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MELBOURNE

FOOD20006

Food Microbiology and Safety

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Food Safety and Regulation

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Ray and Bhunina Ch 8



Intended learning outcomes

- Understand the underlying principles of food safety regulations
- Explain the roles of different regulations and how they contribute to food safety
- Be familiar with some key definition in the Food Act
- Differentiate between quality-control and quality assurance
- Understand how HACCP works

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Lecture plan

- Food safety-what is it?
- History of food regulation in Australia
- Responsibilities for food regulation
- How food safety is assured in Victoria
- HACCP

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What is safe food?

The Victorian Food Act, 1984 defines what unsafe food is.

“... food is unsafe.... If it is likely to cause physical harm to a person who might later consume it...”

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The potential causes of harm are known as hazards

There are three main categories of hazards

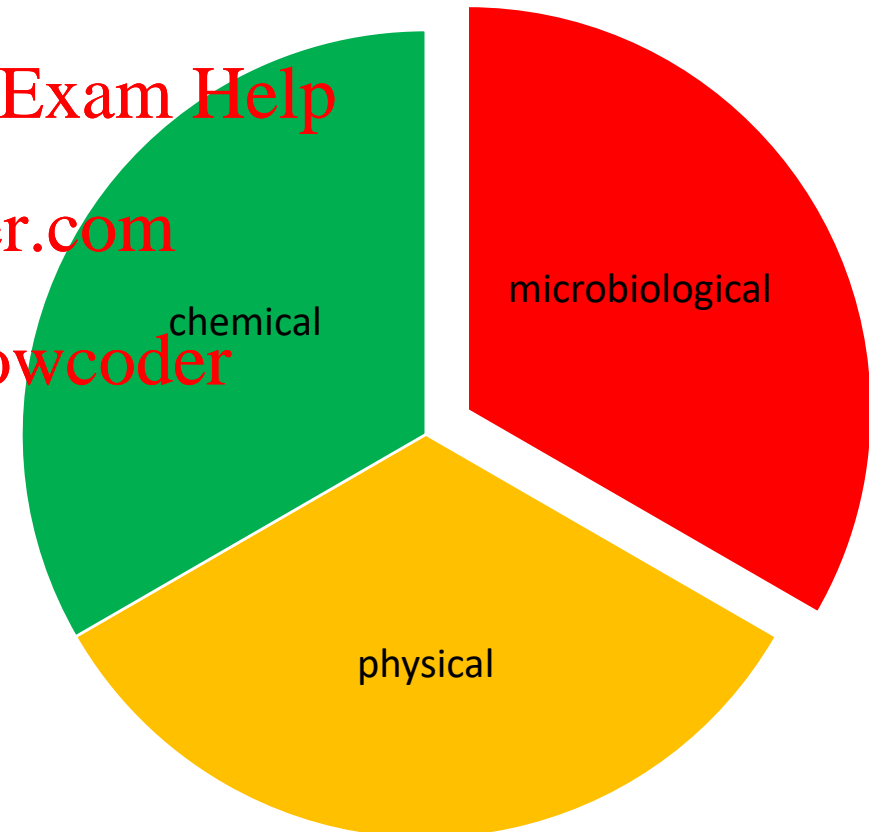
Chemical contaminants

Microbial contaminants

Physical contaminants

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Hazards

Chemical contaminants are chemicals that are present in the food that should not be there and could cause harm. For example, disinfectant residues

Physical contaminants in food may be things such as stones, pieces of metal or glass, wound dressings or other physical items that are not intended to be in the food.

Microbial contaminants in food may be bacteria, viruses, fungi or parasites that are not intended to be in the food.

Note that many fermented foods have high levels of bacteria yeast or mold that have been intentionally added to the food and these are safe and are not considered as contaminants





Risks

Risks are the likelihood that a hazard may do harm

The five most likely risks associated with food safety are listed on the right.

How would you rank them in order of relative risk? i.e. what is the most likely and what is the less likely?

Microbial
contamination

Nutritional
imbalance

Environmental
pollution

Pesticides

Food additives

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Relative Risks

Microbial contamination or nutritional balance HIGH

Microbial
contamination

Nutritional
imbalance

Environmental pollution

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MODERATE
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Environmental
pollution

Pesticides or food additives

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LOW

Food additives

Pesticides



Microbial contamination

Types of contaminants

- Bacteria
- Viruses
- Fungi
- Parasites
- Microbial by-products that form during growth in the food or food ingredients i.e. aflatoxins

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Bacterial food poisoning

Foodborne illness or “food poisoning” can be caused by

Live bacterial pathogen = infection

Pre-formed toxins = intoxication

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The infective dose for different pathogen is variable.

- highly infective so small numbers cause illness
- infectivity and consumption of large numbers of bacteria is required to establish an infection

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Pre-formed toxins

- toxins produced by bacteria as they grow in the food itself.
- The actual bacteria may have died off by the time someone eats the food but the toxin can remain and cause illness, a so-called intoxication





Reducing risk of bacterial foodborne disease

Microbial food safety is assured by

- Limiting pathogen contamination
 - Preventing contamination

Obtaining food from safe sources

Good food handling practice

- Preventing growth (preservation)

Low-temperature storage

Acidification (pickling)

Drying

- Removing bacteria

Physical removal by washing or peeling

Killing them by heat treatment or irradiation

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The beginning of food safety regulation in Australia

Ineffective due to lack of analytics

1863 Victorian Act to Prevent the Adulteration of Articles of Food and Drink

Appointment of public food analysts

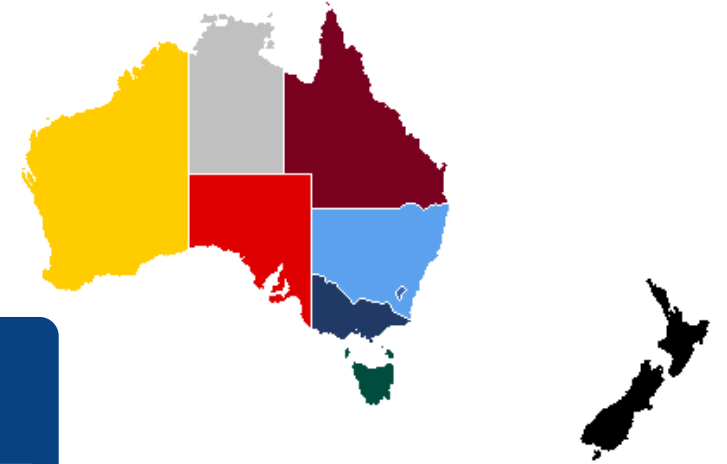
1883 Victorian Public Health Amendment Statute

1905 Victorian Pure Food Act

1908 Quarantine Act; NSW Pure Food Act; SA Food and Drugs Act

1911 WA Health Act

Australia became a Federation in 1901. Each State had its own responsibility for food safety



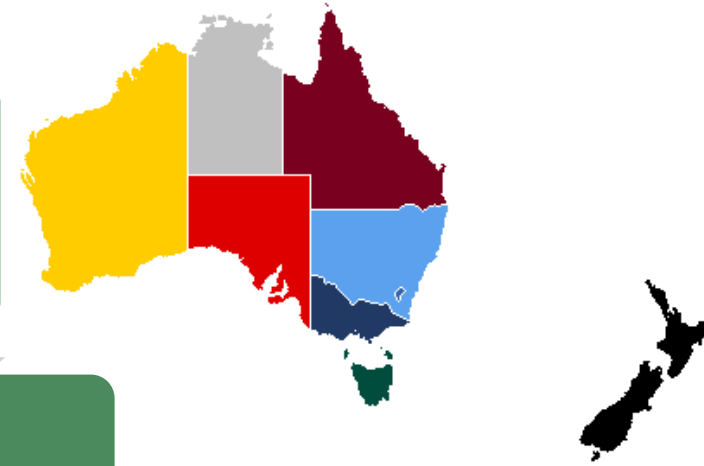
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Towards uniform food legislation

1953 Uniform food regulations within the
NHMRC



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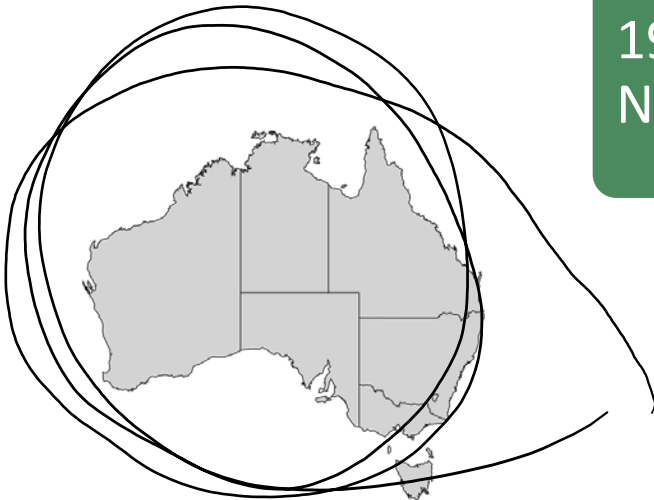
1961 Codex Alimentarius commission set
up

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1986 Drafting of Model Food Act to achieve
National food legislation

1991 National Food authority Act
established the National
food Authority now known as FSANZ





Victoria food safety legislation

- Dairy Act 2000
 - Meat Industry Act 1993
 - Seafood Safety Act 2003
 - Victoria Food Act 1984
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- covers manufacture of food other than meat, dairy and seafood
- covers sale of all food

All of these pieces of legislation require food safety programs



Victorian Food Act, 1984

The objectives of the Act are

- a) To ensure food for sale is both safe and suitable for human consumption
- b) To prevent misleading conduct in connection with the sale of food
- c) To provide for the application in Victoria of the Food Standards Code

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The Food Standards Code is a set of standards written by FSANZ

The Food Act define “unsafe food”

“...likely to cause physical **harm** to a person who might later consume according to its reasonable intended use”

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Unsuitable food (Vic Food Act)

Defined as

“...food is unsuitable if it

- a) Is damaged, deteriorated or perished
- b) Contains any damaged, deteriorated or perished substances that affects its reasonable intended use
- c) Contains a biological or chemical agent, or other matter or substance, that is foreign to the nature of the food

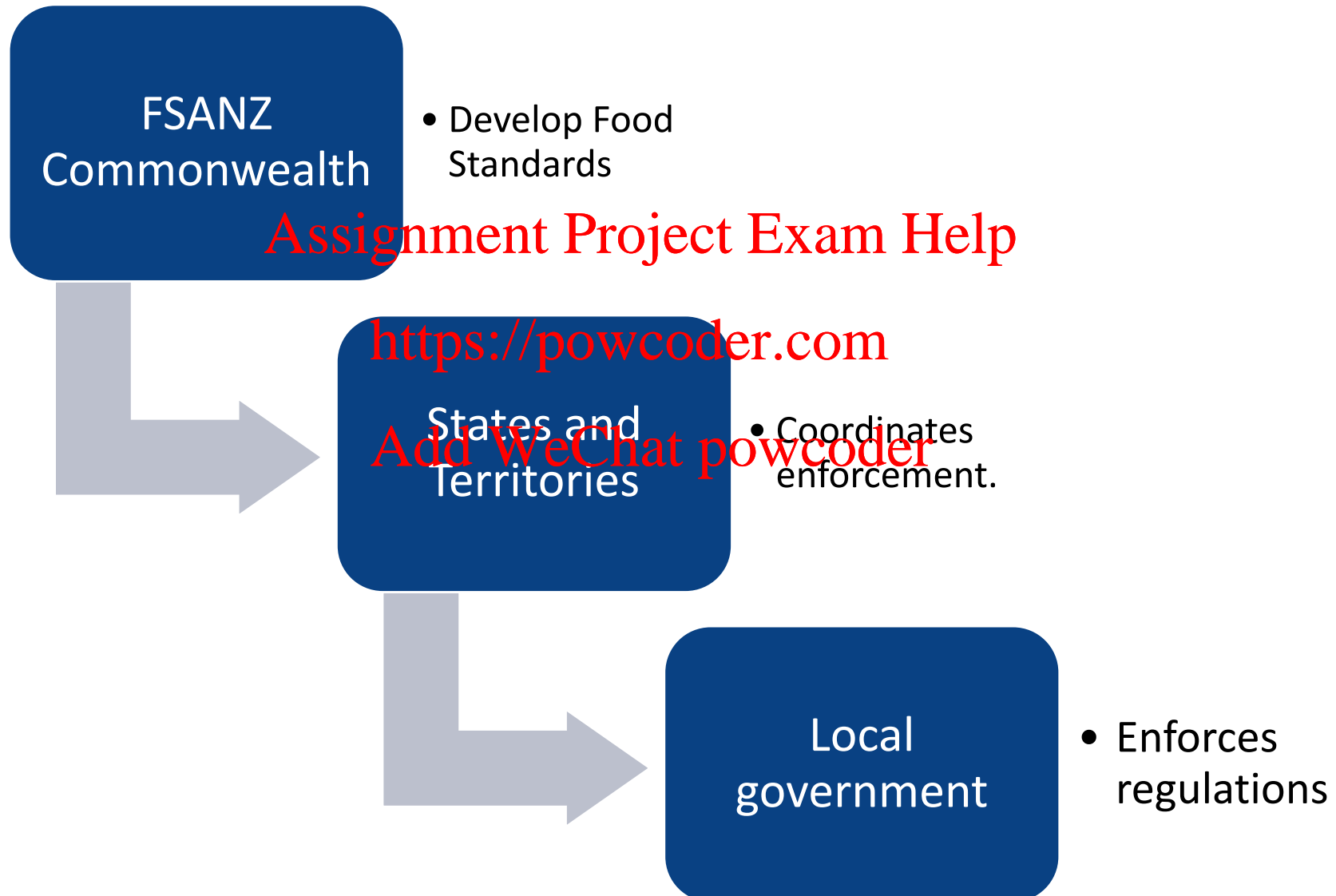


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Roles and responsibilities for food safety



Pause here to review

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1. What are the three classes of hazards?

2. What is risk?

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3. Which poses a higher risk in food safety, microbial contamination or food additives?

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4. What are the two types of food poisoning?

5. Name at least 3 ways to reduce the risk of foodborne disease?

6. What organisation is responsible for developing Food Standards for the whole of Australia?

7. Who enforces food safety regulations?



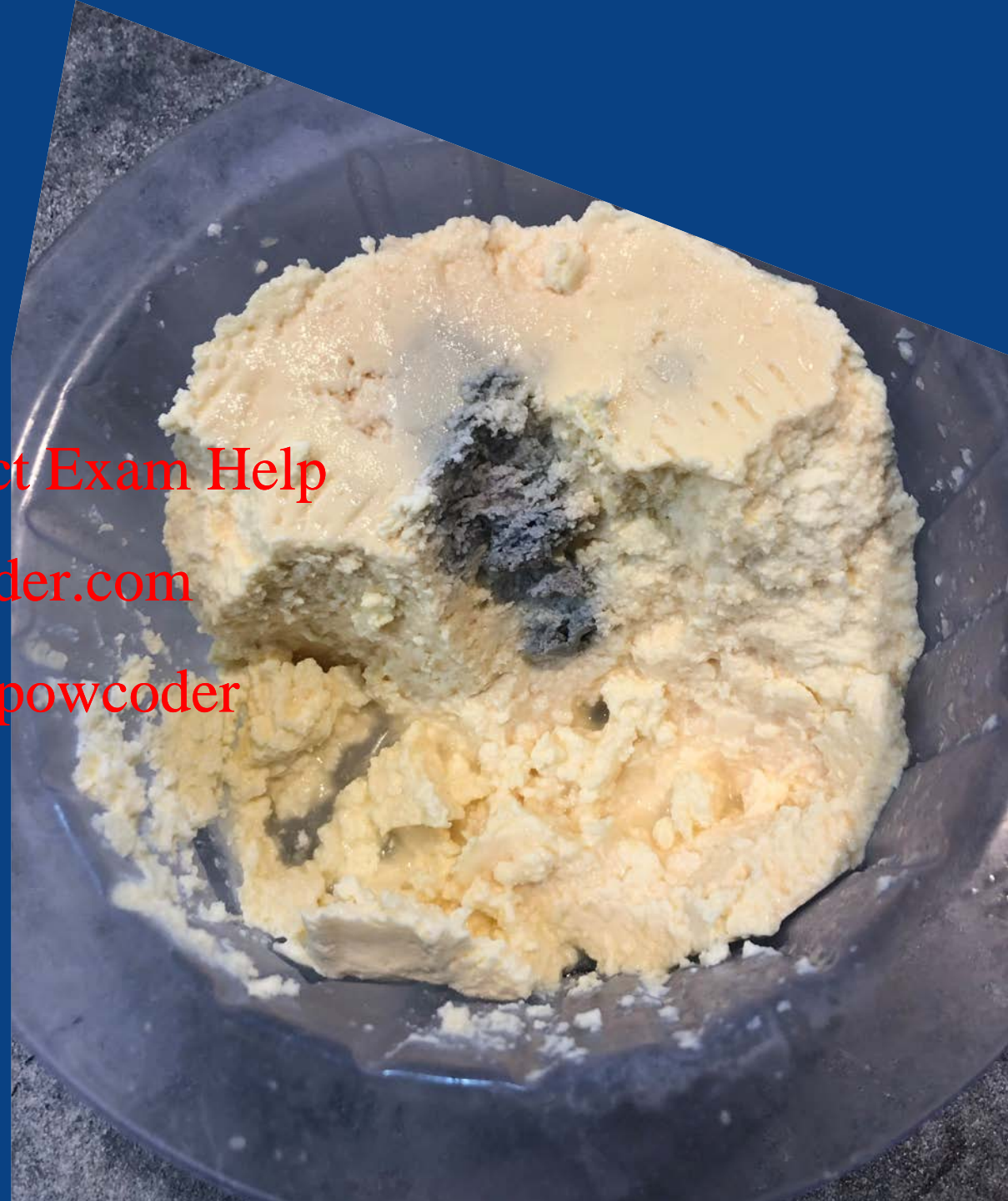
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Food Safety and Quality

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Quality control

Up until the mid 1900s, Food production standards focused on Quality control (QC)

Quality control is a managerial process during which we

1. Evaluate actual performance
2. Compare actual performance to goals
3. Take action on differences

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Quality control process

Quality is assessed by inspection of the final product

- determine what is suitable quality

- check finish product against set “standards”

- substandard products rejected

Quality control is a product oriented process

Corrective actions are taken after the process

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Quality Assurance

Quality assurance is part of quality management which is focused on providing confidence that quality requirements will be fulfilled (ISO 9000:2016)

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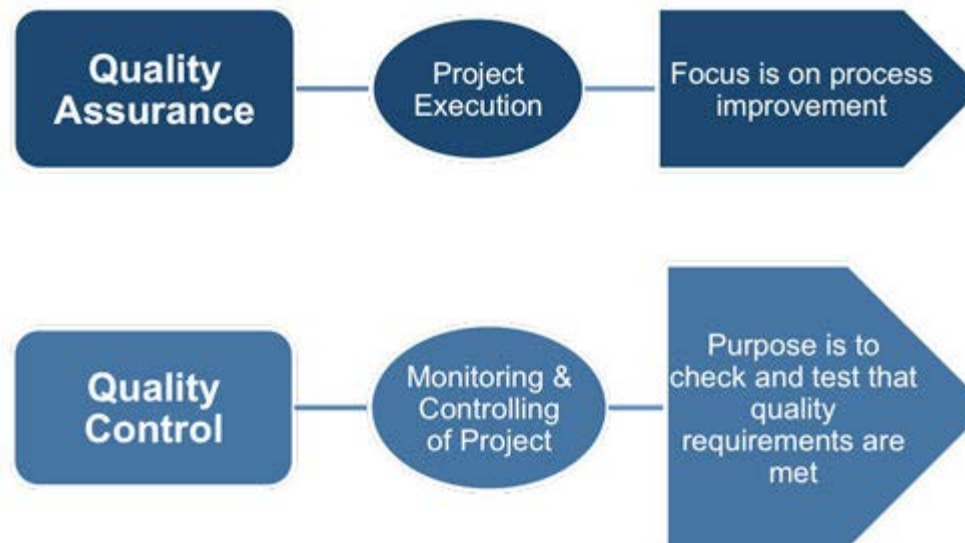
Quality assurance is process oriented

It is a systematic approach

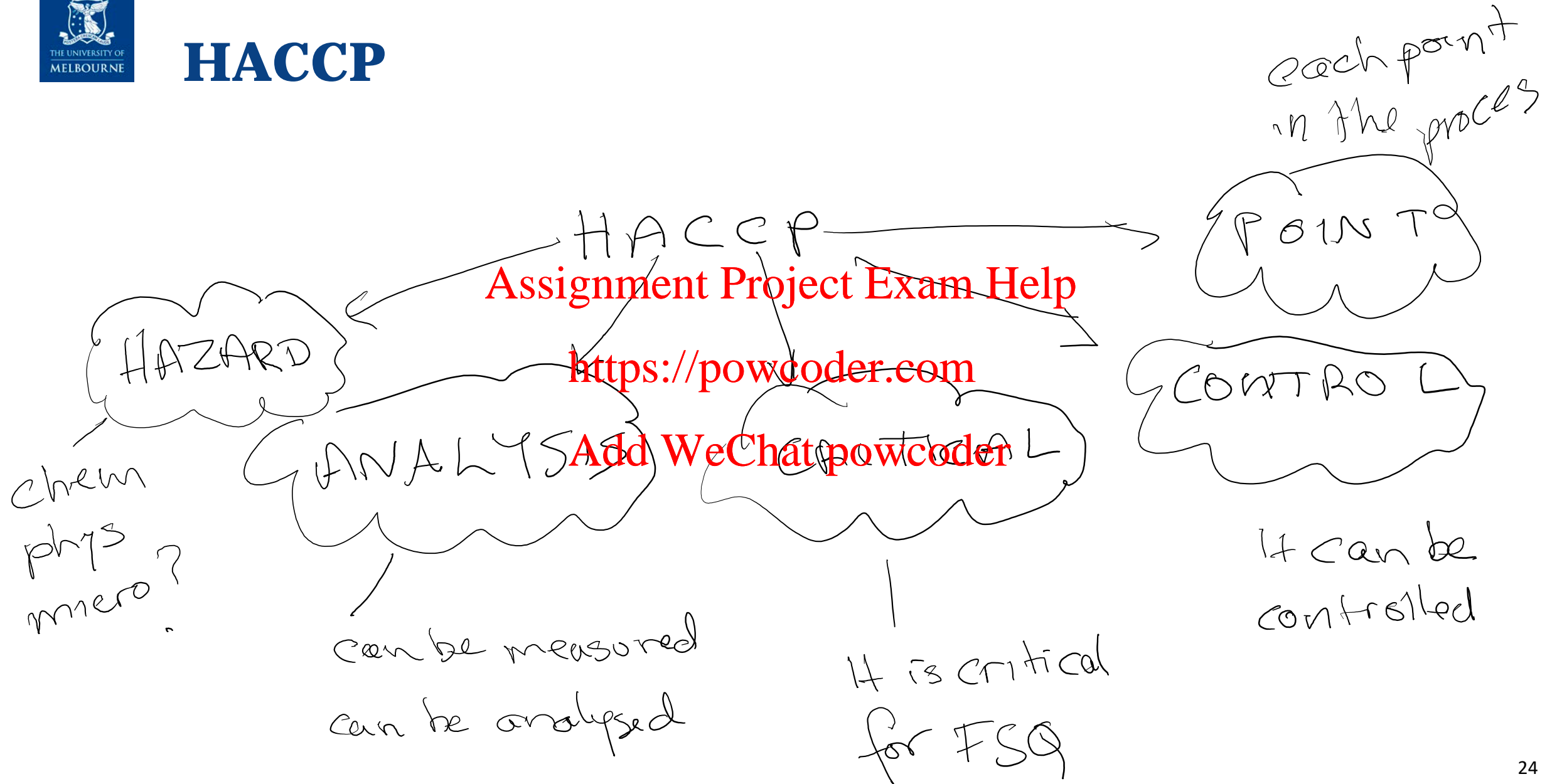
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Checks are made throughout the production cycle to ensure a product will meet quality requirements

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HACCP



HACCP

Hazard Analysis Critical Control Point (HACCP)

HACCP was developed in the 1960s to ensure that astronauts had safe food

It is defined as “a system which identifies, evaluates, and controls hazards which are significant for food safety”

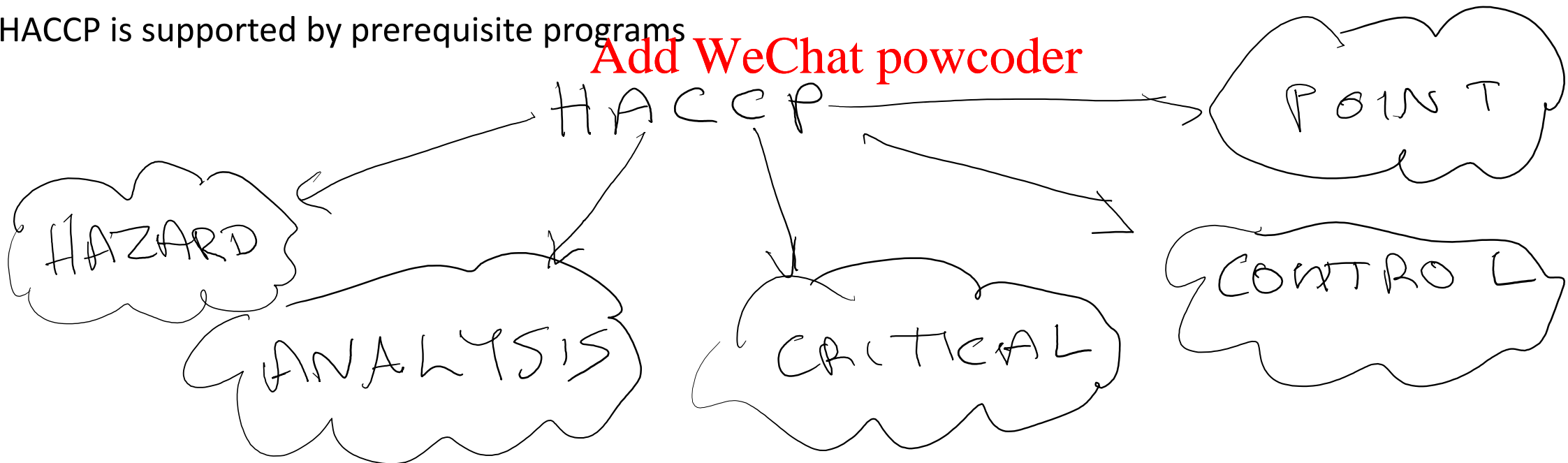
HACCP is based on seven principles and is focused on the production process

HACCP is supported by prerequisite programs

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Prerequisite programs

Prerequisite programs (PRPs) are procedures aimed at producing safe food

.PRPs consider

- the source of the food
- the premises where food is being processed
- the process environment
- the product
- the people involved

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Examples of prerequisite programs are

Good Agricultural Practices (GAP) and
Good Manufacturing Practices (GMP)



The 7 HACCP Principles

1. Conduct a hazard analysis
2. Determine critical control points (CCPs)
3. Establish critical limits for each CCP
4. Establish monitoring
5. Establish corrective actions
6. Verify the system is working effectively
7. Document all procedures and records

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5 Codex extras + 7 HACCP Principles = 12 steps

1. Assemble the HACCP team
2. Describe the product
3. Identify the end use
4. Construct a flow diagram
5. On-site confirmation of flow diagram

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6. Conduct a hazard analysis
7. Determine critical control points (CCPs)
8. Establish critical limits for each CCP
9. Establish monitoring
10. Establish corrective actions
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HACCP





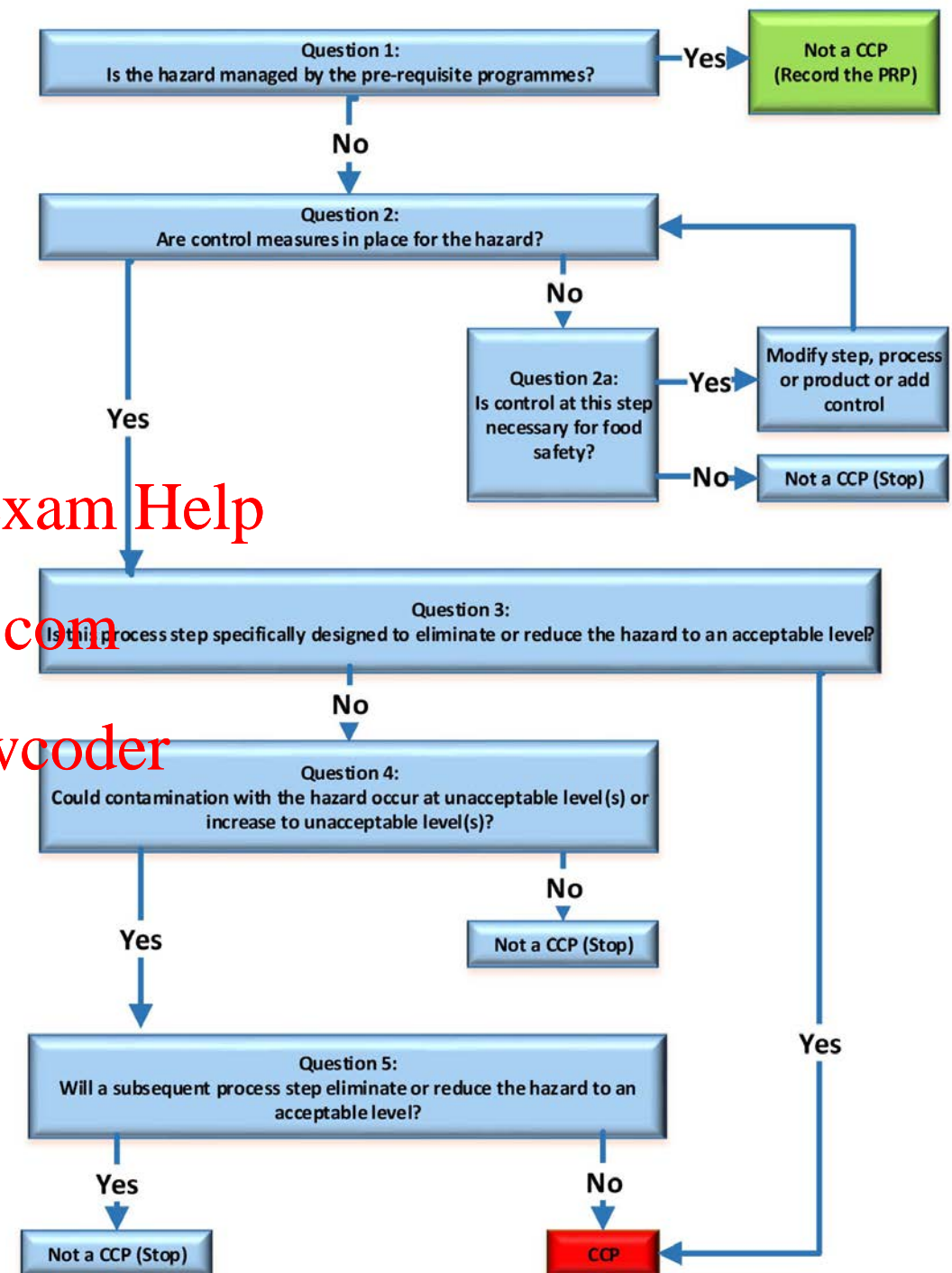
HACCP Decision Tree

The decision tree has questions which help decide whether a step in a process is a critical control point or not.

Pause here and think about the supply chain of milk from the point of delivery of the milk from the dairy to the factory through to the carton of milk leaving the packaging company.

Evaluate the steps 1-4 below. Are any CCPs?

1. Chilling
2. Pasteurisation
3. Homogenisation
4. Packaging





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