



Food Industry Insights Final Report

Prepared for:

Australian Mushroom Grower's Association

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Prepared by:

Nutrition Research Australia Pty Ltd.

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Executive Summary

Background

Hort Innovation project: **MU20003 Educating the Food Industry about Australian Mushrooms** aims to influence and facilitate the incorporation of mushrooms into the menus of the food service sector of the food industry through nutrition education

The overarching strategy is a two-pronged, top-down and bottom-up approach:

- **top-down** engagement with high quantum of influence food industry organisations to implement mushroom focused nutrition interventions, and
- **bottom-up** education and communication with industry professionals influencing the food service sector to educate on the culinary, nutrition, health benefits of Australian Mushrooms (*A. bisporus*).

Approach

To best deliver the project outcomes and planned activations, obtaining food industry insights to advise who in the industry we should be targeting within the key project pillars of the two strategic domains (top-down and bottom-up), and how best to engage and activate them, was deemed an important step to inform and direct the project strategic plan, along with serving to inform key industry stakeholders of opportunities, specifically mushroom growers. Hence an **Industry Insight project** was undertaken and divided into two phases. Phase 1 to identify 'Who' we should be targeting and Phase 2, how best to engage and activate and what opportunities exist.

In Phase 1, an industry blueprint comprised of desktop research was undertaken along with consultation with industry experts to scope and map out the role of the food service sector within the wider food industry. Findings from the information gathering were then reviewed in line with the project's aim, outcomes and strategy to inform the recommendations for:

- a. 'Who' the project should target and;
- b. Key individuals to interview in one-on-one interviews for Phase 2.

In phase 2, qualitative in-depth interviews were undertaken with twelve key opinion leaders and quantitative research conducted with broad range of food industry professionals which were together summarised to provide key insights into the food service industry falling under six key territories; Health centricity, Mushroom Knowledge (nutrition, health, culinary), Usage, Culinary Education, Opportunities and Communication. The qualitative interviews were also used to seek out interest in organisations taking part in planned case study interventions within the project.

Together the insights were used to inform recommendations for how best to execute the project and identify opportunities for the Australian mushroom industry.

Findings and Recommendations

Phase one

Food industry blueprint identified a dynamic and rapidly changing food service sector comprised of four major sectors; Institutional, Commercial, Quick Service Retail (QSR) and Industrial, each comprised of smaller sub-sectors. The industry at large is undergoing a period of rapid change driven by changing lifestyle demands and demographics. It is highly fragmented and largely comprised of independent and low quantum of influence outlets. Some sectors and sub-sectors comprise of chains of outlets managed by organisations that have the potential for higher quantum of influence, thus offering a greater opportunity and impact for the planned mushroom intervention. Food manufacturers were among other significant players identified that influence the foods, meals and menus of the sector.

Culinary training is undertaken by registered training organisations (RTO). While there are multiple smaller sized private organisations, the major trainer is the government funded Technical and Further Education (TAFE) organisations. The sector is comprised of multiple professions and there are several professional membership organisations that offer efficient channels for communication.

Utilising a prioritisation method using relatively objective and simplistic criteria across three domains, nutrition, ease of intervention and impact, five key recommendations were obtained to ensure opportunities with the greatest impact.

Five key recommendations from Phase 1 were:

Recommendation 1: The most relevant sectors/sub-sectors for the top-down mushroom case studies included: Institutional Aged Care and Hospitals, Industrial Caterers, Tier 2 QSR, Commercial Accommodation/Hotels and Food Manufacturing.

Recommendation 2: The following organisations within each sector should be prioritised for the mushroom case study interventions:

Aged Care: BUPA, Calvary, Unity, Regis, Allity

Hospitals: Ramsay Healthcare, NSW Health, VIC Health, Healthscope, St John of God

QSR Tier 2: Zambrero, The Coffee Club, Retail Zoo, Soul Origin, Guzman & Gomez

Industrial: Compass, Sodexo, Cater Care, Australian Turf Club, Trippis White

Accommodation/Hotels: Accor, ALH Hotels, Crown Group, Star Group, Hilton

Recommendation 3: The top five culinary schools for the curriculum revision include: NSW Ryde & Ultimo TAFE, QLD Southbank TAFE, VIC/NSW William Angliss Institute and The Learning Vault.

Recommendation 4: There are seventeen membership organisations that are relevant to target key industry professionals in education and communication activations. An influencer database by food service sector should be created. As individuals may change and new database contacts be

identified as the project progresses, the contact list should be expanded and maintained throughout the project.

Recommendation 5: Fifteen KOLS were identified for the Phase 2: Market Research. They comprised of nine individuals working at high quantum of influence organisations from the food service sectors; two from Aged Care, one from Private Hospitals, two from QSR Tier 2, two from Industrial Catering two from Accommodation/Hotel sectors, two individuals impacting culinary curriculum, four networked individuals and influencers of the broader food service industry; three dietitians and one commercial chef.

Phase two

The quantitative and qualitative research identified several insights of the food service industry across six territories.

Health centricity: It was clear that nutrition and health are not a focus in the nationally accredited commercial cookery curriculum and rarely a direct consideration of the commercial organisational sector. In contrast, nutrition and health are central to the institutional sector where dietitians often work in partnership with chefs. Irrespective of value on nutrition and health, taste is number one priority.

Knowledge: Mushrooms are best known by food industry professionals for culinary benefits with nutrition and health knowledge lacking, particularly for non-health industry professionals. A common misconception with non-health industry professionals is that mushrooms is a 'meat protein equivalent'. It was clear that education around nutrition and health benefits sparks motivation and greater interest in mushrooms. Mushrooms being a good source Vitamin D is the fact most are surprised and delighted by.

Usage: Mushrooms are considered a highly versatile ingredient and are used right across the menu. Their ability to add flavour to meals and be leveraged in plant-based meal offerings are key drivers of usage. Institutional organisations are more likely to value them for their nutritional benefits, compared with commercial organisations, where texture and flavour rate highest. Their ability to reduce sodium and saturated fat for the institutional sector and the misconception of being a protein replacement for meat for the commercial sector, are also important sector drivers.

There are no major barriers to usage for most, with shelf life, lack of top-of-mind awareness and inspiration the main limitations. Cost can be a barrier but can be positively viewed when mushrooms are used as substitute for meat. Nutrition solutions need to incorporate a cost benefit story for cut through, particularly in the institutional sector.

Culinary education: Within the nationally accredited commercial cookery curriculum, mushrooms are considered a vegetable and not specifically recognised. Registered training organisations (RTOs) are free to teach the curriculum as they like, and in practice mushrooms are an ingredient chosen to teach various units and preparation styles due to its versatility.

Opportunities: Many opportunities across the industry were identified. Overall, plant-based, flexitarian and vegetarian diets are key to tap into with opportunity to lead with inspiring mushroom recipes that achieve adequate protein. Related to this, the bigger flexitarian opportunity and dishes incorporating a blend of meat and mushrooms ('The blend') offer nutrition and cost saving potential benefits attractive to both commercial and institutional settings.

Overall, the opportunity to get mushrooms used more, centres around inspiring chefs' creativity to bring mushrooms top of mind. This is best achieved via engaging education on different mushroom types and how to use them (versatile applications), while supporting with underpinning fun nutrition and health facts. From a grassroots level, there is opportunity to provide materials that can be used to support the RTOs in delivery of the newly included unit SITHCCC031 - Prepare vegetarian and vegan dishes and longer term change the national curriculum to recognise mushrooms as a separate food grouping.

For the institutional sector, tapping into a 'Food as Medicine' approach instead of using supplements offers opportunity to educate and foster greater uptake of mushrooms. Taste benefits, vitamin D and other nutrients can offer potential of improved food intake and nutrition/health status, and subsequent less food waste and supplement usage, with consequent cost savings. Within the commercial sector, introducing a mushrooms provenance story has opportunity as a relevant avenue to connect with nutrition and drive interest.

Communication: From a communications perspective the key insight was to keep it simple, and to inspire rather than educate. Communication needs to be practical, visual, tactile and easy to understand. Whilst digital was seen as best, there is need and desire for something tangible that can be utilised in the kitchen to keep it top of mind. As a 'hands on' profession, training executive chefs to then train their staff ('train the trainer') appears a potential high quantum of influence strategy that is practical and puts knowledge into action.

In terms of messaging, leading with culinary benefits is key. Across the industry, the taste and texture benefits of mushrooms are seen to support greater food intake and consequent better nutrition and less food waste. It was clear that due to the different value placed on nutrition and health within the institutional and commercial industry sectors, that messaging needs to be different for each.

A practical usage and application provenance story (farm to fork) underpinned by nutrition fun facts and exploits plant-based food trends offers best opportunity for greater traction of mushrooms within the commercial sector. In the institutional sector however, leading with potential cost benefits underpinned by nutritional benefits, offers the best opportunity for success. Specifically positioning a 'Food as Medicine' approach, with mushrooms ability to provide flavour and texture and be a whole food 'nutrition supplement', supporting increased food and nutrient intake, improved nutritional status, and lower food wastage, were identified as key benefits to leverage.

Seven key recommendations from Phase 2 were:

Recommendation 1: Develop educational resources and an online dedicated food service 'Mushroom Academy' hub.

Recommendation 2: Undertake a mushroom case study intervention within two organisations to leverage in communication and gather support for further research.

Recommendation 3: Conduct a face-to-face pilot 'Masterclass' case study with commercial sector chefs to evaluate.

Recommendation 4: Communicate case studies to wider industry to educate and inspire.

Recommendation 5: Develop a farm tour framework, lesson plan and resource pack that facilitates grower and food industry professional connection and partnership.

Recommendation 6: Develop curriculum materials that can be leveraged as part of the Vegan & Vegetarian units.

Recommendation 7: Communicate key findings from this Mushroom Industry Insights report with industry to inspire and garner support to capitalise on future opportunities.

Future opportunities outside of the scope of the project were also provided. These include manufacturing opportunities, developing a provenance story strategic plan, developing an ongoing 'Train the trainer' strategic plan, investing in published research and advocating for update of the national accredited commercial cookery curriculum, for recognition of mushrooms as its own food grouping.

MU20003 Project Background

In August 2021, the Australian Mushroom Grower's Association (AMGA) in conjunction with Nutrition Research Australia (NRAUS) won a 3-year Hort Innovation project: **MU20003 Educating the Food Industry about Australian Mushrooms.**

Aim

This 3-year project aims to: (i) increase the knowledge of food industry professionals about the nutritional and health benefits of mushrooms; and (ii) facilitate food industry professionals to improve the nutritional profile of existing and new foods, meals, and menus available within the food service sector by incorporating more Australian grown fresh *A bisporus* mushrooms.

Outcomes

The key outcomes of the project include:

1. Food industry professionals will have increased knowledge of the nutrition and health benefits of mushrooms
2. Food industry professionals will more frequently use mushrooms to improve the nutritional profile of a meal
3. Two large catering organisations will use mushrooms in meals or products to improve nutritional profile
4. At least one high influence culinary school will include mushroom nutrition, health, and culinary uses, in their curriculum
5. Food industry professionals will have an increase in their recognition of mushroom nutrition, health, and culinary uses
6. Mushroom Industry is well informed of the Food Industry landscape and the opportunities within the food service industry
7. Growers are well equipped with resources and knowledge to run farm tours for nutrition education independently
8. Culinary educators and students will be more confident to use and recommend Australian mushrooms for their nutrition and health benefits

Strategy

To achieve the aim and outcomes of this project, a two-pronged top-down and bottom-up strategy was planned:

1. **Top-down:** Engagement with high quantum of influence food industry organisations to implement mushroom focused nutrition interventions. Specifically:
 - Mushroom case study interventions at two high impact catering organisations
 - Curriculum revision at one or more culinary schools

2. **Bottom-up:** Engagement with industry professionals influencing the food service sector to educate on the culinary, nutrition, health benefits of Australian Mushrooms (*A. bisporus*), with the following activations planned:
 - Education and upskilling of growers via farm tour packs to run nutrition focused farm tours to key tier 1 food industry professionals who are influencers of the industry
 - Conference sponsorship at high impact and relevant industry conference
 - Oral presentation on nutrition, health and culinary science of mushrooms at a relevant industry conference
 - Oral presentation at a relevant industry conference on nutrition interventions
 - Educational materials (mushroom case study intervention and educational videos, educational brochures, posters, e-books) targeted and communicated to food service professionals via relevant channels

In addition, findings of the report were planned to be communicated with industry growers via presentation (webinar or conference) and updates via Australian Mushrooms Journal.

To meet the deliverables in both project domains (top-down interventions and bottom-up education and communication) there are 4 key strategic pillars:

1. **Food service sectors and organisations** relevant to undertake mushroom interventions.
2. **Culinary schools** relevant for implementation of mushroom relevant curriculum revision.
3. **Industry professional organisations** that can be leveraged to support targeted and efficient dissemination of information through established communication channels.
4. **Key industry influencers** who can be utilized in tandem to amplify messages and utilized as supporters and/or influencers of decision makers to help influence top-down interventions.

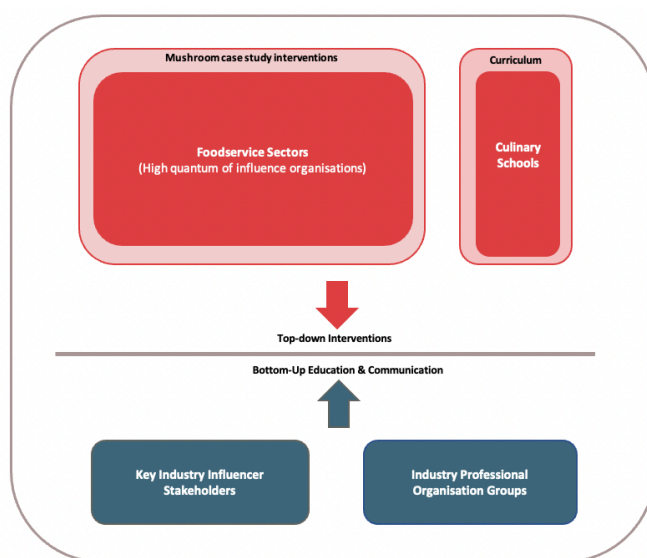


Figure 1. The four key strategic pillars for project MU2003; Food service Sectors, Culinary Schools, Industry Professional Membership Organisations and Key industry influencer stakeholders.

The first step of this project is to map out the opportunities within food service industry to deliver project outcomes and planned activations and is termed the Food Industry Insights Report. The report was divided into two phases:

- **Phase 1:** Identify 'Who' we should be targeting in the key strategic pillars within the two domains (top-down and bottom-up), and
- **Phase 2:** How best to engage and activate.

Phase 1 was completed 30th January 2022 and submitted to Hort Innovation as the 'Phase 1 interim Industry Insights' report. Phase 2 of the report, comprising qualitative and quantitative research was undertaken throughout February to June 2022. This final report incorporates the methodology, findings and recommendations of Phase 2 and comprises of the complete Mushroom Industry Insights report.

The Mushroom Industry Insights Report

Aim

To map out food industry insights that will inform and direct the project's strategic plan to best meet the project aim and outcomes.

Phase 1

Scope and map out the food industry including its key sectors, and identify the key pillars for 'who' the project will target within the two key domains (top-down and bottom-up):

- Provide a detailed overview of the food service sector of the food industry.
- Understand key sectors within this industry and their linkages.
- Understand organisations that operate within these key sectors.
- Identify 'who' to target for the project within each of the pillars within the two key domains (both top down and bottom up).
- Identify 15 key opinion leaders (and their organisations) to target in Phase 2.

Phase 2

Undertake market research with food industry professionals to understand their needs and barriers around using mushrooms, and to provide further insights to help inform 'how' the project will be best executed for maximum impact. Specifically, the research sought to uncover insights on the:

- Importance of nutrition/health (health centricity) within the industry
- Food service professionals' current mushroom nutrition and health knowledge
- Usage of mushrooms, including drivers and barriers within food service organisations
- Current focus of mushrooms within culinary education
- Opportunities and considerations within catering and culinary education organisations
- Effective ways to reach industry professionals to increase mushroom nutrition and health knowledge
- Key messages to target in communication and education of industry professionals

As part of the market research, the project team built rapport and links with key industry leaders and scoped interest in food service organisations and culinary schools' involvement in the project's future planned mushroom case study interventions.

Phase 1: Industry Blueprint

Identify 'who' to target

Methodology

Research Questions

Research questions were developed to help direct:

- a. Information gathering, and
- b. Recommendations on who to target.

Information Gathering

- 1. What is the structure, flow, and networks of the food industry in Australia?**
 - a. What are the key sectors that make up the industry and how do they inter-relate?
 - b. Who are the relevant key players?
 - c. What drives decision making on foods, meals and menu choices?
- 2. Who are the key organisations within these sectors?**
- 3. Who are the key industry professionals that this project should target?**
- 4. What are the culinary education pathways that exist?**

Industry insights were obtained via a combination of desktop research and consultation with food industry experts including Adam Moore (Culinary Revolution, Corporate executive chef), Karen Kingham (Nestlé Food services Brand Nutritionist) and Alan Barclay (Chef & PhD qualified Dietitian). This included:

- a. Reviewing previous reports (MU12006) and industry published reports
- b. Reviewing current market insights and trends on the current food environment – e.g., emergence of ghost kitchens; new meal delivery services, etc.

Based on the information gathered, the role of the food service sector within the wider food industry was mapped out to create an industry blueprint map.

The findings from the information gathering (questions 1-4) were then reviewed in line with the project's aim, outcomes and strategy to inform the recommendations (questions 5-9) for:

- a. 'Who' the project should target and;
- b. Final fifteen KOLs to use in Phase 2.

Recommendations

- 5. What are the relevant food service sectors to focus on for the top-down mushroom case study interventions?**

6. What are the priority organisations (and associated individuals) within identified food service sectors for the top-down mushroom case study interventions?
7. What are the priority culinary schools for top-down curriculum revision intervention?
8. Who are the key food industry professional organisations that reach our target market and key individual industry influencers that can be used for bottom-UP nutrition education and communication to influence the use of mushrooms into the sector?
9. Who are the fifteen key opinion leaders (KOLS) to target for Phase 2?

Priority sectors for mushroom case study interventions

To maximise project investment and produce the deliverables to timelines, the food service sectors and their sub-sectors relevant for the top-down mushroom intervention case studies were prioritised by two project team members (Jutta Wright, Project Manager and Adam Moore, Corporate Executive Chef), utilising a relatively objective and simplistic criteria across three domains:

- a. **Nutrition** i.e., how regularly and/or what proportion of days intake does a consumer rely on this sector for nutrition?
- b. **Ease of (mushroom) intervention** i.e., how likely will the project get traction within 6 months?
- c. **Impact** i.e., how much impact will it make? i.e., does it contribute significant volume to the food service sector; does it have high market profile?

This assessment was based on generalised considerations and broad assumptions by the team. From this assessment, nutritional need was weighted highest (50% of the total score) in view of this being primarily a nutrition education project. Ease of intervention was weighted at 30% of the total score in view of the project's limited timeline to delivery, and impact was weighted at 20% of the total score.

Each criterion was scored as 0, 1, or 2, where 0 was the least favourable response, and 2 the most favourable response (**Table 1**). To determine the weighted score, the total score for each criterion was then multiplied by the weight assigned to each, and the total was calculated by the sum of all. The three separate scores were totalled to provide a final total score out of 2 and rounded to one decimal place.

The sector was rated low if it scored ≤ 1 , moderate if it scores 1.1-1.4 and high if it scored ≥ 1.5 .

Table 1. Assessment criterion to prioritise food service sectors and sub-sectors

CRITERION	MEASURE	SCORE
Nutrition (50% weighting)	How regularly and/or what proportion of daily intake does a consumer rely on the sector for nutrition?	0 (Consumers rely on for meals sometimes i.e., monthly)
		1 (Consumers rely on for some meals regularly i.e., a least one meal during the week)
		2 (Rely on for all meals)
Ease intervention (30% weighting)	How likely will the project get traction within 6 months?	0 (Difficult, too many potential stakeholders)
		1 (Not straightforward, 3-4 stakeholders)
		2 (Relatively easy, 1-2 stakeholders)
Impact (20% weighting)	How much impact will targeting this sector make? Does it have high market profile? Does it contribute significant volume or growth to the sector?	0 (Little)
		1 (Some)
		2 (Significant)

Priority Organisations

Once the prioritised food service sectors and subsectors were identified, organisations within these sectors/subsectors were then scored and prioritised using a pre-determined set of criteria developed by the project team across the same three domains, but with a more detailed assessment (**Table 2**). In assessing organisations, ease of intervention was given a greater weighting based on the rationale that being able to execute an intervention within the project timeframe was considered the key priority.

Thus, each organisation was assessed for: ease of intervention (50% weighting); nutrition and health centrality (30% weighting); and impact and reach (20% weighting). Each category was broken into sub-questions, and a score of 0, 1, or 2 was given for each question, where 0 was the least favourable response, and 2 the most favourable response. To determine the weighted score, the total score for each category was summed and divided by the total number of questions for that sub-category to give a total score out of 2. This was then multiplied by the weighting assigned to

each category, and results summed and multiplied by 10 to give a total score out of 20. Scores are reported to 1 decimal point.

Table 2. Assessment criterion to prioritise organisations within priority food service sectors

CRITERION	MEASURE	SCORING
EASE OF INTERVENTION (50% weighting)	Are they (organisation/individual) known to our project team?	0 (Not at all)
		1 (Indirect)
		2 (Well known)
	How many levels of touchpoints to the decision maker?	0 (>5)
		1 (3-4)
		2 (1-2)
	What is their level of control over menu and meal preparation?	0 (Low, all food is brought into premise from elsewhere)
		1 (Medium, made on site but prepared by cooks)
		2 (High, chef designed/prepared menu/meals)
	How many times are they changing the menu?	0 (Set menu changed >1/yr)
1 (Set menu but regular rotation or promotions)		
2 (Seasonal changes)		
What is the current level of mushroom usage?	0 (Featured/primary ingredient)	
	1 (inclusion/accompaniment ingredient)	
	2 (None)	
		0 (None)

	Mushroom potential: How many menu items can we include with mushrooms?	1 (<3) 2 (≥3)
		0 (No/not possible)
	Do they conduct/have ability to conduct nutrition education for staff?	1 (Possible) 2 (Yes already part of organisation operation)
HEALTH (30% weighing)	Level of nutrition focus?	0 (Non-existent) 1 (Some: nutrition info provided/mentions nutrition in marketing materials) 2 (High: sets own or follows KPIs)
	Nutritionist working on team?	0 (No) 1 (Consultant used) 2 (Employee)
IMPACT (20% weighing)	Marketing reach: How many sites do they have?	0 (0-50) 1 (50-200) 2 (>200)
	Market influence: What is their level of influence on market trends/consumer awareness?	0 (Low) 1 (Medium) 2 (High)

The top five priority organisations for each previously prioritised sector/sub-sector were then identified and collated along with key contacts of individuals working within the organisations obtained via the intel from topic experts, company website and/or LinkedIn.

Priority culinary schools

Consultation was undertaken with food service industry expert Adam Moore to select based on his expertise and network, 3-5 priority culinary schools to target based on those likely to be most efficient for project resources while maximising reach and impact.

Key industry professional associations & Individual industry influencers

A workshop was undertaken with NRAUS, AMGA and Corporate Executive Chef, Adam Moore to identify influential industry professional association groups. A priority contact list of high influence food industry individuals was created. NRAUS and AMGA attendees included: Martine Poulain (Relationship and General Manager, AMGA), Leah Bramich (Marketing & Communications, AMGA), Flavia Fayet-Moore (CEO, NRAUS) and Jutta Wright (Project Manager, NRAUS).

KOLs for the Phase 2 market research

Based on the findings from all research questions (1-8), a workshop was held with AMGA and Corporate Executive Chef, Adam Moore to agree final recommendations for the KOLs to be interviewed 1:1. NRAUS and AMGA Attendees included: Leah Bramich (Marketing & Communications, AMGA), Flavia Fayet-Moore (Director, NRAUS) and Jutta Wright (Project Manager, NRAUS).

Findings

Food Industry Blueprint

Structure, flow and networks food service sector within food industry

The Australian Food industry represents around \$172 Billion AUD (1) and accounts for over one third of the country's total manufacturing sector (2). Traditionally, food has been prepared in the home into meals or snacks from ingredients bought from a structural retail outlet. Over the past two decades, with an increasingly time poor society, the drive for convenience has seen a transition toward eating ready prepared meals or snacks out of home, and a growing defined food service sector, representing ~35% of the industry representing \$57 Billion Australian Dollars (3).

'Food Service' has been defined as those organisations and companies who provide meals prepared outside the home. Traditionally, most of this food has been consumed by individuals away from home and hence the sector has been viewed as capturing the out of home eating occasion. Australian's propensity to eat out is reported to be one of the highest in the world. In 2018, nearly two thirds of the population over 14 years of age ate out at least once per month (3), and it was reported in 2019 that around 37% of consumer's food and beverage spend is spent in the food service sector (1).

With the advances in technology and ever-increasing consumer desire for convenience anywhere, anytime, there has been increasingly a move away from individuals preparing their own food towards utilising ready prepared meals, even within the home, predominantly in metropolitan areas and driven largely by millennials. These dynamics are reshaping the food industry and developing a modern food environment responding to the consumer demand for prepared meals or snacks eaten wherever they want, whenever they want. The food industry at large is undergoing a period of rapid change driven by these lifestyle demands and changing demographics. Furthermore, due to recent events of the global pandemic, COVID-19, there has been huge impacts on the entire food industry, including consumer behaviour, which will likely have a long-lasting effect on the industry.

As meal preparation is progressively outsourced, the boundaries of traditional retail and food service sectors are increasingly blurring. Over recent years the retail supermarkets have emerged as one-stop shops for fast affordable high quality convenient food, expanding their ranges of home-cooked meal replacements and heat-and-serve products such as pastas and pre-packaged mini meals, along with the emergence of their own brands. Traditional convenience stores have also attempted to access this market by expanding their fast-food options such as pre-made sandwiches and salads, and baked goods. While the retailers compete in the traditional 'out of home' eating occasion, commercial food service outlets are seeing the need to maintain relevancy along with potential opportunities for growth in the direct sell into home market, via the emerging online meal delivery channels.

Excitingly, new channels such as online delivery services and new concepts such as 'ghost kitchens' have been developed. The recent COVID-19 global pandemic over 2020-2022 has had a major

impact on the traditional food service channel and its need to adapt as consumers spend months locked down in homes and unable to visit outlets in person. This external event has been a major catalyst in driving growth in these newer online delivery channels and while they only represent 1.6% total share of commercial food service sector, current and predicted trends will see them likely to continue to grow (4). See **Figure 2** for visual overview of key food industry players and inter-relationships.

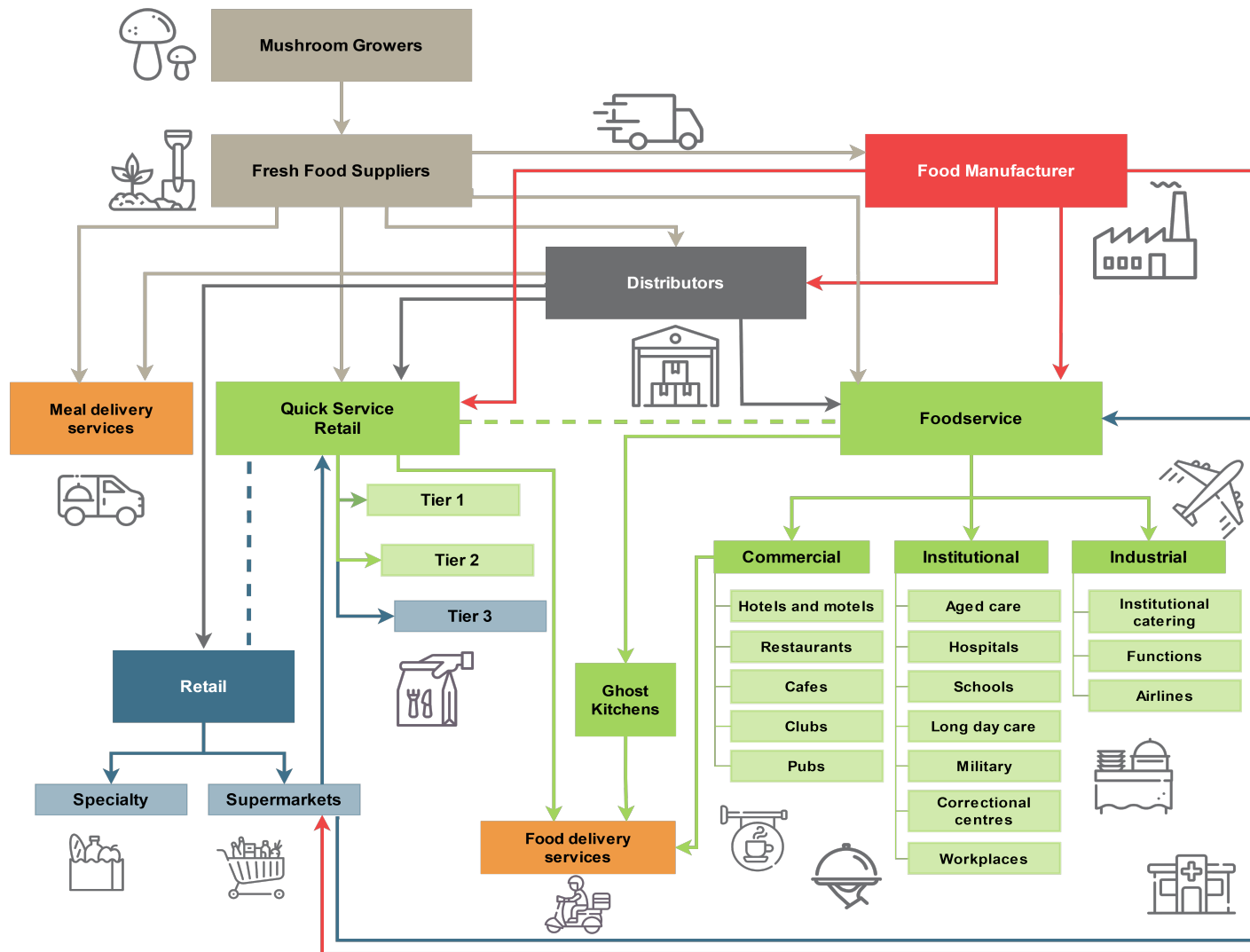


Figure 2. Food service industry blueprint map: key players and inter-relationships

Key Food service Sectors

The food service sector can be divided into four key sub-sectors comprising of commercial, institutional, industrial and Quick Service Retail (QSR) outlets, collectively representing around 90,000 outlets or establishments, with 80% of them positioned on the Australian Eastern states of New South Wales, Victoria and Queensland (5). In addition to these traditional sectors is the emergence of home meal delivery services, ghost kitchens and online meal delivery services. The key organisations within these sub-sectors are outlined in **Table 3**.

Commercial

The commercial sector is the biggest sector with around 65,000 outlets (5). It traditionally includes QSR, accommodation/hotels/motels, restaurants, cafes, clubs and pubs. This sector is highly fragmented and dominated by independent owners or operators comprising over 24,500 individual restaurant businesses and around 14,000 cafés and coffee shops. There are around 470 hotels and resorts in Australia (including luxury establishments), that derive a significant portion of revenue (20%) from the sale of meals and beverages prepared at onsite restaurants (2). The commercial sector is made up of around 30% chain and 70% independent single outlets, with the majority of chain outlets operating in the QSR sector (2). Casual dining (i.e., QSR, café) is the most popular style of dining with fine dining outlets accounting for only 2-3% of the industry total (2). The top volume drivers for the sector include restaurants followed by QSR chains, cafés and QSR independents (5).

QSR

QSR, traditionally viewed as a sub-sector within the commercial sector, is increasingly recognised as a significant inter-dependent player in the food industry. QSR represents the blurring of traditional retail and food service sectors and is fuelling the emergent online delivery service sector. There are around 25,000 fast food and takeaway businesses in Australia, with half of these being chains. QSR can be divided into three tiers; **Tier 1**- International chains such as McDonalds, **Tier 2**- franchises such as Soul Origin and Grill'd and independents, and **Tier 3**- retail connected food outlets including petrol and convenience stores such as 7/11 and Foodary. On average, Australians make 4.8 visits to QSR across a 4 week period, with 17.6% Australians eating from them 10 or more times (6). This is being fuelled by millennials who make up the biggest consumers of the top three outlets which are McDonalds, KFC and Hungry Jacks (see **Figure 3**). QSR acutely reflect consumer eating trends and is increasingly seen as a major influence on the entire food industry sector, influencing market strategy for retailers such as Woolworths and Coles, and in product development via food manufacturers such as Nestlé and Unilever.

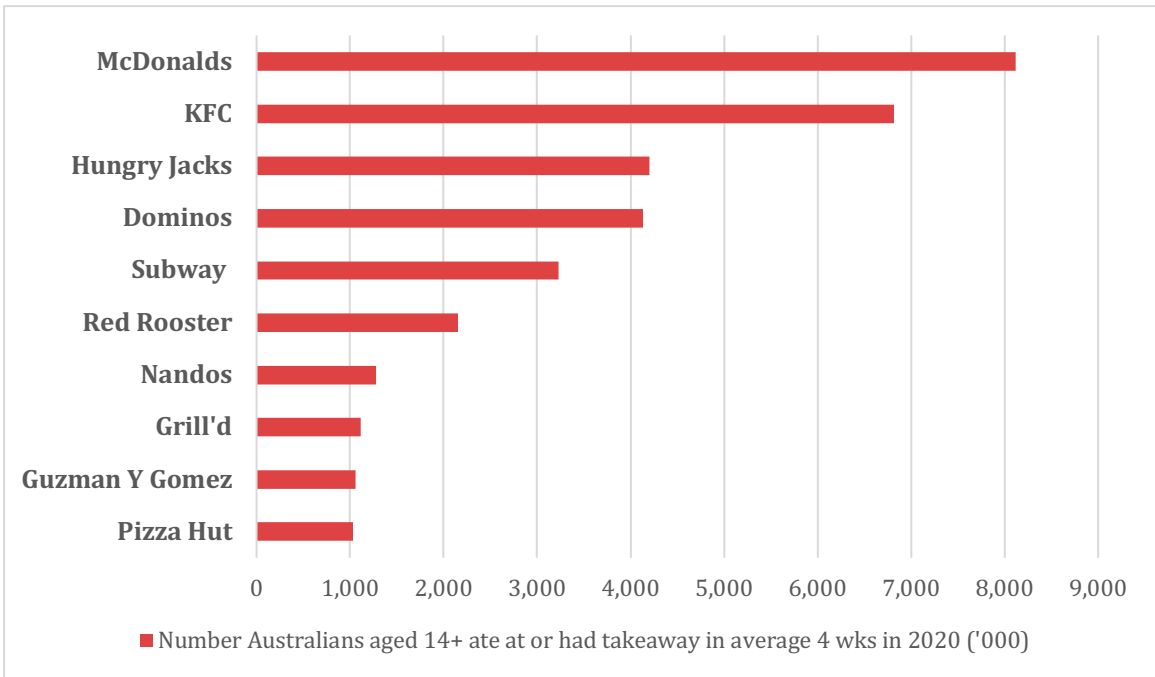


Figure 3. Adapted Roy Morgan poll of the top 10 QSR in 2020 (6)

Institutional

The institutional sector includes aged care, education (universities and schools), hospitals, early learning (long day care), military, correctional and workplaces, comprising approximately 20,000 outlets and around 15% of the food service sector volume (5). The institutional market is also growing in importance as a higher proportion of our population is ageing, fuelling faster growth in the sector (5%) compared to the growth in the commercial sector (3.5%). Aged care contributes the biggest volume to the sector and is predicted to surge as institutional care will be increasingly sought after. Furthermore, big changes in aged care catering are predicted over the next 5-10 years driven by differing tastes and requests for food of the baby boomers, compared to previous generations. In this sector, many organisations have outsourced their meal preparation to specialist catering organisations (i.e., Compass, Sodexo).

In Australia there are 690 public hospitals and 660 private hospitals (7) providing 62,000 beds and 11.3 million hospitalisations in 2018/19 (6.9 million public, 4.6 million private). The majority of these, located on the Eastern side of Australia, reflecting the total population spread in the country. Public hospitals are largely owned and managed by state and territory governments, and private hospitals are owned and managed by private for-profit or not-for-profit organisations.

Industrial

Industrial includes industry operators that provide a range of catering services to businesses, government, hospitals, aged care facilities, defence forces, correctional institutions and transport services including airlines. In 2019, there were over 1000 establishments reported. These services include catering for events such as sporting and one-off seminars, meetings and conferences. Some operators engage in full-service contracts, where they manage full company catering and canteens.

Despite currently being very small, the emerging ghost kitchens and online food delivery and meal delivery services are touted to be a significant future sector based on current and future predicted market dynamics and trends. Currently around 10% of Australians aged 14 years and older use meal delivery services (reported average during three month period) (3). QSR chains are also pushing this trend while responding to consumer trends towards 'eating out' in home, through marketing tactics such as providing exclusive promotional/limited edition offers via home delivery services (8). Online delivery services are allowing restaurants and QSR to expand their geographical distance and reach more people than ever before (3). In 2018, it was reported that a third of Australians living in capital cities order through online food delivery services (9).

Other relevant food service industry players

Food manufacturers are an important entity within the food service sector and food industry at large. Focused on the conversion of raw and semi-raw materials into food, products and meals primarily sold indirect to consumers via retail supermarkets such as Woolworths and Coles, they have over the past decades focused on the food service sector. They are providing unique offerings that best suit the food service market including bulk ingredients or finished/ready-to-use foods for use in meal preparation. Large players like Nestlé, Unilever and Simplot have dedicated food service businesses with sales teams that service both distributors and direct food service sectors and their outlets. The institutional and chain QSR sectors are key customers for food manufacturers due to their greater usage of pre-prepared items to satisfy their need for consistency and staying abreast of food trends.

The food service supply chain is complex (5). There are six channels including general distributors, speciality distributors, cash & carry, supermarkets, other retailers and direct from supplier/manufacturer. Distribution is centralised through distribution centres and wholesalers with the major players being Countrywide, PFD Food services (50% owned by Woolworths), Metcash and Bidfoods Australia.

Drivers of food service sector decision making

The broad commercial and institutional sectors have different drivers that influence decisions regarding food, meals and menu choices. While taste, texture and flavour will always be king for the commercial sector, storage and shelf life are also important determinants that drive decision making in food procurement where there is an acute focus on maintaining and increasing profit margin delivery. The sector is largely influenced by macro consumer eating trends and health is increasingly a need state that consumers are seeking as they increasingly outsource meal preparation to the everyday, rather than occasional.

In 2018 Deliveroo reported that Australians are fans of Asian noodle dishes, lovers of Mexican with the burrito the most ordered takeaway, and often aim for healthier options with healthier food orders tripling. Dishes like poke bowls, vegan meals, protein bowls, and sushi, are becoming more and more popular as food delivery orders (9).

While cost is a keen consideration for the institutional sector that is acutely budget conscious, nutrition takes a more prominent position in comparison to the commercial sector, particularly where catering supports a significant proportion of consumer daily food intake such as aged care, hospitals, defence and correctional centres. The importance and focus on food and nutrition in this sector was a major out-take of the highly publicised government Royal Commission into Aged Care in Australia (10). Engaging at least one dietitian at every aged care home, and an increase to the Basic Daily Fee to include support of nutritional intake, are just some of the recommendations provided in the Commission’s Final Report in 2021. The time is ripe in the next few years to provide cost effective nutrition centred strategies to the institutional sector.

Key food industry organisations

The key relevant organisations identified that comprise the food industry are summarised in **Table 3**.

Table 3. Key Food Industry sectors and relevant organisations

INDUSTRY SECTOR	SUB-SECTOR	RELEVANT ORGANISATIONS
COMMERCIAL	ACCOMODATION/ HOTELS	Accor, ALH Hotels (Endeavour group), Catering HQ, Crown casino, Hilton Group, Marlo, Merlin entertainment, Merrivale, Quadrant Private Equity Group, Sam Prince Hospitality Group, Star casino, Urban rest
	DISTRIBUTORS	Bidfood, Countrywide, Metcash, NAFDA, PFD Foods, Superior food services
INSTITUTIONAL	AGED CARE	ACH group, Allity, Anglican Care, Arcare, BlueCross, BUPA, Calvary healthcare, Catholic healthcare, McKenzie Aged care, NSW health, Primelife, Regis, Southern Cross Care, Uniting Care, Wesley Mission
	CORRECTIONAL	Correctional Service Industries (CSI)
	DEFENCE	AAFCA, Australian Army Catering Corps
	HOSPITALS	Public: Health Share NSW (220 hospitals), Health Share Victoria (200 hospitals), Qld health Statewide Food Services (122 hospitals), SA (122 hospitals), WA Health 80 hospitals, SA Health 72 hospitals), NT health (5 hospitals), ACT Health (3 hospitals) Private^: Ramsay healthcare Australia (72 hospitals), Healthscope (42 hospitals), St John of God Healthcare (27 hospitals), Epworth Healthcare (9 hospitals),
	LONG DAY CARE	Affinity, C&K, G8 Education, Guardian Childcare, Kids gourmet food, KU, Lutheran playgroup, Montessori, The Orchard, YMCA

	UNIVERSITIES	Australian Catholic University, Australian National University, Curtin University, Deakin University, Flinders University, La Trobe University, Monash University, Queensland University Technology, University of Adelaide, University of Melbourne, University of NSW, University of Queensland, University of Sydney, University of Technology, Western Sydney University
FOOD DELIVERY SERVICES		Deliveroo, DoorDash, Menulog, UberEats
FOOD MANUFACTURERS		Birch & Waite, Australian Whole Foods (Patties foods), Edyln, Farm foods Australia, Hub foods, JL King Co, Kids Gourmet Foods, Kraft, Krio Krush, Made with plants, Meal Me Professional, Nestlé Professional, Nutritious cuisine, Paramount foods, Prestige foods, Simplot Food service, Textured food concepts, theMeet Co, Unilever food solutions, V2 food, Vesco food
INDUSTRIAL	INSTITUTION & FUNCTION CATERERS	Australian Turf Club Hospitality, Compass (Eurest, Medirest, Chartwells, ESS), Delaware North, Epicure, Flemington racecourse, Peter Rolland, Restaurant associates (Compass), Rosehill racecourse. Sodexo, Trippis White (now owns Spotless sites)
	TRANSPORT CATERERS	Carnival cruises (P&O, carnival), Dnata (Snapfresh, Q Catering), Gate Gourmet, Plenty Food
MANUFACTURED MEAL DELIVERY SERVICES		Be fit food, Dietilicious, Dinner ladies, Gourmet Dinner Service, Hello Fresh, Lite n ' Easy, Marley Spoon, My muscle Chef, Thrive, YouFoodz
QUICK SERVICE RETAIL	TIER 1	Dominos, Hungry Jacks, KFC, McDonalds, Nandos, Oporto, Pizza Hut, Red Rooster, Subway, Taco Bell
	TIER 2	Ali Baba, Burger Urge, Burger Love, Crust, Grilled, Gloria Jeans, Guzman & Gomez, Hog's Breath Café, La Porchetta, Mad Mex, Milky Lane, Noodle Box, Seagrass Boutique Hospitality Group, Retail Zoo (Betty's Burgers, Salsa, Boost, CIBO), Soul Origin, The Coffee Club, Zambrero (Prince Group)
	TIER 3	Ampol, Bp roadhouse, Costco, Foodary, Ikea, Olivers, United petrol, 7/11
SUPERMARKETS		Aldi, Coles, IGA, Woolworths

^Private sector is highly fragmented. Only the top 5 private hospital groups listed.

Key industry professionals

The relevant food service industry professionals identified for the project are included in **Table 4**.

Table 4. Relevant food service industry professionals

KEY FOOD SERVICE INDUSTRY PROFESSIONALS
Aged and healthcare support service workers
Catering Managers/Production managers/Operational managers
Chefs
Cooks
Food Technologists
Food service & food industry dietitians
Procurement officers/Commercial managers
Restaurateurs/Institutional CEOs

Culinary training schools

In Australia, culinary training is undertaken by registered training organisations (RTO). While there are multiple smaller sized private organisations, the major trainer is the government funded Technical and Further Education (TAFE) organisations. The TAFEs on the Eastern coast of Australia are the biggest training organisations in Australia with the most recognised campuses within the industry located in Ryde and Ultimo in NSW, Southbank in Qld and William Angliss in Victoria. Le Cordon Bleu is considered one of the largest private RTOs in Australia. Many of the RTOs offer online learning. Learning vault (11) has emerged over recent years as an innovative educational company that supports RTOs with fully compliant, hand-crafted course content. An overview of culinary training organisations that exist in Australia (12) are listed in **Table 5**.

Table 5. Australian culinary training organisations

FUNDING	CULINARY SCHOOLS
GOVERNMENT	NSW TAFE (22 campuses) VIC TAFE (15 campuses) QLD TAFE (8 campuses) SA TAFE (3 campuses) TAS TAFE (2 campuses) WA TAFE (1 campus)
PRIVATE	Academia International (VIC, QLD) Academies Australia Polytechnic (NSW, VIC) Adelaide Hospitality and Training School (SA) AIC Australian International College (NSW) Australian Adelaide International College (SA)us Australian Catholic University (NSW, VIC) Australian Education Academy (VIC) Australian Institute of Business and Technology (QLD) Australian Professional Skills Institute (WA)

Box Hill Institute (VIC)
Cairns College English and Business (QLD)
Canberra Institute of Technology (ACT)
Canterbury Technical Institute (QLD)
Chefs Academy (NSW)
Chisholm Institute (VIC)
CQ University (QLD)
Empyrean Education Institute (WA)
Evolution Hospitality Institute (NSW)
Front Cooking School (VIC, QLD)
Holmes Institute (NSW)
Holmesglen (VIC)
Imagine Education Australia (QLD)
Institute of Culinary Excellence (ICE)
Keystone College of Business and Technology (SA, WA)
Le Cordon Bleu (QLD, VIC)
Meriden International Hotel School (NSW)
New York College (QLD)
Quality College of Australia (NSW, SA)
Queensland Academy of Technology (QLD)
Reach Community College (TAS)
Salford College (SA)
Stanley College (WA)
Sydney Business and Travel Academy (NSW)
Sydney School of business and technology (NSW)
The Gordon (VIC)
Victorian Institute Technology (Vic)
Western Australian Institute of further studies (WA)
William Angliss Institute (NSW, VIC)
William Blue (NSW)
Windsor College (NSW)

Recommendations

Food service sectors for mushroom case study interventions

Recommendation 1: The food service sectors/subsectors to form part of the top-down mushroom case studies were identified as Institutional Aged Care and Hospitals, Industrial Caterers, Tier 2 QSR, Commercial Accommodation/Hotels and Food Manufacturing.

Based on the food industry blueprint, all four key food service sectors (Institutional, Commercial, Industrial and QSR) and their sub-sectors were considered relevant targets for top-down mushroom case study interventions. However, the food service sector is extremely diverse and highly fragmented with many independent operators, particularly within the commercial sector. Single outlet owner operators have a low quantum of influence as they make menu decisions that impact only one point of distribution. The project is limited in resources and time; hence prioritisation needs to be given to targeting sectors and sub-sectors that are going to best meet the project aims and outcomes within the timeframe, as assessing all organisations was not feasible.

Prioritisation of the sectors and sub-sectors of the top-down mushroom case study interventions was therefore actioned to help provide greater focus and chance of success. Based on this assessment, the commercial sector rated the lowest and the institutional sector the highest (See **Table 6**). A large reason for this is due to nutrition being a greater driver of food, meal and menu choices in institutional versus the commercial sectors. In addition, being an extremely diverse and largely fragmented sector, comprised largely of independent operators, ease of intervention was rated low and consequently, impact rated lower.

Within the Institutional sector, aged care, hospitals, correctional and defence rated moderate to high (1.3-1.7). Aged care represented a significant opportunity based on this sector being the leading volume driver for the institutional sector, projected to grow significantly and currently receiving a high profile in the national government policy and media for the need for nutritional transformation. While nutrition need is high for most institutional sub-sectors with consumers reliance on the sector for most meals, it is comparatively lower for universities and workplace sub-sectors where meals provide only part of the daily intake. While correctional and defence sectors align highly with nutrition, ease of intervention can be difficult and along with daycare, comprise only a small volume of the sector and hence impact lower. Correctional and defence however rated over moderate. Many organisations in these sectors outsource to industrial caterers, hence it was agreed that defence and correctional would be more efficiently targeted via focus on high quantum of influence institutional caterers.

While industrial and QSR sectors overall rated only 1, the sub-sectors institutional catering (1.5) and Tier 2 QSR (1.2) rated higher reflecting the greater nutritional need for institution catering compared to commercial and transport catering (airlines), and the high impact of QSR within the industry. Transport catering (airlines) rated low due to ease of intervention being low and requiring engagement and agreement with multiple decision makers. Within QSR, while nutrition overall has not been a key driver, the sector, particularly tier 1 and 2 QSR, have a significant impact on the food

service industry. Tier 2 QSR, offers a greater opportunity versus other QSR tiers due to its higher likelihood (and ease) of intervention.

Table 6. Priority assessment of food service sectors/sub-sectors against nutrition, ease of intervention and impact

SECTOR/SUB-SECTOR	SCORE	RATING
INSTITUTIONAL	1.1	
Aged care	1.7	HIGH
Hospital	1.5	HIGH
Defence	1.3	MODERATE
Correctional	1.3	MODERATE
Uni	0.7	LOW
Day care	0.8	LOW
Workplace	0.5	LOW
INDUSTRIAL	1.0	
Institutional Catering	1.5	HIGH
Commercial Catering	1.0	LOW
Airlines	0.7	LOW
QSR	1.0	
Tier 2	1.2	MODERATE
Tier 3	1	LOW
Tier 1	0.9	LOW
COMMERCIAL	1.1	1.1
Accommodation/Hotel	1	LOW
Restaurants	0.9	LOW
Cafes	0.9	LOW
Pubs/Clubs	0.7	LOW

In summary, using a more objective lens, the commercial sector including accommodation/ hotels, cafés, restaurants, pubs/clubs, along with QSR tier 1 and the institutional daycare, educational and workplace sectors, all rated less than or equal to 1 and were therefore not deemed sectors for primary target in this specific project.

While the highly fragmented nature of the commercial sector rules it out from consideration, an opportunity to investigate and have some influence in this sector can be gained from targeting the accommodation/hotels sub-sector which is comprised of higher quantum of influence chain groups (i.e., Accor, Hilton, ALH Hotels). The nutrition centricity and ease of intervention scores are lower than other sectors, but the higher quantum of influence makeup of this sub-sector offers potential opportunity to get engagement into the commercial sector.

The final recommendation for the food service sectors and subsectors to form part of the top-down mushroom case studies was therefore identified as institutional (aged care and hospital), industrial caterers, Tier 2 QSR and Commercial accommodation/Hotels.

Outside of the direct food service sectors, the food industry overview identified that other key players are worth considering and include the food manufacturers (i.e., Nestlé, Simplot) who provide pre-prepared foods, products and ingredients, that are increasingly being sought by the food service sector for convenience and consistency, particularly the institutional and the QSR sectors. While implementation within this sector will likely be difficult and unfeasible within the project timeframe, they are worthy of being explored in the initial phases and kept within consideration as the project progresses, as future product developments may have a large and substantial impact. Project MU20004, a tandem relevant project will be an important resource in this endeavour.

Project MU20004 A scoping study to review fungi-based innovations to inform product development opportunities, has developed a catalogue entitled the "Mushroom Product Compendium 2021", consisting of over 180 mushroom-containing, commercially available food products available globally, designed to inform Australian mushroom growers of novel value add food product possibilities. It includes product innovations catering to the food service sector for convenience and consistency (e.g., mushroom pouches, frozen mushrooms) as well as the health (e.g., vitamin D/Beta-glucan enriched mushroom powder supplements). These products will be instrumental in the long-term success of this project, and will assist to discover new markets for mushrooms (which is part of the Australian Mushrooms Strategic Investment Plan).

Figure 4 provides an overview of the final project target pillars, including food service sectors and sub-sectors recommended to meet project MU20003 aims and objectives.

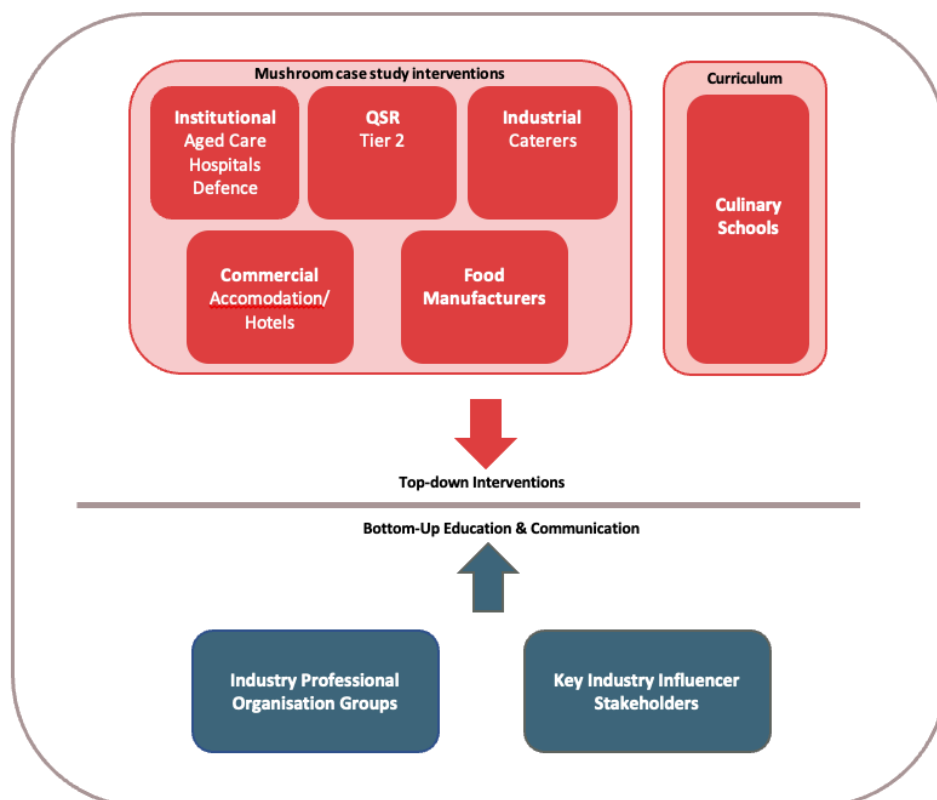


Figure 4. Recommended key target pillars for project MU200003

Priority organisations to target for top-down mushroom case study interventions

Recommendation 2: The top five organisations within each sector were:

Aged Care: BUPA, Calvary, Unity, Regis, Allity

Hospitals: Ramsay Healthcare, NSW Health, VIC Health, Healthscope, St John of God

QSR Tier 2: Zambrero, The Coffee Club, Retail Zoo, Soul Origin, Guzman & Gomez

Industrial: Compass, Sodexo, Cater Care, Australian Turf Club, Trippis White

Accommodation/Hotels: Accor, ALH Hotels, Crown Group, Star Group, Hilton

Organisations with potential for the mushroom case studies pillar were assessed within each prioritised food service sub-sector and ranked. The results of this are listed in **Table 7**.

Table 7. Score (X)^ from assessment of top-down priority organisations

AGED CARE	HOSPITALS	QSR TIER 2	INDUSTRIAL	ACCOMMODATION/ HOTELS
BUPA (14.4)	NSW Health (14)	Zambrero (14.6)	Compass (15.1)	Accor (14.2)
Calvary (14.4)	Ramsay Healthcare (14)	The Coffee Club (14.1)	Sodexo (12.6)	ALH Hotels (11.2)
Uniting (14.4)	VIC Health (13)	Retail Zoo (13.9)	Cater Care (12.6)	Crown group (9.2)
Regis (14.4)	Healthscope (11.6)	Soul Origin (12.9)	Australian Turf	Star group (9.2)
Allity (14.1)	St John of God (11.6)	Guzman & Gomez (11.8)	Hospitality (8.4)	Hilton (8.5)
Catholic Healthcare (14.1)	QLD Health (10.9)	Mad Mex (11.1)	Trippis White (7.1)	Merrivale (7.5)
Anglicare (14.1)	WA Health (9.9)	Seagrass Hospitality	Peter Rolland (7.1)	Marlow (7.5)
BlueCross (14.1)	SA Health (9.9)	Group (9.4)	Restaurant Associates	Prince Group (7.2)
Wesley Mission (14.1)	Epworth Healthcare (9.6)	Grilled (8.8)	(7.1)	Urban rest (7.2)
Southern Cross Care (14.1)	NT Health (8.9)	Hog's Breath Café (8.6)	Epicure (7.1)	Rockpool Group (6.5)
ACH Group (14.1)	ACT Health (8.9)	Burger Urge (7.9)	Delware North (7.1)	Merlin Entertainment (6.5)
		Gloria Jeans (7)	Flemington Racecourse	
		Crust (6.8)	(7.1)	
		Noodle Box (8.1)		
		Milky Lane (6.4)		
		Burger Love (6.4)		
		La Porchetta (5.7)		

^ (X): Score out of 20. Highest value scores best

The top five ranked organisations from each pillar were collated to create the final list of potential organisations for consideration by the project team in the delivery of the mushroom case study interventions. Individuals linked with these associations were identified and collated (see Table 8).

Table 8. Priority organisations and individual contacts for the mushroom case study interventions

ORGANISATION	WEBSITE	CONTACT
AGED CARE		
Calvary	https://www.calvarycare.org.au/retirement-communities/residential-aged-care/	Mark Hogben (Regional Hospitality Manager Aged Care) https://www.linkedin.com/in/mark-hogben-97a69b39/
BUPA	https://www.bupa.com.au/about-us/leadership-team	James Wix (National Food Services Manager) https://www.linkedin.com/in/jamesdwix/
Uniting	https://www.uniting.org/contact-us	Allen Robinson (Procurement Manager) https://www.linkedin.com/in/allen-robinson-1a74729b/
Regis	https://www.regis.com.au/leadership/	Melinda B (National Catering Manager) https://www.linkedin.com/in/melinda-b-262958113/
Allity	https://www.allity.com.au/leadership-team	Manish Arora (Corporate Executive Chef – Group Dining Services Manager) https://www.linkedin.com/in/manish-arora13/
HOSPITALS		
NSW Healthshare	https://www.healthshare.nsw.gov.au/services/food-patient	Carmen Rechbauer (Executive Director, Clinical support) https://www.linkedin.com/in/carmen-rechbauer-39651458/
Ramsay Healthcare	https://www.ramsayhealth.com.au/Australian-Leadership	Dr Bernadette Eather (Chief Nurse and Clinical Services Director) https://www.linkedin.com/in/dr-bernadette-eather/

VIC Healthshare	https://www.health.vic.gov.au/hospitals-and-health-services/public-hospitals-in-victoria	Angela Thompson (Food service dietitian NSW Healthshare) https://www.linkedin.com/in/angela-thompson-88608934/
QLD Health	https://www.qld.gov.au/health	Reuben Phillips (Procurement Liaison Officer) https://www.linkedin.com/in/reubenphillips/
Healthscope	https://healthscope.com.au/about/executive-leadership-team	Denise Cruickshank (Coordinator Statewide Food services Queensland Health) https://www.linkedin.com/in/denise-cruickshank-50953754/ Mark Owens (National Support Services Manager) https://www.linkedin.com/in/mark-owens-15685b23/
QSR TIER 2		
Zambrero	https://www.zambrero.com.au/	Sam Prince (Medical doctor and founder The Prince Group) https://www.linkedin.com/in/dr-sam-prince-53228431/ Sam Jarvis (Head of Supply Chain & Procurement) https://www.linkedin.com/in/sam-jarvis-5b2333b6/
The Coffee Club	https://www.coffeeclub.com.au/	Position not currently filled.
Retail Zoo	https://www.retailzoo.com.au/	Jack Brenan (Operations) https://www.linkedin.com/in/jack-brennan-6a12b430/
Soul Origin	https://www.soulorigin.com.au/	Paul McDonald (Executive Chef) https://www.linkedin.com/in/paul-mcdonald-29717825/
Guzman & Gomez	https://www.guzmanygomez.com/	Luiza Gomes (Co Head of Culinary) https://www.linkedin.com/in/luiza-gomes-9227898a/
INDUSTRIAL		
Compass	https://www.compass-group.com.au/	George Fouskarinis (National Culinary Director) https://www.linkedin.com/in/george-fouskarinis-a2604540/

Sodexo	https://au.sodexo.com/home.html	Michael Foenander (Segment Director Healthcare) https://www.linkedin.com/in/michael-foenander-gaicd-655b051b/
Cater Care	https://catercare.com.au/the-cater-care-way/	Sean Anderson (General Manager Food) https://www.linkedin.com/in/sean-anderson-361923ab/
Australian Turf Hospitality	https://www.australianurfclub.com.au/our-hospitality/	Gerry Maher (Executive Chef) https://www.linkedin.com/in/gerry-maher-57b42147/
Trippis White	https://www.trippaswhitegroup.com.au/	George Diamond (Group Executive Chef) https://www.linkedin.com/in/george-diamond-5a1b13b/

**ACCOMMODATION/
HOTELS**

Accor	https://all.accor.com/australia/index.en.shtml	Anthony Flowers (Director Culinary Accor) https://www.linkedin.com/in/chefanthonyflowers/
ALH Hotels	https://www.alhgroup.com.au/venues	Gary Johnston (National executive Chef) https://www.linkedin.com/in/gary-johnson-chef/
Crown group	https://www.crowngroup.com.au/	Position not currently filled.
Star group	https://www.starentertainmentgroup.com.au/	Jason Alcock (Director Food & Beverage Operations) https://www.linkedin.com/in/jason-alcock-8a09791a/
Hilton	https://www.hilton.com.au/australia/hilton-hotels.htm	Position not currently filled.

Priority culinary schools to target for top-down curriculum revision

Recommendation 3: The top five culinary schools to prioritise for the curriculum revision included: NSW Ryde & Ultimo TAFE, QLD Southbank TAFE, VIC/NSW William Angliss Institute and The Learning Vault.

The priority list of culinary schools to target for the curriculum revision are highlighted in **Table 9**. In terms of reach and efficiency, TAFE organisations were deemed the priority. The priority TAFEs selected were the largest organisations within biggest states NSW, VIC and QLD. It was recommended that the most efficient way to target the private RTOs was via the innovative RTO organisation ‘The Learning Vault’. As an RTO they produce their own material and learning programs, including those utilised by chefs to be certified under Australian Culinary Federation (ACF), along with also producing bespoke online materials that are utilized by every RTO and TAFE.

Table 9. Priority culinary schools

ORGANISATION	WEBSITE	CONTACT
NSW Ryde & Ultimo TAFE	https://www.tafensw.edu.au/courses/cookery-and-wine-courses	Ianthe Smith (Head teacher Commercial Cookery) https://www.linkedin.com/in/ianthesmith/
		Marlene Mifsud (Head teacher Hospitality Commercial Cookery) https://www.linkedin.com/in/marlene-mifsud-4132a541/
QLD Southbank TAFE	https://tafeqld.edu.au/courses/18228/certificate-iv-in-commercial-cookery-diploma-of-hospitality-management	Glen Zacher (Teacher) https://www.linkedin.com/in/glen-zacher-956a5391/
VIC William Angliss Institute TAFE	https://www.angliss.edu.au/courses/foods/cookery/certificate-iv-in-commercial-cookery/	Dale Lyman (Chef educator) https://www.linkedin.com/in/dale-lyman-0b4b4a22/
The Learning vault	https://www.learningvault.com.au/	Nicholas Robert (CEO) https://www.linkedin.com/in/nicholas-robert-62a00432/

Priority organisations and individuals to target for bottom-up education and communication

Recommendation 4: Seventeen membership organisations were identified that target relevant industry professionals and can be leveraged in education and communication activations. An influencer database by food service sector was created. It is noted individuals may change and new contacts identified as the project progresses. It is intended that the contact list be expanded and maintained as relevant throughout the project and ongoing.

The key member organisations that reach the relevant industry professionals and key individual influencers were identified and listed in **Table 9** and **Table 10** respectively.

Table 9. Key organisations that reach relevant food service industry professionals

MEMBERSHIP ORGANISATIONS

Australian Culinary Federation (ACF)
Australian Food service Advocacy Group
Australian Hotels Association (AHA)
Australian Institute Food Science
Australian Institute Food science & Technology (AIFST)
Clubs Australia
Culinary catering companies
Dietitian Australia (DA) Food service interest group
Dietitian Connection
Fine foods Australia
Food industry Australia (FIA)
Food technology Association Australia
Food service Australia
Food service Suppliers Association Australia (FSAA)
Institute of Hospitality in Healthcare (IHHC)
Nutrition Society of Australia
Restaurant catering Association (RCA)

Table 10. Key Food service industry influencer stakeholders by sector

SECTOR/SUBSECTOR	INDIVIDUAL	ORGANISATION
Aged Care	Cherie Hugo Maggie Beer Luke Mangan Louise Murray James Wix Mark Holgben Dr Sandra Iluliano Julie Dundon Anne Schnyder Gabrielle Thoreau Loretta Reikin Jacquie Krassie Julie Walton Olivia Farrer Carmel Curlewis Sharyn Broer	The Lantern Project Maggie Beer foundation Luke Mangan & Company Nosh to Nourish BUPA Calvary Healthcare Austin Health: Uni of Melbourne Nutritional Professionals Australia Nutritional Professionals Australia Food service consultant Aged care Dignity in Dining J. Krassie & Associates Wollongong Uni Flinders Uni Advantage Nutrition Meals on Wheels
Hospitals	Carmen Rechbauer Dr Karen Abbey Sally McCray Biance Guthrie Denise Cruishank Jorja Collins Dr. Kristen MacKenzie-Shalders Lillian Forrest Merrilyn Banks Angela Thompson Sophie Moulden Shannon Singh (Mickeljohn) Kathryn Jones	NSW Healthshare Nutrition and Catering consultancy Mater Hospital QLD Fiona Stanley Hospital Perth QLD Health Statewide Food Service Co-ordinator Melbourne Eastern Health & Monash Uni Bond Uni Healthshare NSW Director Royal Brisbane and Women's Hospital NSW Healthshare Austin Health Vic NSW Healthshare Ramsay Healthcare
Day care	Kay Gibbons	Early childhood management services, Chair

Caterers	George Fouskarinis Ryan Carmichael Jeannine Biviano Michael Foenander Ros Lenoard Sean Anderson Renee Zu Nikita Deo George Diamond	Compass Group Compass Group Compass Group Sodexo Sodexo Cater Care Cater Care Cater Care Trippis White
QSR	Natalie Edwards Sam Jarvis Samantha Parker Marianne Hudson Paul McDonald Jack Brennan Sam Prince	Olivers Real food (Tier 3) Zambrero (Tier 2) Zambrero (Tier 2) Zambrero (Tier 2) Soul Origin (Tier 2) Retail Zoo (Tier 2) The Prince Group (Tier 2)
Commercial	Anthony Flowers Gary Johnson Jason Alcock	Accor ALH Hotels Star Group
Food Manufacturers	Natalie Figueira Karen Kingham Lucy Briscoe Ashleigh McIntosh	Simplot Food service dietitian Nestle Food service dietitian Unilever Food service dietitian Patties Foods (Australian Wholefoods)
Culinary Education	Karen Doyle Nicholas Roberts Dale Lyeman Glen Zacher Marlene Mifsud Ilanthe Smith	ACF president, Le Cordon Bleu and TAFE Program manager The Learning Vault William Angliss Institute Southbank TAFE Ultimo TAFE Ryde TAFE
Other:	Rob Hunt Kathy Usic Maree Ferguson	CEO Dietitians Australia GI Foundation Dietitian Connection

Recommended KOLs for Phase 2 Market Research

Recommendation 5: Fifteen KOLS were identified to be taken through to Phase 2.

Four individuals were selected based on their network and influence within the food service sector. Nine individuals were selected across the five key food service sub-sectors; two each from Aged Care, QSR Tier 2, Industrial Catering and Accommodation/Hotels and only one from the hospital sector. For hospitals, only private hospitals were selected based on low likelihood of getting traction with government organisations within the project timeline and the insight that aged care organisations also have private hospitals, allowing these contacts (and organisations) to also be investigated across both sectors. Finally, two individuals influencing the culinary education space were selected.

Table 11 provides the summary of who the individuals are, respected organisation and rationale for selection and inclusion.

Table 11. Recommended KOLs

KEY OPINION LEADER	ORGANISATION, ROLE & Sector	RATIONALE
Dr Cherie Hugo	The Lantern Project Founder Aged Care	Networked Influencer: Dietitian founder of organisation The Lantern Project which driving nutrition transformation aged care
Sally McCray	Mater Group Qld Director Food services & Dietetics Hospital	Networked influencer: Innovation in food delivery in hospitals. Introduced room service into Mater showing impact on nutrition. Worked with Chef Luke Mangan on introducing plant-based menu into hospital.
Luke Mangan	Luke Mangan & Company Leading Chef & Restaurateur Commercial/Hospital	Networked influencer: Commercial focused Chef working to improve nutrition and quality of food in institutional setting.
Maree Ferguson	Dietitian Connection Founder Hospital/Aged Care	Networked influencer: Well-connected in all areas of nutrition and dietetics, including institutional setting (hospitals, aged care).
Sam Jarvis	Zambrero (Prince Group) Head of Supply Chain & Procurement QSR Tier 2	Rated highest QSR Tier 2: Organisation founded by medical doctor and entrepreneur Sam Prince.
Jack Brennan	Retail Zoo (Betty's burgers, Salsa, Boost, Mad Mex) QSR Tier 2	Key QSR: Entrepreneurial group under Janine Ellis with growing franchise brands – 500 stores. Betty's burgers up and coming.
James Wix	BUPA healthcare National Food service Manager Aged Care	Rated highest Aged care: one of largest aged care facilities with sites across NSW, VIC, QLD, SA.

Mark Hogben	Calvary healthcare Regional Hospitality Manager Aged Care	One of the largest aged care: Recently taken over Japara to now own most aged care sites in Australia. Facilities with sites across NSW, QLD, VIC, ACT, SA.
Dr Bernadette Eather	Ramsay Healthcare Chief nurse & Clinical Services Director Private Hospital	Largest Private hospital group:
George Fouskarinis	Compass National Culinary Director Industrial Catering	One of top 2 industrial catering organisations servicing institutional sector.
Michael Foenander	Sodexo Segment Director Healthcare Industrial Catering	One of top 2 industrial catering organisations servicing institutional sector.
Anthony Flowers	Accor Hotels Executive Chef Accommodation/Hotels	Key accommodation chain offering quantum of influence impact in commercial sector. Accor is a recognized leader in the hospitality wellness segment with nutrition key pillar.
Gary Johnson	ALH Hotels, National executive chef Accommodation/Hotels	Key hotel chain group in commercial sector. Very well known in industry.
Karen Doyle	Le Cordon Bleu Program Manager Culinary Education	AFC president, Le Cordon Bleu and TAFE Program manager. Insight into culinary schools.
Nicholas Robert	Learning Vault CEO Culinary Education	New innovative online learning platform being utilised across RTOs. Potentially effective way to target fragmented private RTO culinary organisations.

Phase 2

Identify 'how' to best execute the project for maximum impact

Methodology

Industry insights

Insights were obtained by quantitative market research that targeted a broad range of food industry professionals, and a deep dive qualitative 1:1 research with identified KOLs from Phase 1. The findings from both were then combined where relevant and summarised into six key territories; Health centricity, Knowledge, Usage, Culinary education, Opportunities & Communication.

Insights answered the following questions:

1. Health centricity

- What importance does nutrition/health have within the industry?
- What are the key nutrition issues and/or challenges for organisations?

2. Knowledge

- What is the current level of knowledge of food industry professionals regarding nutrition, health and culinary benefits of mushrooms?

3. Usage

- How are mushrooms being used within food service organisations?
- What are the drivers to usage?
- What are the barriers to usage?

4. Culinary education

- How do mushrooms feature within the curriculum?

5. Opportunities

- What considerations and/or opportunities are there around including mushrooms within the food service industry?
- What considerations and/or opportunities are there around including mushrooms within the culinary curriculum?

6. Communication

- What are most effective ways to reach organisations and industry professionals with mushroom centred nutrition, health and culinary education?
- What nutrition, health and culinary messages around mushrooms will best get attention of food service professionals?

These over-arching research questions informed the methodology and research questions of both the quantitative and qualitative research.

Qualitative research: 1:1 interview with KOLs

Qualitative research was undertaken with identified KOLs from phase 1, during February to June 2022. The fifteen identified KOLs from Phase 1, representing a broad range of sub-sectors within the industry, were each contacted to ascertain their interest in being interviewed for the project.

Contact details from the KOLs identified from Phase 1 were obtained through LinkedIn, organizational emails and/or networks. An email invite was developed describing the project and its outcomes. The interview spanned 30-60 minutes and was attended by 1-2 members of the research team. Interviews were conducted virtually using Zoom Inc., application. Participants were informed that all responses would be anonymous and confidential and verbally gave consent to the interview. As a thank you for their time, each interviewee received a \$150 gift card.

An interview guide was developed and tested internally by the research team and contained additional questions specific for those in culinary education. Questions were grouped into the following territories: nutrition centrality; key nutrition issues/challenges, mushroom usage, drivers, and barriers; mushroom focus in the curriculum; mushroom knowledge; and communication insights and opportunities. **Table 12** summarises the territories and types of questions explored.

Table 12. Key territories and questions explored in the qualitative research across organisations and culinary schools.

TERRITORY	DEFINITION	ORGANISATIONS	CULINARY SCHOOLS
Nutrition focus	Relevancy, importance and focus on health/nutrition.	<ul style="list-style-type: none"> How important is health and nutrition in the organization/sector? What is the focus? What key performance indicators or benchmarks around nutrition exist that the organization needs/seeks to follow? 	<ul style="list-style-type: none"> How important is health and nutrition in the culinary curriculum? Where does nutrition and health feature?
Key nutrition issues/challenges	Key nutrition issues the organisation must solve	<ul style="list-style-type: none"> What is the biggest nutrition/health issues the organization currently deals with? 	<ul style="list-style-type: none"> NA
Mushroom Usage	Current mushroom usage within the organisation.	<ul style="list-style-type: none"> How are mushrooms currently used? What preparation methods are used? 	<ul style="list-style-type: none"> NA

		<ul style="list-style-type: none"> • What is the frequency and volume used? 	
- Drivers	Attributes that facilitate and/or encourage mushrooms use.	<ul style="list-style-type: none"> • What is the main purpose for using mushrooms on the menu? 	<ul style="list-style-type: none"> • NA
- Barriers	Attributes that impede and/or discourage use of mushrooms use/focus.	<ul style="list-style-type: none"> • Are there any barriers to using (or not adding more) mushrooms to the menu? 	<ul style="list-style-type: none"> • NA
Mushroom Focus	Current mushroom focus within the curriculum.	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • How do mushrooms feature within the curriculum?
Mushroom knowledge	Current knowledge and understanding of mushroom's key benefits.	<ul style="list-style-type: none"> • What do they know about the nutrition, health and culinary attributes of mushrooms? 	
Communication insights	Best way to engage and increase food industry professional's knowledge and understanding.	<ul style="list-style-type: none"> • What would be the best way/s to communication with food industry professionals on nutrition education mushrooms? • What should be the key messages? 	
Opportunities/ Considerations	Key opportunities for mushrooms	<ul style="list-style-type: none"> • What opportunities and/or considerations do they see for using/including mushrooms on the menu? 	<ul style="list-style-type: none"> • What opportunities and/or considerations do they foresee to using/including mushrooms within the curriculum?

On agreement, a mutually convenient interview time was set up with the interviewee and researchers. Researchers included 1-2 of the following people: Chef Adam Moore, dietitian Dr Flavia Fayet- Moore and dietitian Jutta Wright. Where feasible, interviews included at least a dietitian and a chef.

At the start of the interview, researchers received permission from participants to record the interview for note taking purposes. The OTTER.AI, a voice meeting notes and real time transcription digital tool, was utilised for this purpose.

Post interview, researchers recorded and summarised insights according to key research questions developed. Findings were then synthesized with any relevant quantitative data (Knowledge, Usage, Drivers and Barriers only) to inform the over-arching key industry insights research questions.

Quantitative research: Food Industry Professional Online Survey

A short 5-minute market research survey, developed to be used as baseline data for project monitoring and evaluation was leveraged to gain additional insights.

As the survey was short and sweet to maximise reach and assess nutrition knowledge, questions were limited to knowledge and usage (including drivers and barriers) pillars. The survey questions were developed and set up on Typeform, an online survey tool (See **Appendix A**) and the survey ran from 26th April through to 15th June 2022.

A comprehensive communications plan was developed to drive awareness and recruitment to the survey. It included:

- A specific introductory electronic direct mail (EDM), sent out via third party Hospitality Magazine database as well as the AMGA database.
- Social media tiles developed for Facebook and LinkedIn, shared via NRAUS and AMGA social media channels.
- A media release from AMGA, titled 'Mushroom growers call on food industry professionals to share their nutrition knowledge' that was picked up by Bean Scene and Food Industry News.

Respondents were incentivised to undertake the survey for a chance to win one of five \$100 Visa gift cards. This was communicated at the beginning of the survey and in survey communications.

Post survey closure, results were tabulated, and findings summarised accordingly. Relevant data (Knowledge, Usage, Barriers and Drivers) were then synthesized to correspond with the qualitative research and help inform the over-arching key industry insights.

Mushroom Case Study Intervention Opportunities

Separately, the qualitative research was utilised to scope interest the mushroom case study interventions by asking the KOL at the end of the interview, if they or their organization, had any interest in being involved.

FINDINGS

Quantitative Research: Online Food Industry Professional Survey

The communication strategy was highly successful in recruiting individuals to undertake the survey. Despite a large proportion of respondents not being eligible to undertake the survey as they did not work in the industry, the survey achieved 654 valid survey completions from 1424 initial submissions. See **Appendix B** for full survey report.

Survey respondents represented the broad range of professions comprising the food service industry including chefs, cooks, catering managers, operational managers, food service dietitians, industry dietitians, and food technologists.

Qualitative Research: 1:1 KOL Interviews

The COVID-pandemic had significant impact on the food service sector with staff shortages and significant movements of staff, making it difficult for the project team to secure interviews. A few people who were originally identified, were either no longer working at the organisation and therefore no longer available, were not interested or were too busy to participate. In the end, twelve of fifteen interviews were undertaken and included a few KOLs that differed from the original recommendations.

The twelve interviewees comprised of one Food service Manager/Dietitian from institutional sector (major teaching hospital), five chefs from commercial sector (Hotels/Accommodation, QSR, Catering), one Chef and one Dietitian from institutional sector (aged care), one dietitian from manufacturing sector, two culinary educators and one culinary educator/industry association representative. Refer to **Table 13** for the interviewed KOLs.

Table 13. KOLs interviewed

KEY OPINION LEADER	ORGANISATION, ROLE & SECTOR
Amanda Fuller	Executive Chef Indu The Prince Group QSR Tier 2
Anthony Flowers	Accor Hotels Executive Chef Accommodation/Hotels
Ashleigh Jones	Senior Dietitian Lite N' Easy Manufacturing
Gary Johnson	ALH Hotels, National executive chef Accommodation/Hotels
Garry Stokes	Industry specialist consultant CasCat Consulting Culinary education/Industry Association Member

Karen Doyle	Le Cordon Bleu Program Manager Culinary Education
Louise Murray	Nosh Nutrition Accredited Practising Dietitian Aged Care
Manuel Malicdem	Executive Chef Catholic healthcare Aged Care
Michael Treacy	Corporate executive Dominoes Australia & New Zealand QSR Tier 1
Nicholas Robert	Learning Vault CEO Culinary Education
Sally McCray	Mater Group Qld Director Food services & Dietetics Hospital
Toni Saba	Big Tony's Catering CEO Industrial Catering (corporate)

The key findings from both the quantitative and qualitative research for the six industry insight territories (Health centricity, Knowledge, Catering organisations, Culinary schools, Opportunities and Communication) were summarised.

Health Centricity

The focus and importance of nutrition, and nutrition issues and challenges, differed between the institutional and commercial sectors. See **Table 14** for summary.

Table 14. Nutrition focus and challenges by sector

TERRITORY	INSTITUTIONAL SECTOR	COMMERCIAL SECTOR
Nutrition focus	<ul style="list-style-type: none"> • Key focus – Need to meet nutrition standards • Chef & dietitian working in partnership. Nutritional needs of menu based on clientele and guided by dietitian; Chef needs to make taste good at right cost • Ensure meets all food groups, balanced, and variety • Limit salt, added sugar, saturated fat • Ensure adequate energy, protein, healthy fats, healthy carbohydrates, vitamins, minerals 	<ul style="list-style-type: none"> • Not a direct focus - Primarily focused on customer experience/taste rather than nutrition • Dietitians rarely involved, other than organisations that differentiate and position on nutrition offerings • Indirect nutrition focus via consumer trends around nutrition, such as provenance, sustainability, real (quality) food, flexitarian/vegetarian eating patterns
Nutrition specific Issues/challenges	<ul style="list-style-type: none"> • Achieving tasty nutritious food • Cost pressures • Inadequate national nutrition standards • Protein in vegetarian/ flexitarian menus • Protein in vegetarian, weight-controlled diets (nuts too high calories and tofu/legumes not liked) 	<ul style="list-style-type: none"> • Ensuring meet allergen needs and catering to increasing plant-rich dietary eating preferences such as vegan/vegetarian/flexitarian

Q: What importance does nutrition/health have within the industry?

Nutrition and health are not a focus in the culinary education curriculum

It was acknowledged by the industry KOLs that nutrition and health is not a significant part of the commercial cookery curriculum, with the anecdotal opinions that it has a flow on effect that results in low general nutrition and health knowledge level across the industry. There is only one unit that contains some basic principles of nutrition, with this unit primarily focused on catering to clientele with special dietary needs. This unit is SITHCCC042 - Prepare food to meet special dietary requirements (<https://training.gov.au/Training/Details/SITHCCC042>).

The culinary education KOLs acknowledged that they have limited nutrition/health knowledge. It was revealed in the interviews that there was a very common misconception by the industry that mushrooms were a good source of protein. It was noted that the institutional sector relies heavily on food service dietitians to ensure nutrition standards of meals/menus were met, and to upskill nutrition knowledge of catering staff.

Nutrition and health are central to the institutional sector

The qualitative research found institutional sector comprises mostly of organisations responsible for delivering their client's daily food intake and hence a need to ensure that their meals and menus meet appropriate nutritional standards. These organisations often employ a dietitian, who is an important stakeholder in partnership with the catering staff in the delivery of meals to the clientele. It was noted that this relationship could often be a tenuous one as they meet to ensure food is delicious (meeting the chef's needs) as well as nutritious (meeting the dietitians needs). The dietitian's desire for the limitation of nutrients of concern such as sugar and salt are often in opposition to the chef's desire to ensure the food deliver's appropriate taste.

The focus for dietitians within these settings was to cater to the individuals' nutritional needs. For example, in large teaching hospitals it covered a spectrum of dietary needs for life-stages from infancy through to aged care, and specific dietary needs to manage medical or chronic conditions. Managing heart health and diabetes were key conditions, hence ensuring lower salt, added sugar, saturated fat, and healthy carbohydrates (including amount) were a key focus. Whilst in aged care, the focus was on the specific nutritional needs of the life stage which was centred on higher energy, protein, and adequate vitamin D and calcium.

Nutrition and health are rarely considered in the commercial sector

The primary focus was largely on quality, performance and taste. It was noted by many that in the sector more generally, particularly accommodation/hotels/catering, clientele seek more of an experience, rather than 'fuel'. The sensory rather than nutrition attributes of food take priority. While many of the larger hotel chains offer 'healthy choice' offerings in response to feedback for choice on menus, most people still chose the 'less healthy' choices. The major nutrition and health-related consideration in the commercial sector was catering to plant-based/vegetarian/vegan requests.

Catering to dietary intolerances and trends was the focus in the commercial sector

KOLs voiced that while nutrition was not directly important, real 'quality' food delivery was, along with catering to consumer dietary needs, such as allergens and intolerances and dietary trends. The rise of plant-based dietary patterns as a consumer trend and hence catering to vegan, vegetarian or flexitarian was acknowledged to be an increasing focus and interest. This was reflected by the reported industry recommendation to the educational sector in the past few years to create a vegan/vegetarian course in the updated National Commercial Culinary Curriculum, which has recently been accepted.

Q: What are the key nutrition issues and/or challenges for catering organisations?

Taste number one priority across entire industry, irrespective of value placed on nutrition and health

A key insight that came through unanimously was that regardless of nutrition and health value, taste was still the number one priority across *all* sectors. While it is what ultimately makes customers come back again to a commercial organisation, as one institutional dietitian said, *“Food needs to be eaten to impact health, and it needs to taste good to be eaten.”* The institutional sector voiced that the common feedback from clientele is the poor taste of food. It is acknowledged that improved nutrition and health of a population ultimately leads to cost savings in the organization, and that improving the intake of nutritious food will positively impact savings. In addition, there are additional savings from reduced food waste when food is eaten.

Ensuring adequate protein is key challenge in vegetarian/vegan dishes in the institutional sector

A consistent message that came through in the interviews was the challenge of getting enough protein into meals/menus for vegetarian/vegan dishes. Unlike many non-nutrition industry professionals, who believed mushrooms to be a protein source, dietitians reported the difficulty of achieving adequate protein in non-animal-based meals/menus leaving nuts, legumes and dairy (for lacto-vegetarian diets) as the only feasible choices. They appreciated the texture and flavour that mushrooms can provide to a non-meat dish but needed inspiration of how adequate protein can also be delivered.

Current existing national nutrition standards are sub-standard in the institutional sector

It was evident from the KOLs that the nutrition standards that existed were too simplistic. Within one of the biggest sub-sectors, aged care, there are no specific nutrition standards, other than the organisation needing to ensure it is meeting the daily intake of the five food groups as stipulated in the Australian Dietary Guidelines. An aged care dietitian KOL noted that the Australian Dietary Guidelines are designed for the healthy population and are not specific to the nuanced nutrition challenges and issues of aged care. The organisation depended on the dietitians to ensure that individualised needs of clients were met. She advised that advocating for specific nutrition standards for aged care is currently a key priority for Dietitians Australia.

Inspiration for allergen free and plant-rich dietary patterns is a main need of the commercial sector

Where nutrition and health considerations existed, they centred on catering to the clientele’s dietary needs such as allergies and intolerances, and the rising trend of vegan, vegetarian and flexitarian eating patterns. KOLS within this sector voiced a strong desire for inspiration in these areas.

HEALTH CENTRICITY INSIGHTS SUMMARY

- Nutrition and health are not a focus in the National Commercial Cookery Curriculum.
- Central to institutional sector, nutrition and health are rarely a direct consideration in commercial sector.
- Nutrition focus for commercial sector indirectly centres on catering to dietary intolerances and trends, and they seek inspiration.
- Taste number one priority across entire industry, irrespective of value on nutrition and health.
- Ensuring adequate protein is key challenge in vegetarian/vegan dishes.
- Current existing national nutrition standards are sub-standard in institutional sector.

Knowledge

Q: What is the current level of knowledge of food industry professionals regarding nutrition, health and culinary benefits of mushrooms?

Best known for culinary benefits, nutrition and health knowledge is lacking particularly for non-health and non-institutional food industry professionals

Overall, aside from dietitian KOLs, nutrition and health knowledge were lacking. Culinary benefits were one of the most common unprompted attributes that interviewees stated when asked what benefits mushrooms provided. Specifically, mushroom's umami taste and ability to deliver flavour, texture and to lift a dish, were well-known and appreciated.

Supportive of the qualitative findings, in the quantitative research more respondents readily identified culinary benefits than nutrition and health benefits (see **Figures 6-8**). Nearly two thirds (>60%) identified mushrooms as a vegetarian option, to have an umami taste, and to improve taste, particularly by non-health industry professionals (i.e., chef, cooks, catering managers).

Overall, food industry professionals reported awareness of some aspects of the nutritional benefits of mushrooms, with only 7% claiming they are not at all familiar (**Figure 5**). The majority (59%) of food industry professionals say they are familiar with nutrition and health benefits of mushrooms but can't specify, and they were more likely to be non-health industry professionals. Only around one third (34%) claim to be very familiar or can specify a benefit or have an academic knowledge and these are more likely to be health industry professionals.

Overall, when asked about specific nutrition and health benefits, more non-health industry professionals were likely to report that they do not know. Around half of respondents correctly identified fibre, cholesterol free, low calorie, and ability to reduce sodium in a meal, but only around one third knew that mushrooms contain b-vitamins, antioxidants and vitamin D. Less than 1 in 10 knew about the unique components ergosterol, ergothioneine, beta glucan. However, health-oriented food industry professionals were much more likely to identify the key and specific nutritional components including ergothioneine, ergosterol, vitamin D, and beta-glucans.

Overall, less respondents were able to identify specific health benefits with gut health the most identified by less than half of respondents. Health industry professionals were much more likely to identify mushroom's ability to increase vitamin D status.

In terms of confidence, non-health food industry professionals did not have a high degree of confidence in talking about nutrition, health and culinary benefits of mushrooms (**Figure 9**). Overall, dietitians were the most confident in their ability with management professionals the least (**Figure 10**).

Figure 5. Food service industry professionals' awareness of nutrition and health benefits

Q. How familiar are you with the key nutritional properties and health benefits of consuming mushrooms?

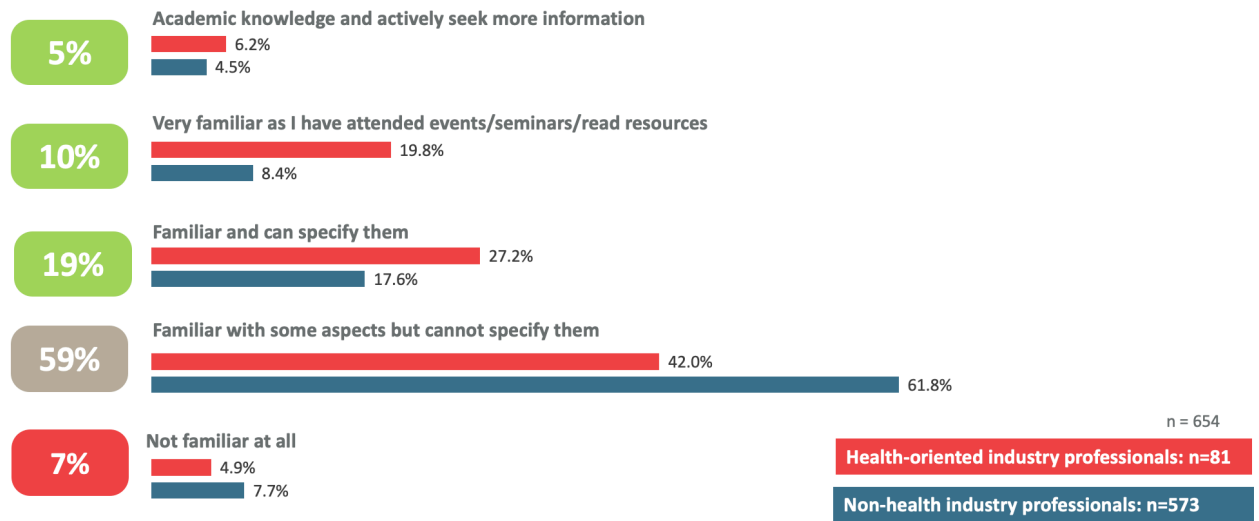


Figure 6. Food service industry professionals' knowledge key nutrition benefits mushrooms.

Q. In your opinion, what are the key nutritional properties of mushrooms?

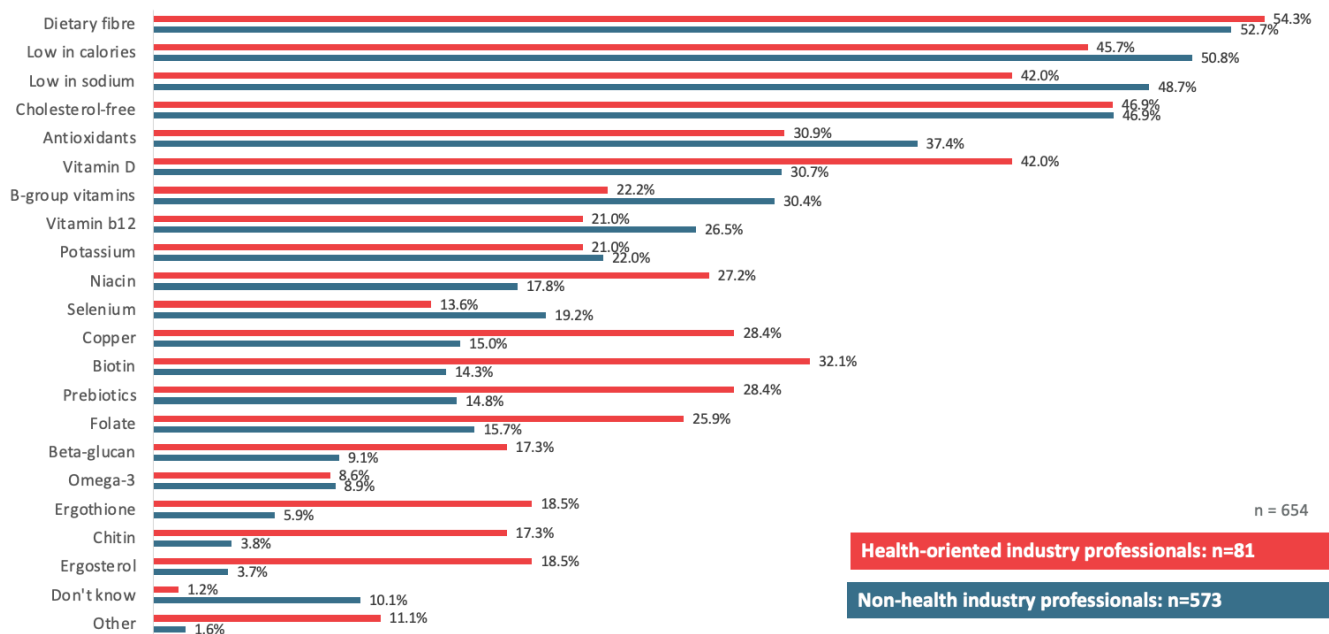


Figure 7. Food service industry professionals' knowledge key health benefits mushrooms.

Q. In your opinion, what are the key **health benefits** of mushrooms?

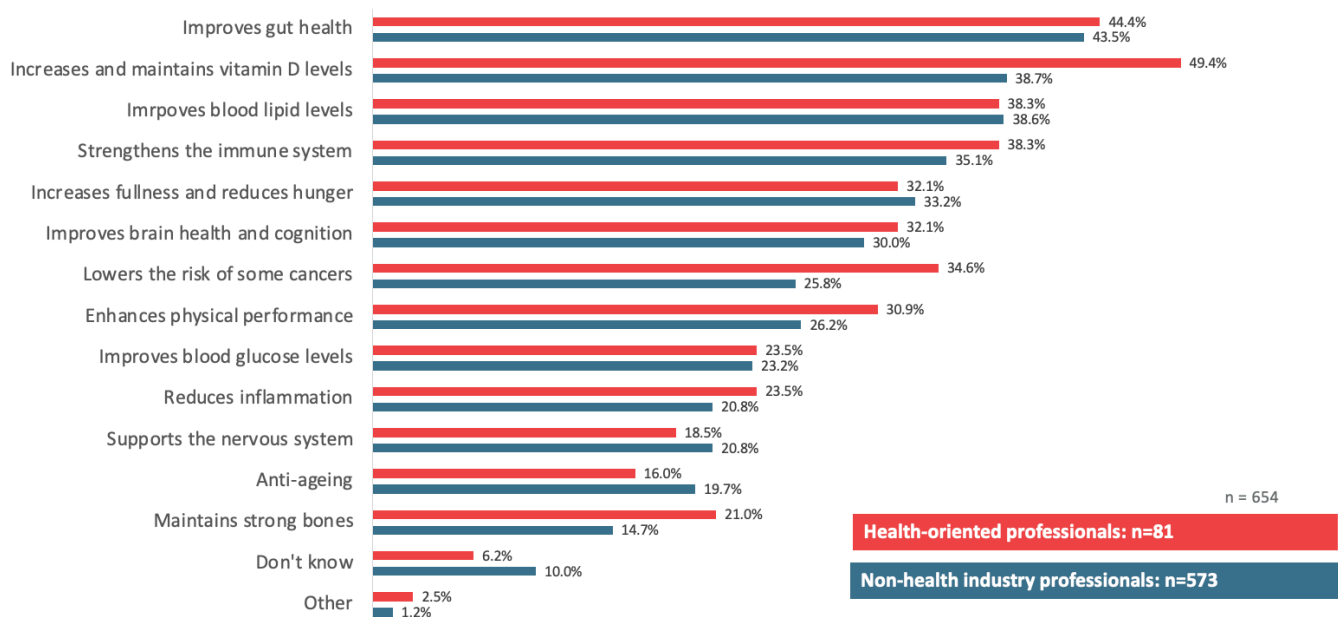


Figure 8. Food service industry professionals' knowledge key culinary benefits mushrooms.

Q. In your opinion, what are the key **culinary benefits** of mushrooms?

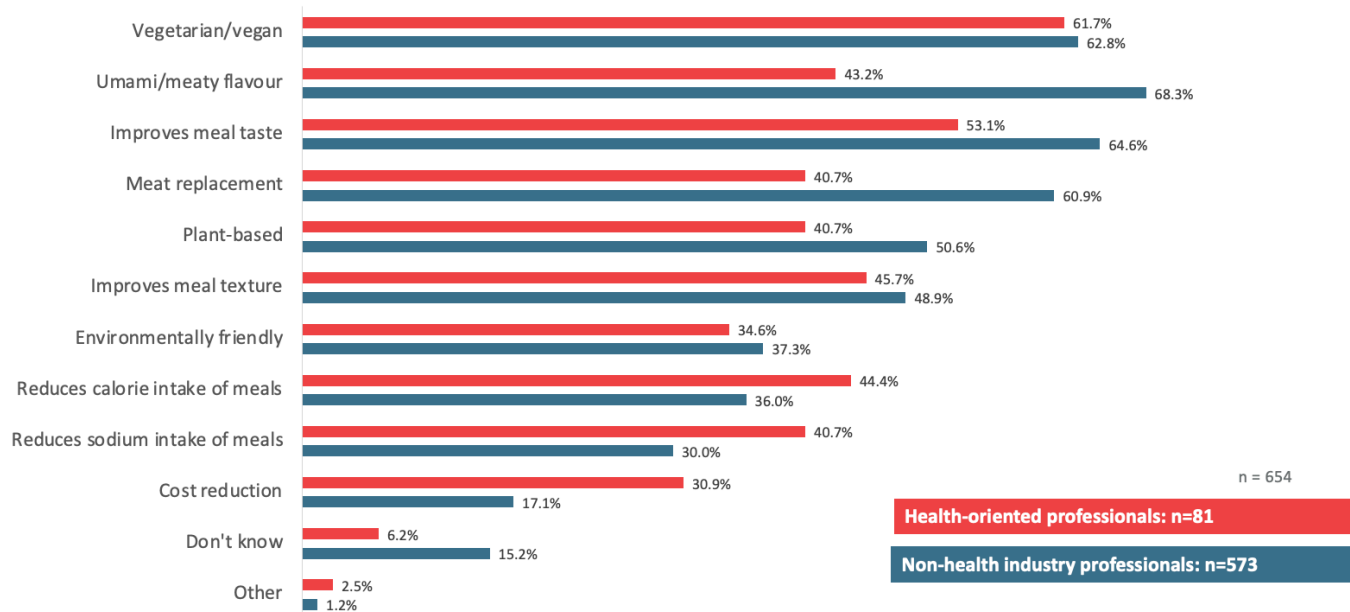


Figure 9. Food service industry professionals' confidence in talking about the benefits mushrooms.

Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in talking about the nutrition, health or culinary benefits of Australian mushrooms? (By industry)

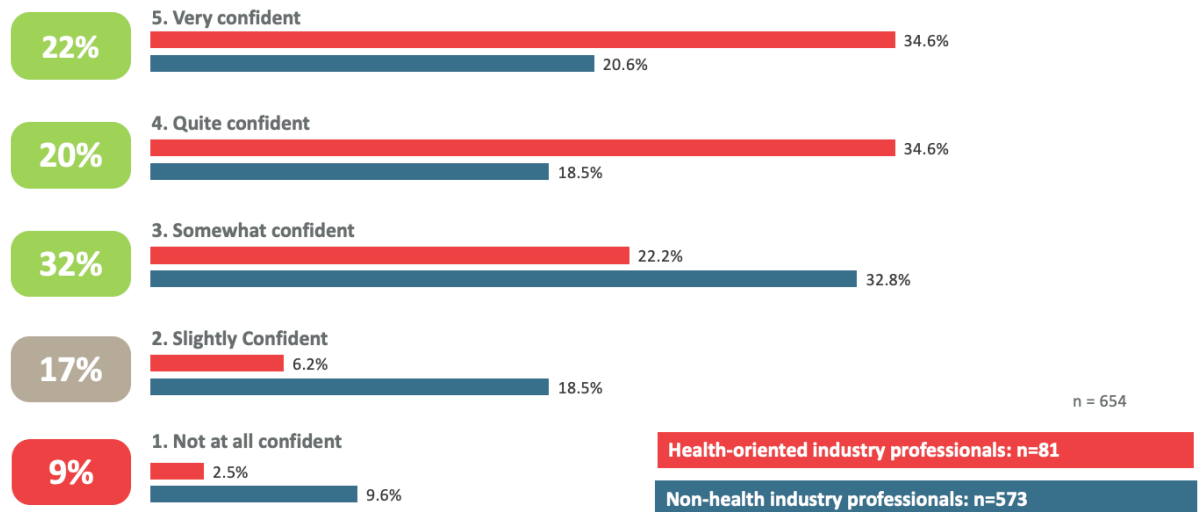
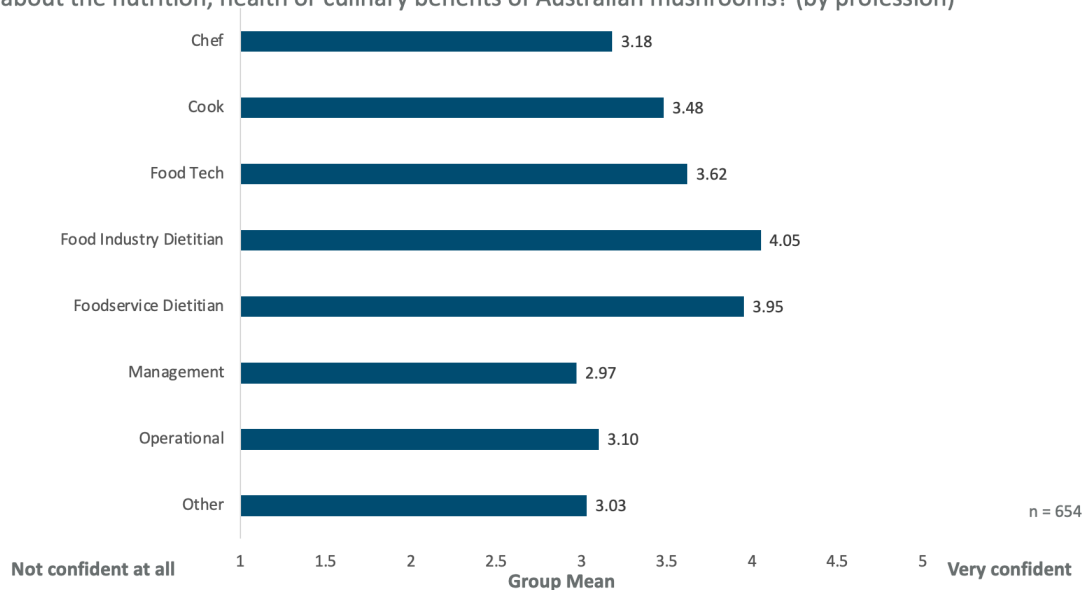


Figure 10. Confidence in talking about the benefits mushrooms by industry profession.

Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in talking about the nutrition, health or culinary benefits of Australian mushrooms? (by profession)



Common misconception that mushroom is a 'meat protein equivalent'

In the qualitative research, all KOLs valued mushrooms to be a key ingredient in a vegetarian dish, with many seeing it as a meat replacer. While the ability to substitute for meat from a texture and taste viewpoint was acknowledged, a common misconception by all non-dietitian industry professionals was that mushrooms are a good source of protein and/or iron, and effectively be a 'meat equivalent' and an appropriate protein substitute in a dish. There is nothing specifically taught around mushrooms nutrition and health benefits in the culinary curriculum, and it was also evident that the educators had a low knowledge on the nutrition and health benefits themselves.

"I can tell you what mushrooms tastes great and what goes with what but as far as nutritional information, I probably am quite lacking in it you know, besides knowing that, you know, mushrooms, meat for vegetarians, and it's something that's, you know, high in iron, I probably don't really know that much"

Mushrooms as a good source Vitamin D, surprised and delighted the most

In the qualitative research, 'sun or UV exposed mushrooms being a good source of vitamin D', was the fact that KOLs across the sectors were often both surprised by and excited to learn about. While dietitians and those working in the institutional sector were more likely to know the nutrition and health benefits of mushrooms, some of KOLs were still unaware that mushrooms are a natural, non-meat source of vitamin D. On learning about this benefit, they saw enormous benefit of leveraging this important nutrient, often a nutrient of concern in institutions (hospitals and aged care). The quantitative research showed 42% of health-oriented industry professionals identified vitamin D to be a key nutrient in mushrooms, compared to only 30% in non-health industry professionals. Regardless, the majority in both were not aware of this nutritional benefit.

Education around mushroom nutrition and health sparks motivation and interest

It was noteworthy that when educated during the qualitative interviews about mushrooms' unique nutrition, health and culinary proposition, that interest increased dramatically. Simple top of mind awareness around mushrooms, particularly discussion around nutrition and health benefits sparked interest and motivation for more knowledge and desire for further menu inclusion (pending education and inspiration on what types and how to use). There was legitimate interest in knowing more about the nutrition and health benefits of mushrooms.

As one interviewee stated, *"Mushrooms are already popular, but you could double the popularity once we are made more aware of it."*

"So, from a from a chef's point of view. Getting the facts to the chef I think would be a lot better. Because obviously, we know from a culinary point of view, we go for appearance and taste. We don't really look at the benefits for it. I mean, we still cook with lots of butter and fat and you name it, you know. So, I think informing the chefs and giving a rough guideline would be instrumental to be honest with you. Because what you've just said there, I knew probably 10-15% of what you've just said, which on the scale of things if you ask me after this interview, I would say, geez, I'm a genius now on mushrooms I think, (laugh)"

KNOWLEDGE INSIGHTS SUMMARY

- Best known for culinary benefits, nutrition and health knowledge lacking particularly for non-health industry professionals.
- Dietitians are the professional group most confident in their ability to talk about nutrition, health and culinary benefits of mushrooms with management the least.
- Common misconception with non-health professionals that mushrooms is 'meat protein equivalent'.
- Mushrooms being good source Vitamin D is the fact most surprised and delighted by.
- Education around nutrition and health benefits sparks motivation and interest.

Usage

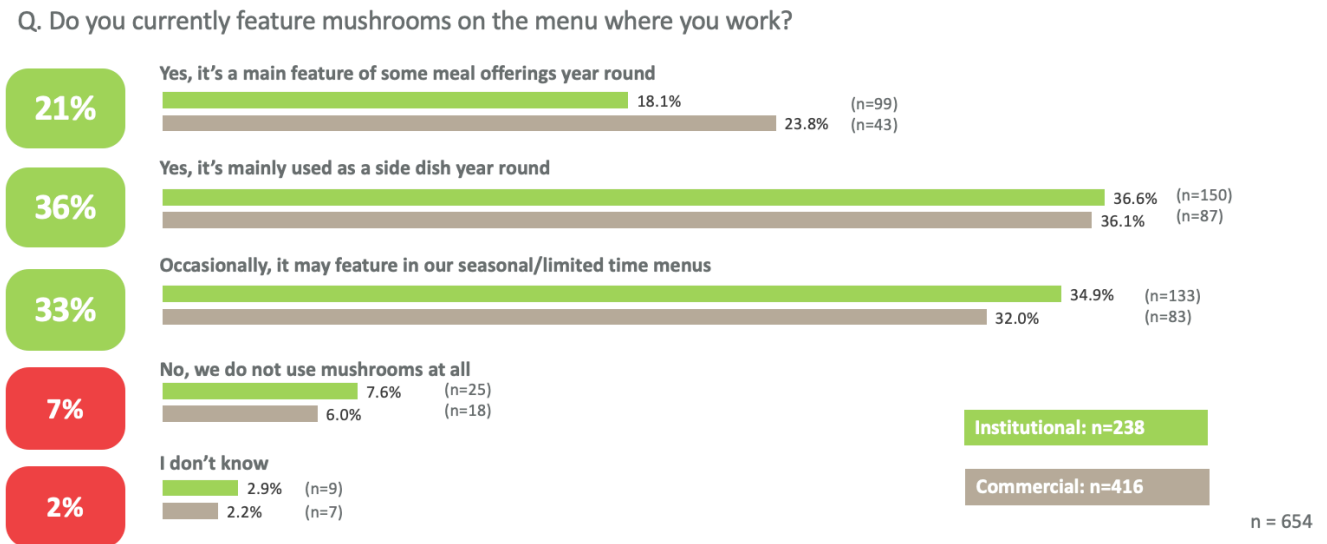
Q: How are mushrooms being used within catering organisations?

Highly versatile ingredient, used right across the menu

Quantitative research showed mushrooms are commonly used in food service organisations with only 7% reporting that they do not include it on their menus. Over half (57%) of respondents featured mushrooms on menus all year around, as either a side dish (36%), or as a main meal (21%) feature. A further 33% used mushrooms occasionally. Commercial sectors were slightly more likely to use mushrooms year around, whereas institutional sectors were slightly more likely to use mushrooms on a seasonal basis. (See **Figure 11**).

From the qualitative interviews, mushrooms were seen to be a versatile ingredient that that can be prepared in several ways and always guaranteed to provide an x-factor to a dish. Mushrooms were reported to be ‘always on the menu’ and used right across the menu as side dishes, as the hero or part of mains, share plates, soups, sauces, stocks and garnish; and prepared in many ways including sautéing, deep frying, pan frying, oven roasting, stir frying, pickling and garnish.

Figure 11. How mushrooms are predominantly used in food service organisations



Q: What are the drivers to usage?

Ability of mushrooms to add flavour to meals, and their versatility including use in plant-based options

The top three drivers for usage in the quantitative research were: i) to enhance flavour; ii) cater for vegetarian and plant-based options; and iii) improve nutrition. Their ability to reduce sodium rated the lowest with only 14% of respondents selecting this (See **Figure 12**). In line with the quantitative research, the main unprompted driver for mushroom usage from KOLs (qualitative research) was adding flavour. One KOL from the aged care institutional sector noted that mushroom extract is widely used by chefs in many of the meals to boost flavour. For some KOLs, also in line with the quantitative research, drivers to usage included mushroom’s ability to add texture to a meal and being viewed as a key ingredient in plant-based, flexitarian or vegetarian meals and menus. A common advantage voiced by the KOLs’ was its versatility.

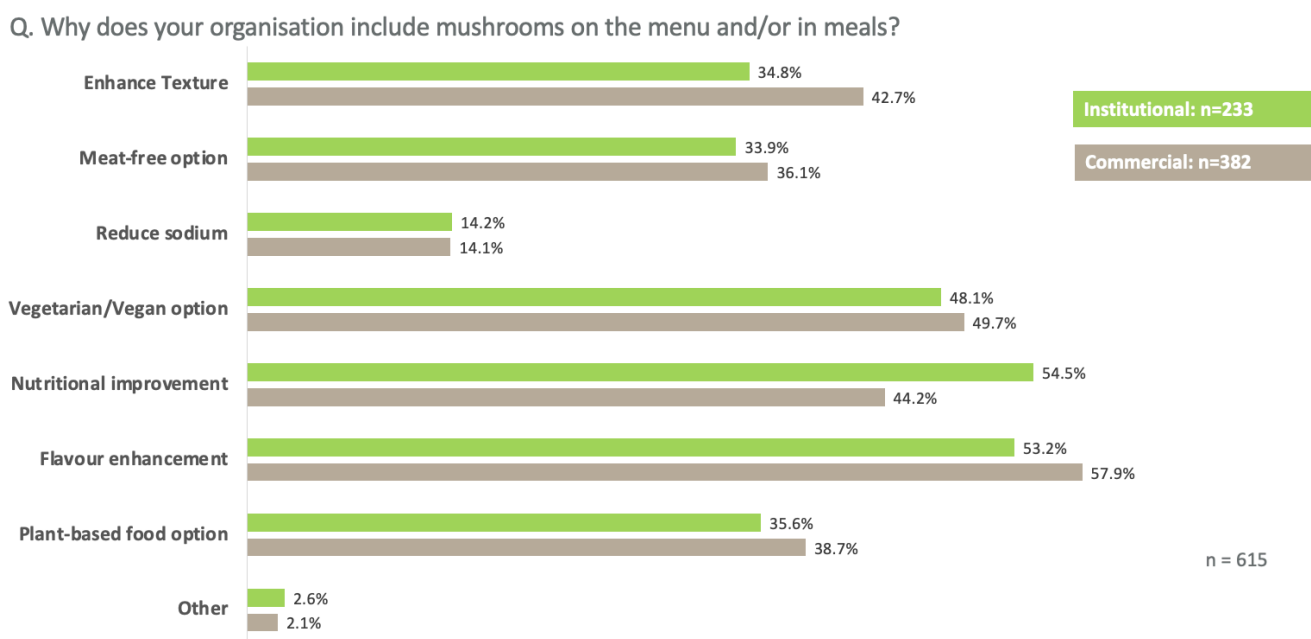
Institutional organisations are more likely to value mushrooms for their nutritional benefits, compared with commercial organisations, which value texture and flavour

Both qualitative and quantitative research supported those institutional organisations value mushrooms equally for their nutritional and flavour benefits, compared with commercial organisations, which placed more value on texture and flavour (see **Figure 12**).

Ability to reduce sodium, saturated fat in institutional organisations and the misconception of being a protein replacement for meat-free options in commercial organisations

In the institutional sector, many dietitian KOLs were aware that mushrooms can be used to lower saturated fat and sodium of meals while delivering a good meal texture and flavour when used to replace meat. For many in the commercial sector, it was frequently used as a protein replacement for meat, based on the misconception that mushrooms contain equivalent protein to meat.

Figure 12. Quantitative research findings for drivers of mushroom usage in food service organisations.



Q: What are the barriers to usage?

No major barriers to usage, with lack of awareness and inspiration the main limitations

In the quantitative research, almost half of respondents (44.3%) did not report any barriers to using mushrooms (See **Figure 13**). There were little unprompted barriers to usage from the KOL interviews, noting that the one limitation out of their control is customers wants and needs. Mushrooms can be polarising and there was acknowledgment that there is a small sub-segment of consumers who dislike or have an intolerance.

It was conceded from qualitative research, that mushrooms simply are not top of mind, nor a food they feel very connected to, hence they get forgotten about. One of the barriers noted by the commercial sector KOLs was that it was already on the menu in many ways, and they are short of ideas on how mushrooms can be further utilised and leveraged. It was reported that catering staff are often not that creative and not equipped to incorporate mushrooms past the basic usage. There was a definite appetite for inspiration on how mushrooms can be further utilised, including knowledge on varieties and uses beyond the basics.

In the quantitative research, for around 1 in 4 respondents, shelf life, cost and seasonal availability were raised as barriers. From a sector perspective, commercial organisations were more likely to raise shelf life, seasonal availability, and supply issues as barriers to using mushrooms. Institutional organisations raised both cost and food safety as barriers. Shelf life was echoed in the qualitative research with KOLs noting 'it goes brown too quickly'. Other barriers offered by KOLs included it being viewed as a winter ingredient.

Cost can be a barrier but can be seen positively when compared as a substitute for meat

Another important driver of meal and menu development across the sector raised in the qualitative research, particularly in the institutional sector, is cost. This is reflected in the quantitative research with nearly 1 in 3 in the institutional sector and just over 1 in 4 in the commercial sector highlighting cost as a barrier to usage.

Budget responsibility is usually the domain of catering staff, and it was reported that in the institutional sector food choices and/or nutrition delivery would be often compromised due to cost pressures. While cost also came up as a barrier in the qualitative research, it also was considered a driver for some KOLs. For some it was positively viewed as being a cheaper alternative to meat, hence able to be use as an expander or meat replacer in some dishes. In contrast, others saw mushrooms to be more expensive than other vegetables and that cheaper options could be found than mushrooms to use as 'expanders' or fillers.

Nutrition solutions need to incorporate a cost benefit story for cut through, particularly in the institutional sector

A key insight was that to get any traction for change within the institutional sector with nutrition, cost benefits needed to be woven into the benefit story. While the commercial sector organisations focused on delivering a return on investment, the dynamics of a more competitive sector allows

food choices, customer experience and even nutrition offering an opportunity to provide value-adds that allows for differentiation.

Lack of protein and low-calorie content can be a limitation for the institutional sector

The institutional sector and meal delivery services need to achieve nutrition targets for their customers, and protein is often a nutrient that is a challenge to meet. Given mushrooms are not a source of protein and are low in calories, this becomes a barrier for this sector as there is often a need to provide high energy/high protein diets to their clientele. Lack of knowledge of catering staff around the nutrition credentials of mushrooms was seen by some institutional dietitian KOLs as a limitation to usage.

For specific sub-sectors food safety constraints and poor performance when thawed from frozen were raised

There were a couple of barriers voiced specific to sub-sectors. In the manufacturing sector (pre-prepared meal delivery service), one manufacturer selling chilled raw ingredients for clientele to prepare their own breakfast, raised a constraint of using (raw) mushrooms. In addition, many of their meals are frozen, and mushrooms do not perform very well with texture changes when thawed.

Figure 13. Quantitative research findings on barriers of mushroom usage in food service organisations.

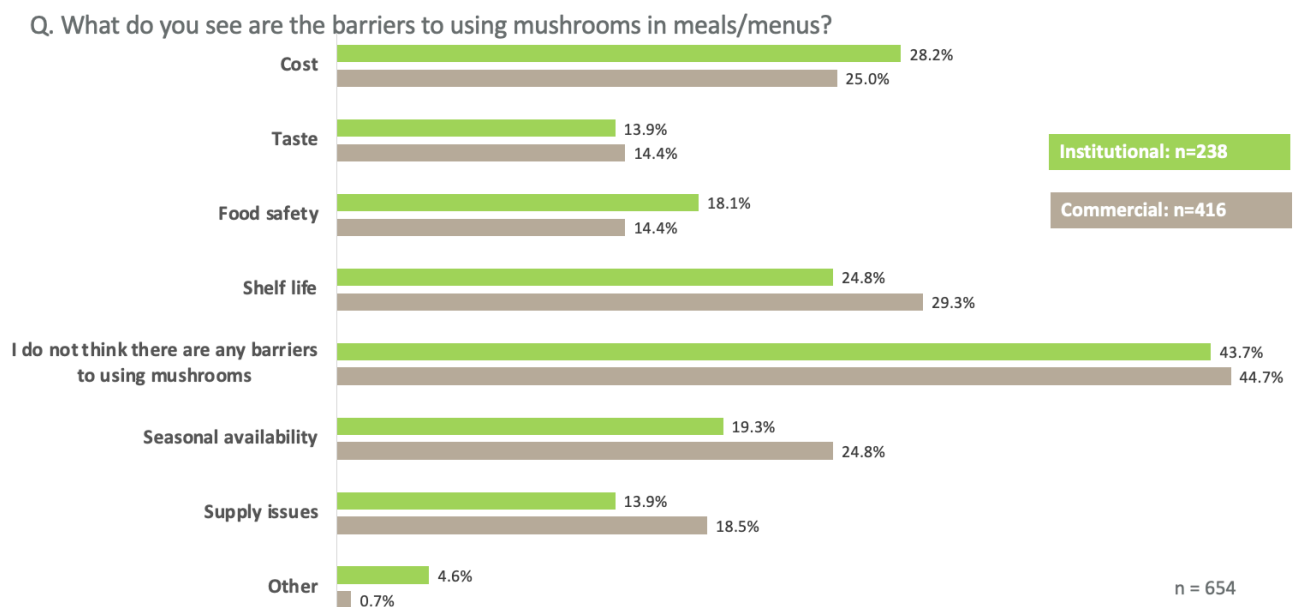


Table 15. Summary of usage drivers and barriers for organisations

TERRITORY	INSTITUTIONAL SECTOR	COMMERCIAL SECTOR
Drivers mushroom usage	<ul style="list-style-type: none"> • Flavour • Use flexitarian/vegetarian/plant-based diet • Versatility 	
	<ul style="list-style-type: none"> • Reduce saturated fat and sodium 	<ul style="list-style-type: none"> • Meat protein (& iron) replacer (misconception) • Texture
Barriers mushroom usage	<ul style="list-style-type: none"> • Nil • Not top of mind • Customer preference • Freshness/Shelf life • Food safety – can't use raw mushrooms. • Cost 	
	<ul style="list-style-type: none"> • Lack of knowledge on nutrition/health benefits by decision maker (chef) • Low in protein and calories when needing high protein and calories for aged care 	<ul style="list-style-type: none"> • Lack of connection with where it comes from • Lack ideas/inspiration • Winter food

USAGE INSIGHTS SUMMARY

- Considered a highly versatile ingredient and used right across the menu.
- Key drivers of usage are its ability to add flavour to meals and be leveraged in plant-based meal offerings.
- Institutional organisations are more likely to value mushrooms for their nutritional benefits, compared with commercial organisations, which value texture and flavour.
- Ability to reduce sodium, saturated fat for institutional and misconception to be protein replacement for meat for commercial are also important sector drivers.
- No major barriers to usage, with shelf life, lack of top-of-mind awareness and inspiration the main limitations.
- Cost can be a barrier but can be seen positively when mushrooms are used as a substitute for meat.
- Nutrition solutions need to incorporate a cost benefit story for cut through, particularly in institutional sector.
- Lack of protein and low-calorie content mushrooms can be a limitation for the institutional sector
- For specific sub-sectors, food safety constraints and poor performance when thawed from frozen were raised.

Culinary education

How do mushrooms feature within the curriculum?

Mushrooms are considered a vegetable and are currently not formally included within the national commercial cookery curriculum

Mushrooms are currently not explicitly included in the national commercial cookery curriculum. It was noted by the culinary education KOLs that there is no reference to mushrooms being in their own biological kingdom, Fungi. Like in the Australian Dietary Guidelines, mushrooms are currently viewed as a vegetable and one of the many vegetables that could be chosen by the educators in practical application.

One of the culinary educators advised that there are three key places where mushrooms could be included. This would be within the follow three units:

1. SITHCCC030 - *Prepare vegetable, fruit, eggs and farinaceous dishes*,
<https://training.gov.au/Training/Details/SITHCCC030>
2. SITHCCC031 - *Prepare vegetarian and vegan dishes*,
<https://training.gov.au/Training/Details/SITHCCC031> or
3. SITHCCC044 - *Prepare specialised food items*
<https://training.gov.au/Training/Details/SITHCCC044>

The educator noted that it was disappointing that while mushrooms maybe not specifically highlighted in the core vegetable and vegetarian/vegan units, it is not even a focus in SITHCCCO44 *Specialised food items*, that has contemporary ingredients such as heirloom vegetables, native ingredients and artisan cheeses.

The national commercial cookery curriculum is developed and managed by a government -funded and outsourced agency, Skills Australia

The curriculum for commercial cookery is outsourced by the Australian government to a private education delivery partner, which is responsible for developing and managing the training packages for all the registered training organisations (RTOs), that includes of TAFE and private colleges. This current agency is Skills Australia.

RTOs have freedom to teach

The government appointed agency Skills Australia develops the course outline, including performance criteria and assessment requirements that the RTO needs to follow. Each RTO then has the freedom to deliver the course how they like. Each RTO can develop their own materials and/or utilise third party content. The LEARNING VAULT digital education company was often mentioned by KOLs due to the high quality and ease of use of their materials. The RTOs are required to show evidence on auditing that they comply with the national curriculum performance criteria and assessment criteria. They are allowed to teach something additional outside of the curriculum if they can show there is an industry need.

Mushrooms are part of the curriculum

The culinary educator KOLs noted that in practice, mushrooms used throughout the course as an ingredient in the preparation of a range of dishes from classical dishes to desserts, due to their versatility, whilst not specifically directed to be taught in the national curriculum as a food group on their own, one of the culinary educators KOL working at a TAFE, has students go out on mushroom foraging twice/year.

CULINARY EDUCATION INSIGHTS SUMMARY

- Mushrooms are considered a vegetable and are not part of the national culinary education curriculum, that is developed and managed by government outsourced agency, currently Skills Australia.
- While registered training organisations (RTOs) for commercial cookery need to show evidence of achieving performance criteria and assessment guidelines, they are free to teach the curriculum how they wish.
- RTOs often develop their own education materials and many value and utilise the materials produced by leading digital education training company, The Learning Vault.
- In practice, while not formally specified in curriculum, mushrooms are an ingredient often chosen to teach various units and different preparation styles due to its versatility.

Opportunities

Q: What opportunities and/or considerations are there around including mushrooms within food service sector?

Overall, plant-based, vegetarian and flexitarian diets are key opportunities for mushrooms

Across the industry it was acknowledged that mushrooms are a go to ingredient in its ability to cater to flexitarian/vegetarian diets that becoming popular. It was acknowledged that a greater opportunity exists in the commercial sector for flexitarian food offerings, which are marked by the need for more vegetables, rather than just the exclusion of meat. Practical inspiration on mushroom varieties and their uses, recipes for incorporating mushrooms in meals already on the menu to boost flavour and nutrition and using them as the hero or part of vegetarian meal offering were seen as key.

Opportunity to lead with inspiring mushroom recipes to achieve adequate protein, particularly in plant-based diets

Offers real opportunity to help solve an issue recognised and reported by the institutional sector. It was noted by aged care interviewee that combining mushrooms with nuts may offer opportunity to provide adequate protein while leveraging mushroom's benefits (nutritional, flavour and texture) in plant-based meals, noting that the biggest allergy seen is seafood/shellfish rather than nuts. An important consideration with leveraging mushrooms in the plant-based dietary pattern trend is also correcting the misconception that it is a protein source and using the opportunity to educate on the many unique value proposition it offers.

'The Blend' offers potential nutrition and cost saving benefits

Meals that blended mushrooms with minced meat such as mushroom bolognese, sparked interest for additional cost savings. An important consideration here was about leveraging the taste and textural advantages of mushrooms over other vegetables as some chefs saw this as an 'expander' opportunity for a meal, and in this context, other vegetables could be considered cheaper.

For the institutional sector where nutrition is important, reducing meat intake and replacing with mushrooms offer additional benefits of reducing sodium content and saturated fat without loss of taste.

Pre-prepped options were attractive to catering organisations

Several interviewees acknowledged that they utilise pre- or semi-prepared ingredients. One manufacturer who produced ready to eat nutritious meals, including for a residential aged care home delivery service, highlighted that there was an opportunity for pre-prepared (Chopped, chilled) mushrooms that overcome food safety issues of using them raw. They noted it would need to be cost effective including availability in smaller minimum order quantities.

Nutrition, health and cost benefits hold high appeal for the institutional sector, and tapping into 'Food as Medicine' offers potential for education and greater menu inclusion mushrooms

For the institutional sector, particularly aged care, where nutrition and health are a high priority, and there is a need to meet certain nutrition KPIs, the nutrition and health benefits of mushrooms hold

high appeal. The vitamin D content was seen as important and relevant since the institutionalised clientele is at higher risk of vitamin D deficiency and need further foods to support the immune system.

To achieve greater cut through and uptake, linking with cost benefits will be vital. There is an opportunity around a 'Food as medicine' story for mushrooms in aged care, where supplement usage and pressures on food costs are significant. One dietitian KOL in aged care saw a huge 'Food as medicine' opportunity. She noted that supplement usage in the institutional setting is not only high but costly. Food is often forgotten as a strategy to improve health and mushrooms offers a range of tangible and measurable benefits. She saw the opportunity to position mushrooms as a food on the menu that would have multiple benefits including improving total intake through boosting taste of meals, increasing vitamin D status of the patient, leading to better nutrition and health status and cost savings for the organisation via decreased food wastage (as more food is eaten via improved taste and texture), less need to use expensive supplements, and potentially less illness via improved health.

Tap into mushrooms' provenance story as a relevant avenue to connect with nutrition & health in the commercial sector

While nutrition and health intrinsically were not seen to be a primary opportunity, a few chef KOLs saw high appeal in information on provenance; connecting the journey of the food to the chef/consumer, where it comes from, and the 'farm to fork' story. This story telling is often used as part of their 'value-add' and experience they deliver to clientele with other ingredients (such as meat, fish, etc.). They voiced that there was a sense of lack of connection to mushrooms, unlike what has been created for other produce like meat, seafood, grapes and so on.

"If, for example, you were to do from a culinary point of view, do a vegetarian degustation and it's around the mushrooms and you can incorporate a bit of a spiel on the mushrooms. And for example, you could I mean I wouldn't have a clue; I'm not being disrespectful, I actually wouldn't have a clue where my mushrooms are come from. But with the focus on beef for example. We say this beef is from Riverina, it's grain fed, and you can trace each animal, you know what I mean? And for the seafood, this is from the Hawkesbury, this is from Dow. And my mushrooms come in I would not have a clue about them."

Provenance, reflecting the sentiment that people want "something from 'somewhere', more than they want something from 'anywhere'" is a key nutrition, health and wellness trend that Mellentin (13) reports from the pandemic and supply issues that continues to strengthen. It is also a concept that ladders to nutrition/health. The Mellentin (13) reports that provenance is closely linked with sustainability in consumers' minds, and with "real food". The link to where the food comes from and growing conditions makes people feel like what they are eating is better for them and has an element of 'quality', an important driver for the commercial sector. Having a provenance story makes it easy to connect with people, and creates an opportunity to educate the foodservice industry about the nutrition and health benefits of mushrooms.

Provide commercial sector and chefs specifically, with mushroom inspiration

The commercial sector KOLs overwhelmingly stated that creativity and inspiration were key to influencing and educating the sector. The chef KOLs had a genuine love for mushrooms but conceded that they did not have the knowledge, motivation nor inspiration. They greatly desired to know more about the different types of mushrooms and be inspired with ideas on how to use them and understand their versatility and applications. Simply, what mushroom use and how to use it.

“I feel that mushrooms are underrated and often overlooked due to uncertainty around the correct preparation and handling: perhaps a ‘quick’ simple campaign similar to the banana ones may help more people incorporate mushrooms into more meals.”

For the institutional setting, inspiration was wanted on how to boost flavour and nutrition. A specific opportunity provided through the qualitative research, included recipe inspiration for mushroom based nutritious soups. The aged care demographic often seeks a lighter meal at night and soup is a popular choice. A key issue is that offerings are nutritionally replete and they complain about their diminishing taste that negatively impacts their food intake. There is an opportunity to add mushrooms to base recipes along with suitable higher-protein-based ingredients like nuts, to deliver good nutrition as well as the flavour and taste that aged care residents desperately desire.

An important consideration will be ensuring that the information is delivered for all mushroom varieties and species, with a focus on *Agaricus bisporous* to ensure project needs are met.

Spark interest and motivation and educate the commercial sector via nutrition fun facts

For the commercial sector, nutrition and health messages alone hold no direct appeal to increasing usage, but it was evident that providing education around fun facts on nutrition and health rouses interest and engagement, making it more top of mind, and more likely to educate, and ultimately drive motivation to incorporate more mushrooms on the menus.

Table 16. Opportunities and considerations for catering organisations

	INSTITUTIONAL SECTOR	COMMERCIAL SECTOR
Opportunities	<ul style="list-style-type: none"> • Recipe inspiration: ‘The blend’ – Tapping into plant-based trends, blending mushrooms with minced meat to improve nutrition and save money. • Product innovation: Getting suppliers to make ready-made options – a lot of food is bought pre-prepped e.g., rissoles, meatballs - mushrooms can be incorporated into these to offer time savings and boost nutritional content of dishes. • Inspiring education: Inspire chefs’ creativity and bring mushrooms top of mind by using engaging education on what are different mushroom varieties are and how to use them (versatile applications), while supporting with engaging nutrition and health facts. <hr/> <ul style="list-style-type: none"> • Provide a cost-benefit analysis of using mushrooms as ‘food as medicine’ instead of supplements. Improved nutritional status and potential improvement in health outcomes; improved vitamin D status, improved immunity, less sickness. • Recipe inspiration using mushrooms to: <ul style="list-style-type: none"> ○ achieve adequate protein in plant-based diets. ○ improve taste of meals and therefore increase nutrition intake. ○ boost nutritional content of meals; greater vitamin D, lower sodium and saturated fat ○ develop ‘aged care’ nutrition soups 	<ul style="list-style-type: none"> • Tap into the local provenance story for mushrooms as avenue to ladder to nutrition/health.
Considerations	<ul style="list-style-type: none"> • Provide solutions in relevant settings to achieving high energy/protein diets while still incorporating mushrooms. 	<ul style="list-style-type: none"> • Correct misconception that mushrooms are a protein source, while maintaining its use within vegetarian/flexitarian meal/menu offerings. • Need to cover exotic mushrooms as this is what the industry also wants to know, while keeping focus on Australian mushrooms.

Q: What opportunities and/or considerations are there around including mushrooms within the culinary curriculum?

The culinary educators interviewed all saw merit in including mushrooms within the culinary curriculum in a more focused and grassroots way, and reported that there are several ways to get greater traction of this well-regarded ingredient within culinary education:

1. Request an update/change to the current national curriculum to have mushrooms acknowledged as a separate food group to vegetables.

One of the educators believed that a more direct way to get mushrooms a greater focus in the curriculum would be to advocate for a review to the national curriculum to have mushrooms separated out from vegetables and have it as its own food grouping in the two relevant modules: SITHCCC030 - Prepare vegetable, fruit, eggs and farinaceous dishes; and SITHCCC031 - Prepare vegetarian and vegan dishes. It was acknowledged that this would be a longer route but had good chance success.

The process would involve contacting the appointed agency and providing a rationale for the change (currently by Skills Australia but noted that a new tender period submission process is underway to take effect from January 2023, with the successful delivery provider to be announced in July/August 2022.)

2. Contact individual TAFE or RTO and work to develop materials that can be used to support the newly included unit SITHCCC031 - Prepare vegetarian and vegan dishes

The commercial cookery curriculum gets reviewed every five years, with the latest review recently completed at the end of 2021. In the review process, industry consultation is undertaken for nomination for any updates/changes. In the last review, industry advocated for compulsory inclusion of a Vegan/Vegetarian module into the curriculum. This was endorsed and signed off in 2021 and will come into effect in the second half 2022. RTOs can use any material they want to teach this course and many welcome supports in developing dynamic course content. Mushrooms were seen to fit well within this unit and a TAFE educator KOL was keen to partner with the project to utilise mushroom materials in their practical teaching of the course.

3. Incorporate mushrooms into modules on 'The Learning Vault'

The Learning Vault is a digital education company that is currently used by TAFE and private RTOs to support students' culinary education. It was suggested that working to develop modules on mushrooms to support stand-alone courses and/or content that could support RTOs in the current delivery of Vegetarian/Vegan unit would be welcomed and timely. Learning Vault is developing content for its course and mushrooms could be leveraged as key hero ingredient.

FOOD SERVICE INDUSTRY OPPORTUNITIES INSIGHTS SUMMARY

Catering organisations

- Overall, plant-based, flexitarian and vegetarian diets are key to tap into with opportunity to lead with inspiring mushroom recipes that achieve adequate protein in plant-based diets.
- 'The blend' offers nutrition and cost saving potential benefits attractive to both commercial and institutional settings.
- Tapping into 'Food as Medicine' approach instead of using supplements offers opportunity in institutional sector to educate and foster greater uptake of mushrooms. Taste benefits, vitamin D and other nutrients can offer potential of improved food intake and nutrition/health status, and subsequently less food waste, less supplements and therefore cost savings.
- Tapping into mushrooms provenance story has opportunity as a relevant avenue to connect with nutrition in commercial sector.
- Inspiring chefs' creativity to bring mushrooms top of mind and use mushrooms more by engaging education on what are different mushroom types and how to use them (versatile applications), while supporting with fun nutrition and health facts.

Culinary education

- Develop proposal and request update/change of the current national curriculum to have mushrooms acknowledged as a separate food group to vegetables.
- Individual TAFE or RTO can be contacted to develop materials that can be used to support the newly included unit SITHCCC031 - Prepare vegetarian and vegan dishes.
- 'The Learning Vault' is currently developing materials to support SITHCCC031 and offers a way to also reach RTOs with content.

Communication

Q: What are most effective ways to reach organisations and industry professionals with mushroom centred nutrition & health education?

Table 17 summarises the ideas from KOLs in the qualitative research. Key insights are discussed below.

Keep it simple and inspire on the job rather than ‘educate’

The consistent insight that came through from all KOLs is that education and communication of industry professionals needs to be easy to understand and quick. It needs to be practical, visual, tactile, and simple. It is best received if it is undertaken within the work environment, ‘on the job’ and meeting them where they are, such as through their digital media channels, rather than trying to push them to attend an external workshop or seminar. Food industry professionals are time poor, hence undertaking any offsite training programs or certification programs were seen as lower priority.

“It needs to be done in such a way that individuals can feel and do it.”

With respect to getting uptake of messages a KOL working within the culinary education field highlighted that for food industry professionals, the key is not making people feel like they are being educated or taught. They respond best when the communication is inspiring and shows them how they can do something, rather than just providing information. Tapping into creativity and inspiration is key for this group.

“We never call it training or professional development as people do not like being told what to do or be ‘taught’.”

Digital works best, but in-kitchen posters are valuable

While there was a distinct preference for digital informational, something tangible they could refer to in the kitchen was also seen to be valuable. A smart approach by several interviewees was to provide information on posters that can be placed on walls within working kitchens and used as a reference guide/educational poster. The Meat and Livestock Association posters for beef that educates on different meat cuts were often described as examples. A few KOLs suggested the incorporation of QR codes on the poster that allows for further access to engaging digital educational resources such as video, infographics and fun facts. This was seen as a more effective way to gain the attention and engagement of the increasingly digital savvy food industry workforce for mushroom messages and to allow for ‘on the job’ training and education. Along these lines, targeting dissemination of communication messages via social media was also seen as important. Leveraging a mushroom ambassador and influencer via social media was also suggested.

Table 17. KOL’s suggestions to best reach food industry professionals with communication.

Communication channels to reach food industry professionals
Posters with QR codes directing to dedicated digital web information
QR code on mushroom boxes
Leaflet that comes with mushroom delivery
Digital web information – engaging messaging and visuals, downloadable short videos, infographics, recipes that are ‘instagramable’, screen saver for the computer
‘Train the trainer’- Educational session with visual takeaways for Executive chefs to take back to organisations to train their team tapping into: <ul style="list-style-type: none"> - Executive Chef Club (https://executivechefsclub.com) - Internal organisational chef meetings in larger organisations with multiple sites - Food Frontiers - Accredited course by the Australian Culinary Federation
Or via: <ul style="list-style-type: none"> - Conducting dedicated mushroom masterclasses - Creating specific mushroom events e.g., mushroom festival or mushroom themed degustation menu - Suppliers
Social media targeted advertising with incentives to share
National conferences e.g., Fine Food Australia, Institute for Hospitality in Healthcare (IHHC)
Utilise a Mushroom Ambassador (Chef)
Magazines e.g., Hospitality Magazine, Dietitians Connection newsletter

‘Train the trainer’ as a high quantum of influence strategy

Another common suggestion given by most of the chef KOLs was around on-site training and leveraging ‘train the trainer’ approaches e.g., training the Executive Chef who would then take the messages and visual takeaways back to their organisation and train their wider team ‘on the job’. While leaflets and videos and other resources have merit, the experience by KOL’s is that being hands on with staff, getting in and doing it with them is where there is greater traction of messages and education. While training all staff is not feasible, targeting the on-the-job training that organically happens in the kitchen, from Executive Chef to junior staff has a huge potential. This idea was echoed by many of the KOLs and positive feedback given by others who were asked their opinion on the idea if not suggested by them. Training Executive Chefs to train the team was seen as an effective way to target the junior staff and get important ‘buy in’, while also providing Executive Chefs with the knowledge and inspiration they desire to fulfil their teaching role in the kitchen. As primarily the decision makers in the kitchen, if you can inspire them, it will flow onto the organisation.

Suggestions of how Executive Chefs could be targeted included: conducting dedicated masterclasses, creating specific mushroom themed events such as a mushroom festival or mushroom themed

degustation menu, tapping into internal Executive Chef organisational meetings for catering organisations with multiple sites, or externally via the Executive Chefs Club. The Executive Chefs Club (<https://executivechefsclub.com>) is an informal association of Executive Chefs designed for interactive meetings with purveyors and producers, or through suppliers. Most catering organisations are visited by suppliers who regularly hold educational sessions on their products with the Executive Chefs passing this information onto their junior team members. Educating suppliers to take the message out to the individual organisations was also identified by a number of KOLs as a potentially efficient and effective way of educating catering organisations more broadly.

As one executive chef said, "I think that training is invaluable. I love that. So I love to learn stuff, you know, and I love to pass that knowledge on to my team, whether it be just me standing next to them saying Oh, listen, this is really good, has got this, it's that... I do think you need to focus on the people that purchase the mushrooms and write the menus like me... I would probably sit down and learn from you guys and be educated by you guys. And then the fact sheets that you give me I can then pass on and be the tutor and educate my team rather than have this forum where you've got executive chefs and apprentices, armies and you go there. And I do think is important that they know. But I think it's important that the people at the top that make the decisions that design the menus, do the costings, accept the product, that we know first what's going on. And then we can pass that information down the line."

Consider the target audience

An insight from one dietitian KOL working in the institutional sector noted that it is key to communicate and educate chefs and catering staff more than dietitians, as they are the ones who ultimately have the cut through and will get changes taken up. Dietitians are the supporters but not often the decision makers in the organisation. Existing suppliers and supply chain are also important to influence as they educate the decision makers and purchasers of products and ingredients in organisations.

Q: What nutrition & health messages around mushrooms will best get attention of food service professionals?

Leading with culinary benefits is key

For the institutional sector, nutrition is intimately linked to cost. Cost is the number one key driver of decision making. The institutional sector needs to meet certain nutrition standards, but cost will often prevail. In the commercial sector, while cost is a definite driver, delivery of quality and taste and support for inspiration are important considerations. Ultimately, chefs are interested in the practical aspects of food, how to get it to the customer, with flavour and performance their key aim and focus. Overall, the clear insight within the food service industry was that the key to education on nutrition and health is to lead with the culinary benefits and how wonderful mushrooms are for texture and flavour enhancement.

Communication messaging should be targeted to the intended audience and based on their needs and drivers

Aligning with the different value placed on nutrition and health within the institutional and commercial industry sectors, KOLs identified opportunities for key messaging for mushrooms that would gain traction. It was clear that in the commercial sector nutrition and health fun facts that centred on inspiration for usage and application, and that tapped into the provenance story (farm to fork) offers the best opportunity to gain greater traction in this sector.

Whilst in the institutional sector, leading with potential cost benefits with underpinning nutritional benefits offered the greatest opportunity. Specifically positioning a ‘Food as Medicine’ approach – mushrooms providing flavour and texture and providing a whole food supplement approach to increase food intake, nutrition and status with lower food wastage was key.

Table 18. Key messages per sector.

MESSAGE	INSTITUTIONAL	COMMERCIAL
Common	Taste/flavour/texture enhancer = greater food intake (hence better nutrition with less food waste) Plant-base food trends – vegetarian/vegan, flexitarian – meat and mince mushroom blends	
Specific Lead Story	Food as medicine: Flavour enhancing whole food fortification Synergy of nutrients and bioactives; less cost to supplements, enhances food intake and nutrition & health benefit/s.	Versatile flavour enhancer that is good for you - What mushroom to use, how to use them, underpinned by nutrition and health fun facts. - Tied to a provenance story.
Support	<ul style="list-style-type: none"> - Vitamin D intake/status - Immunity - Gut health - Blood glucose control - Improve recipes: lower sodium and saturated fat, added nutrients 	<ul style="list-style-type: none"> - Different varieties - Inspiring application and versatility - Details on where the mushrooms were grown, soil conditions - Sustainability

COMMUNICATION INSIGHTS SUMMARY

How

- Keep it simple, inspire rather than educate. It needs to be practical, visual, tactile and easy to understand.
- Provide something tangible that can be utilised in the kitchen. Posters in the kitchen with QR code taps into achieving the need to be top of mind in a practical way but also tap into an increasingly digitally savvy workforce.
- A digital go to hub for information and resources is ideal.
- ‘Train the trainer’ has potential as high quantum of influence strategy that taps into the underlying driving need of this industry to be practical and put knowledge into action.
 - Masterclasses and educational events for executive chefs to take back to the kitchen.
 - Opportunity to educate suppliers who are already in the supply chain to go on to educate the organisations.

What

- Communication messaging should be targeted to the intended audience and their needs/drivers thus should be different for institutional versus commercial audiences.
- Irrespective of sector, leading with culinary benefits is key.
- Taste/flavour/texture enhancer = greater food intake (hence better nutrition less food waste) is the common ground for both sectors, along with connecting with plant-based food trends.
- The lead story for institutional sector = Flavour enhancing whole food fortification that can save money – improved nutrient intake, higher vitamin D status and immune support benefits. Potential benefits less food waste, less need supplements.
- The lead story for commercial sector = Local versatile flavour enhancer that is good for you and your customers – what mushrooms to use, how to use, underpinned by fun nutrition facts.

Mushroom case study interventions

The KOLs in the qualitative research were passionate industry professionals and were extremely interested and excited to learn about mushrooms' nutrition, culinary and health benefits. Moreover, they were all keen to be involved in potential case study interventions as part of the project.

Recommendations

Recommended next steps have been provided, based on the research findings:

Develop educational resources and an online dedicated food service 'Mushroom Academy' hub

Central to the project is developing a digital hub that serves to inspire and educate, providing easy and ready digital access to educational information and resources. This website should be the main call to action to any communication activity. It should aim to include sections on a 'farm-to-fork' connection, masterclass educational videos and brochures, and mushroom inspiration.

It was evident that printed brochures and resources are of limited value, except for posters which could be hung in food service kitchens and leaflets that are provided with mushroom boxes. Digital resources such as fact sheets and masterclass videos could be housed on the site. The key messages for these resources should centre around mushroom 'what and how' with engaging nutrition and health facts, and recipe inspiration all interwoven.

Based on the research the below resources are recommended:

- 1 x Poster outlining different types/varieties of mushrooms and nutrition facts with QR code (that sends to 'Mushrooms Academy').
- 3 x fact sheets (digital); Different varieties & growing, Culinary benefits & how to prepare – tips and tricks, Plant based diet inspiration
- 3 x 2-3 min masterclass videos; Different varieties & growing, Culinary benefits & how to prepare – tips and tricks, Plant based diet inspiration
- E-Book of poster and factsheets that can be used to recruit to database sign-up.

Undertake a mushroom case study intervention within two organisations to leverage in communication and gather support for further research

Undertake a mushroom case study intervention with two organisations. It is recommended that one of these be an aged care organisation. The intervention involves education and incorporation of mushrooms into the menu to achieve an intake of at least 3 Cup mushrooms per person each day for a set number of weeks compared with another residential site used as a comparator.

The aim is to obtain resident's nutritional intake pre- and post- the mushroom intervention. Document the journey of the mushrooms intervention via film. This pilot intervention could be used to undertake a larger scale clinical trial that aims to evaluate the cost benefit to incorporating more mushrooms into the sector (see future opportunities).

Conduct a face-to-face pilot 'Masterclass' with commercial sector chefs and evaluate

The research supports that practical and, on the job, learning is the best way to encourage behaviour change in the overall sector. The institutional and commercial sectors are distinctly different and a direct nutrition and health intervention in the commercial sector is not motivating and educating enough.

It is recommended to undertake a pilot face-to-face Masterclass where a select number of commercial Executive Chefs are invited to a masterclass to be educated and inspired on nutrition, health and culinary benefits of mushrooms. The impact of this would then be measured via evaluating mushroom knowledge and usage of these organisations in the 3-month period after the Masterclass. This evaluation could then be utilised to consider whether this strategy offers an opportunity longer-term for the industry to invest in. The masterclass series could evolve to being conducted longer term as an online live class. The face-to-face pilot as part of this project, offers an opportunity for further insights and learnings to be gathered to understand true feasibility longer term.

Communicate case studies to wider industry to educate and inspire

Present at two key conferences; Institute Hospitality in Healthcare and Food Service Australia to educate and inspire food industry professionals with an engaging presentation on the nutrition, health and culinary benefits mushrooms and case study interventions, showing how mushrooms can drive benefits to the sector.

Develop a farm tour framework, lesson plan and resource pack that facilitates grower and food industry professional connection and partnership

A key insight from the research was the opportunity to develop a greater connection between the and food industry professionals with growers and the mushroom provenance story. It was clear from the research that food industry professionals prefer experiential learning. Farm tours are an ideal way to build this connection and educate with experience. This interaction also facilitates key invited influencers to expand the reach of the key messages more broadly by via sharing their experiences via their own social networks.

This project can develop a framework for growers to undertake farm tours with food industry professionals and start to weave education to the industry on nutrition, health and culinary benefits of mushrooms.

It is recommended that a tour framework and a curriculum-linked learning opportunity/lesson plan be combined with relevant resources (previously developed above). These resources could be printed by the individual farm growers to distribute to tour participants.

Develop curriculum materials that can be leveraged as part of the Vegan & Vegetarian units

Influencing from the grassroots via culinary curriculum is fundamental to the ongoing impact of increasing the incorporation of mushrooms into the food service sector. There is no opportunity at present to influence the new national Vegan/Vegetarian unit as part of culinary curriculum that has been already developed by the government appointed training agency. However, there is an opportunity to develop materials that can be utilised by the RTOs in the teaching of the content and working with both TAFE NSW and the Learning Vault to create these materials.

Communicate key findings from this Mushroom Industry Insights report with industry to inspire and garner support to capitalise on future opportunities

The research uncovered several opportunities for the mushroom industry that are outside of the scope of this project. To capitalise on these opportunities and provide the industry with rich insights to inspire them, it is recommended this report be presented to the industry at the high-profile AMGA conference 26-28 October 2022.

Other Opportunities

Manufacturing opportunities

While outside of current project scope, there was a lot of feedback from KOLs within the qualitative interviews for product mushroom innovation opportunities. Listed are some of the ideas the industry should consider:

- Product innovation that overcomes issues of shelf life.
- Mushroom powder used as a booster in nutrition and flavour that can be added to dishes.
- Pre-prepped and ready-to use blend of mushroom and meat mince.
- Mushroom based soups in aged care.

Develop a provenance story strategic plan

The provenance story is a big opportunity for the industry to consider more holistically. While this will be executed in this project as part of developing farm tour materials and information on the 'Mushroom Academy' website, there is greater opportunity to consider this more strategically. Opportunities to consider include utilising a QR code for information on mushroom boxes with information (about the farm, where mushrooms come from), printed information on the box or included brochure/flyer that educates and inspires. There could be a distinct strategy of getting the growing area/farm of where the mushroom came incorporated into organisational menus. Mushrooms from 'x' area can be communicated by Chefs when describing the meal in the commercial sector. The 'Mushroom Academy' website could also host an online video series of high-profile chefs visiting farms and bring the 'paddock-to-plate' story alive.

Develop an ongoing 'train the trainer' strategic plan

On review of the pilot masterclass intervention, develop a strategic plan that looks to incorporate potential third party like Executive Chef Club, live online classes and/or suppliers as ways to educate and inspire across the industry in a high quantum of influence way.

Invest in published research that supports health and cost benefits for mushroom usage in aged care/institutional sector and advocacy.

Undertake clinical research that provides evidence for the benefits (i.e., reduced cost, improved nutritional intake, and health outcomes) of including mushrooms into the menus of an aged care facility with anticipation of less waste and supplement usage. Published research can be used in advocacy with the sector and to support in other projects like providing evidence for mushrooms to be a separate food group in the Australian Dietary Guidelines and the proposal to update the National commercial cookery curriculum to consider mushrooms a separate food grouping.

Develop submission and advocate to the National curriculum to include mushrooms as a separate food group.

To influence the sector from a grassroots level, having mushrooms identified as a separate food group and given distinct focus within the National Commercial Cookery Curriculum will be key. This would require developing an appropriate submission requesting an update.

References

1. Foresight FI. The nature of the food service market. 2020.
2. USDA. Australia Food service Report 2018.
3. Flanders. Food & Beverage Industry Market Overview Australia. 2019.
4. Foresight FI. Food service Bulletin. 2021;No.2.
5. Foresight FI. The Australian Food service Market. 2020.
6. Morgan R. Australian eating habits eating in out December 20202021. Available from: <http://www.roymorgan.com/findings/8712-australian-eating-habits-eating-in-out-december-2020-202105240437>.
7. AIHW. 2020 [Available from: <https://www.aihw.gov.au/reports/australias-health/hospital-care>].
8. Honey N. McDonald's launches Tim Tam McFlurry — here's how to be among the first to taste it. Available from: <https://kitchen.nine.com.au/latest/mcdonalds-uber-eats-launches-tim-tam-mcflurry/53898be4-2d4d-492e-9638-30cca8b2ad81>.
9. Banney A. Australians spend \$1,590 each year on delivered food2018. Available from: <https://www.finder.com.au/australians-spend-1590-each-year-on-delivered-food>.
10. Australia Co. Royal Commission into Aged Care Quality and Safety Final report: Care, Dignity and Respect. 2021.
11. Robert N. Learning Vault 2022 [Available from: <https://www.learningvault.com.au/>].
12. IDP. Hot courses abroad 2022 [Available from: <https://www.hotcoursesabroad.com/study/training-degrees/australia/cookery-courses/loc/9/cgory/nf.-4/sin/ct/programs.html#search&catCode=NF.-4&countryId=9&nationCode=9&nationCntryCode=9&studyAbroad=N&studyOnline=N&studyCross=N&studyDomestic=N&studyPartTime=N&startOnlineCampusLater=N&manStdyAbrdFlg=N&parentCatEngName=Travel,%20Tourism%20and%20Hospitality&childCatEngName=Food%20and%20Drink%20Production&ldcsCatEngName=Cookery&restRefineFlag=Y&pageNo=5>].
13. Mellentin, J. 10 Key trends in food, nutrition and health 2022, New nutrition business, The Centre for Food & Health Studies Limited 2021.

Appendix A

Australian MUSHROOMS

ARE YOU A FOOD INDUSTRY PROFESSIONAL LIVING IN AUSTRALIA?

Australian Mushrooms Growers Association (AMGA) are working on some research to understand what people working in the food industry know about mushrooms, including their unique nutritional and health properties and ways to consume them.

Please spare only a **few minutes** to complete this short survey, for a chance to win one of five \$100 VISA gift cards!

This project has been funded by Hort Innovation using the mushrooms research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Start press Enter ↵

● Takes 4 minutes

1 → Before we begin, tell us a little bit about the kind of work you do in the food industry. What type of food industry professional are you? *

Choose which best represents your main role. If your role is not included here, please select "other" and let us know what it is.

- A Foodservice dietitian
- B Food Technologist
- C Operational
- D Cook
- E Chef
- F Food industry dietitian
- G I do not work within the food industry
- H Management
- I Other (please specify)

2 → Which of the two food industry sectors do you mainly work? *

A **Institutional sector** (i.e. hospitals, aged care, defence, education, day-care, correctional centres)

B **Commercial sector** (i.e. cafes, hotels/accommodation, restaurants, pubs, clubs, quick service retail, food manufacturing, grocery)

3 → Do you currently feature mushrooms on the menu where you work? *

Choose which best applies to your main place of work.

- A Yes, it's a main feature of some meal offerings year round
- B Yes, it's mainly used as a side dish year round
- C Occasionally, it may feature in our seasonal/limited time menus
- D No, we do not use mushrooms at all
- E Don't know

4 → Why do you use mushrooms on your menu? *

Choose as many as you like

- A To help improve the nutritional delivery of the meal/menu
- B To help enhance the flavour of the meal
- C To help enhance the texture of the meal
- D Plant-based food option
- E To help reduce the sodium content of the meal
- F Meat free food option
- G Vegetarian/Vegan food option
- H Other (please specify)

OK ✓

5 → What do you see are the barriers to using mushrooms in meals/menus? *

Choose as many as you like

- A Cost
- B Taste
- C Food safety
- D Shelf-life
- E I do not think there are any barriers to using mushrooms
- F Seasonal availability
- G Supply issues
- H Other (please specify)

OK ✓

6 → How familiar are you with the key nutritional properties and health benefits of consuming mushrooms? *

Please select the statement that best applies to you.

- A Not familiar at all
- B Familiar with some nutritional properties or health benefits but cannot specify them
- C Familiar and can specify them
- D Very familiar as I have attended events / seminars / read resources
- E Academic knowledge and actively seek more information

OK ✓

7→ In your opinion, what are the key nutritional properties of mushrooms? *

Choose as many as you like (scroll to see all options)

- A Selenium
- B Dietary fibre
- C Prebiotics
- D Cholesterol free
- E Copper
- F Biotin
- G Niacin
- H Low in sodium
- I Low in calories
- J Antioxidants
- K Beta-glucan
- L Ergosterol
- M Chitin
- N Vitamin D
- O Omega-3
- P Folate
- Q Potassium
- R Ergothioneine
- S Folate
- T B-group vitamins
- U Vitamin B12
- V Don't know
- W Other (please specify)

OK ✓

8 → In your opinion, what are the key health benefits of mushrooms? *

Choose as many as you like (scroll to see all options)

A Anti-ageing

B Enhances physical performance (e.g. energy, muscle mass)

C Improves gut health

D Improves blood fat levels (e.g. cholesterol, triglycerides)

E Improves blood glucose levels

F Improves brain health and cognition

G Increases and maintains vitamin D levels

H Increases fullness and reduces hunger

I Lowers the risk of some cancers

J Maintains strong bones

K Reduces inflammation

L Strengthens the immune system

M Supports the nervous system

N Don't know

O Other (please specify)

OK ✓

9 → In your opinion, what are the key culinary benefits of mushrooms? *

Choose as many as you like (scroll to see all options)

- A Umami/meaty flavour
- B Reduces sodium intake of meals
- C Reduces calorie intake of meals
- D Meat replacement
- E Cost reduction
- F Improves meal texture
- G Improves meal taste
- H Vegetarian/Vegan
- I Environmentally friendly
- J Plant-based
- K Don't know
- L Other (please specify)

OK ✓

10 → On a scale between 1 and 5, where 1 is '*not confident at all*', and 5 is '*very confident*', how confident do you feel in talking about the nutrition, health or culinary benefits of Australian mushrooms? *

1	2	3	4	5
---	---	---	---	---

Not confident at all

Somewhat confident

Very confident

OK ✓

11 → On a scale between 1 and 5, where 1 is 'strongly disagree', and 5 is 'strongly agree', thinking about your current workplace, how much do you agree with the following statement:

"There has been an increase in the use of mushrooms in order to improve the nutritional profile of meals." *

1	2	3	4	5
---	---	---	---	---

Strongly disagree

Unsure

Strongly agree

OK ✓

12 → As a food industry professional, have you ever seen educational resources about the health benefits of mushrooms? *

<input type="checkbox"/> A	I don't know of any resources
<input type="checkbox"/> B	I have seen resources but am not really interested in them
<input type="checkbox"/> C	I have resources and they are not very useful
<input type="checkbox"/> D	I have resources and they are useful
<input type="checkbox"/> E	I have resources and would like more

OK ✓

- 13 → Please provide any additional questions or thoughts on the type of information that you would like to see provided about the nutritional, health, or culinary properties of mushrooms.

Type your answer here...

Shift ⌘ + Enter ↵ to make a line break

OK ✓ press Enter ↵

- 14 → To be in the running for one of five VISA \$100 gift vouchers, please **submit your email below.**

The winners will be drawn and contacted by email on **June 30th, 2022.**

If you do not wish to enter the draw, simply leave the email blank and click "Submit" (*hit 'enter' if the button is not immediately visible*).

** By entering the draw, you are subscribing to the Australian Mushrooms food industry professional database and will receive information, resources and updates about the unique nutrition, health, and culinary properties of mushrooms. You can unsubscribe at any time.*

What is your email address? *e.g. john.smith@example.com*

name@example.com

Appendix B