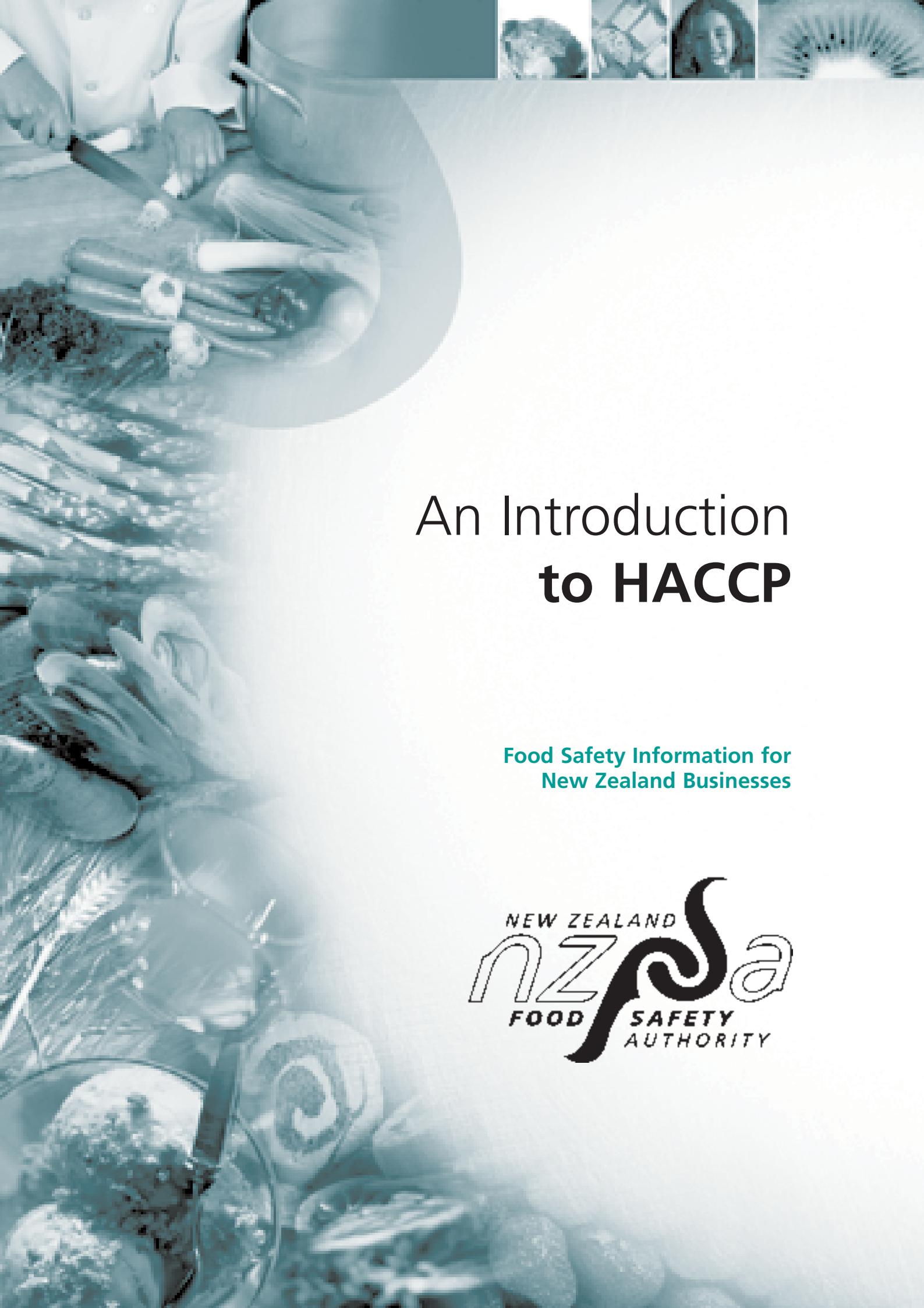


An Introduction **to HACCP**

Food Safety Information for New Zealand Businesses

NEW ZEALAND FOOD SAFETY AUTHORITY

Revised edition
Published in May 2003
by New Zealand Food Safety Authority
PO Box 2835, Wellington, New Zealand
ISBN 0-477-01975-7

This document is available on the
New Zealand Food Safety Authority's website:
www.nzfsa.govt.nz

NEW ZEALAND
nzfsa
FOOD SAFETY AUTHORITY

An Introduction **to HACCP**

Food Safety Information for New Zealand Businesses

Contents

Why are we changing our approach to food safety?

Too many people in New Zealand are being affected by food poisoning. Around 10,000 cases of food-related illness are reported every year. However, many never report having suffered illness and the actual number is estimated to be around 300,000.

Is your food safe by good luck or good management?

While food contamination can happen after food has been bought and taken home, some New Zealand food businesses are having problems in consistently providing safe food. We need an approach that will address the basic issue of how to achieve safe food all the time.

Information is already available to help the public increase food safety in the home. Now, the New Zealand Food Safety Authority is looking at ways to improve food safety standards in the food industry.

> Food businesses can choose to apply for exemption from the requirements of the Food Hygiene Regulations and register a food safety programme instead. Initially the transition is voluntary. Food businesses are strongly reminded that compliance with the Food Hygiene Regulations 1974 may well not cause them to address certain hazards appropriately. Uncontrolled hazards put both the business and the consumer at risk. An effective food safety programme will provide the basis for ensuring that these risks are being addressed.

What is involved in this change in approach?

Food safety is about making sure that food products are safe to eat. Put simply, it means taking care with all aspects of food production and preparation to make sure that what people eat does not make them ill. A preventative approach to food safety ensures you examine every stage of the process, identify the essential procedures and make sure process standards remain consistent. The way to do this is to establish and maintain a **food safety programme.**

What is a food safety programme?

A food safety programme is a set procedure for always producing safe food. It involves a thorough examination of a process in order to identify **and control** the hazards that could make the food you produce harmful to eat. Put simply it asks "What might go wrong, and how do I make sure it doesn't?"

What is in it for you?

If your food is safe you can be confident that your business will be safe.
Food safety is all about making sure that food you produce or sell does not make people sick.

The food business is one of our fastest growing industries.
The opportunities for success are greater than ever. Your customers will place their confidence in food produced under a food safety programme.

Food safety programmes give you control over food safety.
Make sure all the people working in your business are committed to producing safe food by involving staff in the system development.

Food safety problems become easier to spot before they happen.
You save time, money and worry.

There will be no "surprises".
You will have confidence in your product, because you will have control over the process.

How do I develop my food safety programme?

You are the best person to plan your food safety programme. You know your business better than anyone. You may choose to develop a programme from a code of practice or start from scratch. You may need some expert technical advice to help you identify the hazards and necessary controls.

Internationally it is recognised that the ideal tool to give assurance of food safety is the **Hazard Analysis Critical Control Point (HACCP)** system.

What is HACCP?

HACCP is a system that allows you to deal with important food safety issues yourself.

It requires answers to key questions about the safety of the food that you produce or handle:

- What type of business am I involved in?
- What are the food safety hazards associated with my business?
- What causes those hazards?
- How can I control or remove those hazards?
- How can I show that I have controlled or removed those hazards?
- What will I do if things go wrong?

Once you have the answers to these questions, applied the key controls that have been identified, and kept those controls in place, you are in the position to confidently say, **"I know I provide safe food."**

To be sure of this you need to know:

- **what you are doing**
- **why you are doing it**
- **that you actually are doing it.**

How HACCP works – the principles

Principle 1: Identify hazards

It is important to be able to identify the possible microbiological, chemical and physical hazards that can occur at every stage of the food business – from growth, processing, manufacture, storage and distribution, until the point where it is sold to the customer and eaten. As far as possible you should consider how the customer might handle it too.

What are the main hazards to food?

Microbiological Hazards:
Any bacterium, virus, or protozoan that is capable of causing illness and that grows or may be carried on food. Well-known examples of bacteria are *Campylobacter*, *Listeria* and *Salmonella*. The most likely food-borne viruses are the Norwalk type viruses. *Giardia* is an example of a protozoan that may be food borne. It is important to have some understanding of the risks associated with different types of microbiological hazards.

Chemical Hazards:
Examples include excessive or toxic amounts of *heavy metals, chemicals, pesticides, herbicides, insecticides, vitamins, minerals, preservatives, disinfectants, detergents* and *cleaning compounds.* Some hazards may be naturally present such as in green potatoes or taro and rhubarb leaves.

Physical Hazards:
Objects that get into food, or are already present in food, may cause illness, injury or distress to the person eating it. Some examples are *glass, metal fragments* etc. Other contaminants such as hair or insects may be offensive but not necessarily a danger to health. They should nonetheless be considered and controlled.

Once the hazards are identified, the next step is to work out the likelihood of them happening, and then deciding on appropriate preventive measures for their control.

Preventative measures are the actions and activities needed to remove hazards or control them by reducing them to acceptable levels.

Principle 2: Determine critical control points

Decide which of the control points is critical. This means identifying whether it is the essential step at which to control an identified hazard. Bear in mind that different types of hazard may have critical controls at different steps in the process.

Control points are the points in the food processing chain where it is possible to control or remove hazards.

Critical control points are the control points in the processing chain where it is essential to a hazard, usually because there is no later step at which to establish control.

Principle 3: Establish critical limits

After each control point is identified, decide how to check whether it is under control during processing. This may be by observation or by measurement (such as temperature or time).

Critical limits for critical control points are measurements such as temperature and time, that must be met, or characteristics such as appearance and texture. Critical limits need to be validated (see definitions).

Principle 4: Establish a monitoring system

To be sure that the critical limits are always effective, it is important to set up a system to monitor and record control at the critical control point.

Monitoring is the regular measurement or observation of a critical control point to ensure it is not beyond its critical limits.

The monitoring system must ensure any loss of control at the critical control point can be discovered in time to take corrective action before the product is rejected.

Information obtained from monitoring must be assessed by someone who has the knowledge and authority to carry out corrective actions when needed.

Quick on-line chemical and physical measurements and observations are better than microbiological tests that take time to analyse. Usually simple time and temperature records are sufficient. Often all that is needed is a system to record observations. All records and documents must be signed by the person doing the monitoring and by a responsible reviewing official of the food business.

Principle 5: Establish corrective action

Decide exactly what corrective action to take when monitoring shows that a particular critical control point is out of control. You may need to think about reprocessing or dumping the affected product.

> **Take corrective action** to bring the process back under control before the problem ('deviation') leads to a safety hazard.
>
> Consider proper management (disposition) of any adversely affected product.

Document corrective actions in the HACCP records.

Principle 6: Establish verification procedures

Once the HACCP system is established, set up procedures to verify (check) that the system works.

> **Verification procedures** are tests and programmes that make sure the HACCP system working properly.

Examples of verification include:

- reviewing the HACCP system and its records to ensure that controls are effective
- reviewing corrective action reports to ensure that the corrective actions were undertaken
- occasional testing to demonstrate that control has been maintained.

Principle 7: Establish record keeping and documentation requirements

The level of documentation required will depend upon the needs and the complexity of the food business.

In a small business, a simple log book or diary may be all that is needed.

If your business is bigger or more complex, more detailed or formal documentation will be necessary.

> **Record keeping** and documentation systems must meet the needs of the business and be adequate to show that the food safety programme is working.

Before you start

Things to think about when developing your food safety programme

Your programme must cover all the possible hazards to food safety in your business. The following headings will help you decide which areas are important.

Some of the following may not apply to your food business, but you can highlight those that do to make your planning easier.

The 'raw material'

Prevent the introduction of hazards during the production, handling and supply of raw materials. This includes ingredients, packaging, water and anything that may come in contact with the product.

Where possible your suppliers should have a food safety programme to demonstrate their control. Set specifications for all material supplied.

Things to consider:

- characteristics of raw materials and products
- hygienic production of raw materials
- processing, handling, storage and transport
- cleanliness of the surroundings, equipment, and staff
- receiving (in what condition will the incoming material arrive).

The buildings

To control hazards properly, ensure your premises are designed and built to be hygienic, that they are in a suitable place, and have the necessary facilities. Control the entry of insects, birds and rodents.

Things to consider:

- identify and document the hazards associated with your building
- location of premises – external factors: yards, drains and potential hazards from outside
- entry points for people and goods
- preventing entry and infestation by pests
- design, layout and maintenance of premises, rooms and equipment
  - flow of production
  - air quality and ventilation
  - drainage and waste disposal
  - lighting and temperature control
  - personal hygiene facilities and toilets
  - storage areas

- internal structures and fittings – walls and floors, ceilings, overhead fixtures, windows, doors and working services
- food control and monitoring equipment, such as temperature probes
- equipment cleaning and sanitation
- containers for waste and inedible substances
- location of equipment within the premises.

Controlling the operation

To reduce the risk of unsafe food take preventive measures to protect the safety of food at suitable stages of the operation.

Things to consider:

- control of food hazards
  – identify food safety steps
  – set up, monitor and review control procedures

Key features of control systems:

- control of incoming raw material
- processing
  – recipe
  – measurement of ingredients
- acidity (pH)
- temperature control
  – refrigeration
  – freezing
  – pasteurising
  – cooking
- packaging
- control of microbiological cross-contamination
- control of physical and chemical contamination
- final product specifications
- temperature control
- water
  – as an ingredient
  – ice and steam
  – in contact with food
- management and supervision
- documentation and records
- complaint systems
- recall systems.

The premises and equipment – cleaning and maintenance

Set up systems to establish control over such things as the safe and effective cleaning and sanitising of all surfaces and fittings. Give special regard to food contact surfaces and equipment and utensils. Establish programmes to maintain control over pests and other hazards.

Things to consider:

- identify and document the hazards associated with premises and equipment
- maintenance and replacement
- proper standards of repair and condition
- cleaning methods and procedures for external areas
- cleaning programmes for all areas within the building (or vehicle)
  - walls and floors
  - ceilings
  - overhead fixtures
  - windows
  - doors
  - working surfaces
- cleaning and sanitation of equipment and utensils
- monitoring the effectiveness of cleaning and sanitation
- cleaning and sanitation of waste disposal areas
- pest control systems
  - good hygiene practices
  - destruction of pests
  - monitoring and detection of pests.

Training – selling safety to the team

Training is critical to any food safety system. Poor staff training in food hygiene is a real threat to the safety of food. Staff must understand how food safety knowledge is applied in your food safety programme. Any staff member without commitment to food safety threatens the entire programme.

Things to consider:

- identify and document the hazards associated with not training your staff
- how the effectiveness of the food safety programme is to be evaluated
- food hygiene and safety awareness – and responsibilities
- instruction and supervision
- training programmes
- evaluate the practicality of all training. Does it produce the desired results?
- refresher training.

Your local Health Protection Officer or Environmental Health Officer can offer advice on where to find the appropriate training.

Personal hygiene

People who do not have a high standard of personal hygiene or the necessary standards of behaviour, or who have certain health problems, can contaminate food and pass on illnesses to your customers.

Things to consider:

- identify and document the hazards associated with poor personal hygiene
- changing-room facilities
- health of staff
- a policy with respect to illness and injuries
- sticking plasters
- jewellery
- personal cleanliness
- personal behaviour
- protective clothing
- visitors
- washing facilities
- toilets.

Transportation and storage – moving it safely

Unless proper control measures are taken during the transportation and storage of food it may reach its destination unfit for use. Establish control over hazards in transport and storage.

Things to consider:

- identify and document the hazards associated with transportation and storage
- transport and storage systems that
  - do not contaminate food
  - are easily cleaned
  - allow food to be separated from non-food items
  - provide protection from contamination
  - maintain the correct temperature
  - allow temperature to be checked as required
  - are properly maintained and repaired
  - are cleaned and sanitised
  - allow delivery in an appropriate timeframe
- what to do in the event of a breakdown.

Product information – telling your customers how to keep food safe

Poor product information, or lack of knowledge by the consumer can lead to products being mishandled. This can result in illness, or in products becoming unfit to eat, no matter how good earlier control measures have been.

Things to consider:

- identify and document the hazards associated with poor product information
- labelling and product information
  - datemarks, ingredients, storage and preparation instructions etc
- lot or batch identification.

How to plan your own food safety programme

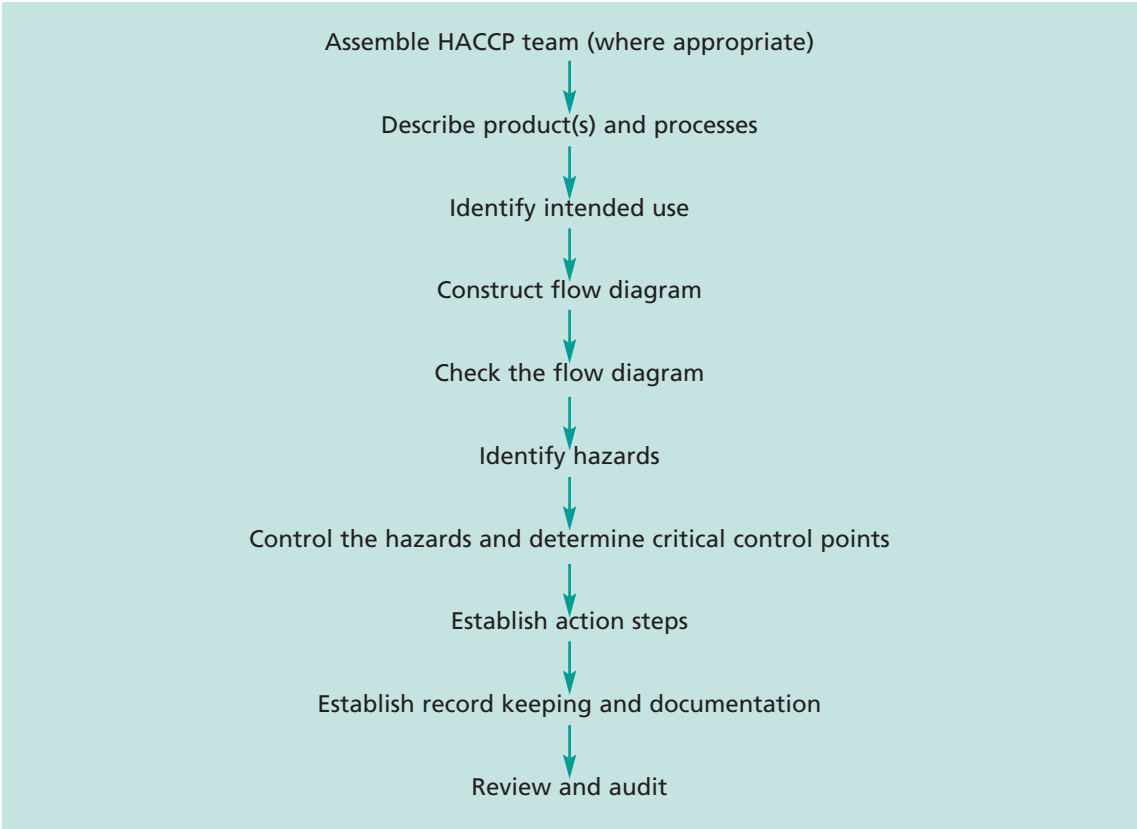
This section takes you through a sample HACCP programme step-by-step.

A checklist of questions is included at each step.

The exact steps involved in any particular business will differ, particularly between production, processing and retailing of food. The general principles remain the same.

To operate a 'hazard analysis system' successfully, you will need the support and commitment of everyone in your business.

The important steps are as follows:



It is important that you use the HACCP technique in all areas of your food business and that the system is reviewed regularly.

Step 1: Assemble a HACCP team (decide who is responsible for the programme)

Small owner-operated businesses such as dairies and retail outlets can confidently produce good food safety programmes without the help of a HACCP team.

Some food businesses may be able to use the knowledge of a food industry association to help them develop a code of practice. One may already exist. You can develop a programme from a code of practice to suit your own business.

Medium to large-sized food businesses will probably have the experience and knowledge needed to put together a HACCP team on site.

For larger businesses, the HACCP team should include a manager, quality assurance manager, or supervisor responsible for the process under study. It may also include an engineer, or microbiologist and should also include members of staff who have experience with the product and process.

All businesses may occasionally need to consult an expert for technical advice or to help identify hazards and controls. This may be a food safety consultant or you may contact your local Health Protection Officer, who can offer advice or direct you to the appropriate expert.

Look for the skills in your organisation before you commit resources to consultants.

Checklist

Questions to ask yourself:

- Do we have or can we obtain the skills necessary to identify the hazards and controls?
- Do we have a person with overall responsibility for the food safety programme?
- Is the person responsible trained in the requirements of the HACCP system?
- Does this person have the authority to establish and maintain the programme?
- Are staff aware of the importance of food safety and hygiene?
- Does our business have a training programme?
- Do our staff know what to do, and who can make decisions, if something goes wrong?

Step 2: Describe the product(s) and processes

Draw up a full description of the food product. Include information on what it contains, how it is made or prepared, stored and distributed.

A generic description will often be sufficient – for products such as frozen foods, packets, and products of similar characteristics.

Checklist

Questions to ask yourself:

- What are our products and what are the associated risks?
- Have all the steps in our food business been considered?
- Have we considered processes carried out, and ingredients added, by our suppliers?
- Have we missed any steps in the process? (See Step 5)

Step 3: Identify the intended use

The 'intended use' of the food product is the expected use of the product by the end user or consumer.

In some cases, you may need to consider people who are particularly at risk from contaminated food, such as the elderly, the very young, and those who are ill. Pregnant women and unborn children are seriously at risk from *Listeria monocytogenes* for example.

Checklist

Questions to ask yourself:

- Have we thought of all the possible end uses of our product?
- Have we considered all who may use our product?
- Have we provided the appropriate information with the product?

Step 4: Construct a flow diagram

The flow diagram describes the process and shows the raw materials, processing steps, packaging, storage and distribution stages.

Include the information needed for hazard analysis – such as information on micro–organisms that may be associated with the product. Do they form spores or toxins? What is their potential for survival and growth?

Other information includes: process times and temperatures, product acidity (pH), premises conditions and hygienic design, cleaning, equipment characteristics, storage conditions, and instructions for consumer use.

Checklist

Questions to ask yourself:

- Do we have set procedures for checking and approving suppliers?
- Do we have a system for monitoring the quality of products from suppliers?
- Do we have all the information we need to identify potential hazards?

Step 5: Check the flow diagram

Compare the actual processes being carried out with the flow diagram.

Watch the process with a critical eye and with the flow diagram in your hand.

Checklist

Questions to ask yourself:

- Have any steps, ingredients, or other information been missed?
- Do we actually do it the way the flow diagram shows?

Step 6: Identify the hazards (Principle 1)

Check that all potential microbiological, chemical and physical hazards have been considered for each stage in the business – from raw materials to finished product.

Checklist

Questions to ask yourself:

- Have we examined all sources of hazards (including suppliers)?
- Have we used diagrams of the premises and its surroundings to identify hazards?
- Have we used the flow diagram to identify possible hazards in the processes involved?
- Have we identified risks attached to the product itself, such as the potential for misuse or abuse?

Step 7: Control the hazards and determine critical control points (CCPs) (Principles 1 and 2)

Ensure that each of the hazards identified in Step 6 has a control and determine which of the controls are critical to the safety of your product.

Checklist

Questions to ask yourself:

- Have controls been identified for each hazard?
- Do they effectively remove, or minimise the likelihood of each hazard occurring?
- Can we alter the process where preventable measures don't exist?
- Do our staff understand what the CCP requirements are?

Step 8: Establish action steps (Principles 3, 4 and 5)

Establish **critical limits** for each critical control point (where possible), how the critical limits can be monitored, and decide on the action to take if these limits are exceeded.

Checklist

Questions to ask yourself:

- Have we established limits for each critical control point?
- Are we following the limits set down?
- Are our measuring instruments sufficiently accurate?
- Do our measurement systems meet recognised standards?
- Has corrective action been decided on for each out-of-control condition?
- Do we have procedures for learning from food safety problems?
- Do we have a system for handling complaints?
- Is the frequency of our monitoring and recording appropriate?
- Do we have a system for recalling our products?

Step 9: Establish record keeping and documentation (Principles 6 & 7)

Decide the level of documentation and record keeping needed that will meet the needs of the business to demonstrate the effectiveness of the food safety programme.

Documentation may include:

- a plan of the layout of the food business
- hazard worksheets
- action plan worksheets
- procedural documentation
- written procedures
- operating methods
- checklists
- log sheets or diaries
- training programmes
- maintenance
- control points.

Checklist

Questions to ask yourself:

- Do we have a satisfactory level of record keeping?
- Do we file and store records safely?
- Do we record and action critical control points?
- Have we recorded the limits for each CCP?
- Are our control measures properly recorded?
- Are we monitoring and evaluating our methods?
- Do we keep records of our calibrations?
- Do we get independent checks of our food safety programme?
- Do we have checks of our products in the marketplace?
- Do we have a procedure for recording the detection of unsafe products?
- Do we have written instructions for handling unsafe food products?
- What measures do we take to check that our food safety programme is being carried out?
- Do we keep records of our system checks?

Step 10: Review and Audit

Establish a regular internal audit of the system, or parts of it and review or modify it to accommodate new information or problems as they are identified. The frequency of internal audits will depend on the complexity of the operation and whether there are any changes or problems experienced in the process. As a guide, a three-monthly internal audit should be appropriate with regular verification checks between. However, changes or problems encountered will have a marked influence on this.

Appoint an approved auditor to provide independent assessment of whether your system has identified and established control over the relevant hazards. The frequency of external audit depends on the same factors mentioned above. With a well run programme that is regularly monitored and reviewed, an annual audit should suffice.

Checklist

Questions to ask yourself:

- Does our system work as we planned?
- Do our processes match our procedures?
- Have any changes been made or shortcuts taken?
- Have we had any complaints? What did we do about them?
- Has a similar product been involved in a public health issue or recall?

Definitions

Action Plan	Proposed actions or recommendations to be carried out in order to develop, improve or rectify a Food Safety Programme.
Approved Auditor	An auditor approved by the NZFSA for the auditing of food safety programmes in premises exempt, under the Food Act 1981, from the provisions of the Food Hygiene Regulations 1974.
Audit	A systematic comparison of a defined procedure with an actual process. In food safety terms, a check on documentation and procedures and whether the hazards have been identified and effectively controlled. An audit may be internal or external.
Chemical Hazards	Any potentially harmful chemical substance that may contaminate a product. Examples include excessive or toxic amounts of metals, chemicals, pesticides, herbicides, insecticides, vitamins, minerals, preservatives, disinfectants, detergents and cleaning compounds.
Code of Practice	A generic set of guidelines which defines minimum requirements for food safety and would typically include all stages of the production cycle from raw materials to consumption.
Control	**(verb)** To manage the conditions of an operation to maintain compliance with established criteria. **(noun)** The state in which correct procedures are being followed and criteria are being met.
Control Point	A process or step which may prevent, eliminate or reduce a hazard to an acceptable level.
Corrective Action	Remedial procedures to be followed when a deviation occurs. Action to be taken when the results of monitoring indicates a loss of control.
Critical Control Point (CCP)	A process or step at which control is essential so that a food safety hazard is prevented, eliminated, or reduced to an acceptable level.
Critical Limit	**(a)** A criterion (for example a cooking temperature or time, or a refrigeration temperature) that must be met in order to assure food safety. **(b)** A value that separates acceptability from unacceptability.
Cross Contamination	The transfer of micro-organisms (or other contaminant) from one food product to another. For example the transfer of bacteria from raw to cooked meat.
Decision Tree	A series of questions to help decide whether a control point is critical.
Deviation	**(a)** Failure to meet a critical limit. **(b)** Process change from defined procedure.

Disposition	Action taken with product that has been produced out of control in order to dispose of it or to render it safe.
Documentation	Procedures and records of processes.
External Supplier	People who provide the materials and resources from which products and services are created.
Flow Diagram	A diagram which identifies process steps, inputs and outputs (materials), sequential relationships (consecutive, feed-back) and food safety controls.
Food Safety Programme	A programme designed to identify and control food safety risk factors in order to establish and maintain food safety. A self-imposed, continuing, documented system tailored to individual operations to assure that products are safe and wholesome.
HACCP	Hazard Analysis Critical Control Point – a system used to identify hazards associated with a food product and ensure control is established at critical points in the process.
Hazard	A biological, chemical or physical agent with the potential to cause harm when present at an unacceptable level.
Microbiological Hazard	Any bacterium, virus, or protozoan that is capable of causing illness and that grows on, or is carried on, food.
Monitor	To conduct a planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record for future verification.
Physical Hazard	Objects that get into food, or are already present in food, which may cause illness, injury or distress to the person eating it. Some examples are glass, metal fragments etc.
Preventive Measures	The actions and activities needed to remove hazards or to control them by reducing them to acceptable levels.
Procedure	The defined method of carrying out a food process.
Process	The actual method of producing food as carried out in practice. A process should follow the defined procedure.
Records	Information such as checklists, log sheets, instrument charts and records, log books, work diaries. May be formal or informal but all records must be auditable.
Risk	An estimation of the likelihood and severity of a hazard.
Severity	The magnitude or seriousness of harm resulting from a hazard.
Validation	Evidence that a control, if appropriate for the type of food, and properly carried out, will be effective against a hazard. Validation may be by test or by reference to established knowledge.
Verification	The use of methods, procedures, or tests in addition to those used in monitoring to determine if the process is in compliance with the food safety programme.

Public Health Units

For further advice on food safety programmes contact a Health Protection Officer at your local Public Health Unit:

Auckland DHB	Private Bag 92 605	Auckland	(09) 262 1855
Choice Health	Private Box 58	Masterton	(06) 370 5020
Community and Public Health	Private Box 443	Greymouth	(03) 768 1160
Community and Public Health	PO Box 1475	Christchurch	(03) 379 9480
Community and Public Health	Private Box 510	Timaru	(03) 688 6019
Hawke's Bay DHB	PO Box 447	Napier	(06) 834 1815
Health Waikato	PO Box 505	Hamilton	(07) 838 2569
Hutt Valley DHB	Private Bag 31 907	Lower Hutt	(04) 570 9002
MidCentral Health	Private Bag 3003	Wanganui	(06) 348 1775
MidCentral Health	Private Box 2056	Palmerston North	(06) 350 9110
Nelson Marlborough DHB	Private Box 647	Nelson	(03) 546 1537
Nelson Marlborough DHB	Private Box 46	Blenheim	(03) 520 9914
Northland DHB	Box 742	Whangarei	(09) 430 4100
Pacific Health	Private Bag 1858	Rotorua	(07) 349 3520
Pacific Health	PO Box 2121	Tauranga	(07) 571 8975
Pacific Health	PO Box 241	Whakatane	(07) 306 0720
Public Health South	PO Box 5144	Dunedin	(03) 474 1700
Public Health South	PO Box 1601	Invercargill	(03) 211 0900
Public Health South	PO Box 2180	Queenstown	(03) 442 2500
Tairawhiti District Health	PO Box 119	Gisborne	(06) 867 9119
Taranaki Health	Private Bag 2016	New Plymouth	(06) 753 7798

For further information please contact:

NEW ZEALAND FOOD SAFETY AUTHORITY