

AUSTRALIAN FOOD, BEVERAGE AND
PHARMACEUTICAL PRODUCT
MANUFACTURING INDUSTRY SECTOR

**IRC Skills Forecast and
Proposed Schedule of Work**

2019–2022

Prepared on behalf of the Food, Beverage and Pharmaceutical Industry Reference Committee (IRC) and Pharmaceutical Manufacturing (IRC) for the Australian Industry Skills Committee (AISC).

IRC Skills Forecast and Proposed Schedule of Work 2019-2022

Purpose

The Industry Reference Committee (IRC) Skills Forecast and Proposed Schedule of Work identifies proposed Vocational Education and Training (VET) training package development work necessary to meet the needs of industry and sets out the evidence of that need. The Australian Industry and Skills Committee (AISC) consider this information in prioritising and commissioning training package development work.

The IRC annual review of the Skills Forecast and Proposed Schedule of Work allows the identification of priority projects and provides the likely timing of training package development work over the next four years.

The Skills Forecast and Proposed Schedule of Work needs to provide the AISC with sufficient information on each project to consider:

- What work is to be commissioned;
- Clear evidence of employer and industry need;
- Alignment to Ministers' Priorities (see Appendix).

The Skills Forecast and Proposed Schedule of Work is to be developed in line with:

- Standards for Training Packages 2012;
- Training Package Products Policy;
- Training Package Development and Endorsement Process Policy.

This Skills Forecast presents the latest industry intelligence and resulting schedule of work for priority industry skills areas of the Food, Beverage and Pharmaceutical Industry Reference Committee (IRC) and the Pharmaceutical Manufacturing IRC.

This document is not intended to be identify and address every challenge faced across all industry sectors; it identifies and addresses the issues, challenges and opportunities that industry has identified as 'priority' for this stage of the schedule and acts as a resource and reference for industry and associated skills, learning and accreditation bodies seeking to act upon them.

Detailed data and information concerning industry skills needs across all sectors covered by the Food, Beverage and Pharmaceutical IRC and the Pharmaceutical Manufacturing IRC, including information from previous Skills Forecasts, can be found on the Skills Impact website www.skillsimpact.com.au and is available to Industry, RTO and consumers in line with Ministerial priorities.

Method & Structure

This Skills Forecast and Proposed Schedule of Work was developed through research of national and industry data sources, and ongoing input from IRC members and key stakeholders.

IRC members undertake consultation with industry, and guide consultation processes undertaken on their behalf throughout each year. Consultation may include personal meetings, conference attendance, organised workshops, surveys, project feedback collection and unsolicited contributions sent to the SSO.

The Skills Forecast structure is guided by the Australian Industry Skills Commissions (AISC), which requires the following to be included:

- **Sector overview:** Brief description of the industry and industry sub-sectors, the Training Package, and current challenges and opportunities.
- **Employment & Skills Outlook:** Overview of the data, strategies and policies relevant to the industry.
- **Key Changes and Proposed Responses:** identifying the drivers for change from industry (e.g. occupations, technology, emerging markets), regulation, and nationally important policies, and proposed responses including the impact on stakeholders.
- **Consultation Undertaken:** Information on the consultation previously undertaken to support the proposed responses, including issues and sensitivities raised.
- **Proposed Schedule of Work:** The current proposed schedule of work over the next four-year period as modified from previous plans as a result of consultations and the need to meet changing priorities
- **Project Details:** details of proposed projects proposed for approval of the AISC to be undertaken in 2019 – 2020.

Administrative Information

Name of Industry Reference Committees (IRCs):

- 1) Food, Beverage and Pharmaceutical
- 2) Pharmaceutical Manufacturing

Name of Skills Service Organisation (SSO): Skills Impact

This IRC Skills Forecast and Proposed Schedule of Work 2019–2022 has been produced with the assistance of funding provided by the Commonwealth Government through the Department of Education and Training.

www.skillsimpact.com.au

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EXECUTIVE SUMMARY

The Australian Trade and Investment Commission describes the adaptability and responsiveness of the Australian food product industry as a key reason Australia remains at the forefront of the global food industry. With direct employment of more than 200,000 people and more than \$40 billion in exports of food and beverage each year, food and beverage products are also central to the employment and sustainability of the agriculture, meat, seafood, wine, wholesale and retail, and tourism and hospitality industries. “Skills” was specifically identified as one of the 5 Growth Enablers in the sector by the CSIRO Food and Agribusiness Roadmap released in July 2017.

The highly skilled and trained workforce is recognised as a key strength for Australia’s Pharmaceutical Product Manufacturing Industry in the CSIRO Medical Technologies and Pharmaceuticals Roadmap, released in April 2017. The roadmap also recognises that unless addressed, a major opportunity for growth, the manufacture of high-value pharmaceuticals, may be impeded by specialist skills requirements and shortages, lack of sector specific management skills and Australia’s lagging STEM skills pipeline.

Almost 40,000 Australian jobs are in roles related to the Certificate I, II and III in Food Processing, and there were approximately 7,000 enrolments in these qualifications, which were last updated in 2011. A full review of the qualifications is a priority and builds on the previous review of associated qualifications. For 2020-2021, there is a proposed review of qualifications in food and beverage in the context of innovation in product development and packaging.

The previously approved project on bioprocessing in pharmaceutical manufacturing, which was delayed due to the lack of availability of key stakeholders, will be undertaken in 2019-2021. This will support Australia’s ability to develop high-value pharmaceutical manufacturing.

Pharmaceutical manufacturing training and assessment is a case study in significant challenges posed by the current vocational skills, learning and accreditation system. There are no independent Registered Training Organisations approved to deliver the current Certificate IV or Diploma in Pharmaceutical Manufacturing and there are minimal enrolments in all Pharmaceutical Manufacturing qualifications. The industry undertakes extensive in-house training and often utilises the current training package to design and support this training. Regulation of the industry is extremely strict and requires ongoing, auditable proof of competency, including evidence of training and assessment. Without an RTO authorised to deliver the Certificate IV and Diploma level, it is difficult to get independent assessment of workers’ competency, and impossible to obtain recognised qualifications verifying competency. The system is not meeting industry needs in training or accreditation. While the introduction of upgraded qualifications may result in improvements in this situation, there is a need to research, identify and create solutions to deal with the complexity of factors contributing to this problem.

The Pharmaceutical Manufacturing IRC recommends a project to identify issues, propose solutions and encourage uptake of Pharmaceutical Manufacturing qualifications, given the critical need for industry to meet regulatory requirements, including auditable evidence of ongoing competency. Consultations with other IRC in sectors with thin markets and low enrolments indicate that this project may help identify issues and potential solutions in other industries, address the question of whether low enrolments is equivalent to low demand, and will serve as an appropriate case study of value to other IRCs.

Proposed Schedule of Work 2019–2022

2019-2020	<p>Project 1: Review of Food Processing Qualifications</p> <p>The review of Certificate I, II and III in Food Processing and Certificate II and III in Food Processing (Sales), with a focus on introducing or improving the development of priority skills.</p> <p>Qualifications to be reviewed are:</p> <ul style="list-style-type: none"> • FBP10117 Certificate I in Food Processing • FBP20117 Certificate II in Food Processing • FBP30117 Certificate III in Food Processing • FBP20317 Certificate II in Food Processing (Sales) • FBP30617 Certificate III in Food Processing (Sales) <p>Project 2: Research into challenges in formal and industry Pharmaceutical Manufacturing qualification usage</p> <p>Research project to identify issues, propose solutions and drive enrolments in Pharmaceutical Manufacturing, given the critical need for industry to meet regulatory requirements, including auditable evidence of ongoing competency.</p> <p>Additional Project: Bioprocessing in Pharmaceutical Manufacturing (Previously approved)</p> <p>Development of training package components relevant to the manufacture of chemically processed drugs and medicines that are manufactured in living organisms such as bacteria, yeast and mammalian cells.</p>
2020-2021	<p>Project 1: Review of duplications, and opportunities for incorporation of cross-sector and innovation units across qualifications and Training Packages</p> <p>Undertake an examination of the FBP Training Package and scope potential development projects to:</p> <ul style="list-style-type: none"> • Identify remaining unit duplication within FBP Training package, and duplication of job functions by FBP units which could be addressed by importing units from other training packages. • Identify opportunities to incorporate existing cross-sector and updated BSB units into the FBP Training package. • Identify opportunities and relevance of units that address innovation skills, for importation into FBP or to be promoted as available for use in other training packages, especially in relation to innovative packaging solutions. • Scope identified skills gaps, training package component development as projects to implement identified changes. <p>Project 2: Flour Milling and Plant Baking</p> <p>Review of the Flour Milling and Plant Baking qualifications, which have not been reviewed for content since 2011. This will complete the review of the content of all existing FBP qualifications (since 2017).</p>
2021-2022	<p>Project 1: Development of components for FBP Training Package</p> <p>Undertake Training Package component development and/or deletions as required based on the research project undertaken in the 2020-2021 on duplicated and cross-sector and innovation units.</p> <p>Project 2: Development of Training Package components to support advanced Pharmaceutical Manufacturing</p> <p>Development of qualifications, units and skill sets to meet skills gaps and needs identified in the CSIRO Medical Technologies and Pharmaceuticals Roadmap to support high-value pharmaceutical manufacturing, including management skills and a focus on applying emerging techniques at manufacturing production level</p>
2022-2023	<p>Project 1: TBA</p> <p>Projects to be identified based on feedback on the implementation of training products recently and currently under review.</p>

Food, Beverage and Pharmaceutical Industry Reference Committee

The Food, Beverage and Pharmaceutical IRC is responsible for national training package components relevant to food processing and manufacturing, beverage manufacturing, pharmaceutical and nutraceutical manufacturing.

The Chair of the Food, Beverage and Pharmaceutical IRC is Anne Astin, and the Deputy Chair is Ian Curry.

Since the last Skills Forecast, Chris Day and David McKinnon have handed their IRC roles to colleagues from their respective organisations, Melanie Pauga from the Australian Beverages Council has replaced Kate Fisher from Sanitarium, representing the non-alcoholic beverage industry, Fiona Fleming has taken the role for the Australian Institute of Food Science & Technology and work on filling the remaining position for a member of the grain processing industry is in progress.

Table 1: IRC Membership as at January 2019

Name	Organisation or Area of expertise
Anne Astin	Expertise in food processing and manufacturing
Ian Curry	Australian Manufacturing Workers Union
Carolyn Macgill	Australian Industry Group
Geoffrey Annison	Australian Food and Grocery Council
Fiona Fleming	Australian Institute of Food Science and Technology
Scott Young	Australian Sugar Milling Council
Melanie Pauga	Australian Beverages Council
Sarah Hills	South Australian Wine Industry Association
Liz Newlan	Bega Cheese Ltd
Nicole Lam	Carlton United Breweries
Alexis Roitman	Independent Brewers Association
Briannon Avery	Expertise in livestock and pet feed manufacturing
Brett Noy	Expertise in food processing and manufacturing
Vacant	Representative of the grain processing industry

Pharmaceutical Manufacturing Industry Reference Committee

The Pharmaceutical Manufacturing IRC is responsible for national training package components relevant to the pharmaceutical manufacturing industry.

Qualifications overseen by the IRC are Pharmaceutical Manufacturing qualifications included in the FBP Food Beverage and Pharmaceutical Training.

These qualifications are included in the following Training Packages:

- Food Processing (FBP)
- Health
- Retail Services

The Chair of the Pharmaceutical Manufacturing IRC is Paul MacLeman and the Deputy Chair is James Thomas from CSL Behring. Since the last Skills Forecast, Dan Grant has taken on the role for MTP Connect and Carolyn McGill has taken the AI Group position.

Table 2: IRC Membership as at January 2019

Name	Organisation or Area of expertise
Paul MacLeman	Expertise in pharmaceutical manufacturing
Carolyn McGill	Australian Industry Group
Anne Donnellan	Australian Manufacturing Workers Union
Louise White	SeerPharma
Charles Ross	Vaxxas
James Thomas	CSL Behring
Dan Grant	MTPConnect
Vacant	Expertise in complementary medicine manufacturing

SECTOR OVERVIEW

Introduction

The food, beverage and pharmaceutical manufacturing industries provide direct employment to more than 215,000 people¹ and almost \$20 billion in exports of food and beverage each year (see Table 1). Food and beverage products are central to the employment and sustainability of the agriculture, meat, seafood, wine, wholesale and retail, and tourism and hospitality industries. The Pharmaceutical Manufacturing industry generates an annual revenue of \$9 billion and contributes significantly to the Australian health system.

Table 3: Industry snapshot

Manufacturing Industry	Revenue	Profit	Exports	Wages	Industry Value Added ²
Food Products	\$54.4bn	\$ 5.2bn	\$10.9bn	\$ 7.3bn	\$12.3bn
Beverages	\$25.2bn	\$ 2.2bn	\$ 4.6bn	\$ 3.0bn	\$ 6.2bn
Pharmaceutical and Medicinal Products	\$ 9.0bn	\$ 0.9bn	\$ 4.2bn	\$ 1.4bn	\$ 2.5bn

Source: IBISWorld Industry Wizard

According to the Australian Trade & Investment Commission, the industry has been extremely quick to respond to consumer demands and trends, which of late has been for more convenient, healthier, fresher, less-processed foods, with minimal time in storage before purchase. This has led to the identification of new skills priorities as the industry seeks to maintain that responsiveness.

Sector Description

The [Australian Trade and Investment Commission](#) describes the adaptability and responsiveness of the Australian food product industry as a key reason Australia remains at the forefront of the global food industry.

The food, beverage and pharmaceutical product manufacturing industry sector integrates all businesses that operate in the following sub-sectors.

Table 4: Industry sub-sectors

Industry Group	Industry Sub-Sector (ANZSIC Code)
Food Product Manufacturing ³	Milk and cream processing (1131)
	Ice cream manufacturing (1132)
	Cheese and other dairy product manufacturing (1133)
	Fruit and vegetable processing (1140)
	Oil and fat manufacturing (1150)

¹ Australian Bureau of Statistics - 6291.0.55.003 - EQ06 - Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards

² Industry value added (IVA) is the contribution by businesses in each industry to gross domestic product (GDP). Put another way, IVA records the market value of the goods and services produced by the industry, with the cost of goods and services used in production subtracted from the total.

³ All data and references to ANZSIC Group 'Food Product Manufacturing' (code 11) exclude 'Meat and Meat Product Manufacturing' (code 111) and 'Seafood Processing' (code 112).

	Grain mill product manufacturing (1161)
	Cereal, pasta and baking mix manufacturing (1162)
	Bread manufacturing (factory based) (1171)
	Cake and pastry manufacturing (factory based) (1172)
	Biscuit manufacturing (factory based) (1173)
	Bakery product manufacturing (non-factory based) (1174)
	Sugar manufacturing (1181)
	Confectionery manufacturing (1182)
	Potato, corn and other crisp manufacturing (1191)
	Prepared animal and bird feed manufacturing (1192)
	Other food product manufacturing (1199)
Beverage Manufacturing	Soft drink, cordial and syrup manufacturing (1211)
	Beer manufacturing (1212)
	Spirit manufacturing (1213)
	Wine and other alcoholic beverage manufacturing (1214)
Pharmaceutical and Medicinal Product Manufacturing	Human pharmaceutical and medicinal product manufacturing (1841)
	Veterinary pharmaceutical and medicinal product manufacturing (1842)

There are a variety of job roles in the industry and assigning specific job titles is becoming more difficult as job functions change through industry evolution. Occupations described within the FBP Training package include:

- Food Processing Salesperson
- Bakery Production Assistant
- Baker's Assistant
- Bakery Mixer
- Food and Drink Factory Hand
- Grocery Processing Operator
- Food and Drink Packaging Worker
- Food Processing Sales Assistant
- Food Service Sales Assistant
- Sales Representative – Food Industry
- Pharmaceutical Production Operator
- Cellar Operator
- Cellar Hand
- Vineyard Hand
- Cellar Door Salesperson
- Sugar Services Operator
- Sugar Mill Worker
- Sugar Transport Operator
- Sugar Processing Operator
- Advanced Food and Drink Packaging Operator
- Plant Bakery Production Operator
- Plant Bakery Packing Room Operator
- Pastry Cook
- Cake Manager
- Chef Patisserie
- Pastry Sous Chef
- Bread Baker
- Artisanal Baker
- Baker
- Business Development Professional – Food
- Account Manager – Food Sales
- Rice Packaging worker
- Rice Food Manufacturing Worker
- Rice Production Worker
- Rice Miller

- Pharmaceutical Production Leading Hand
- Wine Grape Grower
- Wine Bottling and Packaging Operator
- Senior Cellar Operator
- Sugar Transport Operator
- Senior Baker
- Bakery Manager
- Leading Flour Mill Operator
- Food and Production Manager
- Flour Mill Technician
- Small Business Manager (Processed Food)
- Store Manager (Processed Food)
- Food and Drink Production Technician
- Food and Drink Production Supervisor
- Food Safety Systems Officer
- Production Line Supervisor
- Food Testing Manager
- Food safety supervisor – health and community services
- Assistant Environmental Health Officer (Local Government)
- Food Laboratory Technician

Businesses

There were 12,752 food, beverage and pharmaceutical product manufacturing businesses operating at the end of the financial year in 2017⁴ (a 1.2 per cent increase). Of these businesses, 46 per cent (5,834) are in the bakery product manufacturing sector (see Table 5). Around 52 per cent (6,597) are 'small businesses' by virtue of employing between one and 19 people. Only one per cent (96) are classified as 'large'.

Table 5: Count of food, beverage and pharmaceutical businesses

ANZSIC four-digit industry title	Business Size			
	Non-Employing Businesses	Small Businesses (1-19 Employees)	Medium Businesses (20-199 Employees)	Large Businesses (200+ Employees)
Ice Cream Manufacturing	73	115	19	0
Cheese & Other Dairy Product Manufacturing	104	113	54	6
Oil and Fat Manufacturing	109	63	7	0
Milk and Cream Processing	25	36	11	3
Fruit and Vegetable Processing	257	250	69	7
Grain Mill Product Manufacturing	37	35	13	3
Cereal, Pasta & Baking Mix Manufacturing	75	145	28	4
Bread Manufacturing (Factory based)	89	177	60	7
Cake and Pastry Manufacturing (Factory based)	201	308	77	5
Biscuit Manufacturing (Factory based)	15	40	15	0
Bakery Product Manufacturing (Non-factory based)	1,022	3,210	603	5
Sugar Manufacturing	11	9	3	6
Confectionery Manufacturing	127	172	38	6
Potato, Corn & Other Crisp Manufacturing	3	5	0	3
Prepared Animal & Bird Feed Manufacturing	126	127	38	3
Other Food Product Manufacturing n.e.c.	566	595	128	10

⁴ Australian Bureau of Statistics, 2017, '8165.0 - Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017: Businesses by Main State by Industry Class by Employment Size Ranges, June 2016 and June 2017'

Soft Drink, Cordial & Syrup Manufacturing	213	160	30	3
Beer Manufacturing	213	196	30	3
Spirit Manufacturing	42	25	5	0
Wine & Other Alcoholic Beverage Manufacturing	1,105	642	157	6
Human Pharmaceutical & Medicinal Product Manufacturing	181	144	43	16
Veterinary Pharmaceutical & Medicinal Product Manufacturing	29	30	12	0

Source: 8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017

Stakeholders

Key stakeholders include:

- Peak industry and employer associations representing organisations and professionals in the food and beverage manufacturing industries including Australian Beverages Council, AIGroup, Australian Food and Grocery Council, Australian Institute of Food Science and Technology, Australian Sugar Milling Council, Independent Brewers Association, National Baking Industry Association, South Australian Wine Association Inc., Australian Technical Millers Association, Australian Institute of Packaging and Dairy Australia.
- Peak industry and employer associations representing organisations and professionals in the pharmaceutical manufacturing and biotechnology industry, including AusBioTech and Medicines Australia.
- Peak industry and employer associations for pet and stock feed manufacture, including Pet Food Industry Association of Australia and Stock Feed Manufacturers' Council of Australia
- Key research and development organisations working in food and beverage industries such as Australian Export Grains Innovation Centre,
- Growth centres and industry-led organisations focused on developing food, beverage and pharmaceutical industries in the global marketplace, such as Food Innovation Australia Limited (FIAL) and Medical Technology and Pharmaceuticals Growth Centre (MTPConnect).
- Regulatory bodies and statutory authorities overseeing the manufacture, packaging and labelling of pharmaceuticals, food and beverages, including the Therapeutic Goods Administration and Food Standards Australia New Zealand.
- Employee unions representing workers in food, beverage and pharmaceutical processing and manufacturing industries, including the Australian Manufacturing Workers Union, United Voice, the National Union of Workers and the Australian Workers Union.

Other bodies

- RTOs with project units of competency on scope
- Industry Training Advisory Bodies/Councils
- State/Territory Training Authorities

Challenges and Opportunities in the Sector

Introduction

The food, beverage and pharmaceutical manufacturing industries operate in constantly changing environments driven by consumer demands and industry practices and innovations, with risk management a key focus in all operations. Operators and workers are faced with challenges in dealing with the consequences of international standards (including ISO), as well as policies and regulation that are driven at federal, state and territory levels, and by local governments and government agencies.

The substantial export potential of Australian food products into the Asian region rests on the reputation, based on demonstrable reality, of Australian food products as high quality, produced in clean environments, and above all being safe. That reputation is underpinned by private and proprietary food safety and quality standards and a comprehensive and rigorous food regulatory system.

In addition to compulsory food safety regulations, a large number of private (proprietary and commercial) standards have been developed which incorporate requirements for safe food production as well as additional requirements which relate to aspects of quality or methods of production. Retailers, quick service restaurants, food service companies and major manufacturers commission a large number of audits of their suppliers for compliance with these private standards. These are in addition to enforcement agencies conducting food safety audits.

The 2017 CSIRO *Futures Report for Food and Agribusiness* summarises five major influences on the Food and Agribusiness industry globally:

- a less predictable planet;
- health on the mind;
- choosy customers;
- one world;
- smarter food chains.

Each of these influences are creating additional risk considerations for industry operators. They are also resulting in additional skills needs, such as understanding supply chains, relationship management and digital platforms, as well as deep technical knowledge. Structured on-the-job training plays a role in developing these skills.

The 2017 CSIRO *Medical Technologies and Pharmaceuticals Roadmap* summarises seven major influences that will affect the operations of pharmaceutical manufacturing:

- chronic burden;
- precision healthcare;
- global biosecurity;
- consumer control;
- digital evolution;
- developing markets;
- integrated care.

Manufacturing high-value pharmaceuticals is identified as a key focus if Australia is to become a major international player in the medical technologies and pharmaceuticals space, which is critical to Australian healthcare outcomes and affordability.

Demographics

One of the challenges regularly identified in reports is the aging workforce. Australia has an aging population and people are working longer. They are also maintaining fitness and abilities later into life, as well as a desire to work, at least part-time or casually, whether for financial reasons, to maintain social involvement or for the enjoyment they get from productive work (e.g. [Sami, ABC, The World Today, 15 June 2015](#)). While research has shown that employing older, more engaged workers can have benefits to organisations ([Kulik, The Conversation, 17 October 2017](#)), recruitment and employment practices may not have developed quickly enough to meet current trends ([Williams, The Conversation, 26 November 2015](#)). While the age profile of the industries is moving towards older workers, this is generally treated as though it is a challenge without also examining the opportunities. At the same time, Australia's unemployment and underemployment rates for those aged 15–24 years remains more than double that of the general population.

There are many issues arising from the changing demographics of employees, and these are being considered by employers, unions and policy makers. It may be that different training practices may need to be introduced to bring mutually beneficial results to industry and employees.

Pharmaceutical Manufacturing Training and Assessment

Pharmaceutical manufacturing training and assessment faces significant challenges posed by the current vocational skills, learning and formal recognition of competency system. In particular, the lack of enrolments in qualifications is often seen as an indicator of lack of requirement for training.

Australian healthcare strategies are divided by competing pressures that are difficult to manage. The government is striving to meet extreme cost pressures, while patient outcomes are driving personalised diagnosis and treatment. Pharmaceuticals manufacturing requires strong control measures to ensure accurate dosage, prevent contamination, minimise theft and fraud, and create security of the supply chain. The industry also applies advanced manufacturing techniques and Industry 4.0 developments, requiring rapid change to remain competitive in the market environment. CSIRO⁵ emphasised the importance of focusing Australian manufacturing efforts towards high-value and niche pharmaceutical products to create sustainable export revenue, while also encouraging accelerated pharmaceutical development. Conversely, the industry faces high-level regulatory controls on the approval, manufacture, distribution and use of pharmaceuticals.

In a job competency context, regulation of pharmaceutical manufacturing is strict and requires ongoing, auditable proof of competency, which may include evidence of training and assessment.

There are no Registered Training Organisations (RTOs) approved to deliver the Certificate IV in Pharmaceutical Manufacturing and minimal enrolments in all pharmaceutical-specific qualifications. One certificate program taught from an Australian RTO is only offered to offshore learners in China.

The industry undertakes extensive in-house training, often utilising the training package to design and support their efforts.

Without approval to train at Certificate IV and Diploma levels, it is difficult to get independent assessment of competency for extremely competent workers, and impossible to obtain recognised qualifications verifying competency.

⁵ CSIRO, 2017, Medical Technologies and Pharmaceuticals Roadmap

There are specific issues relating to pharmaceutical manufacturing competency and training that are significant in broader contexts:

- It is a regulatory requirement that competency must be *current* – it is not enough to show previous training – and *demonstrated*, including updating of skills on a regular basis.
- Mobility of the workforce is affected: when a competent employee moves to another company, it is a regulatory requirement that they are ‘re-recognised’ as competent in their new company.
- Pharmaceutical manufacturing is seen in a training context as a thin market, yet industry employs over 26,000 workers (24,000 full-time) across more than 450 businesses, many of which are in urban areas. Also, at almost \$98,000⁶, there is a higher average industry salary compared to other FBP sectors.
- There are barriers to market entry for independent RTOs to deliver training and assessment, especially given the dearth of qualified trainers and assessors and lack of access to manufacturing equipment and advanced technologies.
- There are multiple programs designed to promote careers in Science, Technology, Engineering and Mathematics, which tend to have a strong focus on school studies and university programs, to the detriment of the VET sector.

The system is not meeting industry needs in training or accreditation. While the introduction of upgraded qualifications may improve this situation, there is a need to research, identify and find solutions to deal with the complexity of factors contributing to this problem.

Consumer and industry trends

There are continuing and growing changes in consumer demand, and food and beverage trends that have influenced this Skills Forecast, including but not limited to:

- a desire for healthier, ‘clean’ and natural food, beverages and pharmaceutical products;
- interest in gluten-free, non-dairy and allergen-free foods, and personalised nutrition;
- the desire to know where food and beverages have come from and how it was transported and processed;
- the preference for ethical practices in food and beverage production;
- a desire to reduce the carbon footprint and environmental effects of food and beverage production and product transportation
- a desire to reduce or manage waste, including food and beverage waste and packaging.

These preferences may not be shared by all consumers, but open new markets and product opportunities, leading to greater consumer choice and industry competition.

Traceability

Traceability is the ability to track any food, feed, food-producing animal or substance that will be used for consumption, through all stages of production, processing and distribution.⁷

Workers in both large and small manufacturing plants are now required to have a greater understanding of traceability concepts and systems. New technologies are also being introduced that require the ability to understand and operate systems, which may include application of blockchain.

⁶ IBISWorld Industry Wizard

⁷ EU Health & Consumer Protection Directorate-General Factsheet 2007

Regulations relating to processing, packaging and labelling of food, beverage and pharmaceuticals are changing in response to an increasing demand to know where a product has come from and what is in it.

Provenance

Food provenance is the accurate knowledge of where a food or ingredient has originated whether grown or manufactured. Buying local, reducing food and beverage transport costs and imports, keeping local food producers and processors in jobs and supporting local businesses are all consumer trends that have influenced the way that food and beverage industries operate, and the skills and knowledge required to work in these fields.

Fraud

Food fraud is a collective term used to encompass the deliberate and intentional substitution, addition, tampering, or misrepresentation of food, food ingredients, or food packaging; or false or misleading statements made about a product, without the purchaser's knowledge for economic gain.

Food, beverage and pharmaceutical fraud and adulteration has the potential to seriously affect Australia's global reputation as a safe and reliable producer, as well as endangering peoples' health and wellbeing.

Commonly counterfeited products in global food and beverage production include fruit juices, olive oil, honey, spices, coffee, tea, milk, organic foods, grains and wine. There is an enormous black market in stolen and counterfeited pharmaceuticals. Consumers have become more aware that products are being substituted, adulterated or mislabelled, influencing a stronger demand for more carefully tracked, labelled and monitored products.

Food and Beverage Contamination

While recent instances of food contamination have been widely reported in Australia's media, food and beverage manufacturers have considered this an urgent issue for at least the past five years. Products of concern include those processed wholly in Australia as well as those made from imported ingredients. Recent cases include deliberate contamination as an act of sabotage, contamination of pet and livestock food with plastic, and food contaminated with bacteria because of poor food safety practices.

Contamination of food and beverage can be broken into three categories: biological contamination (e.g. salmonella and listeria), physical contamination (e.g. needles, bandages, hairs), and chemical contamination (e.g. pesticides, cleaning chemicals, mercury).

An increase in the skills and knowledge required to prevent contamination of food and beverage products can be achieved by enhancing the assessment requirements in units relating to product and equipment handling, transporting, processing, packaging, controlling and tracking stock, products and equipment.

Food and Beverage Allergens

Allergy occurs when a person's immune system reacts to substances in the environment that are harmless for most people. These substances are known as allergens and are found in house dust mites, pets, pollen, insects, moulds, foods and some medicines.

The ability to manage responses (for example, to asthmatic and anaphylactic reactions) has become a key skill in many service occupations. Risk management and product labelling and communication of allergen risks are critical food safety matters for food and beverage manufacturers.

- Allergic diseases are among the fastest growing chronic conditions in Australia, affecting approximately one in five Australians;
- Hospital admissions for anaphylaxis (severe, life threatening allergic reactions) have increased five-fold in the last 20 years;
- Deaths from anaphylaxis have increased by seven per cent per year for the last seven years;
- Food allergy induced anaphylaxis has doubled in the last ten years. One in ten infants now have a food allergy.⁸

Knowledge about common food groups that cause reactions, identifying and mitigating risks and accurate labelling and regulatory compliance have become critical skills for people producing food, beverages, ingredients, supplements and additives for consumption by humans and animals.

Training Package Overview

The FBP Food, Beverage and Pharmaceutical Training Package contains 25 FPB qualifications, 454 Units of Competency and 38 Skill sets. The previous FDF10 Training Package has now been superseded.

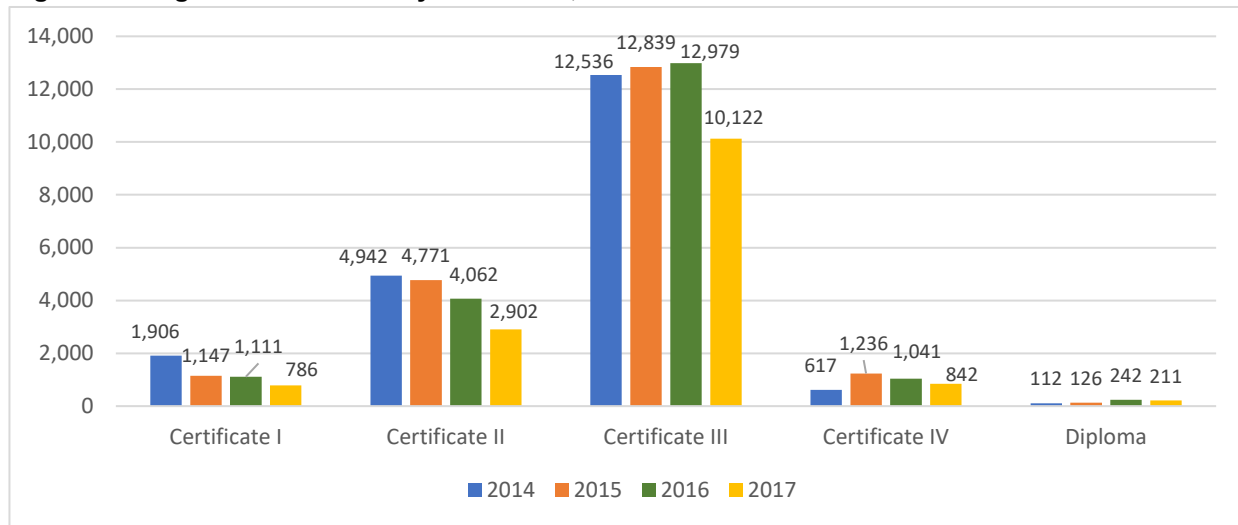
As the FBP Training Package was only released in January 2018, data about the number of students and courses has not yet been released by NCVET. As at January 2019, FBP components are on the scope of 100 registered training organisations (RTOs). It is expected that the majority of the 396 RTOs who currently have components of the superseded FDF10 Training Package on their scope will transition to the FBP Training Package as the deadline nears.

After three years of relative stability in enrolment numbers, there were 26 per cent (5,250) fewer program enrolments in 2017 compared to 2014 figures, and a 24% drop from 2016 to 2017 (see APPENDIX 1).

Enrolments at Certificate I, II and III-levels dropped between 2014 and 2017 (with Certificate IV enrolments decreasing each year between 2015 and 2017). On the other hand, enrolments at Diploma-level have increased since 2014 (see Figure 1).

⁸ <https://nationalallergystrategy.org.au/news/national-progress-in-the-management-of-allergies>

Figure 1: Program Enrolments by AQF Level, 2014-2017

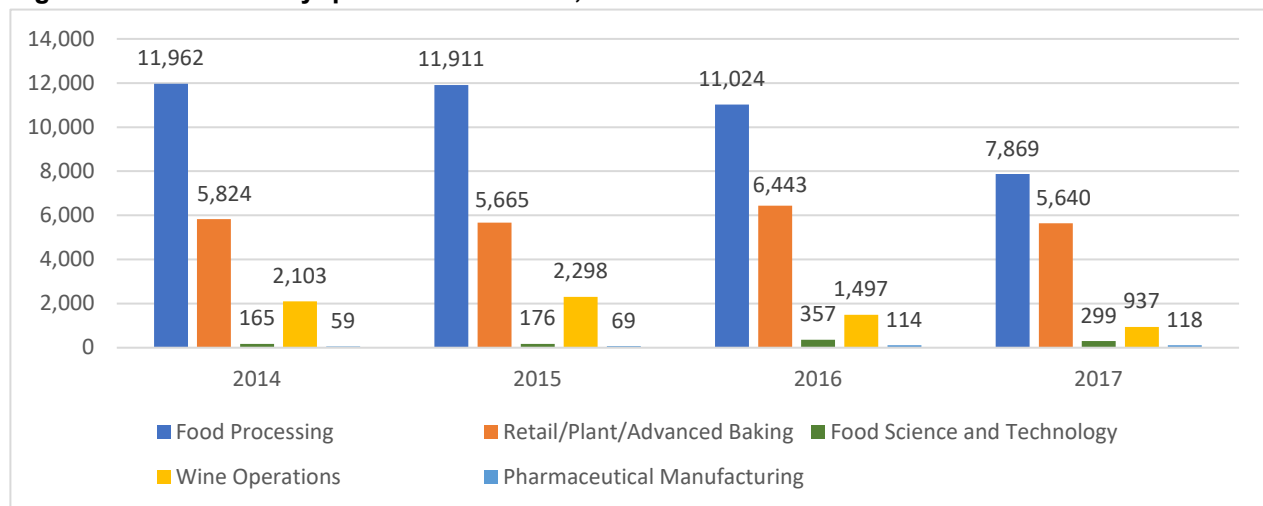


Source: NCVER VOCSTATS, TVA program enrolments 2014-2017

While the recent updating of qualifications may have had an impact on statistical tabulation and collection, there are substantial drops in enrolments in food processing and food processing (sales) qualifications, which are among the last qualifications in FBP training package to be reviewed.

In pharmaceutical manufacturing, enrolments have almost doubled since 2014. This is likely due to an increased need for advanced skills training, as well as industry-wide promotion of training in the sector (including by the Pharmaceutical IRC).

Figure 2: Enrolments by qualification cluster, 2014-2017

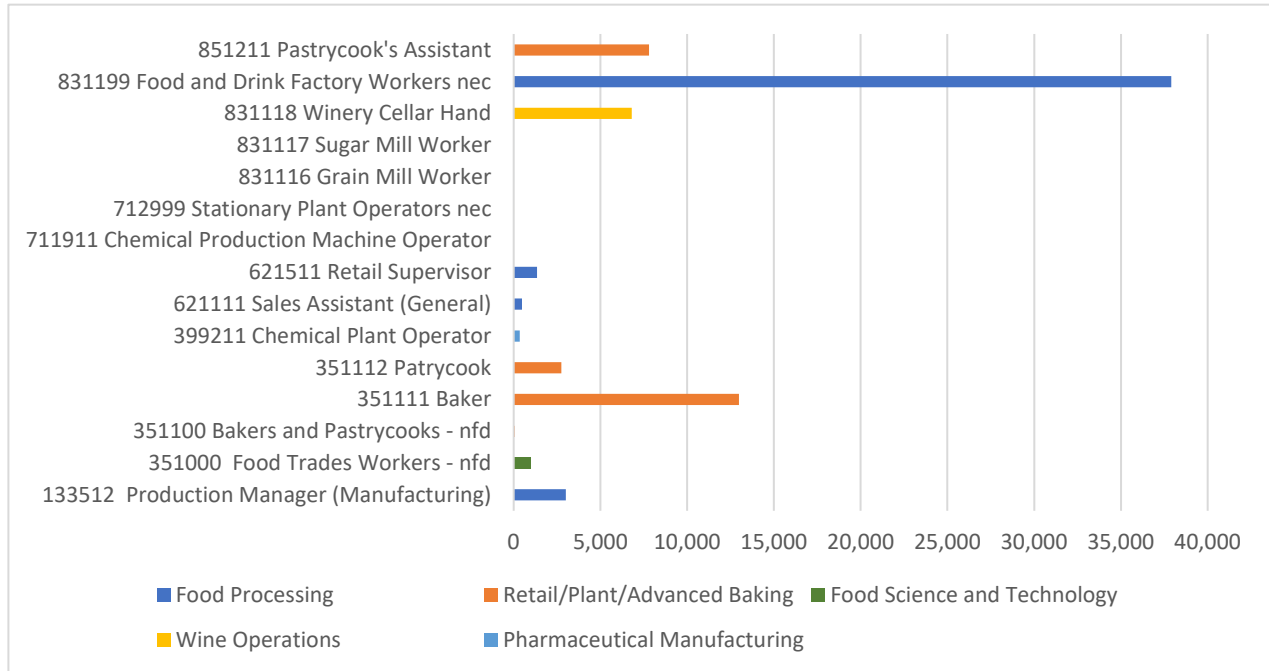


Source: NCVER VOCSTATS, TVA program enrolments 2014-2017

Overall, qualifications associated with Food Processing were responsible for 57 per cent (42,766) of enrolments in the Training Package, with Baking-related qualifications making up almost one-third. This is reflected in the occupations to which FDF10 Training Package enrolments are intended to lead: over 50 per cent (37,901) are linked to the occupation 'Food and drink factory worker' (ANZSCO code 831199).

The IRC is concerned about the quality of the available data relating to Qualification Occupations (see Figure 3). While this may be the best data available, it does not meet the needs of the IRC in considering evidence related to current and future jobs, skills and training requirements.

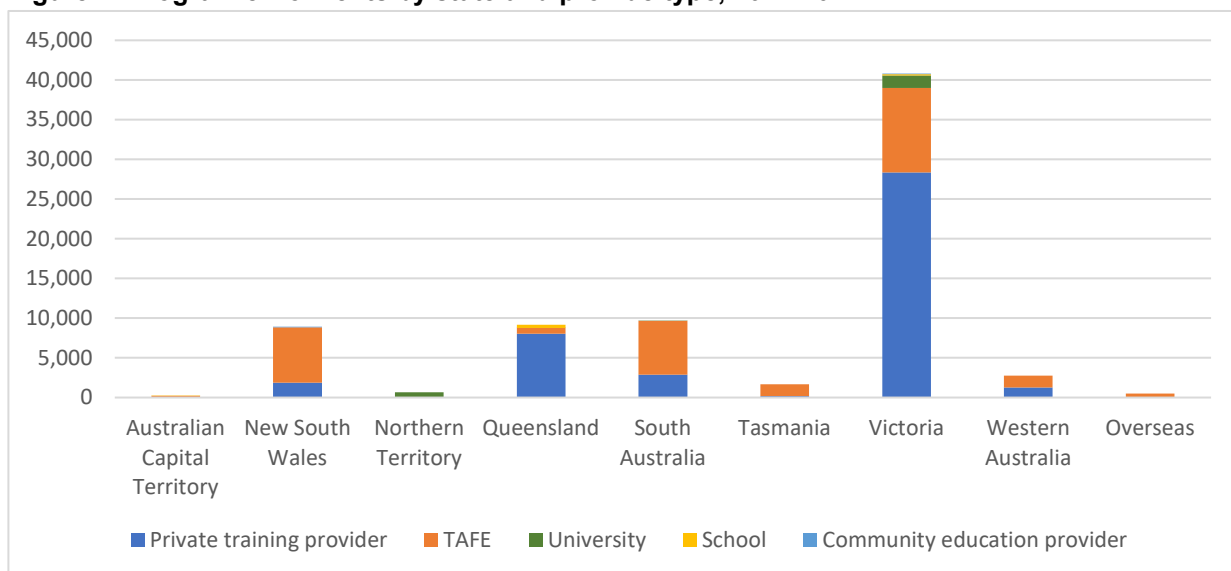
Figure 3: Qualification occupations, 2014-2017



Source: NCVET VOCSTATS, TAFE program enrolments 2014-2017

Around 57 per cent of program training was delivered by RTOs between 2014 and 2017, with TAFEs accounting for a further 39 per cent. In that period, 55 per cent (40,826) of enrolments were in Victoria (see Figure 4). There was also some training delivered overseas by Australian providers, including 76 per cent (267) of FDF30210 Certificate III in Pharmaceutical Manufacturing enrolments. While all subject enrolments overseas were funding type 'International fee for service', government funding supported 78 per cent of subject enrolments between 2014 and 2017 in Australia.

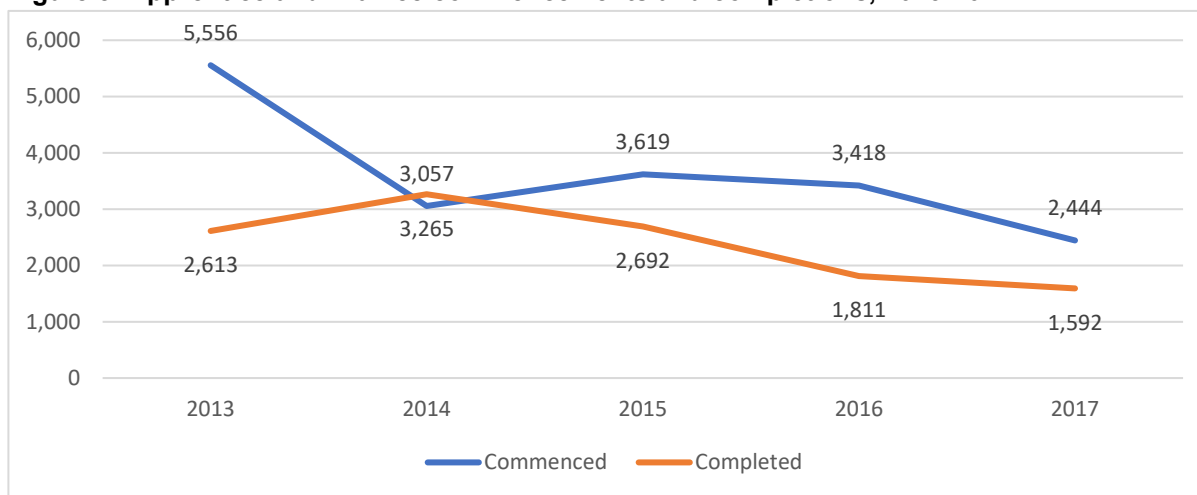
Figure 4: Program enrolments by state and provide type, 2014-2017



Source: NCVET VOCSTATS, TVA program enrolments 2014-2017

Both commencements and completions through apprenticeships and traineeships in the FDF10 Training Package have declined (see Figure 5). Over 50 per cent of apprentices and trainees in training (as at 31 December 2017) were enrolled in a Baking qualification.

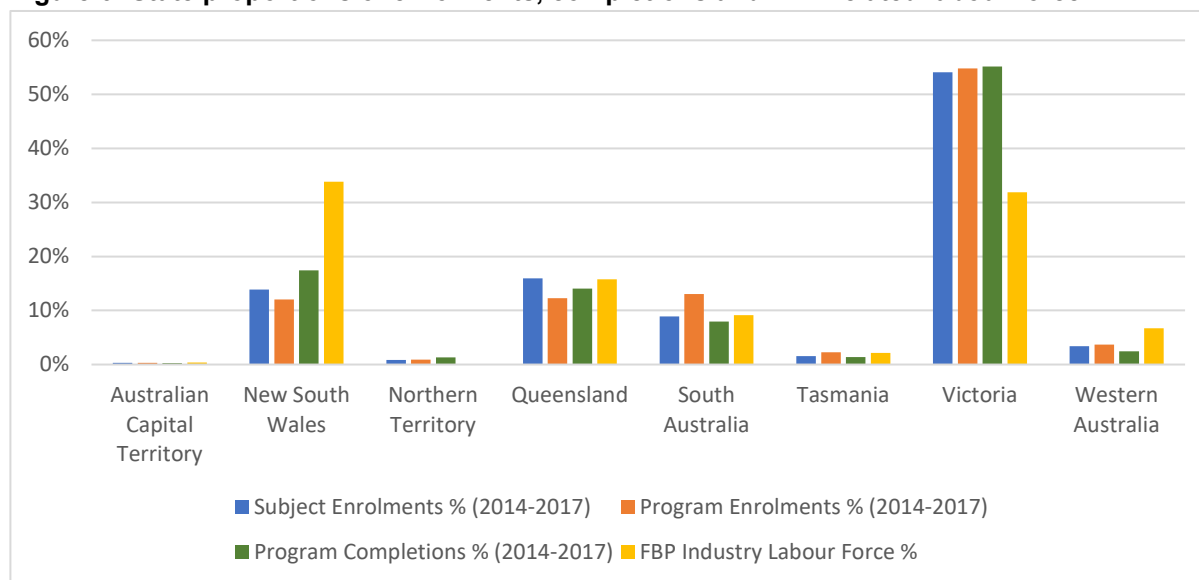
Figure 5: Apprentice and Trainee commencements and completions, 2013-2017



Source: NCVET, SAS Visual Analytics Viewer

Overall, comparing states' relative amounts of the FBP-related labour force with training data (see Figure 8; also the section on **Employment**, below) shows that Victoria is over-represented, and New South Wales under-represented, through VET activity. Currently the Training Package is going through a transition from the FDF10 Training Package to the new FBP training package, with all qualifications completing transition in December 2018. The IRC will monitor whether there has been an under-reporting of training data during this period.

Figure 6: State proportions of enrolments, completions and FBP-related labour force



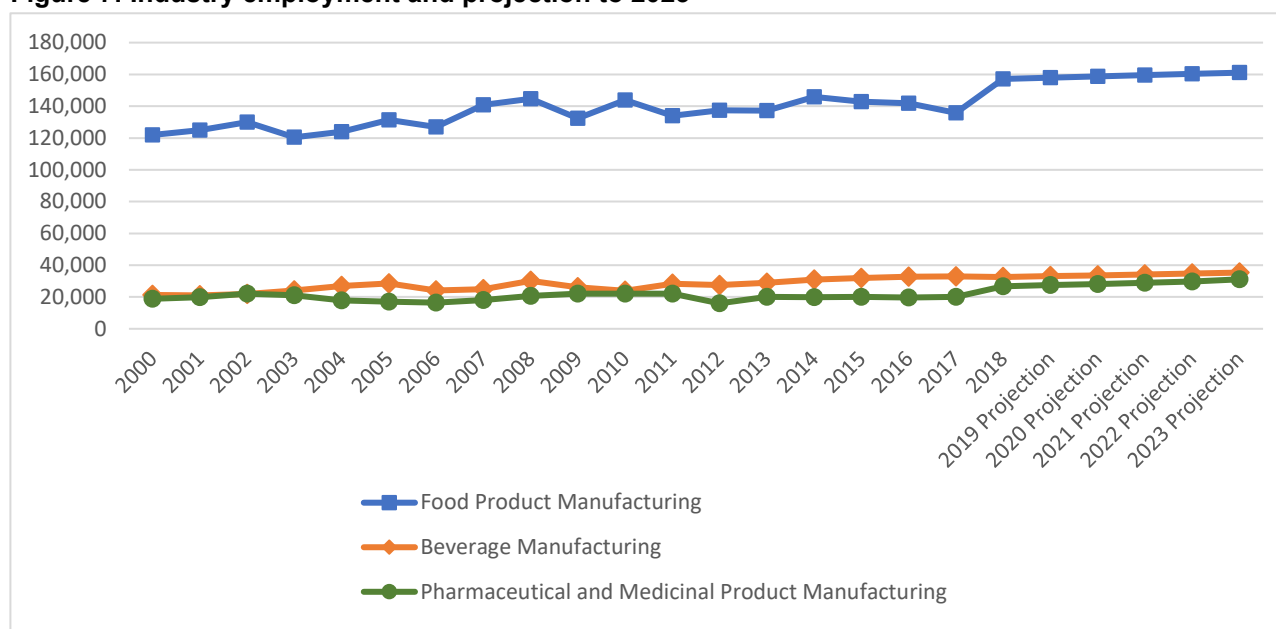
Sources: a) NCVER VOCSTATS, TVA subject enrolments 2014-2017; b) NCVER VOCSTATS, TVA program enrolments 2014-2017; c) NCVER VOCSTATS, TVA program completions, 2014-2017; d) Australian Bureau of Statistics - 6291.0.55.003 - EQ06 - Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards

EMPLOYMENT & SKILLS OUTLOOK

Employment

There were approximately 216,000 people employed in the food, beverage and pharmaceutical manufacturing industries. Following the highest employment levels on record⁹ in 2018, the food, beverage and pharmaceutical manufacturing industries are projected to continue growing over the next 5 years (see Figure 7).

Figure 7: Industry employment and projection to 2023



Sources: a) Australian Bureau of Statistics - 6291.0.55.003 - EQ06 - Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards; b) Labour Market Information Portal, 2018 Industry projections - five years to May 2023 (% growth projected)

Key statistics from a labour force analysis include (see also Table 6):

- 74 per cent (159,166) of the combined food, beverage and pharmaceutical industries labour force are employed full-time.
- 56 per cent (120,422) of the labour force is male;
- Women account for 71 per cent (40,729) of the part-time labour force, but only 35 per cent (55,255) of full-time workers.
 - Men outnumber women in every food product manufacturing sector, except from bakery product manufacturing (in which women are 57 per cent of the labour force).
 - 29 per cent (9,277) of the beverage manufacturing industry labour force are women;
 - 53 per cent (14,160) of the pharmaceutical and medicinal product manufacturing industry labour force are women.

⁹ ABS, 2018, 6291.0.55.003 - Labour Force, Australia, Detailed, Quarterly, Aug 2018, EQ06 - Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards (Pivot Table)

Table 6: Employment by sex and labour force status

Industry of Employment (three-digit ANZSIC)	Sex	Full-time	Part-time	Total
Food Product Manufacturing nfd	Female	6,303	1,778	8,081
	Male	7,868	1,296	9,164
Dairy Product Manufacturing	Female	5,092	1,792	6,883
	Male	12,263	1,370	13,633
Fruit and Vegetable Processing	Female	1,761	1,852	3,614
	Male	4,375	1,580	5,955
Oil and Fat Manufacturing	Female	305	261	566
	Male	780	0	780
Grain Mill and Cereal Product Manufacturing	Female	898	923	1,821
	Male	5,653	442	6,096
Bakery Product Manufacturing	Female	14,346	23,181	37,527
	Male	21,429	6,805	28,233
Sugar and Confectionery Manufacturing	Female	4,565	2,482	7,047
	Male	8,785	1,169	9,954
Other Food Product Manufacturing	Female	4,768	2,239	7,007
	Male	8,918	1,873	10,791
Beverage Manufacturing	Female	5,407	3,870	9,277
	Male	21,587	1,662	23,249
Pharmaceutical and Medicinal Product Manufacturing	Female	11,808	2,352	14,160
	Male	12,253	314	12,566
Total	Female	55,255	40,729	95,984
	Male	103,912	16,510	120,422

Source: Australian Bureau of Statistics - 6291.0.55.003 - EQ06 - Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards¹⁰

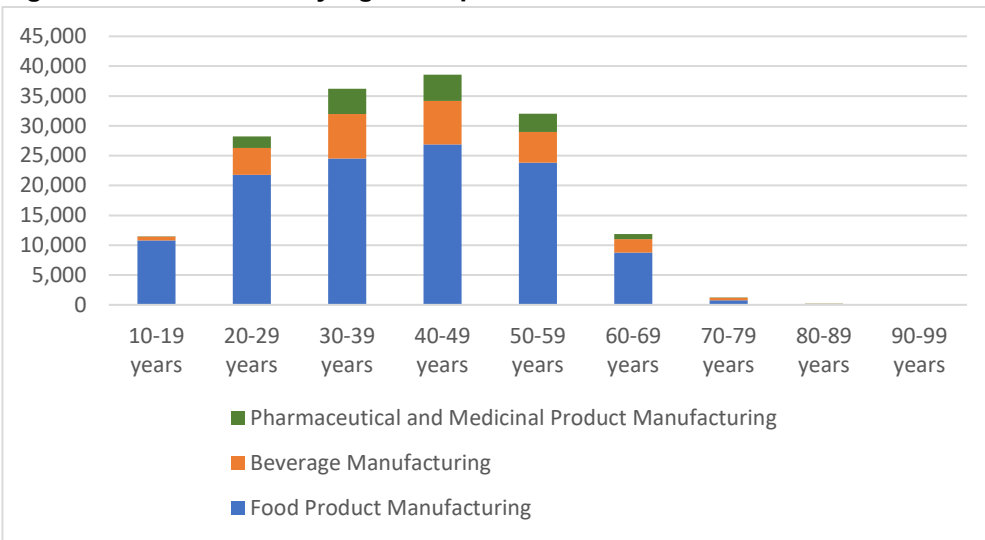
While only 29 per cent (9,277) of the beverage manufacturing industry labour force are women, there are key enterprises and associations working to address the trend, such as Two Birds (Australia's first female-owned brewing company) and Australian Women in Wine Awards (an initiative of The Fabulous Ladies' Wine Society to acknowledge the work of women in the Australian wine community and notable workplace champions of sex equality).

Overall, the food, beverage and pharmaceutical industries' workforces are ageing (see Figure 8). The 2016 Census showed that around 30 per cent of employees were over 50 years of age, which was six per cent greater than in 2006¹¹.

¹⁰ Unlike in the 2016 Census data, this Australian Bureau of Statistics data source does not contain a third labour force status of 'Employed, away from work' to reflect seasonal workers and those with an irregular shift arrangement. As such, these employment figures are averages over four quarters (to August 2018) to allow for such fluctuations. Furthermore, ABS advises caution in using employment statistics at the ANZSIC group level, as quoted here, as estimates may be subject to sampling variability and standard errors too high for most practical purposes.

¹¹ Census of Population and Housing, Census TableBuilder, 2006 and 2016

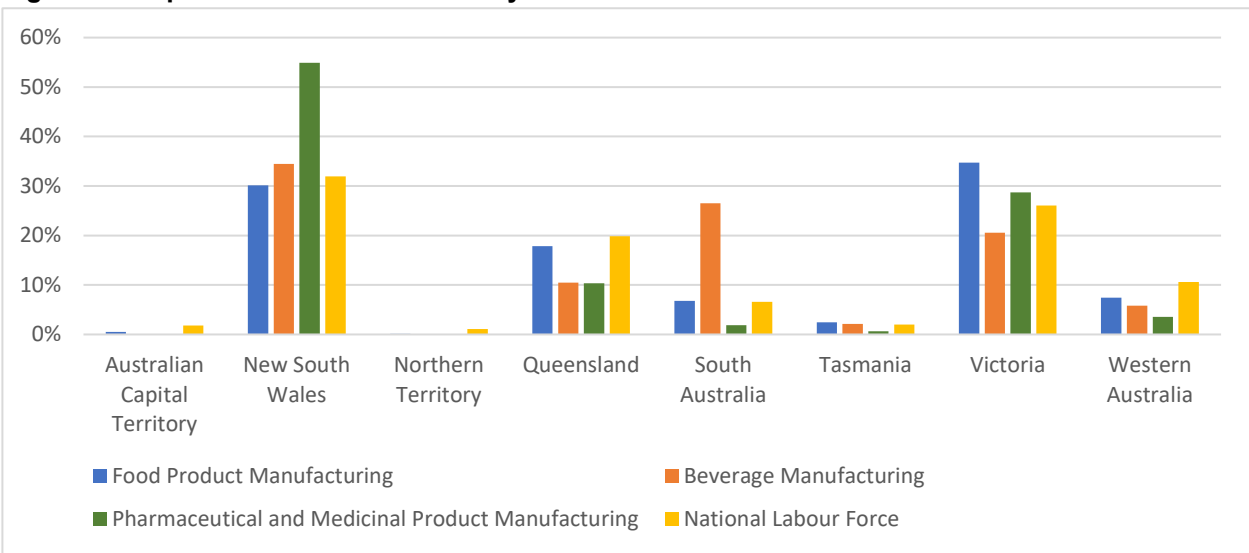
Figure 8: Labour Force by Age Group



Source: Census of Population and Housing, 2016, TableBuilder

Almost 66 per cent of the food, beverage and pharmaceutical manufacturing labour force reside in New South Wales and Victoria.

Figure 9: Proportion of Labour Forces by State



Source: Australian Bureau of Statistics 2017, 6291.0.55.003 - Labour Force, Australia, Detailed, Quarterly, August 2018: EQ06 - Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards (Pivot Table)

New South Wales accounts for 32 per cent of the national labour force but 55 per cent of Pharmaceutical and Medicinal Product Manufacturing industry employees. This concentration reflects multinational

companies' taking advantage of existing infrastructure and market size (with Victoria also showing a significant proportion of the labour force).¹²

South Australia makes up seven per cent of the national labour force yet employs 27 per cent of those in the Beverage Manufacturing industries, owing largely to its close to fifty per cent share of Australian wine production.¹³

Victoria, despite its 26 per cent share of the national labour force, employs 35 per cent of the food product manufacturing labour force. This high proportion relates to Victoria's strategic location, which, according to IBM's Plant Location survey, is considered the best in the Asia-Pacific for advanced food and beverage processing (considering access to skilled labour, fresh produce, transport infrastructure and research and development capabilities).¹⁴

Skills Outlook

Foundational skills in food, beverage and pharmaceutical manufacturing are driven by the need to ensure the health and safety of consumers, and the quality of the product. More advanced skills are required in more senior job roles, and can be driven by changing consumer trends, technological development and improvements in health and safety and regulation changes.

This section focuses on the skills requirements being addressed in the proposed food processing project for 2019-2020.

Skills and knowledge to be addressed within the scope of this review include, but are not limited to:

- product and equipment handling, transporting, processing, packaging, controlling and tracking stock, products and equipment;
- application of traceability processes;
- identifying and preventing risks of food fraud;
- complying with regulations relating to processing, packaging and labelling of food and beverage;
- operating new technologies including provenance processes and systems;
- risk identification and management to prevent contamination of food and beverage;
- identification of allergen risk identification and management, including knowledge of and skills to deal with allergic reactions;
- communication of allergen risks and management;
- complying with mandatory product labelling regulations;
- identifying and mitigating risks throughout food, beverage and pharmaceutical production;
- complying with regulations, and taking preventative actions involved in recalling products;
- following recall processes appropriate to the role, including reporting procedures;
- undertaking best practice recycling and waste-minimisation;
- undertaking sustainable manufacturing processes;
- undertaking responsible consumption of energy and minimisation of energy waste;
- working safely and maintain a safe and healthy work environment;

¹² IBISWorld Industry Report C1841: Pharmaceutical Product Manufacturing in Australia, p.20

¹³ Wine Australia 2018, National Vintage Report 2018

¹⁴ Agriculture Victoria, 2018, Food processing: Invest in Victorian agriculture and food

- operating digital screens and equipment.

In the proposed Food Processing project, current job titles and their associated AQF levels include:

Table 7: Job titles and associated AQF levels

Job Titles	AQF level
Food and Drink Factory Hand	1, 2, 3
Food and Drink Packaging Worker	1, 2, 3
Food and Drink Production Technician	4
Food Processing Sales Assistant	2
Food Processing Salesperson	3
Food Service Sales	3
Food Service Sales Assistant	2
Grocery Processing Operator	2
Sales Representative – Food Industry	3
Account Manager – Food Sales	3
Advanced Food and Drink Packaging Operator	3
Advanced Food and Drink Production Operator	3
Business Development Professional – Food	3

KEY DRIVERS FOR CHANGE AND PROPOSED RESPONSES

This section will cover the proposed food processing project for 2019-2020. Drivers of the proposed research project for pharmaceutical manufacturing can be found in the *Challenges and Opportunities in the Sector* section under the heading *Pharmaceutical Manufacturing Training and Assessment*, while solutions, impacts and risks are covered in the project proposal.

Table 8: Review of Food Processing qualifications

Key Drivers	Proposed Solutions	Stakeholder Impact	Risks of not Proceeding
<p>Changes in consumer demand and food trends, and greater demand to eat locally produced, minimally processed food and beverages</p> <p>Need to maintain a safe food supply to ensure consumer trust and confidence in the food and beverage supply</p> <p>Computerisation and advancements in technology that play a major role in food, beverage and pharmaceutical manufacturing</p> <p>Units haven't been updated for content since 2011-2012</p>	<p>Redevelop Certificates I, II and III in Food Processing.</p> <p>Review Certificates II and III in Food Processing (Sales) and potential deletion</p> <p>Potential development of new Skill Sets</p>	<p>Improved ability for industry to flexibly meet consumer demands</p> <p>Improved capacity for consumers to address their health and wellbeing</p> <p>More efficient food processing operations and use of advanced technology</p> <p>Qualifications to be made fit for purpose, improving RTO capacity to attract enrolments</p>	<p>Diminished adaptability and responsiveness of industry and consequential loss of global market share</p> <p>Diminished traceability of product leading to reputation impacts, and increased occurrences of theft and fraud</p> <p>Increased need to source workers from overseas</p> <p>Health and reputation damage caused by poor safety practices</p> <p>Qualifications will not reflect skills needed for industry.</p>

CONSULTATION UNDERTAKEN

Consultation has been undertaken throughout 2018-2019 and continues. Each IRC member undertakes their own consultations and networking with industry stakeholders and organisations, training organisations.

The FBP IRC has overseen and guided consultations undertaken by Skills Impact both to support the development of the Skills forecast 2019-2022, and as part of consultations on the completion of current projects within the FBP Training package. Organisations that have been consulted include:

National Organisations:

- Accolade Wines
- Angoves
- AusBioTech
- Australian Beverages Council
- Australian Blending Company
- Australian Distillers Association
- Australian Export Grains Innovation Centre
- Australian Food And Grocery Council
- Australian Industry Group
- Australian Institute of Food Science and Technology
- Australian Institute of Packaging
- Australian Manufacturing Workers' Union
- Australian Specialist Cheesemaker's Association
- Australian Sugar Milling Council
- Australian Taxation Office
- Australian Technical Millers Association
- Australian Workers Union
- Baking Association Australia
- Barley Australia
- Bega Cheese Co-operative Limited
- C. A. Henschke & Co
- Carlton and United Breweries
- Casella Family Brands
- Coopers Brewery
- CSIRO - Commonwealth Scientific and Industrial Research Organisation
- CSL Behring
- CRC for Honey Bee Products
- Dairy Australia

- DTS Food Assurance
- Food Innovation Australia Ltd (FIAL)
- Food Innovation Centre
- Food Labelling and Safety Pty Ltd
- Food Standards Australia New Zealand
- Food Technology Association Australia (FTAA)
- Independent Brewers Association
- Institute of Brewing and Distilling
- Lion Beer
- Lion Dairy & Drinks
- Mars Wrigley Confectionary
- Mauri Foods
- McCormick Foods
- Medical Technology and Pharmaceuticals Growth Centre (MTPConnect)
- Medicines Australia
- National Baking Industry Association
- National Food Institute
- National Union of Workers
- Nestle
- Pernod Ricard Winemakers
- Pet Food Industry Association of Australia
- Ridley Corporation
- Sherlock Food Allergen Risk Management Pty Ltd
- Simplot Australia Pty Ltd
- South Australian Wine Industry Association
- Stock Feed Manufacturers' Council of Australia
- Therapeutic Goods Administration
- The Holy Goat
- Treasury Wine Estates
- Trisco Foods
- United Voice
- Warrnambool Cheese and Butter Co.
- Wilmar Sugar Australia
- Wolf Blass
- Yalumba

- Lyrah Vinegar
- Australian Packaging and Processing Machinery Association
- Australian Institute of Packaging

Victorian-specific

- Tolpuddle Goat Cheese and Farm Foods
- The Fermentary
- William Angliss Institute
- Federation University
- LaTrobe University
- Dairy Food Safety Victoria

Queensland-specific

- TAFE Queensland
- Department of Agriculture and Fisheries, Queensland
- Food Innovation Australia (Queensland)
- Wilmar Sugar

New South Wales-specific

- TAFE NSW
- Riverina Institute of TAFE

Western Australian-specific

- North Metropolitan TAFE
- South Metropolitan TAFE
- Gage Brewery
- Little Creatures
- Department of Training and Workforce Development

South Australian-specific

- TAFE SA
- Food & Beverage Development Fund
- Australian Olive Company
- South Australian Wine Industry Association
- Primary Industries and Regions SA

Tasmanian-specific

- University of Tasmania
- Tasmanian Institute of Agriculture
- FermenTasmania
- Tasmanian Whiskey Academy

2019–2022 PROJECT DETAILS

Project 1: Review of Certificate I, II & III Food Processing Qualifications

Description

The proposed project is for the review of Certificate I, II and III in Food Processing and Certificate II and III in Food Processing (Retail), with a focus on introducing or improving training for the priority skills identified in the 2018 Skills Forecast¹⁵ and confirmed during consultations throughout the year.

Rationale

The Australian Trade and Investment Commission describes the adaptability and responsiveness of the Australian food product industry as a key reason Australia remains at the forefront of the global food industry. With direct employment of more than 215,000 people and almost \$20 billion in exports of food and beverage each year, food and beverage products are also central to the employment and sustainability of the agriculture, meat, seafood, wine, wholesale and retail, and tourism and hospitality industries. “Skills” was specifically identified as one of the five Growth Enablers in the sector by the CSIRO Food and Agribusiness Roadmap released in July 2017.

Almost 40,000 Australian jobs are in roles related to the Certificate I, II and III in Food Processing, and there were approximately 7,000 enrolments in these qualifications in 2017.

The Certificate I, II and III in Food Processing were last fully reviewed and updated for content and industry relevance in 2011-2012 and were transitioned to meet the revised Standards for Training Packages during 2018. In 2017-2018, the Certificate IV and Diploma level qualifications were reviewed and redeveloped.

Changes in job roles, workplace or industry

The food and beverage industry has experienced many key changes in the skills and tasks performed by the food processing workforce since 2011. These range from regulatory changes affecting food safety and manufacturing processes to trends in what consumers want to eat and drink.

In particular, there is a need to consider:

- Traceability and risk management
- Food fraud management and detection
- Contamination detection and management
- Allergens awareness
- Recall procedures awareness
- Sustainable work practices and efficient energy consumption
- Work, Health & Safety
- Automation and digitalised manufacturing

¹⁵ https://www.skillsimpact.com.au/site/skilliampactmedia/uploads/2018/05/ISF.FBP_IRCSkillsForecast2018-2021.pdf

Need for Graduates

Employment was projected to continue a gradual rise in the food product manufacturing sector (ABS 2018 projections), although it should be noted that these estimates were made without adjusting for a sharp rise in employment in the sector during 2017-2018. Trained and skilled employees are needed as food processing is undertaken in a complex regulatory and standards environment, requiring knowledge of multiple requirements.

Timeline for Latest changes

All relevant qualifications and units of competency have recently undergone transition to meet the Standards for Training Packages, having been released in either January or December 2018.

However, the relevant qualifications and units of competency have not been reviewed for relevance, content, new work methods or duplication since 2011 or 2012, with 87.5 per cent of units not updated since January 2011, other than for transition (and in a small number of examples, clarification of performance criteria to ensure coverage of food for human and non-human consumption).

Low enrolments and New Components

Overall enrolment figures for the qualifications remain steady. As a result of the recent transition, enrolment numbers for individual units of competency may be misleading and difficult to interpret. However, over 20 per cent of units of competency have had no enrolments in the last three years and almost 40 per cent have had less than ten enrolments each during that period (refer to *APPENDIX 1: Training Package Data*). This would indicate that as well as issues relating to transition and available data, unit enrolments have been affected by:

- The age and relevance of the units;
- Changes to the way that work is undertaken;
- Fewer FBP units being used as imported units for other packages;
- Possible over-specialisation of units that could be delivered in a broader industry context.

Consultation undertaken during 2018 has identified these matters as potential issues, without being able to identify any primary cause for low enrolments. As a result, a key element of the project design will be to identify qualifications and units of competency which are no longer required and skills that can be shared across industry sectors.

Consultation with industry during 2018, undertaken directly and through current and recent FBP projects, indicates that there is a need to update current qualifications to incorporate new components, particularly in relation to:

- Traceability
 - Regulations relating to processing, packaging and labelling of food and beverage have changed in response to an increasing demand to know where a product has come from and what is in it. Workers at all levels of the workplace hierarchy in both large and small manufacturing plants are required to have a greater ability to identify and assess risk, to understand and use new technologies such as block chain processes, traceability and the increasing risks associated with food fraud.
- Food Fraud
 - Commonly counterfeited products in global food production include fruit juices, olive oil, honey, spices, coffee, tea, milk, organic foods, grains and wine. Consumers have become more aware that products are being substituted, adulterated or mislabelled. An ability to detect and manage contaminated products and to follow appropriate procedures is

increasingly important. This awareness influences a stronger demand for more carefully tracked, labelled and monitored products.

- Contamination
 - Recent instances of the contamination of foods have been widely reported in Australia's media but for the past five years the contamination of food and beverages has become a topical, urgent issue that many food and beverage manufacturers are addressing. This concern affects products processed wholly in Australia as well as those made from imported ingredients. Recent cases include deliberate contamination as an act of sabotage, contamination of pet and livestock food with plastic and food contaminated with bacteria as a result of poor food safety practices.
 - Contamination of food and beverage can be broken into three categories: Biological contamination (e.g. salmonella and listeria); Physical contamination (e.g. needles, bandages, hairs); and Chemical contamination (e.g. pesticides, cleaning chemicals, mercury)
 - An increase in skills and knowledge required to manage contamination of food and beverage can be achieved through enhancing the assessment requirements in units related to product and equipment handling, transporting, processing, packaging, controlling and tracking stock, products and equipment.
- Allergens
 - Allergies to proteins in foods that cause abnormal immune responses are increasing. Consumer awareness of allergic reactions has also increased and the ability to manage responses such as asthma and anaphylaxis has become a key skill in many service occupations. Risk management and mandatory product labelling for food allergens are critical food safety matters for food and beverage manufacturers.
 - There has been an increasing level of regulation relating to allergens, resulting in additional requirements at all levels of the workforce. Knowledge about common food groups that cause reactions, identifying and mitigating risks and accurate labelling and regulatory compliance have become critical skills for people producing food, beverages, ingredients, supplements and additives for consumption by humans and animals.
- Recall procedures
 - Statistics reported by Food Standards Australia and New Zealand (FSANZ) indicate that the number of food and beverage recalls has increased over the past five years. Recalling food and beverage products is a complex, time-consuming and expensive process, whether through company-initiated or mandatory recall. The steps involve actions within and outside of the manufacturing plant, including stopping supply, notification of authorities and consumers, and potential compensation.
 - Although food processors working at AQF levels 1 and 2 may not be required to initiate or participate in undertaking a product recall, all workers in this industry are required to have knowledge of the regulations, reasons and preventative actions involved. Units of competency relating to these tasks are required to reflect this increase in expectation.
- Sustainable work practices and efficient energy consumption
 - The food and beverage manufacturing industry is expected to keep up with modern recycling and waste-minimisation practices, sustainable manufacturing processes and responsible consumption of energy. This project will review units relating to manufacturing processes, packaging, disposing of waste, operating and maintaining equipment and undertaking processes that result in run-off and waste matter.
- Work Health and Safety

- All units will be considered for modifications that may be necessary to ensure they meet the current regulations, higher standards and profile of working safely and maintaining a healthy work environment. Units specifically related to health and safety will be properly reviewed and redeveloped if required. Other units addressing skills and knowledge not specifically about health and safety will be reviewed to ensure that where appropriate, health and safety considerations are added to assessment requirements and conditions.
- Automated and digitalised manufacturing processes
 - Units of competency relating to tasks that are now more automated and require skills in operating digitalised screens and equipment will be reviewed and updated.

Existing Components and cross-sector approaches

Review of the units (current and recently superseded) indicates that importing units from the *FBP Training Package* into other training packages is diminishing. This may be impacted by the updating process and some delay in recording the use of imported units in the available data; however, it also appears to reflect a dissatisfaction with the currency of units.

The FBP IRC has tried to closely monitor the progress of the Automation Cross-Sector Project, which they believe is important to their sector. However, there is limited information and involvement at this time. The FBP IRC believes that it is critical they be involved in the automation project due to its impact on the industry overall. The FBP IRC continues to seek updated information concerning this project.

The FBP IRC is very aware of current cross-sector work relating to: Sustainable work practices and efficient energy consumption; Work, Health & Safety; and Automation and digitalised manufacturing. In this context, the IRC will collaborate with relevant IRCs and Cross Sector Reference Groups to minimise duplication and proliferation. After consideration of the needs of industry and the progress of cross-sector projects, the FBP IRC recommends that this project is well-placed to proceed. This should ensure that these qualifications are sufficiently updated to allow incorporation of new and emerging approaches to work. Where appropriate and available, the FBP IRC will incorporate the results of cross-sector projects into relevant qualifications and other training components.

Data

Detailed data is included in relevant sections of this Skills Forecast and in the Table A document separately submitted to the AISC.

Ministers Priorities Addressed

Obsolete and duplicate qualifications removed from the system

The project includes review of five qualifications to be updated to reflect current work practices and job outcomes. The project reviews the Certificate II and III in Food Processing (Sales) for relevance with a likelihood of deletion of these qualifications, with training for relevant job roles to be available through alternative existing qualifications (including those in other training packages) and Skill Sets, if required.

More information about industry's expectations of training delivery is available to training providers to improve their delivery and to consumers to enable more informed choices

This priority will not be addressed in this project.

The training system better supports individuals to move more easily between related occupations

The qualifications being reviewed are entry and trade level qualifications, which provide foundations for future career pathways. Updating the units will ensure changing approaches to work are well incorporated into foundational training.

Improved efficiency of the training system through units that can be owned and used by multiple industry sectors

Food manufacturing is now one of the largest manufacturing sectors in Australia, and units from the *FBP Training Package* have previously been used in other Training Packages, including AMP and SFI. Updating the units will improve the prospects of increasing use by multiple industry sectors.

Foster greater recognition of skill sets

Recent review relating to the FBP Training package have resulted in an increase in available Skill Sets, with 35 new Skill Sets added in December 2018. It is possible that the results of this review will follow a similar pattern and that additional Skill Sets will be identified and developed.

Consultation Plan

The FBP IRC will oversee and guide consultation, including identification of relevant experts and stakeholders. Initial development work will be undertaken in consultation with relevant subject matter experts. Drafts changes will be created and reviewed by the experts. The drafts will then be made available for public consultation and feedback, with consultation sessions to be held around Australia. Following this, the final drafts will be validated through further consultation and Quality Assurance processes. The Case for Endorsement will be finalised and submitted to the FBP IRC for review and final approval, prior to submission to the AISC.

Stakeholders for Consultation

The IRC will consult and collaborate with relevant IRCs and Cross Sector Reference Groups in carrying out this work to minimise duplication and proliferation.

Broad consultation will be undertaken during the project. Stakeholders may include but will not be limited to the following:

- AusBioTech
- Australian Beverages Council
- Australian Blending Company
- Australian Distillers Association
- Australian Export Grains Innovation Centre
- Australian Food And Grocery Council
- Australian Industry Group
- Australian Institute of Food Science and Technology
- Australian Institute of Packaging
- Australian Manufacturing Workers' Union
- Australian Sugar Milling Council
- Australian Technical Millers Association
- Australian Workers Union
- Baking Association Australia
- Barley Australia
- Bega Cheese Co-operative Limited
- Carlton and United Breweries
- Casella Family Brands
- Coopers Brewery
- CSIRO - Commonwealth Scientific and Industrial Research Organisation
- CSL Behring
- Dairy Australia

- Dairy Food Safety Victoria
- Department of Agriculture and Fisheries, Queensland
- DTS Food Assurance
- Federation University
- Ferment Tasmania
- Food & Beverage Development Fund
- Food Innovation Australia (Queensland)
- Food Innovation Australia Ltd (FIAL)
- Food Innovation Centre
- Food Labelling and Safety Pty Ltd
- Food Standards Australia New Zealand
- Independent Brewers Association
- Institute of Brewing and Distilling
- LaTrobe University
- Lion Beer
- Lion Dairy & Drinks
- Mars Wrigley Confectionary
- Mauri Foods
- McCormick Foods
- Medical Technology and Pharmaceuticals Growth Centre (MTPConnect)
- Medicines Australia
- National Baking Industry Association
- National Food Institute
- National Union of Workers
- Nestle
- North Metropolitan TAFE (Perth)
- Pet Food Industry Association of Australia
- Ridley Corporation
- Sherlock Food Allergen Risk Management Pty Ltd
- Simplot Australia Pty Ltd
- South Australian Wine Industry Association
- Stock Feed Manufacturers' Council of Australia
- TAFE NSW
- TAFE Queensland
- TAFE SA
- Tasmanian Institute of Agriculture
- Therapeutic Goods Administration
- Treasury Wine Estates
- Trisco Foods
- United Voice
- University of Tasmania
- Warrnambool Cheese and Butter Co.
- William Angliss Institute
- Wilmar Sugar Australia
- Yalumba

Other bodies

- RTOs with project units of competency on scope
- Industry Training Advisory Bodies
- State/Territory Training Authorities

Scope of Project Overview

Overall timing: 14 months from delivery of signed Activity Order

Expected Date for Endorsement: September 2020

Summary of Components

Qualifications

- Review – five qualifications
 - Updating – up to five qualifications
 - Deletion – up to two qualifications
- New – No new qualifications are expected

Units of Competency

- Review – 168 Units
 - Updating – up to 150 Units
 - Deletion – up to 60 units
- New – up to 35 units

Skill Sets

- Review, Updating and Deletion – No relevant Skill Sets
- New – up to 20 Skill Sets

Project 2: Research into challenges in formal and industry Pharmaceutical Manufacturing training

Description

Research project to identify issues and propose solutions towards increasing enrolments in Pharmaceutical Manufacturing, given the critical need for industry to meet regulatory requirements, including auditable evidence of ongoing competency.

Rationale

The *CSIRO Medical Technologies and Pharmaceuticals Roadmap*, released in April 2017, highlights the need for a highly skilled and trained workforce to take advantage of the opportunities presented by pharmaceutical manufacturing to help the Australian economy. The Australian Government has instituted Industry Growth Centre initiatives, including MTPConnect¹⁶ which identifies the medical technology and pharmaceutical sector as one of six key areas of competitive strength and strategic priority. The Queensland Government has committed to funding the *Biomedical 10-Year Roadmap and Action Plan*¹⁷, and the Victorian Government is implementing its *Medical Technologies and Pharmaceuticals Sector Strategy*¹⁸ which has doubled export revenue between 2011 and 2018.

Pharmaceutical manufacturing training and assessment face significant challenges posed by the current vocational skills, learning and accreditation system. In particular, the lack of enrolments in qualifications is often seen as an indicator of lack of requirement for training, whereas industry has clear and mandated requirements for training.

The Pharmaceutical Manufacturing qualifications have been fully updated and made available on training.gov.au on 18 December 2018. This makes it an ideal time to work on promoting enrolments and ensuring the new qualifications will be offered within Australia by independent Registered Training Organisations (RTOs).

There are specific features related to pharmaceutical manufacturing competency and training, though they raise issues in broader contexts:

- It is a regulatory requirement that competency must be current – it is not enough to show previous training. Current competency must also be demonstrated, including skills updates on a regular basis. This is done through company-based training and assessment, not through the VET Sector.
- Mobility of the workforce is hampered: as currently competent employees move from company to company, it is a regulatory requirement that they be “re-accredited” as competent in their new workplace. This re-accreditation is completed using company-based assessment and would not need to occur if national VET competency assessments were being used.
- Pharmaceutical manufacturing is seen as a thin market in a training context, yet the sector employs over 26,000 workers (24,000 full-time) across more than 450 businesses, many of which are in urban areas. It is also a relatively high-income industry compared to other FBP sectors.¹⁹
- There are barriers to market entry for independent RTOs to deliver training and assessment, given the issues in obtaining qualified trainers and assessors, including the relatively good wages offered within the industry compared to the education and training sector, and providing access to manufacturing equipment and advanced technology.

¹⁶ <https://www.industry.gov.au/strategies-for-the-future/industry-growth-centres>

¹⁷ <https://www.statedevelopment.qld.gov.au/resources/plan/eid/biomedical-10-year-roadmap-and-action-plan.pdf>

¹⁸ <https://www.premier.vic.gov.au/victoria-growing-as-a-pharmaceuticals-hub/>

¹⁹ these figures include medicinal product manufacturing and may include elements of the “complementary medicine” industry

- There are multiple programs designed to promote careers in Science, Technology, Engineering and Mathematics (STEM), which tend to have a strong focus on school studies and university programs, rather than training in the VET sector.

The current VET delivery system is not meeting industry needs in training or accreditation. While the introduction of upgraded qualifications may result in improvements in this situation, there is a need to research, identify and create solutions to deal with the complexity of factors contributing to the lack of certified VET training or accreditation in this industry sector.

Changes in job roles, workplace or industry

Many of the staff employed in the pharmaceutical manufacturing industry are university degree-qualified; however, there are specific skills required of roles that are not covered by degree-level qualifications. In particular, there is a considerable amount of machine operation, logistics and warehousing skills required by qualified staff, that they can only obtain through a VET level skills program. This is in addition to full-time workers employed at Certificate III and IV levels with this work being undertaken in the context of current Good Manufacturing Practice (GMP). The major job roles include:

- Production operator/production worker;
- Packaging operator;
- Supervisor or line manager production/packaging;
- Technician;
- Senior manager.

In a job competency context, regulation of pharmaceutical manufacturing is strict and requires ongoing, auditable proof of competency, which may include evidence of training and assessment. The industry undertakes extensive in-house training, and often utilises the training package to design and support this training.

Pharmaceutical manufacturing also utilises advanced manufacturing techniques and Industry 4.0 developments, requiring rapid change to remain competitive in the market environment. The 2017 *CSIRO Medical Technologies and Pharmaceuticals Roadmap* emphasised the importance of focusing Australian manufacturing efforts towards high-value and niche pharmaceutical products to create sustainable export revenue, while also encouraging accelerated pharmaceutical development.

Need for Graduates

The Pharmaceutical Manufacturing industry has developed practices to address the lack of availability of VET delivery, often employing newly graduated tertiary students (such as a Bachelor Degree in Chemistry, Chemical Engineering or Pharmacy) to fulfil low level production and support roles, and then providing on the job training to develop specific workplace skills. As the industry has been experiencing growth it has identified that this employment model is not sustainable or flexible enough to meet industry needs, creating an unstable and volatile staff turnover rate. In part, this reflects the increased opportunities for graduates with STEM degrees, with an ever-increasing number of jobs at higher salary levels that cannot be matched for the production and support roles required by industry.

Timeline for Latest Changes

All qualifications have been updated and are now entering the 12 months teach-out period. The updated qualifications and units were made available from 18 December 2018.

The redesigned Pharmaceutical Manufacturing units and related assessment requirements cover the practical skills and knowledge required of the industry including the legislative GMP requirements of the

Therapeutic Goods Administration (TGA). These requirements were not specified sufficiently in the previous version of these units.

Low enrolments and New Components

Enrolment data from the NCVET for 2014 to 2017 shows zero or negligible enrolment in pharmaceutical manufacturing qualifications other than the Certificate III. The majority of learners enrolled in the Certificate III undertook the qualification overseas.

There are no independent RTOs approved to deliver the Certificate IV and Diploma in Pharmaceutical Manufacturing and minimal enrolments in all qualifications (the Diploma has been deleted in the December 2018 Training Package update). One certificate program taught from an independent Australian RTO is only offered to offshore learners in China.

Despite these figures, the Pharmaceutical Manufacturing industry demonstrated a commitment to training through participation in the recently completed review of the qualifications and identified the need for skills at these levels, as demonstrated in the submitted and approved Case for Endorsement.

Existing Components and cross-sector approaches

Previous experience suggests that RTOs were unwilling to offer higher level qualifications at Certificate IV and Diploma level, despite industry need. Without approved RTOs at Cert IV and Diploma level, it is difficult to get independent assessment of competency for competent workers, and impossible to obtain recognised qualifications verifying competency.

Data: Sector Overview

Table 9: Pharmaceutical and Medicinal Product Manufacturing industry statistics

Revenue	Profit	Exports	Wages	Industry Value Added ²⁰
\$9.0bn	\$0.9bn	\$4.2bn	\$1.4bn	\$2.5bn

Source: IBISWorld Industry Wizard

Table 10: Pharmaceutical and Medicinal Product Manufacturing Employment (ANZSIC: 184)

Sex	Full-time	Part-time	Total
Female	11,808	2,352	14,160
Male	12,253	314	12,567
Total	23,061	2,666	26,727

Source: Australian Bureau of Statistics - 6291.0.55.003 - EQ06 – Employed persons by Industry group of main job (ANZSIC), Sex, State and Territory, November 1984 onwards

²⁰ Industry value added (IVA) is the contribution by businesses in each industry to gross domestic product (GDP). Put another way, IVA records the market value of the goods and services produced by the industry, with the cost of goods and services used in production subtracted from the total.

Table 11: Pharmaceutical Manufacturing enrolments

Current Qualification Code	Qualification Name	2014	2015	2016	2017	Total
FDF10210*	Certificate I in Pharmaceutical Manufacturing	0	3	1	4	8
FBP20418	Certificate II in Pharmaceutical Manufacturing	0	0	0	0	0
FBP30818	Certificate III in Pharmaceutical Manufacturing	59	66	113	114	352
FBP40518	Certificate IV in Pharmaceutical Manufacturing	0	0	0	0	0
FDF50210	Diploma of Pharmaceutical Manufacturing	0	0	0	0	0

Source: NCVET VOCSTATS, TVA program enrolments 2014-2017

nb. Qualifications data includes enrolments in superseded qualifications

* Qualification now deleted (not superseded)

Ministers Priorities Addressed

Obsolete and duplicate qualifications removed from the system

The project will help to better define the parameters of obsolete qualifications, in particular whether enrolment numbers should be utilised to demonstrate obsolescence. The Pharmaceutical Manufacturing industry has demonstrated a commitment to training and to the redevelopment of the existing qualifications, including the deletion of an obsolete qualification. The project will identify and address factors that impact on enrolment numbers.

More information about industry's expectations of training delivery is available to training providers to improve their delivery and to consumers to enable more informed choices

The industry is seeking to attract RTOs to deliver pharmaceutical manufacturing training in Australia, which they have been unable to do for a number of years. The industry is considered a high-value industry and employment numbers suggest there should be a market for RTO delivery. This has not been the experience of industry. The project will identify information requirements that will enable the attraction of RTO delivery supported by enrolments.

The training system better supports individuals to move more easily between related occupations

This priority will not be addressed by this project.

Improved efficiency of the training system through units that can be owned and used by multiple industry sectors

This priority will not be addressed by this project.

Foster greater recognition of skill sets

This priority will not be addressed by this project.

Consultation Plan

The Pharmaceutical Manufacturing IRC will oversee and direct consultation, to be carried out by *Skills Impact*, including identification of relevant experts and stakeholders. A research approach utilising available data, qualitative and quantitative approaches will be taken.

Skills Impact will undertake desk research and conduct consultations to support the research. *Skills Impact* will also engage with NCVET to ensure full access is available to the latest research that may prove beneficial to the completion of the project.

Further consultations will take place with industry to introduce the qualifications as updated, and to ascertain industry preferences for utilisation of assessment and training. In particular, consultation will examine the needs for on-site and industry-driven assessment, the prospects of qualifying assessors (and potentially trainers) to be made available as independent assessors through RTOs, issues related to workforce mobility and proof of workplace competence, and industry requirements for assessment and certification of current competency.

Consultations will take place with relevant RTOs which:

- Have pharmaceutical, food, beverage, advanced or other manufacturing programs on scope or the potential to have them on scope to ascertain reasons for the reluctance to place pharmaceutical manufacturing qualifications on scope within Australia;
- Have pharmaceutical qualifications and allied health qualifications using high-level technology currently on scope;
- Will include enterprise-based RTOs;
- Are located in advantageous geographical positions to ensure on-site training and assessment used in the industry can be conducted with minimal additional resources for RTOs.

Consultations will take place with federal, state and local regulators as appropriate, including the Therapeutic Goods Administration, to ascertain their preferred evidence requirements for proof of competency and adherence to standards.

Consultations will take place with industry bodies for pharmaceuticals, manufacturing and science occupations to examine issues related to STEM promotion and attraction of students in a VET context.

IRC SIGN-OFF

This **IRC Skills Forecast and Proposed Schedule of Work** was agreed as the result of a properly constituted IRC decision.

Signed for and on behalf of the two Industry Reference Committees by their appointed Chairs

Food Beverage and Pharmaceutical IRC

Pharmaceutical Manufacturing IRC



Signature of Chair
Anne M Astin

Signature of Chair
Paul MacLeman

Date: 29 April 2019

Date: 29 April 2019

APPENDIX 1: Training Package Data

Enrolments

Table 12: Training Package program enrolments, 2014-2017

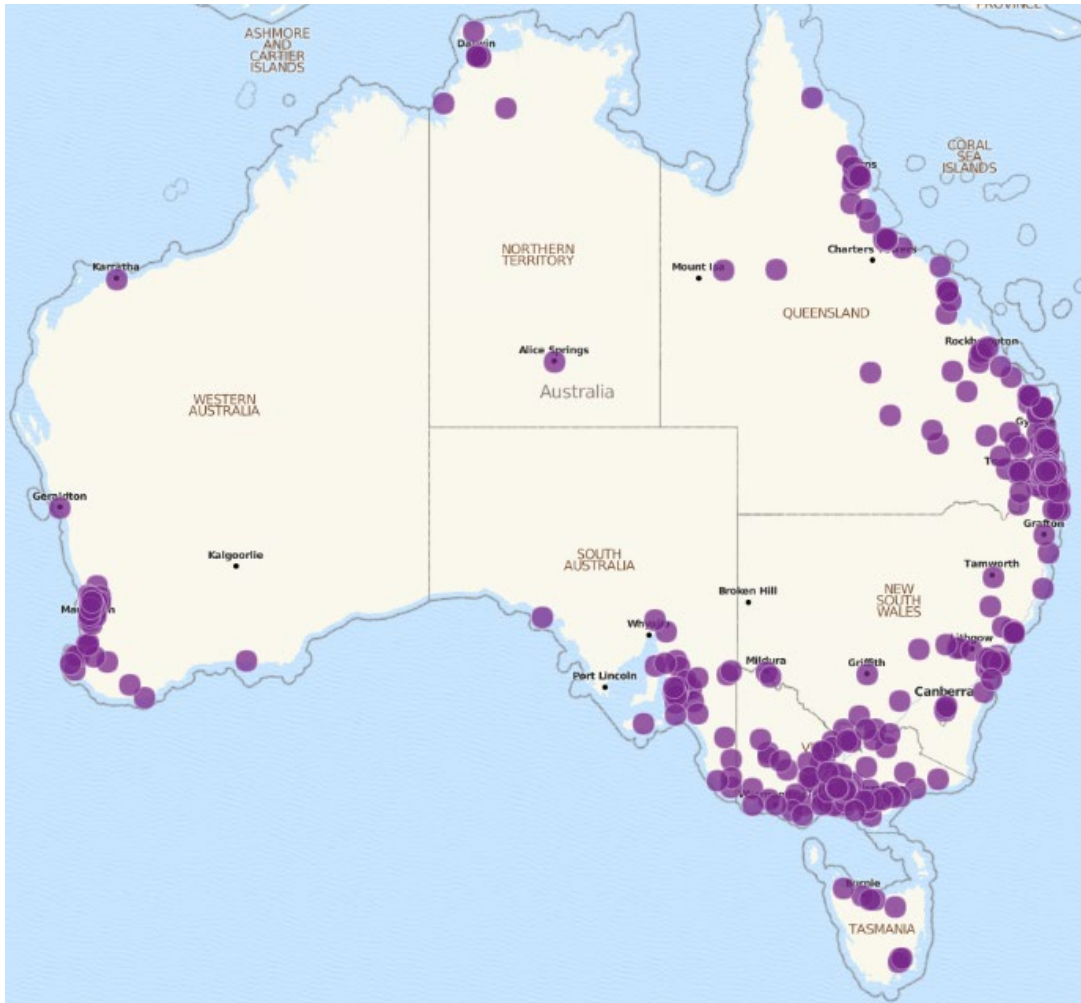
Current Qualification Code	Qualification Name	2014	2015	2016	2017	Total
FBP10217 ⁱ	Certificate I in Baking	n/a	n/a	n/a	n/a	n/a
FBP10117 ^{iv}	Certificate I in Food Processing	1,906	1,144	1,110	782	4,942
FBP20217 ⁱⁱⁱ	Certificate II in Baking	396	238	355	386	1,375
FBP20117 ^{iv}	Certificate II in Food Processing	2,641	2,452	2,676	2,027	9,796
FBP20317 ⁱⁱⁱ	Certificate II in Food Processing (Sales)	152	266	25	36	479
FBP20418 ⁱ	Certificate II in Pharmaceutical Manufacturing	n/a	n/a	n/a	n/a	n/a
FBP20518 ⁱⁱⁱ	Certificate II in Wine Industry Operations	1,753	1,813	1,006	453	5,025
FBP20618 ⁱ	Certificate II in Sugar Milling Support	n/a	n/a	n/a	n/a	n/a
FBP30517 ⁱⁱⁱ	Certificate III in Baking	2,679	3,186	3,673	2,868	12,406
FBP30717 ⁱⁱⁱ	Certificate III in Rice Processing	0	0	0	0	0
FBP30117 ^{iv}	Certificate III in Food Processing	6,236	6,578	6,075	4,265	23,154
FBP30417 ⁱⁱⁱ	Certificate III in Bread Baking	1,558	1,599	1,679	1,601	6,437
FBP30217 ⁱⁱ	Certificate III in Plant Baking	3	29	35	25	92
FBP30617 ⁱⁱ	Certificate III in Food Processing (Sales)	509	368	320	153	1,350
FBP30317 ⁱⁱⁱ	Certificate III in Cake and Pastry	1,001	523	588	612	2,724
FBP30818 ⁱⁱⁱ	Certificate III in Pharmaceutical Manufacturing	59	66	113	114	352
FBP31018 ⁱⁱ	Certificate III in Sugar Milling Industry Operations	17	0	0	0	17
FBP30918 ⁱⁱⁱ	Certificate III in Wine Industry Operations	337	483	491	484	1,795
FBP40117 ⁱⁱ	Certificate IV in Flour Milling	0	6	0	0	6
FBP40217 ⁱⁱⁱ	Certificate IV in Baking	63	83	108	148	402
FBP40518 ⁱⁱⁱ	Certificate IV in Pharmaceutical Manufacturing	0	0	0	0	0
FBP40318 ⁱⁱⁱ	Certificate IV in Food Processing	450	1,049	787	589	2,875
FBP40418 ⁱⁱ	Certificate IV in Food Science and Technology	104	98	146	105	453
FBP50118 ⁱⁱ	Diploma of Food Science and Technology	61	78	211	194	544
FBP50218 ⁱ	Diploma of Food Safety Auditing	n/a	n/a	n/a	n/a	n/a
	Total	19,925	20,059	19,398	14,842	74,224

Source: NCVET VOCSTATS, TVA program enrolments 2014-2017

- i This is a new qualification, with enrolment data not yet reported
- ii Data includes qualifications that are superseded by, and equivalent to, the current qualification
- iii Data includes qualifications that are superseded by, but *not* equivalent to, the current qualification
- iv Data includes superseded qualifications that are equivalent *and* not equivalent to the current qualification

Delivery locations

Figure 10: Training package delivery locations, 2017

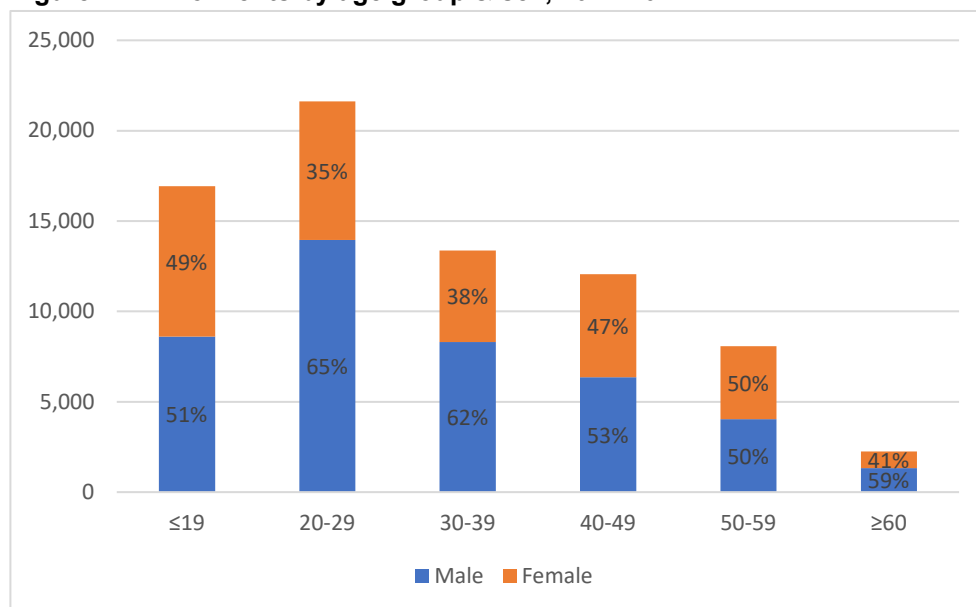


Source: NCVET, *Atlas of Total VET*

Student profile

Between 2014 and 2017, women accounted for 43 per cent of enrolments (see Figure 11), which is above the average (35 per cent) and median (27 per cent) of all Training Packages.

Figure 11: Enrolments by age group & sex, 2014-2017



Source: NCVET VOCSTATS, TVA program enrolments 2014-2017

People from non-English-speaking backgrounds accounted for over 30 per cent of enrolments between 2014 and 2017, including 87 per cent in Pharmaceutical Manufacturing (see Table 13). Compared to all Training Packages, this has the fifth highest proportion of enrolments by people from non-English-speaking backgrounds and is well above the average (17 per cent) and median (12 per cent).

Table 13: Enrolments by language region of the country in which a student was born, 2014-2017

Qualification Cluster	Non-English-speaking background	English-speaking background
Food Processing	27,491	13,254
Retail/Plant/Advanced Baking	15,502	6,841
Food Science and Technology	592	400
Wine Operations	5,014	431
Pharmaceutical Manufacturing	47	311
Total	48,646	21,237

Source: NCVET VOCSTATS, TVA program enrolments 2014-2017

Between 2014 and 2017, Indigenous people accounted for three per cent of enrolments (see Table 14), which is below the average (five per cent) and median (four per cent) of all Training Packages.

Table 14: Enrolments by Indigenous status, 2014-2017

Qualification Cluster	Indigenous	Non-Indigenous
Food Processing	1,550	39,572
Retail/Plant/Advanced Baking	730	22,261
Food Science and Technology	0	992
Wine Operations	87	6,623
Pharmaceutical Manufacturing	0	352
Total	2,367	69,800

Source: NCVET VOCSTATS, TVET program enrolments 2014-2017

Between 2014 and 2017, people with disabilities accounted for nine per cent of enrolments (see Table 15), which is above the average (seven per cent) and median (six per cent) of all Training Packages.

Table 15: Enrolments by disability status, 2014-2017

Qualification Cluster	With a disability	Without a disability
Food Processing	3,709	36,126
Retail/Plant/Advanced Baking	2,060	20,231
Food Science and Technology	39	964
Wine Operations	321	6,373
Pharmaceutical Manufacturing	0	360
Total	6,129	64,054

Source: NCVET VOCSTATS, TVET program enrolments 2014-2017

APPENDIX 2: Industry Regulations and Standards

The Australian food, beverage and pharmaceutical industry operates under a high level of regulation.

Food Standards Australia New Zealand

All food and beverage manufacturing operations are subject to national standards and safety assurance systems developed by Food Standards Australia New Zealand (FSANZ). The Food Standards Code (The Code) represents the uniform law governing Australian food and beverage production, which is enacted and enforced at State and Territory level.

The Code describes appropriate labelling requirements, provides specific definitions of products, details the composition of products and permitted ingredients, and outlines approved processing methods. Businesses manufacturing functional foods and drink must comply with all requirements under The Code that are relevant to content formulation and nutrition, health and related claims made on labels or in advertisements.

The industry recently experienced regulation changes related to country of origin labelling laws. These changes became mandatory on 1 July 2018 and require manufacturers to state the percentage of Australian content for products manufactured in Australia.

Food safety practices are also enforced by local councils and environmental health offices. These systems are applicable to local producers.

Other Australian Legislation and regulation is applied to the industry, including the Australian Consumer Law, trade measurement legislation, food acts and regulations, and fair trading provisions.

Producer's licence

A producer of liquor who wants to sell their product is required to hold a producer's licence or equivalent licence under the respective state/territory liquor licensing legislation.

Wine industry regulations

The wine industry has stand-alone regulations in relation to geographical terms, labels and exports under the *Wine Australia Act 2013* and *Wine Australia Regulations 2018*.

Industry/customer standards

The food and beverage manufacturing sector is also subject to many customer food standard requirements, including the Woolworths Quality Assurance (WQA) Standard, and international food safety standards, including the BRC Global Standard for Food Safety and the IFS International Food Safety Standard.

Australian Consumer Law

All nutrition content and health claims of functional food and drink products must be factually correct and substantiated through scientific research papers or clinical trials to avoid misleading consumers and breaching Australian Consumer Law.

Australian Packaging Covenant

Businesses signatory to the Australian Packaging Covenant, an agreement between government, industry and community groups, are obliged to find and fund solutions to address packaging sustainability issues.

Sugar industry regulations

In the past, the Queensland Government played a central role in forming industry policy and regulations in the sugar industry in relation to controlling price, sugarcane plantation areas, compulsory sale of all sugar to Queensland Sugar Limited (QSL) and mills' licence permits. In recent years, this sector has become more open and transparent. Early in 2014, QSL was removed as the only option for sugar milling companies to market their sugar. As a result, most major sugar companies decided to break ties with QSL from 2017, creating their own marketing and export channels. In response to cane grower concerns regarding changes to sugar marketing arrangements in Australia, a federal government-established taskforce released a report in 2015 recommending the creation and implementation of a mandatory code of conduct for the Australian sugar industry. Subsequently, the *Sugar Industry (Real Choice in Marketing) Amendment Act 2015* was passed in the Queensland Parliament, providing Queensland cane growers with the right to choose who sells and prices Grower Economic Interest (GEI) sugar, and permitting arbitration if required.²¹

Excise compliance

The alcoholic beverage sector is subject to excise regulations that require producers to measure and sample the alcohol content of the product they produce to calculate the excise that is payable. A licence from the Australian Taxation Office (ATO) is required to distil alcoholic spirits in Australia. This licence imposes several obligations to ensure spirit products are kept secure, production is accounted, and excise duty is paid when due. The ATO requires significant and adequate records for all excisable products to show these obligations have been met.

Export licence

Wine producers and exporters have to obtain an export licence from the Wine Australia. The regulation of wine exports is primarily to ensure the quality of Australian products marketed overseas. Wine Australia also oversees labelling requirements for wine producers to ensure labels include the variety of grapes used and Australian Geographical Indications (GI).

Advertising and packaging regulations

Alcohol beverage advertising and packaging also needs to be consistent with other applicable laws and codes, for example:

- federal competition and consumer legislation
- state/territory fair trading legislation
- Alcohol Beverages Advertising Code
- Australian Association of National Advertisers (AANA) Code of Ethics
- Commercial Television Industry Code of Practice
- Commercial Radio Code of Practice
- Outdoor Media Association Code of Ethics.

Environmental protection measures

Food and beverage manufacturers must adhere to national and state environment protection measures, as do all businesses; however, there are particular challenges in relation to the discharge of waste into waterways and chemical emissions in the air caused by fermentation reactions in production.

²¹ QSL, 2016, 'Developments in the Queensland export sugar industry', <<http://www.qsl.com.au/developments-queensland-export-sugar-industry/fast-facts>>.

Pharmaceuticals regulations

Regulation of pharmaceuticals in Australia is overseen by the federal government in relation to the quality, safety, listing and pricing, patent protection, clinical trials, and efficacy of therapeutic goods supplied in Australia through the following:

- Therapeutic Goods Administration (TGA)
- Australian Register of Therapeutic Goods (ARTG)
- Advisory Committee on Prescription Medicines
- Good Manufacturing Practice (GMP)
- Advisory Committee on the Safety of Medicines
- Pharmaceutical Benefits Scheme (PBS)
- Pharmaceutical Benefits Advisory Committee (PBAC)
- IP Australia
- Medicine Australia
- Pharmaceutical Inspection Cooperation Scheme (PICS)

The advertising of therapeutic goods, including complementary medicines, is subject to the advertising requirements of the *Therapeutic Goods Act 1989*, which adopts the *Therapeutic Goods Advertising Code* (TGAC) and the supporting regulations, the *Competition and Consumer Act 2010* and other relevant laws.

The state governments play an important role in the control of pharmaceutical product distribution through their scheduling systems. The industry is also subject to self-regulation by Medicine Australia through an internationally recognised code of conduct.

Companies who export or have multinational operations are also subject to regulations of various countries and unions (such as the FDA in the USA and EMA in the European Union), along with other sovereign agencies, depending on location of exports or operations.

Complementary medicines regulations

Complementary medicines are regulated under the *Therapeutic Goods Act 1989*. In addition, the [Australian Regulatory Guidelines for Complementary Medicines \(ARGCM\)](#) provides detail on the regulation of complementary medicines and assists sponsors to meet their legislative obligations. Business will also need to consider whether their product needs to be listed or registered with the Therapeutic Goods Administration (TGA).

The TGA inspects manufacturers on an ongoing basis for compliance with good manufacturing practice and undertakes monitoring of safety, quality and efficacy of listed, registered and included therapeutic goods once they are on the market.

Therapeutic goods available on, and sold through, international websites are not regulated by the TGA.

APPENDIX 3: Industry Priority for Generic Skills

Table 16: Industry priority for generic skills

Rank	Generic Skill
1	Learning agility/Information literacy/Intellectual autonomy and self-management skills
	<p>Ability to identify a need for information.</p> <p>Ability to identify, locate, evaluate, and effectively use and cite the information.</p> <p>Ability to discriminate and filter information for importance.</p> <p>Ability to do more with less.</p> <p>Ability to quickly develop a working knowledge of new systems to fulfil the expectations of a job.</p> <p>Ability to work without direct leadership and independently.</p>
2	Communication/Collaboration including virtual collaboration/Social intelligence skills
	<p>Ability to understand and apply the principles of creating more value for customers with fewer resources (lean manufacturing) and collaborative skills.</p> <p>Ability to critically assess and develop content that uses new media forms and leverage these media for persuasive communications.</p> <p>Ability to connect with others deeply and directly, to sense and stimulate reactions and desired interactions.</p>
3	Language, Literacy and Numeracy (LLN) skills
	<p>Foundation skills of literacy and numeracy.</p>
4	Managerial/Leadership skills
	<p>Ability to effectively communicate with all functional areas of the organisation.</p> <p>Ability to represent and develop tasks and work processes for desired outcomes.</p> <p>Ability to oversee processes, guide initiatives and steer employees toward achievement of goals.</p>
5	Technology use and application skills
	<p>Ability to create and/or use of technical means understand their interrelation with life, society, and the environment.</p> <p>Ability to understand and apply scientific or industrial processes, inventions, methods, etc.</p> <p>Ability to deal with increasing mechanisation and automation and computerisation.</p> <p>Ability to do work from mobile devices rather than from paper.</p>
6	Design mindset/Thinking critically/System thinking/Solving problems skills
	<p>Ability to adapt products to rapidly shifting consumer tastes and trends.</p> <p>Ability to determine the deeper meaning or significance of what is being expressed via technology.</p> <p>Ability to understand how things that are regarded as systems influence one another within a complete entity, or larger system.</p> <p>Ability to think holistically.</p>
7	Science, Technology, Engineering and Maths (STEM) skills
	<p>Sciences, mathematics and scientific literacy.</p>
8	Entrepreneurial skills
	<p>Ability to take any idea, whether it be a product and service, and turn that concept into reality and not only bring it to market but make it a viable product and/or service.</p> <p>Ability to focus on the very next step to get closer to the ultimate goal.</p> <p>Ability to weather the ups and downs of any business.</p> <p>Ability to sell ideas, products or services to customers, investors or employees etc.</p>
9	Environmental and sustainability skills

	Ability to focus on problem-solving and the development of applied solutions to environmental issues and resource pressures at local, national and international levels.
10	Customer service/Marketing skills
	Ability to interact with another human being, whether helping them find, choose or buy something. Ability to supply customers' wants and needs both via face to face interactions or digital technology. Ability to manage online sales and marketing. Ability to understand and manage digital products.
11	Data analysis skills
	Ability to translate vast amounts of data into abstract concepts and understand data-based reasoning. Ability to use data effectively to improve programs, processes and business outcomes. Ability to work with large amounts of data: facts, figures, number crunching, analysing results.
12	Financial skills
	Ability to understand and apply core financial literacy concepts and metrics, streamlining processes such as budgeting, forecasting, and reporting, and stepping up compliance. Ability to manage costs and resources, and drive efficiency.
13	Other generic skills
	Risk assessment and writing SOPs Safety Operating Procedures