



Product development and marketing opportunities to boost children's vegetable intake

A guide for small to medium food manufacturers and retailers



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Best practice guidelines for increasing children's vegetable intake

Despite convincing evidence that adequate vegetable intake is essential for a healthy diet and is protective against a range of chronic diseases [1], Australian children's vegetable intake remains below recommended levels. A 2017-18 national survey reported that only 6% of children and adolescents eat the recommended amount of vegetables [2].

Increasing vegetable intake is a strong focus for public health and commercial stakeholders, with benefits for individuals and families, the community, vegetable growers, food manufacturers, distributors, retailers and governments [3].

Vegetable intake in children can be positively influenced by factors including availability at home and school; parental food literacy; convenience; and price [4, 5]. Harnessing the sensory properties of vegetables that appeal most to children (e.g. bright colours, sweet-tasting vegetables) and use of fun names and characters to draw their attention can also help. These are all elements that can be influenced by food industry.

A set of seven best practice guidelines has been developed to help [increase children's vegetable intake](#). The guidelines are based on extensive research of previous initiatives. The guidelines can be applied in a number of settings and they have been translated into resources for use in long day care, schools, out-of-school hours care, government policy stakeholders and food industry. This resource aims to assist those in food industry to create and implement new initiatives to increase children's vegetable intake.

One serve of vegetables

75g = 1 cup raw vegetables or 1/2 cup cooked vegetables or legumes



Foundation

- 1 Make vegetables the hero**
Have simple vegetable specific messages with a clear focus.
- 2 Coordinate sustained effort across multiple players**
Coordinate long-term action among key players involved in providing and promoting vegetables to children.
- 3 Grow knowledge and skills to support change**
Identify and act on gaps in knowledge and skills to support children's vegetable intake.
- 4 Minimise barriers to increase success**
Understand and identify ways to address barriers to children's vegetable intake.

Action

- 5 Plan for and commit to success**
Set clear and measurable vegetable-specific goals and commit to a plan of action.
- 6 Create an environment that supports children to eat vegetables**
Make vegetables the easy choice by providing an environment that promotes vegetable familiarisation and intake.

Review

- 7 Monitor and provide feedback on progress**
Monitor progress and achievement against goals and provide feedback at regular intervals.

Further details on each guideline follow. Additional resources and proven ideas for action are included later in this guide.

Foundation

1 Make vegetables the hero

There are many elements to healthy eating, but if we are serious about improving children's vegetable intake, food industry can play its part in making vegetables more of a focus.

Promoting a range of different vegetables in meaningful amounts

Children are eating only 1½ to 2 serves of vegetables across the day [6].

A meaningful amount of vegetables could look like:

- at least 1 vegetable serve per child in main meals, for example a ½ cup of cooked mixed vegetables
- at least 3 types of vegetables per main meal, for example carrots, broccoli and capsicum
- at least ½ vegetable serve per child in snacks, for example 4 cherry tomatoes or 4 carrot sticks.

Note: Some hard vegetables may need to be cooked, grated, puréed or very finely sliced to prevent choking in young children.

What's a serve?

The Australian Dietary Guidelines offers guidance on what constitutes one vegetable serve, and how many serves are required by children each day [7].

Table 1: Australian Dietary Guidelines recommendations for children's vegetable intake

Age group	Boys	Girls
2-3 years	2 ½ serves	2 ½ serves
4-8 years	4 ½ serves	4 ½ serves
9-11 years	5 serves	5 serves
12-13 years	5 ½ serves	5 serves

A standard serve of vegetables is about 75g, or:

- ½ cup cooked green or orange vegetables (for example broccoli, spinach, carrots or pumpkin)
- ½ cup cooked, dried or canned beans peas or lentils
- 1 cup green leafy or raw salad vegetables
- ½ cup sweetcorn
- ½ medium potato or other starchy vegetables (sweet potato or cassava)
- 1 medium tomato.

Promoting vegetables in meaningful amounts can be achieved through product development including its packaging and marketing.

Opportunities for product development

New eating opportunities

Vegetables are commonly eaten by children at dinner, but the amounts they eat over the day do not meet recommended levels.

Other meals and snacks, such as breakfast, lunch, and morning and afternoon snacks, offer opportunities to boost children's vegetable intake. Combined, these currently provide children with less than a ½ serve of vegetables [6].

There are a range of product development opportunities to increase children's exposure to vegetables and create more eating opportunities outside of dinner, where the majority of children's vegetable intake occurs. This may include vegetable-packed:

- single-serve, ready to eat lunch or snack products
- pre-made, or ready-to-buy [Crunch&Sip®](#) kits
- packaged products for busy families to easily add to lunchboxes
- family meals
- semi-prepared vegetables or vegetable-based ingredients to make addition of vegetables easy
- mixed dishes such as pasta, curries, quiches and more.

What you can do

- Embed criteria around vegetables in your product development process.
e.g. Mixed meals must contain at least 75g of vegetables in each serve
- Taste is king and will have a significant impact on repeat-buying and therefore the longevity of your product. Before large scale production, sense-check your vegetable product/recipe. Engage a tasting panel comprised of your target market, which will include children as well as parents/caregivers. You might also get your tasting panel to comment on the product concept, product name, packaging and proposed price point.

Vegetables need to be made the hero of children's and family meals or snacks so that children become familiar with them and even love them. Plant-based nutrition and snacking is trending, which means that the time is ripe to consider how your product range might include a product that makes vegetables the hero.

Adding more vegetables that value-add to your product in different ways and can also assist with your marketing message:

- Rescue vegetables or vegetable off-cuts, such as broccoli stalks, can be of value as an economical bulk filler.
- You can use vegetables such as corn, beetroot, pumpkin, carrot or sweet potato for a sweeter flavour profile for soups, sauces or dips instead of adding sugar.

Up-cycling vegetable waste and using sweet-flavoured vegetables as a sugar substitute have the added benefit of contributing to a more favourable Health Star Rating.

Increasing the proportion of vegetables in a product contributes V points, which reflect fruit, vegetable, nut and legume (fvnl) content and contribute to a product's assessment against the Nutrient Profiling Score Criterion (NSPSC). The NPSC is used to calculate the Health Star Rating and is also used to determine if a product is eligible for health claims.



For more information, see Schedule 1.2.7 of the Australia New Zealand Food Standards Code available from www.foodstandards.gov.au and www.healthstarrating.gov.au.

Opportunities for product packaging and marketing

Since parents and carers are the main decision makers when it comes to food choices for the household, it is important to consider what will appeal to them, as well as their children.

For product packaging and marketing, strategies could include:

- Exciting and flavourful **product descriptors** that can help improve the appeal of a vegetable product [8]. Research suggests that health messages around vegetable intake are not as effective for children as they are for adults. Rather, impressing the sensory (tasty, flavoursome etc.) aspects of vegetable products is more successful with children.
- Vegetables add colour to **packaging artwork** and can make your product look more appetising. One study suggests that featuring vegetables on your product packaging using photos might be effective at encouraging children to eat them [9].

- If vegetables are not a characterising ingredient of your product, you can feature vegetables as part of a **servicing suggestion**. For more information on characterising ingredients and serving suggestions, see *Australia New Zealand Food Standards Code Standard 1.2.10 – Characterising Ingredients and Components of Food* for more guidance. Note, serving suggestions can also be made following preparation instructions.

e.g. a pasta bake could be served with a salad vegetable platter.

- For vegetable-containing products, using cartoon **characters** or mascots on the packaging has been shown to positively influence children’s vegetable intake [10] and willingness to try vegetables [11], compared to no character association.
- Provide **recipes** that encourage addition of vegetables, or demonstrate the versatility of your product through the addition of vegetables. Providing several options of vegetables encourages them to choose a vegetable that they like, that will still fit with the recipe and also account for seasonal availability.

e.g. A serve of mild chilli con carne can be prepared according to pack instructions, spooned into a hollowed capsicum, eggplant, zucchini or mushroom and grilled to make a stuffed vegetable; or a series of pasta and sauce variations, each featuring a different combination of vegetables.

- Develop **communications or messages** that demonstrate the qualities of the vegetables in your product that would appeal to your target market. These might include being Australian or locally grown, convenience, ease of preparation, tastiness and nutrition value of your finished product.
- **Innovative marketing campaigns** to gain children’s or parents’ interest in and demand for vegetable rich products, such as point of sale promotions, competitions, reward schemes.
- **Widen your market** for products that are not traditionally targeted at children, through in-store or catalogue promotion. e.g. Promote snacking vegetables during the back to school period or mid-term for lunchbox inspiration; or feature frozen vegetable mash in the baby food section of a catalogue.



You can use vegetables such as corn, beetroot, pumpkin, carrot or sweet potato for a sweeter flavour profile for soups, sauces or dips instead of adding sugar.

2 Coordinate sustained effort across multiple players

Key players that mostly influence a product's development may be within your company such as the marketing team, finance, and product development. External key players, such as suppliers, retailers and customers will mostly influence the uptake and demand for the product.

If you are advocating for more vegetable products within your company, identify who has influence over vegetable product development and highlight what the benefits would be for them.

To advocate to business or finance executives, align vegetable goals, whether it be a marketing campaign or a new product, with the company's strategy. Will this initiative widen the market? Will it increase demand? Will it reduce production cost? Business outcomes will be more relatable.

If advocating to marketing and product development teams, understand the marketing plans and messages, then align your value proposition.

Will this product or initiative fill a gap in the market?

Will it respond to the target consumer/customer needs?

Does it tap into a consumer or health trend?

Does it support local growers?

What the marketing and sales teams can do

- Continue to drive demand for vegetables by communicating about vegetables or your vegetable product to your target market through social media, eDMs and your website.
- Explore new distribution channels to reach new audiences or new settings. For example, can you deliver your new vegetable-packed product in bulk to wholesalers who deliver to canteens?

3 Grow knowledge and skills to support change

Be aware of current knowledge and skills amongst staff as well as your target market to help identify areas for improvement. Find out what they do and don't know to identify what they can learn. Then build the skills to make change.

Some knowledge gaps may include:

- The benefits of supporting children's vegetable intake.
- How to cook or prepare vegetables in an appealing way, demonstrating that they can be nutritious and delicious. This could apply internally (staff such as marketing, sales, point of sale staff), or your target market.
- Vegetable market performance.
- Understanding your target market; understanding children's and parents attitudes and behaviours towards vegetables. This includes which sensory aspects appeal and do not appeal to children.
- School canteen requirements.

Basic education about vegetables within your company can be as simple as a vegetable cooking demonstration or recipe inspiration through team lunches or the staff noticeboard.

More formal training could cover why children need to be eating more vegetables, the nutrition benefits and sensory aspects of vegetables. Education on how to cook or prepare tasty vegetable-rich products could be especially useful for retailers and their point of sale staff as they communicate to consumers directly.

The following are some resources to get you started building vegetable knowledge and skills.

Grow your vegetable literacy

- [Veggycation](#)

This is a website where you can learn about the nutrition and health benefits of Australian grown vegetables, including information on optimum cooking methods, preparation and storage.

- [Tryfor5](#)

This website can help build food literacy within your company or amongst your target market by promoting vegetables through recipes, storage, cooking and shopping tips.

Understand vegetable market performance and shopper behaviour

- [Harvest to Home](#)

This website is primarily for Australian vegetable growers and contains information that could help retailers and food manufacturers understand and diagnose market performance and shopper behaviour.

Understand what sensory aspects of vegetables appeal and do not appeal to children

- The report, New opportunities for developing vegetable products for children - report summary [12], presents a framework based on sensory science that can be used to develop new vegetable-based products for children. This framework was used to develop a range of new vegetable-containing products, with the results of concept testing and evaluation by children and parents also reported.

Understand how you can optimise your product to increase the likelihood of being stocked in school canteens

- [Healthy Kids Association](#)

The Healthy Kids Association (HKA) website contains links to all the canteen strategies by state/territory. HKA can work with manufacturers to understand canteen guidelines and have developed nutrient criteria to assist product development. They also have a Buyer's Guide that canteens can use to see what products are considered Everyday or Occasional.

Learn more about how adding more vegetables can improve your product's Health Star Rating

- [Health Star Rating](#)

The Health Star Rating website contains a Guide for Industry to the Health Star Rating Calculator, which shows how the percentage of fruits, vegetables, nuts and legumes can impact a product's Health Star Rating.

4 Minimise barriers to increase success

Since parents or caregivers are the ones that make the food purchasing decisions in the household, it is important to first minimise their barriers to serving more vegetables or vegetable products at home. From there, ensuring that vegetable products are acceptable to children from a sensory perspective, to encourage intake, is necessary.

Common parental barriers include high cost, perceived effort or time to prepare the vegetables and low food literacy [4, 5], although these barriers will vary according to your target market. Common sensory barriers for low acceptance of vegetables by children include high bitterness, low saltiness and low sweetness [13] as well as textural complexity.

Some examples on how to minimise these barriers are given below.

What product development can do

- Promote convenience of vegetables through innovative packaging solutions or processes that allow for easy/minimal preparation or reduced cooking time.
- Use rescue vegetables or vegetable off-cuts as ingredients for a more economical price point.
- Combine more bitter vegetables with other typically sweeter vegetables (e.g. green capsicum and carrot) to increase liking, or include vegetable-based flavour sachets (e.g. vegetable dips or vegetable powders) with mixed vegetables for a quick meal idea. Research has shown that children like vegetables most when flavourings are added [14].
- Mask bitter taste of vegetables with sweet, sour or salty-tasting ingredients. From a health perspective, caution should be exercised against adding too much salt or sugar.

In addition to parents/caregivers, include children in your tasting panel to ensure the product's taste and concept appeal to them.

What marketing can do

- Include an easy recipe with a small number of common ingredients on pack showing how to prepare or serve your product with vegetables.
- Emphasise the taste, flavour and fun messages associated with eating vegetables.
- Include science-backed 'tips and tricks' section on back of pack to give parents the right tools and information to help increase their child's vegetable acceptance and intake. Tips could include the effect of multiple exposure on vegetable intake, staying clear of health messages, best cooking techniques for different vegetables (e.g. boiling can reduce bitterness compared to steaming in brassica vegetables) and other non-vegetable flavours/ingredient suggestions that pair with the vegetable product to encourage intake. More information can be found [here](#).

Nutritious products can sometimes have the perception of being less tasty. Dial up promotion of how your product tastes. This can be done through your product descriptors on pack.

What retailers can do

- Ensure vegetables are always a part of quick meal solutions at end of aisle promotions.
- Include recipe cards with vegetables, particularly less common or liked vegetables, to give consumers an idea of the sorts of dishes that the vegetable could be used in and how to prepare such a vegetable. This could be backed up with the same recipe card elsewhere in the store where the other complimentary ingredients sit.
- Offer free snacking vegetables in-store for children instead of fruit-only options.
- Consider in-store promotions such as engaging vegetable displays for kids. This might be an eye-catching rainbow arrangement of vegetables, or a display that teaches kids the different varieties or formats of vegetables along with some interesting facts, such as where the vegetables are grown and their journey to the store.



Action

5 Plan for and commit to success

1. Identify a clear and specific goal

Be focused with your vegetable-specific goal and to gain traction, ensure the goal aligns to the company's strategic plans.

Companies will have their strategic reasons for increasing vegetables in their products. Whether it be responding to health trends, consumer demand or government policies such as nutrition guidelines, lower production costs or having a wider consumer audience, use these drivers to create your goal.

Being clear about exactly what you want to do to around increasing vegetables is essential. Your goal might be around:

- The level and variety of vegetables in product formulation.
- The number of vegetable-forward products in your range.
- Increasing accessibility to your vegetable product by widening your market or distribution channels.
- Increased awareness of target market of your vegetable product through promotional and sales activity.

2. Choose a practical, simple approach

Keep it simple.

Once you know what you want to change, brainstorm with your team as to the simplest and most practical way for you to achieve that goal. You do not need to tackle all goals at once. You could start with even one. To help you decide, you can ask:

What is the most practical option?

What is affordable and what resources do we need to achieve it?

What will deliver the best outcomes (sales, volumes)?

Example strategies to raise vegetable intake through product formulation, product range, product distribution and promotion.

Approaches	Product formulation	Product range	Product distribution and promotion
Target examples	Include at least half a vegetable serve (38g) in x number of snack products.	Increase proportion of vegetable-based SKUs to x%.	Identify x number of vegetable-based product(s) in your range that are considered "Everyday" or "Occasional" to allow selling into school canteens.
	Include a minimum of 75g of vegetables, using at least three vegetable varieties in x number of meal products.	Add x number of vegetable product SKUs to suit a different meal occasion (i.e. snacks).	Create a calendar of communications to be sent to your subscriber list featuring your products and increasing your target market's knowledge on the benefits of the vegetables featured in your products or that appear in recipes you provide them.

3. Plan for and commit to change

Make a plan.

There are lots of ways to make a plan. A tried and true way to start is by bringing your team or colleagues together and brainstorming the following:

- Why are we doing this and why is it important?*
- What is the overall goal and what steps needs to be undertaken?*
- When do we put these steps in place?*
- Where should the initiative and steps take place?*
- Who is responsible and who is the target audience?*
- How do we measure our progress and how can we improve?*

The overall process may take time to get it right.

You should also consider what barriers will make it hard to achieve your goal and what knowledge and skills gaps exist. Addressing these is important for success.

Include all the relevant stakeholders in your company, but be clear on their roles and identify a clear owner to drive this plan.

Remember to commit to the change and, where appropriate, make it part of your overall business strategy. Steps like reporting on progress at staff meetings, undertaking regular reviews, or reporting to your customers can help you keep on track.



Create an environment that supports children to eat vegetables

Help make vegetables readily available and support their intake.

For product developers, the format of your product can contribute to an environment that supports children to eat vegetables and relies on your product's ability to make it an easy choice. Showing parents or carers how tasty and convenient your vegetable product is to prepare and serve are key.

Marketing can also play a part by providing activities for kids such as quizzes, puzzles, fun fact sheets or stories that promote vegetables.

In retail, consider in-store promotions such as vegetable tastings for kids or free snacking vegetables for kids, provided that younger kids are supervised by their parents to minimise choking risk. Offer promotions that encourage customers to purchase more vegetables or vegetable products rather than promotions that encourage less healthy foods. End-of aisle promotions offering meal inspiration or solutions should always include a range of vegetables.

Review

7 Monitor and provide feedback on progress

Monitoring and providing feedback are essential components of any initiative or strategy. They are undertaken at regular times during the initiative as well as at the end. Final evaluation is a must.

Monitoring has a number of benefits:

- it keeps your business on track
- it allows you improve what you are doing as you go
- it helps you design better initiatives in the future.

Reporting back on progress keeps everyone motivated and keeps you accountable. For example, in response to public health concerns about salt, many companies set a goal to reduce the amount of salt in their products and have been successful in making significant reductions. This has generated positive PR and marketing messages for these companies. Could a similar success story be made about increasing the amount of vegetables in your products?

Bringing the best practice guidelines to life

Case study: Nourishing Bubs

Founded by Olivia Bates, Paediatric Dietitian and Nutritionist, Nourishing Bubs is a range of convenient snap-frozen, individually portioned fruit and vegetable purées for young children. The products are available in major retailers Australia-wide.

Nourishing Bubs embodies a number of the best practice guidelines for increasing vegetable intake in children. The product messaging clearly highlights the simple goodness of eating vegetables for children (Guideline 1). As such, Nourishing Bubs have capitalised on the way parents will naturally prioritise their children's health and providing vegetables is central to this (Guidelines 2, 6).

Olivia emphasises staff training and development in the business for the purpose of understanding the many health benefits associated with vegetable intake (Guideline 2). This further fosters enjoyment and builds belief in vegetables within the organisation. Some examples of activities Olivia runs for her staff include: seminars; topic-specific training; vegetable-focused lunches and catering (such as hummus and chopped vegies for meetings); circulating recipes and competitions.

Nourishing Bubs provides extensive meal ideas and recipes on their website and distribute these through marketing communication campaigns (Guideline 6). The regularly updated blog section of the website also contains useful and practical information on childhood feeding practices and nutrition (Guideline 4).

www.nourishingbubs.com



References

1. National Health and Medical Research Council. (2013) Australian Dietary Guidelines. National health and Medical Research Council, Canberra, Australia.
2. Australian Bureau of Statistics. 4364.0.55.001 - National Health Survey: First Results, 2017-18. 2018 [cited 2019 19 Sept]; Available from: <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-18~Main%20Features~Children's%20risk%20factors~120>.
3. Hort Innovation. (2019) Growing into the future: Strategy 2019-2023. Horticulture Innovation Australia Limited.
4. Godrich, S.L, Davies, C.R, Darby, J, Devine, A. (2018) Which ecological determinants influence Australian children's fruit and vegetable consumption? *Health Promotion International*, 33(2), pp. 229-238.
5. Rasmussen M, Krølner R, Klepp K.I, Lytle L, Brug, J, Bere, E and Due, P. (2006) Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part I: Quantitative studies. *Int J Behav Nutr Phys Act*, 3(22), doi: 10.1186/1479-5868-3-22
6. Hendrie, G.A., et al., Food group distribution across meals and snacks in Australia. [manuscript under review], CSIRO
7. National Health and Medical Research Council. (2013) Healthy Eating for Children: Teach Your Child Healthy Habits for a Healthy Life. Canberra: National Health and Medical Research Council, Department of Health and Ageing. Available from: https://www.eatforhealth.gov.au/sites/default/files/content/The%20Guidelines/n55f_children_brochure.pdf
8. Turnwald B.P, Boles D.Z, Crum A.J. (2017) Association Between Indulgent Descriptions and Vegetable Consumption: Twisted Carrots and Dynamite Beets. *JAMA Intern Med*. 177(8):1216–1218. doi:10.1001/jamainternmed.2017.1637
9. Lagomarsino, M., & Suggs, L. S. (2018) Choosing Imagery in Advertising Healthy Food to Children: Are Cartoons the Most Effective Visual Strategy? *Journal of Advertising Research*, JAR-2018-2003.
10. Karpyn, A., Allen, M., Marks, S., Fillion, N., Humphrey, D., Ye, A., . . . Gardner, M. P. (2017). Pairing Animal Cartoon Characters With Produce Stimulates Selection Among Child Zoo Visitors. *Health Education & Behavior* 44(4), 581-589.
11. Kraak, V. I., & Story, M. (2015). Influence of food companies' brand mascots and entertainment companies' cartoon media characters on children's diet and health: a systematic review and research needs. *Obesity reviews*, 16(2), 107-126.
12. Beelen, J., Broch M., Heffernan, J., Poelman, A.A.M. (2020) New opportunities for developing vegetable products for children - report summary. CSIRO, Australia.
13. Poelman, A. A., Delahunty, C. M., & de Graaf, C. (2017) Vegetables and other core food groups: A comparison of key flavour and texture properties. *Food Quality and Preference*, 56, 1-7.
14. Baranowski, T., Domel, S., Gould, R., Baranowski, J., Leonard, S., Treiber, F., & Mullis, R. (1993). Increasing fruit and vegetable consumption among 4th and 5th grade students – results from focus groups using reciprocal determinism. *Journal of Nutrition Education*, 25(3), 114-120.

