
- 7.2) Texture modified foods should be prepared according to the directions for use of the thickening agent or the recipe. In some cases a blender might be required to achieve an adequate mix.
- 7.3) Any equipment such as blenders and stab mixers should be dismantled to enable thorough and effective cleaning and sanitising.

### Where food is modified or puréed *without* cooking:

- 7.4) For food that is modified or pureed and not intended to be cooked (eg puréed fruit):
  - (a) where practical use equipment dedicated to uncooked ready-to-eat foods only, or
  - (b) ensure all equipment is clean and sanitised prior to modifying/puréeing, or
  - (c) ensure these foods are processed before other foods that need to be cooked, or else the equipment is cleaned and sanitised in between uses.

### Where food is modified or puréed *before* cooking:

- 7.5) Minimise the amount of time between texture modification and cooking (eg less than 1 hour).
- 7.6) Thoroughly cook food to temperatures of at least 70°C for 2 minutes (or use an equivalent process).
- 7.7) Ensure texture modified food remains above at least 60°C before serving.

### Where food is modified or puréed *after* cooking:

- 7.8) Thoroughly cook food to temperatures of at least 70°C for 2 minutes (or use an equivalent process).
- 7.9) To limit the risk of contaminating foods that are thickened, puréed or cut up after cooking:
  - (a) where practical, it is recommended that this is done in an area away from raw meats and other non ready-to-eat foods on equipment dedicated to ready-to-eat foods only,
  - (b) texture modify/purée the food immediately after cooking, or
  - (c) ensure the food is cooled in compliance with Food Standards Code requirements (the '2-hour/4-hour cooling rule') such that the food is cooled:

- (i) within two hours—from 60°C to 21°C, and
  - (ii) within a further four hours—from 21°C to 5°C,
  - (iii) and then modify/purée after cooling.
- 7.10) Ensure all equipment has been dismantled, cleaned and sanitised before use.
- 7.11) Minimise the amount of time it takes to texture modify the food before chilling commences (eg place in coolroom as soon as possible).
- 7.12) Minimise the amount of time texture modified/puréed food is stored between cooking and reheating/consumption (eg should be limited to 48 hours at refrigerated storage at 5°C or below). Where foods are frozen, they should be used within 48 hours of being thawed.
- 7.13) During modification the food may be exposed to contamination so it is recommended that these foods be reheated to 70°C for 2 minutes (or equivalent) prior to serving.
- 7.14) Serve the reheated food above 60°C.

### **Nutritional supplements and milkshakes**

The preparation of nutritional supplements and milkshakes requires special attention. These items are able to support the rapid growth of pathogenic bacteria. The following steps need to be taken to make sure you reconstitute, prepare and handle these items safely. Staff hygiene, in particular hand washing, is extremely important in ensuring the safety of in house prepared nutritional supplements and milkshakes. The guideline also applies to commercial shelf-stable reconstituted products once they have been opened.

- 7.15) The following steps should be followed to prepare nutritional supplements and milkshakes safely:
- (a) wash hands thoroughly with soap and warm water and dry thoroughly. Clean gloves may be used as an additional barrier,
  - (b) where practical, it is recommend to make nutritional supplements and milkshakes in an area away from raw meats, and other non ready-to-eat foods on equipment dedicated to these foods,
  - (c) minimise the time that prepared items are left on the bench during preparation and dispensing (eg serve immediately or place in coolroom as soon as possible), and
  - (d) never save any hydrated unfinished items—discard them.
- 7.16) Where nutritional supplements are produced in batch, ensure they are refrigerated at 5°C or below and used within 48 hours.

## Part 8 - Preparation of infant formula

Staff hygiene and storage temperature of prepared formula are the two main elements to ensure the safety of infant formula from pathogenic bacteria such as *Salmonella* and *Cronobacter sakazakii*.

- 8.1) Where nutritionally appropriate sterile infant formulas are available they should be used.

In facilities where infant formula needs to be rehydrated and prepared, the food safety program should include a procedure or set of work instructions for how this is done including the sterilising of equipment and water used in rehydrating the formula.

The procedure should include the following to ensure infant formula is prepared safely:

- 8.2) Wash hands thoroughly with soap and warm water and dry thoroughly—clean gloves may be used as an additional barrier.
- 8.3) Good hygienic practice is required during preparation. Make infant formula in an area dedicated to preparation.
- 8.4) Prepare infant formula according to the manufacturer's instructions and ensure all equipment is cleaned and sanitised prior to use:
- (a) add the formula powder to sterile water (eg pre-boiled cooled water), and
  - (b) use sterilised bottles, teats and other utensils.

Hot water urns may not produce water at a temperature suitable to sterilise bottles or to produce boiled water.

- 8.5) As much as possible, avoid storing prepared formula by preparing formula as needed and using promptly, especially after warming.
- 8.6) When infant formula needs to be stored after preparation, it should be kept at a temperature of 5°C or less for no longer than 24 hours.
- 8.7) Discard any unfinished feeds.

## Part 9 - Allergen control

Foods such as peanuts, tree nuts (eg cashews, almonds, walnuts), shellfish, finned fish, milk, eggs, sesame and soybeans can cause severe allergic reactions and must be declared on a food label. Gluten is also included in the list for those with Coeliac disease.

Cross contact occurs when an allergen is transferred from a food containing an allergen to a food that does not contain the allergen.

Where necessary, the following control measures should be implemented to control allergens:

- 9.1) Have a system in place for identifying patients or residents with any food-related allergies upon admission to the facility (not limited to those listed in Table 2).
- 9.2) Have a system in place to identify the allergens that are on site including those that are present in dry ingredients. This includes those products that are labelled with an allergen declaration or allergen warning.
- 9.3) Design the menu to reduce the risk of allergens and, where possible, have an allergen-free alternative meal.
- 9.4) Store products that contain allergens in a manner that will not contaminate allergen-free products.
- 9.5) Have a system in place to identify and control allergen spills.
- 9.6) Cross contact of allergens should be controlled by:
  - (a) before preparing allergen-free meals, washing hands thoroughly with soap and warm water and drying thoroughly—clean gloves may be used as an additional barrier,
  - (b) where practical, using separate cookware (including frying oil), equipment and utensils for preparing and serving meals containing allergens and allergen-free meals,
  - (c) thoroughly washing, rinsing and sanitising all cookware, utensils and equipment in between meal times,
  - (d) covering allergen-free meals to avoid cross contact with other meals containing allergens,
  - (e) where practical, running production schedules so that allergen-free food is produced before those that contain allergens, and
  - (f) providing adequate cleaning/flushing between batches of food containing allergens.

**Table 2: Allergens that must be identified and controlled under the Food Standards Code**

Cereals containing gluten and their products (eg wheat, rye, barley, oats and spelt and their hybridised strains)
Crustacea and their products
Egg and egg products
Fish and fish products
Milk and milk products
Peanuts and soybeans, and their products
Added sulphites in concentrations of 10 mg/kg or more
Tree nuts and sesame seeds and their products other than coconut from the fruit of the palm <i>Cocos nucifera</i>

Adapted from the Food Standards Code – *Standard 1.2.3 Mandatory Warning and Advisory Statements and Declarations*.

# Appendix 1 - References and further reading

## Part 1 – Licensing requirements

NSW Food Regulation 2010. Available at: <http://www.legislation.nsw.gov.au/>

## Part 2 – Specific issues a food safety program should address

FSANZ (2001). Safe Food Australia: A guide to the Food Safety Standards Chapter 3 of the Australia New Zealand Food Standards Code (Australia only). Food Standards Australia New Zealand Available at: [http://www.foodstandards.gov.au/\\_srcfiles/complete\\_safefood.pdf](http://www.foodstandards.gov.au/_srcfiles/complete_safefood.pdf)

FSANZ (2008). Food Safety Programs for Food Service to Vulnerable Persons A guide to Standard 3.3.1 – Food Safety Programs for Food Service to Vulnerable Persons. Food Standards Australia New Zealand Available at:

[http://www.foodstandards.gov.au/\\_srcfiles/Std%20331-Food%20Safety%20Prog%20Vul%20Pers-guideFNL1.pdf](http://www.foodstandards.gov.au/_srcfiles/Std%20331-Food%20Safety%20Prog%20Vul%20Pers-guideFNL1.pdf)

## Part 3 – Menu design

### *Nutrition standards*

NSW Health (2010). Nutrition standards for adult inpatients in NSW hospitals. Greater Metropolitan Clinical Taskforce/Agency for Clinical Innovation. Available at: [http://www.health.nsw.gov.au/resources/gmct/hen/pdf/Nutrition\\_standards\\_for\\_adult\\_inpatients\\_in\\_NSW\\_hospitals\\_2010\\_03\\_01.PDF](http://www.health.nsw.gov.au/resources/gmct/hen/pdf/Nutrition_standards_for_adult_inpatients_in_NSW_hospitals_2010_03_01.PDF)

### *Low microbial diet and modified diets*

NSW Agency for Clinical Innovation (2010). Draft Therapeutic Diet Specifications – for consultation and comment. Draft Therapeutic Diet Specifications. Available at: [http://www.health.nsw.gov.au/resources/gmct/hen/pdf/general\\_diet\\_spec\\_2010\\_06\\_03.pdf](http://www.health.nsw.gov.au/resources/gmct/hen/pdf/general_diet_spec_2010_06_03.pdf)

### *Food brought in from home*

Food Safety Information Council (2004). Fact sheet: Do you cook and bring food to an elderly relative or friend in an aged care facility? Available at: [http://www.foodsafety.asn.au/\\_srcfiles/elderlyquarkv4.pdf](http://www.foodsafety.asn.au/_srcfiles/elderlyquarkv4.pdf)

Food Safety Information Council (2004). Fact sheet: Protecting tiny tummies and sensitive systems. Available at: [http://www.foodsafety.asn.au/\\_srcfiles/Tiny\\_tummy\\_logo.pdf](http://www.foodsafety.asn.au/_srcfiles/Tiny_tummy_logo.pdf)

## Part 4 – Preparation and storage of ready-to-eat foods that are not cooked

FSANZ (2002). Food Safety: Temperature control of potentially hazardous foods. Guidance on the temperature control requirements of Standard 3.2.2 Food Safety Practices and General Requirements. Food Standards Australia New Zealand. Available at: [http://www.foodstandards.gov.au/\\_srcfiles/FSTemp\\_control\\_Edition\\_for\\_printing.pdf](http://www.foodstandards.gov.au/_srcfiles/FSTemp_control_Edition_for_printing.pdf)

CSIRO (2010). Make it safe: a guide to food safety. CSIRO Food and Nutritional Sciences. CSIRO Publishing, Collingwood Victoria.

## Part 5 – Cook serve foods

CSIRO (2010). Make it safe: a guide to food safety. CSIRO Food and Nutritional Sciences. CSIRO Publishing, Collingwood Victoria.

## Part 6 – Cook chill foods

### *Cook chill*

Cox, B. & Bauler, M. (2008). *Cook chill for foodservice and manufacturing: Guidelines for safe production, storage and distribution*. Australian Institute of Food Science and Technology (AIFST), Sydney.

### ***Cooking temperatures***

Betts, G.D. (1996) *Code of Practice for the Manufacture of Vacuum and Modified Atmosphere Packed Chilled Foods with Particular Regard to the Risk of Botulism*. Campden & Chorleywood Food Research Association Guideline No. 11, London, UK.

Gaze, J.E., Brown, G.D., Gaskell, D.E. & Banks, J.G. (1989). Heat Resistance of *Listeria monocytogenes* in Homogenates of Chicken, Beef Steak and Carrot. *Food Microbiology* 6:251-259.

### **Part 7 – Preparation of texture modified and puréed food**

Dementia Collaborative Research Centre (2008). Thickened fluids for people with dementia in Residential Aged Care Facilities. Available at:

[http://www.dementia.unsw.edu.au/DCRCweb.nsf/resources/DCRC3+Products+3/\\$file/Thickened+Fluids++Report+FINAL+30\\_3\\_09.pdf](http://www.dementia.unsw.edu.au/DCRCweb.nsf/resources/DCRC3+Products+3/$file/Thickened+Fluids++Report+FINAL+30_3_09.pdf)

### **Part 8 – Preparation of infant formula**

World Health Organization (2007). *Safe preparation, storage and handling of powdered infant formula. Guidelines*. World Health Organization in collaboration with Food and Agriculture Organization of the United Nations. Available at:

[http://www.who.int/foodsafety/publications/micro/pif\\_guidelines.pdf](http://www.who.int/foodsafety/publications/micro/pif_guidelines.pdf)

### **Part 9 – Allergen control**

NSW Agency for Clinical Innovation (2010). Draft Therapeutic Diet Specifications – for consultation and comment. Draft Allergy Diet specifications. Available at:

[http://www.health.nsw.gov.au/resources/gmct/hen/pdf/allergy\\_diet\\_spec\\_2010\\_06\\_03.pdf](http://www.health.nsw.gov.au/resources/gmct/hen/pdf/allergy_diet_spec_2010_06_03.pdf)

The Food Allergy and Anaphylaxis Network (US) (2010). Welcoming guests with food allergies. Available at: <http://www.foodallergy.org/files/WelcomingGuests2010.pdf>

## Appendix 2 - Cooking temperatures for cook serve foods

Products	Internal temperature (°C)
Eggs	Cook until white is firm and yolk begins to thicken
Dishes containing eggs (eg sauces, custards)	71
Poultry (Chicken and turkey, whole or parts)	74
Fish	63
Meat (Beef, veal, lamb) (Steaks and roasts) - Medium rare	63
Meat (Beef, veal, lamb) – Medium	71
Meat (Beef, veal, lamb) – Well done	77
Minced meat (Beef, veal, lamb, pork hamburgers, sausages)	71
Minced poultry (Chicken and turkey hamburgers, sausages)	74
Pork (Medium)	71
Pork (Well done)	77
Sauces using raw meat, poultry or fish	Bring to the boil
Leftovers < 48 hours old (reheat)	60
Cook chill foods (reheat)	70 for 2 minutes

**Foods cooked using these temperatures should be served within 48 hours.**

**Alternatively, a facility may choose to cook all products to an internal temperature of 75°C.**

## Appendix 3 - Cooking times and temperatures for cook chill foods

Inactivation of <i>Listeria monocytogenes</i>		
Internal product temperature (°C)	Time for 6 log reduction (mins) and (secs)	
60	43 mins	34 secs
61	32 mins	3 secs
62	23 mins	34 secs
63	17 mins	21 secs
64	12 mins	45 secs
65	9 mins	23 secs
66	6 mins	54 secs
67	5 mins	5 secs
68	3 mins	44 secs
69	2 mins	45 secs
70	2 mins	1 secs
71	1 mins	29 secs
72	1 mins	6 secs
73	0 mins	48 secs
74	0 mins	36 secs
75	0 mins	26 secs
76	0 mins	19 secs
77	0 mins	14 secs
78	0 mins	10 secs
79	0 mins	8 secs
80	0 mins	6 secs
81	0 mins	4 secs
82	0 mins	3 secs
83	0 mins	2 secs
84	0 mins	2 secs
85	0 mins	1 secs

Note: z value = 7.5°C from Gaze et al (1989)

The Critical limit for cooking is 70°C for 2 minutes—longer cooking times will need to be monitored and recorded.

Inactivation of non-proteolytic <i>Clostridium botulinum</i> type B		
Internal product temperature (°C)	Time for 6 log reduction (mins) and (secs)	
75	465 mins	45 secs
76	360 mins	37 secs
77	279 mins	13 secs
78	216 mins	11 secs
79	167 mins	23 secs
80	129 mins	36 secs
81	100 mins	21 secs
82	77 mins	42 secs
83	60 mins	9 secs
84	46 mins	35 secs
85	36 mins	4 secs
86	27 mins	55 secs
87	21 mins	37 secs
88	16 mins	44 secs
89	12 mins	58 secs
90	10 mins	2 secs

Note: z value = 9.0°C from Betts (1996)

Time and temperature must be recorded.

## Appendix 4 - Limiting shelf life as a control measure for *Listeria monocytogenes*

Table 1 of this guideline lists recommended control measures for higher risk foods including limiting the shelf life of some foods to a maximum of 7 days from packaging.

Most foods that are contaminated with *L. monocytogenes* typically have very low levels of the organism, and some growth is required in order to produce illness, even in the susceptible populations. Risk assessment data has consistently shown that the risk of listeriosis is increased in ready-to-eat (RTE) foods which support the growth of *L. monocytogenes* and have extended shelf lives, and that cases of listeriosis result from high levels of *L. monocytogenes* (> 100 cfu/g) in the food.

Under European Union regulations (EC 2073/2005), a RTE food or ingredient with a shelf life of less than 5 days is considered to be unable to support the growth of *L. monocytogenes*. In addition, Health Canada has a revised policy on *L. monocytogenes* in RTE foods which includes a 'Category 2A RTE foods'. This category includes RTE refrigerated foods with a shelf-life of under 5 days. The policy states that this time period would not allow sufficient time, under reasonably foreseeable conditions of distribution, storage and use, for *L. monocytogenes* to grow to levels above 100 cfu/g by the end of the stated shelf-life (Health Canada, 2010).

The FDA/UDA risk assessment in 2003 examined several 'what-if' scenarios including estimating the effect of shelf life on the predicted number of listeriosis cases. The scenarios tested included maximum storage times for deli meats of 4, 7, 10, 14, 17, 21, and 28 days. Shortening the shelf life to 10 days was found to reduce the estimated number of cases in the elderly sub-population by 32.5%. Further reducing the shelf life to 7 days resulted in approximately a 60% reduction in the number of listeriosis cases from deli meats (FDA/USDA, 2003).

Another study by Carrasco et al. (2010) examined the effect of shortening the shelf life of RTE lettuce salads on the high-risk population of Spain, with reduction of the shelf life to 7 days resulting in a 24% reduction in predicted number of listeriosis cases. A further reduction to a 5 day shelf life resulted in a 62% reduction. Along with storage temperature and serving size, shelf life was the third most important factor in determining the number of listeriosis cases.

The intent of the Authority in recommending limiting the shelf life of foods that support the growth of *L. monocytogenes* to 7 days is to reduce the risk of listeriosis compared to product that is distributed for retail sale—for example, pre-packaged RTE deli meats may have a 6-7 week shelf life which may allow the organism to grow up to infective dose levels.

### References

Carrasco, E., Perez-Rodriguez, F., Valero, A., Garcia-Gimeno, R.M. and Zurera, G. (2010). Risk assessment and management of *Listeria monocytogenes* in ready-to-eat lettuce salads. *Comprehensive Reviews in Food Science and Food Safety* 9:498-512.

FDA/USDA [US Food and Drug Administration/ United States Department of Agriculture] (2003). Quantitative assessment of relative risk to public health from foodborne *Listeria monocytogenes* among selected categories of ready-to-eat foods. Retrieved 30 October 2008, from <http://www.foodsafety.gov/~dms/lmr2-toc.html>.

Health Canada (2010). Policy on *Listeria monocytogenes* in Ready-to-Eat Foods. Food Directorate Health Products and Food Branch.

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