FOOD STANDARDS
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Te Mana Kounga Kai - Ahitereiria me Aotearoa

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# Attachment 1 – Rapid scoping review on young child formula use and understanding, stage labelling and proxy advertising

## Supporting Document 2 - Labelling for young child formula products

## Proposal P1066 – Review of young child formula

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# Executive summary

To inform Proposal P1066 1st Call for submissions (CFS), Food Standards Australia New Zealand (FSANZ) conducted a scoping literature review of consumer research relating to behaviours, attitudes and knowledge of young child formula in Australia and New Zealand. This research built on previous work conducted by FSANZ during Proposal P1028 – Infant Formula[1] by assessing social science evidence from January 2000 to July 2025 to address three research questions:

1. How do caregivers use, and understand the purpose of, young child formula (marketed as toddler and junior milks)?
2. How do caregivers use and understand stage labelling on young child formula products (e.g. stage 3 and 4)?
3. Does proxy advertising on young child formula products (i.e. referring to infant or follow-on formula or next/previous stage toddler/junior milks on products) influence caregivers' perceptions and purchase decisions of young child formula?

Stage labelling refers to the labelling of infant formula, follow-on formula, 'toddler milk' and 'junior milk' as stages 1, 2, 3 and 4 respectively. Proxy advertising refers to any references (including names, numbers, images and nutrition content and health claims) made about another product within a range on the label of a young child formula product.

[1] See FSANZ (2022) Proposal P1028 – Infant Formula. 1st Call for Submissions Supporting Document 3 Attachment 1 – Consumer research on infant formula labelling. Food Standards Australia New Zealand, Canberra. Available online at: https://www.foodstandards.gov.au/sites/default/files/food-standards-code/proposals/Documents/Attachment%201%20to%20SD3%20-%20Consumer%20research%20on%20infant%20formula%20labelling.pdf and FSANZ (2023) Proposal P1028 – Infant Formula. 2nd Call for Submissions Supporting Document 3 Attachment 1 – Rapid Systematic Evidence Summary in Infant Formula Stage Labelling and Proxy Advertising. Food Standards Australia New Zealand, Canberra. Available online at: https://www.foodstandards.gov.au/sites/default/files/food-standards-code/proposals/Documents/Attachment%201%20to%20SD3%20-%20Consumer%20Evidence%20Stage%20Labelling%20and%20Proxy%20Advertising.pdf

Ten studies assessed during Proposal P1028 – Infant Formula were considered, and 11 primary research papers and two scoping reviews were identified during additional literature searches. In total, this included ten studies that included data related to Australia or New Zealand (noting that four of these studies only included relevant findings for prevalence of young child formula use). Sixteen primary research studies were assessed as high quality and five as medium quality. This report outlines the methodological approach to the scoping literature review and the relevant findings from the literature. Key findings are summarised below by research question. Results from international studies may not be directly applicable to the Australian and New Zealand context due to potential differences in child nutrition literacy, exposure to young child formula advertising and differences in cultural or regulatory environments.

**How do caregivers use, and understand the purpose of, young child formula (marketed as toddler and junior milks)?**

- Prevalence of young child formula use in Australia ranged from 1.9% (ever served) to 31.8% (served once or more in the past week) with one estimate of 6% for New Zealand. These results likely varied based on sampling methods, population characteristics, child age and measures of frequency. Internationally, prevalence varied between 8.5% and 78.5%. Prevalence of use in Australia and New Zealand appeared to be much less than in a range of Asian countries. Cultural and socioeconomic differences mean international estimates may not be applicable to Australia and New Zealand.
- Australian and New Zealand caregivers generally used young child formula as a supplement with reasons for use including convenience, to ease the transition from breastmilk or infant formula to cow's milk and solids, or as a comforter. Some caregivers used young child formula for its perceived nutritional benefits, especially for fussy easters or to address perceived dietary gaps.
- Internationally, caregivers sometimes saw young child formula as an essential next step after infant formula or breastfeeding, influenced by recommendations by healthcare professionals and beliefs about perceived health benefits.
- Nutrition and health claims on packaging were frequently noticed by caregivers and made caregivers more likely to view young child formula as holistically healthy, healthier relative to cow's milk, able to prevent illness and support brain development. Some US caregivers' perceptions were high regardless of the presence of a claim, suggesting overall value in young child formula products.

**How do caregivers use and understand stage labelling on young child formula products (e.g. stage 3 and 4)?**

- Australian and New Zealand caregivers were generally familiar with product stages (labelling of infant formula, follow-on formula, toddler milk and junior milk as stage 1, 2, 3 and 4) but relied more on age information ('suitable for ages…') to identify the correct product for their child.
- Some caregivers perceived a necessary progression through product stages (continuing use from Stage 1 to Stage 2 and Stage 3).
- Evidence from international studies showed some caregiver confusion and misunderstanding about the meaning of stage numbers, with some caregivers

misinterpreting what the number indicates (e.g. age in months or years, “added value”, or number of cups). This was particularly the case for pregnant women and when glancing at an advertisement without careful reading.

- In some countries (e.g. United Kingdom) there was a sentiment from healthcare professionals that young child formula was not necessary, and this was echoed in caregivers’ opinions.
- Overall, it was unclear the extent to which on-pack stage labelling impacted progression through stages relative to other on-pack marketing or off-pack influences.

**Does proxy advertising on young child formula products (i.e. referring to infant or follow-on formula or next/previous stage toddler/junior milks on products) influence caregivers’ perceptions and purchase decisions of young child formula?**

- Previous literature reviews highlighted that elements of proxy advertising (i.e. similar branding or packaging to infant formula) could confuse caregivers, leading them to believe they were seeing advertising for infant formula when exposed to young child formula marketing. This was particularly the case when they were unfamiliar with young child formula as a product and when the advertisement was glanced at and not read thoroughly.
- Brand trust, particularly brands linked to infant formula, can influence caregivers’ purchasing intentions and progression through a brand’s product stages.
- This scoping review did not identify any studies that directly examined the effect of on-pack references to other products within a range on caregivers’ perceptions or purchasing behaviour for young child formula (e.g. images of stage 1, stage 2 or stage 4 products on a stage 3 product label).

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# 1. Introduction

To inform Proposal P1066 1st Call for submissions (CFS), Food Standards Australia New Zealand (FSANZ) conducted a scoping literature review to provide information relating to consumer behaviours, attitudes and knowledge of young child formula (milk-based products for children aged 12 months to under 4 years including products marketed as 'toddler milk' and 'junior milk') in Australia and New Zealand. This research builds on previous work conducted by FSANZ during Proposal P1028 – Infant Formula where FSANZ prepared a targeted literature review (FSANZ 2022) and a rapid systematic evidence summary (FSANZ 2023) of social science evidence relating to the labelling of infant formula products (this includes infant formula for infants from birth to 12 months and follow-on formula from 6 to 12 months) from January 2003 to May 2022. These previous reviews included consideration of the impacts of stage labelling and proxy advertising of infant formula products on caregiver perceptions and behaviour. The reviews considered evidence from studies with information related to young child formula use and understanding.

Stage labelling refers to the labelling of infant formula, follow-on formula, toddler milk and junior milk as stages 1, 2, 3 and 4 respectively. For the purposes of Proposal P1066 – Young child formula, the term young child formula captures both toddler and junior milks (stage 3 and 4). The available literature uses terms including "toddler milk", "growing-up milk", "other formulas or powdered milk" and "commercial milk formula" to describe products considered as young child formula. Proxy advertising refers to any references (including names, numbers, images and nutrition content and health claims) made about another product within a range on the label of a young child formula product.

This present assessment sought to address three research questions:

1. How do caregivers use, and understand the purpose of, young child formula (marketed as toddler and junior milks)?
2. How do caregivers use and understand stage labelling on young child formula products (e.g. stage 3 and 4)?
3. Does proxy advertising on young child formula products (i.e. referring to infant or follow-on formula or next/previous stage toddler/junior milks on products) influence caregivers' perceptions and purchase decisions of young child formula?

Ten research papers and reports assessed during Proposal P1028 – Infant Formula were considered with an additional 11 primary research papers and two scoping reviews identified during updated literature searches. The two scoping reviews either did not present any information relevant to caregivers' perceptions of young child formula (Cavalcanti et al. 2024) or their findings reflected those of the rest of this review (Richter et al. 2023b) and therefore were not included. Reference list screening of the two reviews did not identify any additional relevant papers. Five new papers included data for Australia (n = 4) or New Zealand (n = 1), noting three Australian studies and the single New Zealand study only included data relevant to the prevalence of young child formula use (no caregiver perceptions reported). This document outlines the previous evidence relevant to young child formula from Proposal P1028 – Infant Formula and summarises relevant findings from the rapid scoping review.

# 2. Methods

A systematic scoping search of the literature was undertaken using the following methods:

- Reviewing research included in two previous reviews (consumer research on infant formula labelling and rapid systematic evidence summary on infant formula stage labelling and proxy advertising) conducted for Proposal P1028 – Infant Formula (FSANZ 2022, 2023).
- Searching seven online databases and Google Scholar for peer reviewed studies published between May 2022 and July 2025 with existing search terms defined during Proposal P1028, and between January 2000 and July 2025 for new search terms defined in the current assessment.
- Searching reference lists and citing studies of literature included in the evidence summary.

The scoping review included peer-reviewed articles published in academic journals. The online database search used multiple Boolean search strings to i) update the search conducted during the rapid systematic evidence summary for Proposal P1028 – Infant Formula using two preexisting strings, and ii) conduct one new search to capture additional literature relevant to young child formula. These identified 35, 57 and 282 studies respectively after duplicates were removed. Exclusion criteria were determined prior to commencing the literature search. Screening, data extraction and narrative evidence synthesis was completed by one officer, resulting in the inclusion of 11 primary research studies. This evidence was integrated with relevant findings from 10 studies from the targeted infant formula labelling literature review and rapid systematic evidence summary from Proposal P1028 – Infant Formula. Further detail on the methods can be found in Appendix 1 – Method.

# 3. Results

## Research question 1: How do caregivers use, and understand the purpose of, young child formula?

FSANZ considered the available evidence to understand the prevalence of young child formula provision, reasons why caregivers provide young child formula to their children, whether caregivers perceive young child formula as essential or supplementary, and any relevant factors driving these perceptions. While use and understanding of young child formula was out of scope during Proposal P1028 – Infant Formula, some studies considered during assessment reported information related to toddler milk (previously assessed in the context of infant formula and follow-on formula). Study summaries for all papers can be found in Appendix 2 – Summary of studies.

Prevalence of young child formula use

*Previous evidence*

FSANZ previously considered three studies (Romo-Palafox et al. 2020; Romo-Palafox and Harris 2021; Moumin et al. 2022) that reported the prevalence of young child formula use during Proposal P1028 – Infant Formula (FSANZ 2022, 2023).

Moumin et al. (2022) used data from the 2020–2021 Australian Feeding Infants and Toddlers Study (OzFITS) to describe the mean energy and nutrient intake of children aged 0 to 24 months (Moumin et al. 2022). The study conducted a cross-sectional phone survey of caregivers of children who had commenced complementary foods or formula feeding (n = 976; 475 aged between 12 and 23.9 months with a completed food record) to record what children ate in the previous 24 hours. 13.5% of young children aged 12 to 23.9 months consumed toddler milk on the day of the survey.

FSANZ previously noted that the study only looked at milk product consumption over a 24-hour period and participants were recruited through online advertising resulting in a convenience sample. The sample was primarily female (97.5%), more likely to be university educated (75.5%), married or in a de facto relationship (94.1%) and have an annual household income >$100,000 (61.0%). Therefore, the results may not be generalisable to the wider Australian population and may not capture those with lower education and income levels or single caregiver households.

Romo-Palafox and colleagues produced two papers reporting on a 2017 United States (US) study which aimed to measure milk type provision in children aged 6 to 36 months and assess caregiver confusion between infant formula (including follow-on formula) and toddler milk (Romo-Palafox et al. 2020; Romo-Palafox and Harris 2021). In brief, the online survey recruited 1,645[2] caregivers and asked them to identify the milk products they served to their child in the last month, and which were provided most often. Caregivers were first asked to identify the product categories they served ('infant formula', 'other formulas or powdered milk'[3], 'regular milk', 'non-dairy milk', 'other', or 'none of the above' which included exclusive

[2] Romo-Palafox & Harris 2021 reported the sample as 1,607 which included all participants in the multivariable model (participants with missing data for any adjusted variables were removed). This resulted in slight variations between the two studies.

[3] Romo-Palafox et al. 2020 and Romo-Palafox & Harris 2021 used the term 'other formulas or powdered milk' in their survey to capture toddler milks and growing-up milks, in recognition that there is no broadly accepted terminology in the United States. The term 'toddler milk' is used in this analysis for simplicity.

breastfeeding). If caregivers chose ‘infant formula’ or ‘other formulas or powdered milk’, they were asked to identify from a list the brand and the product they served most often in the past month.

22% of infants aged 6 to 11 months were inappropriately served toddler milk including 11%[4] with toddler milk as the most common milk product (Romo-Palafox et al. 2020). It is possible that caregivers of infants aged 6 to 11 months thought that toddler milk was infant formula, as over half of the caregivers who chose toddler milk as the most common milk product initially chose infant formula as the category of milk they served (Romo-Palafox et al. 2020). The second paper found that 18% of infants aged 6 to 11 months were served toddler milk and infant formula, indicating that all but 4% receiving toddler milk were also receiving an age-appropriate milk product (Romo-Palafox and Harris 2021).

In an initial analysis of children aged 12 to 23 months, 44% received toddler milk in the past month (Romo-Palafox et al. 2020). The second paper examined children aged 12 months separately, recognising this age as a period of transition (Romo-Palafox and Harris 2021). 33% of children aged 12 months (16% as the most common milk product), 45% of children aged 13 to 23 months (23% as the most common milk product) and 41% of children aged 24 to 36 months (21% as the most common milk product) were served toddler milk in the previous month.

FSANZ previously concluded that a substantial proportion of US caregivers who provide formula milk products to their children may have provided an incorrect product type for their child’s age. The study drew on a large, random sample of caregivers in the US and provided appropriate coverage of different ethnic groups, however differences in nutrition literacy, regulatory environments, exposure to infant formula and toddler milk advertising and culture may mean the results are not generalisable to Australia and New Zealand.

*New evidence*

This rapid scoping review identified four additional studies reporting the prevalence of young child formula consumption in Australia or New Zealand (Cairncross et al. 2017; Bolton et al. 2018; Willcox et al. 2021; Zahra et al. 2022), one from Mexico (Vilar-Compte et al. 2022) and three from the US (Duffy et al. 2021a; Duffy et al. 2021b; Richter et al. 2022). Willcox et al. (2021) also reported prevalence data for Indonesia, Singapore and Thailand.

Bolton et al. (2018) and Zahra et al. (2022) used data from the 2010 Australian National Infant Feeding Survey (ANIFS) to examine and compare feeding practices of infants aged up to 24 months of Chinese-born (Bolton et al. 2018) or Vietnamese-born (Zahra et al. 2022) mothers, respectively, with infants of Australian-born mothers. Participants were recruited from the Medicare database and included all infants of either Chinese-born (n = 602) or Vietnamese-born mothers (n = 261) that completed the survey and a randomly selected, equal-sized sub-sample of infants of Australian-born mothers. Some sociodemographic characteristics differed between both Chinese-born or Vietnamese-born and Australian-born mothers. However, the samples in both studies were not matched on any characteristics and therefore other factors beyond ethnicity may have driven these differences.

Bolton et al. (2018) reported 11.7% of infants of Chinese-born mothers and 6.0% of infants of Australian-born mothers had ever consumed toddler milk. Both Chinese-born and Australia-born mothers were highly educated (89.9% and 80.7%, respectively, held an educational

[4] Reported as 10% in Romo-Palafox & Harris 2021.

qualification beyond high school), were socioeconomically advantaged (21% and 29.7%, respectively, were in the two most disadvantaged SEIFA[5] quintiles) and had a spouse living at home (94.3% and 92.2%, respectively).

Zahra et al. (2022) reported 15.9% of infants of Vietnamese-born mothers and 1.9% of infants of Australian-born mothers had ever consumed toddler milk. Most Vietnamese-born and Australian-born mothers were highly educated (63.6% and 79.2%, respectively, held an educational qualification beyond high school), and had a spouse living at home (84.6% and 95.4%, respectively). A greater proportion of Vietnamese-born mothers experienced socioeconomic disadvantage (62.4% in the two most disadvantaged SEIFA quintiles compared to 23.7% of Australian-born mothers), however as previously noted this difference may not be due to ethnicity alone.

Neither paper specified the age at which infants were introduced to toddler milk, but both adjusted the sample size to account for infants potentially too young for certain feeding practices (n = 488 and 484 for Chinese- and Australian-born mothers, respectively and n = 434 for the combined sample of Vietnamese- and Australian-born mothers for the toddler milk variable). Both studies drew random sub-samples of infants of Australian-born mothers from the 2010 ANIFS (n = 19,106[6]). This random sampling approach resulted in differences in sample characteristics and prevalence of toddler milk use between the two papers. Zahra et al. (2022) performed reproducibility analyses using both the total Australian-born population and a matched sub-sample[7] and found no substantial differences from their primary analysis. Neither paper reported other factors influencing infant feeding, such as father's ethnicity, acculturation, length of residency, or social support.

Willcox et al. (2021) conducted a cross-sectional study in 2017 to assess the frequency of use and sociodemographic factors associated with growing-up milk consumption across cities in four Asia Pacific countries (Bangkok, Thailand; Jakarta, Indonesia; Singapore; and Melbourne, Brisbane and Sydney, Australia) (Willcox et al. 2021). Australian cities were combined for all analyses. Mothers with a child aged 12 to 36 months were recruited through an online panel resulting in a convenience sample. Countries were selected based on their World Bank Income Bracket (low for Indonesia, upper middle for Thailand, high for Singapore and Australia) with middle class families targeted within each country. Logistic regression was used to investigate between-country associations and binary logistic regression was used for in-country associations. Variables that were significant at $p \leq .01$ were included in multivariable analyses.

1,051 women completed the survey including 263 from Thailand, 275 from Indonesia, 261 from Singapore and 252 from Australia. Most mothers were highly educated (diploma, certificate or tertiary education; Indonesia 98.6%, Thailand 97.3%, Singapore 95.4%, Australia 81.0%, $p < .001$) and were employed full or part time at the time of the survey (Singapore 76.3%, Thailand 73.4%, Indonesia 63.7%, Australia 50.0%, $p < .001$). 94.2% of women were married or in a de facto relationship and 33.9% were primiparous (no significant difference between countries for either factor). Most mothers reported feeding infant formula to their child in the first 12 months (Singapore 77.8%, Indonesia 73.1%, Australia 66.7%, Thailand 66.2%, $p = .009$).

[5] SEIFA quintiles are interpreted as 1st quintile – greatest disadvantage to 5th quintile – least disadvantage
[6] Reported in Zahra et al. 2022 only
[7] Matched by age, parity and SEIFA

Most women reported feeding growing-up milk to their child once or more per week[8] except for a smaller proportion of Australian mothers (Singapore 78.5%, Thailand 75.3%, Indonesia 63.7%, Australia 31.8%). Mothers in Thailand (OR 5.7, 95% CI: 3.8, 8.6), Indonesia (OR 3.5, 95% CI: 2.3, 5.5) and Singapore (OR 7.4, 95% CI: 4.9, 11.1) had significantly higher odds of feeding growing-up milk once or more per week compared to Australian mothers.

The study used a convenience sample of predominantly highly educated women from middle class families with a spouse or de facto partner and may not be representative of the general population. There were some inconsistencies in reporting between main text and tables with values presented in tables considered as more accurate. This study reports a lower frequency of use of growing-up milk in Australia compared to other countries in Asia, however results should be interpreted with caution as the study population is limited to three major cities and may not reflect differences in behaviours and perceptions in regional locations.

Cairncross et al. (2017) conducted a cross-sectional study to test vitamin D status and examine factors associated with deficiency in young children in New Zealand (Cairncross et al. 2017). In 2012, the study sampled 1,329 children aged from 2 up to 5 years in 2012 from 17 cities and towns. Caregivers completed a demographic and health data questionnaire and children provided a blood sample to test their vitamin D levels. Most children were of New Zealand European heritage (70%), most mothers had a post-secondary education (81%) and 51% of participants were in the two least deprived quintiles of households.

Overall, 6% of children in the study drank toddler milk. The study did not include young children under 2 years of age and therefore the prevalence of toddler milk consumption is not applicable to this age group. Toddler milks were not the focus of the study and analysis of free-text responses to capture any ‘other’ milk products may have missed additional responses for toddler milk.

Vilar-Compte et al. (2022) conducted a cross-sectional survey of pregnant women and mothers of children aged 0 to 18 months to explore awareness, beliefs and sources of information of follow-up formula and growing-up milk (Vilar-Compte et al. 2022). The study took place during 2020 in two large metropolitan areas in Mexico (Mexico City and Guadalajara) and recruited 1,044 women with quotas for pre- and post-natal status, infant age, household socioeconomic status and city of residence. Participants were recruited using non-probabilistic sampling from hospitals, child daycares, pharmacies and baby product stores. The questionnaire was previously validated and was delivered in a face-to-face format. As the study did not explore any relationships between follow-up formula and subsequent growing-up milk use, only results relevant to growing-up milk use are reported in this assessment.

The study recruited 296 pregnant women (3 or more months gestation; mean age 26.2y, SD 6.3y) and 748 mothers of children aged 0 to 18 months (27.7y, SD 6.4y). Approximately half of the study population (49% of pregnant women and 50% of mothers) completed a high school or graduate qualification and 28.7% and 30.6% of pregnant women and mothers, respectively, were employed at the time of survey. By design, the sample included equal proportions of low, middle and high socioeconomic status participants. Pregnant women

[8] Frequency of feeding growing-up milk was reported as ≥7 times per week, 5–6 times per week, 2–4 times per week, once per week, 1–3 times per month, never or less than once per month, or not sure. The new category ‘once of more per week’, as reported in the paper and this assessment, combines the four most frequent categories.

(67.2%) were more likely than mothers (43.0%) to be primiparous (p <.001).

14.8% of women intended to use or actually used growing-up milk, with a significant difference between pregnant women (8.5%) and mothers (17.3%, p <.001). Many women (74.0%) reported being recommended by a doctor to use growing-up milk (52.0% pregnant women and 78.3% mothers, p = .01). The analysis could not differentiate intended use and actual use based on question wording.

Duffy and colleagues produced two papers (2021a, 2021b) reporting results from a pilot and full-scale cross-sectional study in the US evaluating the impact of sugary drink warnings and taxes on purchasing behaviours. A component of this broader study explored experiences, perceptions and advertising exposure to toddler milk. The pilot study (Duffy et al. 2021b) included Latino parents of children aged 2 to 18 years while the full-scale study (Duffy et al. 2021a) recruited approximately half Latino (48%) and half non-Latino (52%) parents of children aged 2 to 12 years.

The pilot study was conducted in North Carolina in 2019 and analysed a convenience sample of 58 Latino parents who do at least half the grocery shopping for their household and consume sugary drinks at least once per month. Participants attended five weekly visits to a naturalistic convenience store laboratory setting where they performed a shopping task followed by a self-administered online survey. Toddler milk-specific items were included in the survey from visit three. Parents viewed images of two toddler milks and were informed that these products were different from infant formula to minimise confusion.

Most parents were female (98%) with a mean age of 35.8y (SD 6.8y). Sixty one percent had a high school education or higher, 98% had an annual household income below $50,000, 33% used the Supplementary Nutrition Assistance Program (SNAP), and 24% had a child aged between 0 and 3 years. Ninety three percent of parents had ever seen toddler milk in a retail setting, and 44% reported ever purchasing toddler milk including 21% purchasing toddler milk 10 or more times. When asked about a specific brand of toddler milk (“Nido”), 51% of parents reported a previous purchase, suggesting that 7% of parents may not consider the brand as a toddler milk product.

The full-scale study (Duffy et al. 2021a) used an online survey platform in 2019 to recruit a convenience sample of 1,078 parents. After completing a questionnaire related to the sugary drink warnings study, participants answered questions related to toddler milk. Participants were shown images of two toddler milks and were informed that these products were different from infant formula.

Fifty eight percent of parents were female with a mean age of 35.3y (SD 7.4y). Fifty three percent held a higher education qualification, 47% had an annual household income below $50,000, 32% used SNAP in the last year and 35% had a child aged 0 to 3 years. Seventy nine percent of parents reported ever seeing toddler milk in a retail setting, with 51% previously purchasing toddler milk including 23% purchasing toddler milk 10 or more times.

Parents were more likely to have ever purchased toddler milk if they drank sugary beverages themselves ≥7 times per week (compared with parents who drank sugary beverages <7 times per week, predicted probability (pp; defined as the likelihood of an event occurring) 59% vs 45%, p <.001), if they completed a college degree or higher (compared to high school or lower, pp 59% vs 41%, p <.001), were aged between 18 and 29 years (compared to 40 years or older, pp 57% vs 42%, p = .004, not significant for 30 to 39 years), were male (compared to female, pp 58% vs 45%, p <.001), lived in the US for fewer than 10 years

(compared to being born in the US, pp 73% vs 48%, p <.001) and if they were Latino (compared to non-Latino, pp 59% vs 43%, p <.001).

Both the pilot and full-scale studies used a convenience sample, and the results may not be representative of the greater US population. Some survey questions for the pilot study were not validated prior to roll-out and no statistical tests were performed. The sample populations in both studies were primarily from lower income households and possessed some level of education (high school or higher education). Only a small proportion of parents had children within the 0-to-3-year age group.

Richter et al. (2022) conducted a randomised, three-arm control trial to investigate how structure/function claims (defined as a claim that describes how an ingredient or nutrient affects the structure or function of the human body) on toddler milk packaging influence parents' beliefs and perceptions towards toddler milk. The sample population consisted of 2,190 US parents (65% female, mean age 35y) of children aged 1 to 5 years recruited in 2020 from an online panel. Participants were recruited for a broader study examining the impact of front-of-pack claims on fruit-flavoured drinks with added sugar. Sixty six percent of parents held a college degree or higher, 33% had an annual household income under $50,000, and 33% and 21% identified as Latino and Black, respectively. The methodology of the claims task is described in further detail under the section 'impact of nutrition claims on use and understanding'.

Forty percent of parents reported ever serving toddler milk to their child. Among these, 36% provided toddler milk before their child reached 9 months of age and 49% provided toddler milk between 9 and 12 months. It is not clear whether there was confusion between infant formula products and toddler milk. The proportion of parents that ever-served toddler milk was highest between 13 and 24 months at 68%, declining to 54% for children aged 25 to 36 months and to 38% for children 37 months and older.

Reasons for, and factors influencing, young child formula use

*Previous evidence*

FSANZ previously assessed four studies that explored reasons for young child formula use and factors influencing behaviours and attitudes (Yockney and Comfort 2013; Romo-Palafox et al. 2020; Romo-Palafox and Harris 2021; Fleming-Milici et al. 2022).

The New Zealand Ministry for Primary Industries commissioned a study to investigate caregivers' understanding, perceptions, and usage of follow-on formulas and toddler milks (Yockney and Comfort 2013). Qualitative data were collected through online forums that included 137 caregivers from Australia and New Zealand. All participants had at least one child aged between 6 and 36 months. The three forum groups were Australian formula users, New Zealand formula users and caregivers from both countries who did not use formula.

The study found that reasons for toddler milk use varied depending on whether caregivers transitioned from breastfeeding (where formula products were introduced after 6 months) or from infant formula use commencing prior to 6 months. Where caregivers used toddler milks after breastfeeding, reasons included that their child wasn't eating enough after weaning and introducing solids, or pairing breastfeeding with formula products for convenience, particularly when feeding outside of the home. However, when caregivers were transitioning from infant formula and/or follow-on formula after 12 months of age, reasons for using toddler milks included as a supplementary source of nutrition to provide missing nutrients from an

unbalanced diet, for additional benefits including iron and protein, and to boost nutrients for growth and development.

Feeding styles also differed for children aged between 12 and 24 months and children aged between 24 and 36 months. In general, caregivers most commonly saw toddler milks as a supplement or top-up to complement their child's wider diet. Between 12 and 24 months of age, supplementary feeding styles included as a milk-based beverage, as a component of food, as a comforter in the evenings, and as a snack between meals. This includes as a replacement for, or in addition to breast milk (closer to 12 months) or cow's milk, to provide additional nutrients for fussy eaters, to settle and soothe in the evenings and as needed as a snack. Between 24 and 36 months, caregivers were providing fewer feeds, mainly restricted to mornings and evenings, and were using less formula overall, with the main use as a comforter or where a cow's milk allergy was present.

Caregivers described finding ingredients information useful to monitor their child's intake, to avoid allergens or excess consumption of sugar or artificial ingredients and to compare products. One caregiver using toddler milk stated "I find the ingredients list most important, as I do with all foods. You don't want too much sugar" (Yockney and Comfort 2013, pg 56). Some caregivers found ingredients information less useful, more commonly with New Zealand caregivers than Australians. Caregivers that shared this view believed most formulas and toddler milks contained the same ingredients, didn't understand what the ingredients were, don't know what is meant to be in the ingredients, or trusted the brand and therefore the ingredients. It was not clear the extent to which reasons for or against using ingredients information related to toddler milk compared to infant or follow-on formula.

Fleming-Milici and colleagues (2022) conducted a series of focus groups during 2019 in low-to-moderate income neighbourhoods at two sites (Hartford, Connecticut and Washington, DC) in the US to understand parents' perceptions of sweetened fruit drinks and toddler milk. This included how marketing tactics and labelling information may contribute to perceptions (Fleming-Milici et al. 2022). The study comprised of 9 focus groups with 50 parents of children aged 9 to 36 months who made feeding decisions for their child. Participants were recruited from social media groups and flyers at local organisations. Participants were reported to have diverse ethnic and racial backgrounds however no specific demographic information was collected.

During the discussions, participants described that the connection between infant formula brands and toddler milks conveys the latter as a natural or necessary "next step" (pg 7), particularly during the "transition from formula to whole milk" (Fleming-Milici et al. 2022, pg 6). Parents also considered toddler milk as a better alternative to snack foods, with one participant stating "… they're only eating crackers this week… so here's something that looks good. And it's from a trusted company" (Fleming-Milici et al. 2022, pg 7).

Romo-Palafox and colleagues also assessed caregiver agreement with marketing messages used to promote milk products (Romo-Palafox et al. 2020). US caregivers (n = 1,645) were 1.59 times (95% CI: 1.41, 1.79) more likely to serve toddler milk to their child for each additional point of agreement (on a 7-point scale) with the statement "toddler formulas or powdered milks provide nutrition that toddlers do not get from other food and drinks" (60% of caregivers). Romo-Palafox and Harris (2021) tested the associations between different demographic factors and type of milk provided to toddlers aged 13 to 36 months (Romo-Palafox and Harris 2021). They found that there was no significant relationship between the provision of toddler milk and providing commercially prepared infant formula (p = .36)(Romo-

Palafox and Harris 2021).

*New evidence*

This rapid scoping review identified five studies that explored caregivers' characteristics, perceptions and behaviours associated with young child formula use (Duffy et al. 2021a; Duffy et al. 2021b; Willcox et al. 2021; Vilar-Compte et al. 2022; Richter et al. 2023a).

During multivariable analysis with all participants combined (analysis sample of 1,051 from Thailand, Indonesia, Singapore and Australia), Willcox et al. (2021) found that older mothers (31–35 years OR 0.63, 95% CI: 0.46, 0.86, and ≥36 years OR 0.53, 95% CI: 0.38, 0.76 compared to mothers ≤30 years) and those with a secondary education or less (OR 0.38, 95% CI: 0.22, 0.66 compared to tertiary educated mothers) were less likely to provide growing-up milk once or more per week to their child. Mothers that worked full time (OR 2.30, 95% CI: 1.70, 3.12 compared to those that are unemployed, on leave or studying and raising children) and those who fed infant formula to their child in the first 12 months (OR 2.96, 95% CI: 2.21, 3.94 compared to those who did not use infant formula) were more likely to provide growing-up milk once or more per week to their child.

Australian mothers who fed their child infant formula in their first 12 months were almost four times as likely to provide toddler milk (OR 3.86, 95% CI: 1.93, 7.71) after adjusting for child gender. Mothers in Singapore who worked full time (OR 2.70, 95% CI: 1.36, 5.42 compared to not currently working) and were not currently breastfeeding (OR 2.26, 95% CI: 1.22, 4.19 compared to currently breastfeeding) were more likely to provide toddler milk to their child. No variables remained significant for Thailand or Indonesia when analysed in an adjusted model.

Richter et al. (2023a) conducted a qualitative study to investigate the beliefs, attitudes and perceptions of Latinx and non-Latinx caregivers in the US who had previously served toddler milk to their children. The research was conducted in 2021 across five US cities with large Latinx communities (Los Angeles, Chicago, Miami, New York City and Raleigh). A convenience sample was recruited through online social media platforms with purposive oversampling of Latinx participants. Initially, nine focus groups were planned, but due to a protocol breach involving participants located outside the US, the final analysis included four focus groups with 18 participants (11 Spanish-speaking Latinx across two groups, five English-speaking Latinx in one group and two non-Latinx in one group). In addition, 15 in-depth interviews were conducted to supplement the limited focus group sample using the same recruitment criteria and data collection methods as the focus groups (four Spanish-speaking Latinx, four English-speaking Latinx, seven non-Latinx).

Participants were prompted with images of three toddler milk packages and guided through discussions about their experiences, beliefs and attitudes towards the products. The average age of participants was 35.4y (SD 6.9y), 91% were female, 33% had completed high school, and 39% reported an annual household income of at least $50,000. 60% of caregivers stated they fed their child toddler milk once or more daily, which included some serving their child toddler milk prior to 12 months of age. This result may not be representative of the general US population due to the sampling approach of the study.

Caregivers reported struggling to distinguish between toddler milk and infant formula, with one participant stating that toddler milk packages "look similar to the formulas, they just changed to toddler drink" (pg 23) and another noting that "they're all toddler formula because it now says 12 to 36 months … I didn't see that initially because it's very small" (Richter et al.

2023a) (pg 21). Caregivers also talked about their experiences with infant formula despite clarification from the interviewer that the product stimulus was toddler milk. Some caregivers perceived toddler milks as a healthful product. One caregiver believed that toddler milk was healthier than cow's milk, stating that "it has a lot of vitamins and stuff like that in it, and I don't even think regular milk has all that stuff" (pg 21) with another stating that toddler milk "is more focused on nutrients" (pg 21). Other caregivers disagreed and stated that they didn't like toddler milk as "it contains too much sugar" (pg 22) and "[toddler milk producers] put much more of these nutrients [than] the child really needs, such as amino acids" (pg 22).

Toddler milk consumption generally commenced around 12 months of age. Caregivers reported using toddler milk due to its convenience and flexibility, because their child liked the taste, that it "builds [child's] immunity, it supports healthy growth" (pg 22), and as an aid to transition between infant formula and cow's milk. Reasons against use included price, high sugar content and artificial ingredients. Despite negative perceptions on some ingredients, one caregiver still saw nutritional benefits stating "I'm not [going] to say I don't like it … it provides very good nutrition for my son" (pg 22). There were no major differences in perceptions between Latinx and non-Latinx participants except for brand familiarity.

Despite the protocol breach for the focus groups, the study authors were able to integrate and analyse the results of the focus groups and in-depth interviews together.

Vilar-Compte et al. (2022) reported that 19.0% of women (12.8% of pregnant women and 21.4% of mothers, $p = .003$) were aware of growing-up milk. Of those who had heard of growing-up milk, 60.0% believed that older infants required the product, with no significant difference between pregnant women and mothers. Health professionals were the most common information source for growing-up milk for mothers (49.4% compared to 18.4% of pregnant women, $p = .001$) while family members were the most common information source for pregnant women (36.8% compared to 10.6% of mothers, $p < .001$). 9.6% of women found information about growing-up milk from advertisements with no significant difference between pregnant women (5.3%) and mothers (10.6%). Perceived benefits of consuming growing-up milk included helping their child for their future (30.8%), brain development (17.2%), child's growth (15.2%), that their child would be less hungry (14.7%) and due to allergies (12.1%), with no significant difference between pregnant women's and mothers' responses. It was not clear from the study description whether these were existing survey options or open-ended responses coded during analysis. Pregnant women were more likely to perceive that breast milk didn't have sufficient nutrients (28.9%) compared to mothers (13.1%, $p = .01$) as a reason for needing growing-up milk.

Vilar-Compte et al. (2022) found that women were exposed to growing-up milk and once they knew about them, many believed older infants and young children required them, with perceived benefits closely linked to marketed product claims. The study used non-probabilistic sampling and only recruited from two large cities therefore results may not be generalisable to the Mexican population. Some pregnant women were also already mothers to a child older than 18 months, and the analysis did not adjust for parity to determine the effect of previous experience with growing-up milk.

Across both pilot and full-scale studies, Duffy et al. (2021a, 2021b) asked parents for reasons why other parents may purchase or provide toddler milks to their child (from a list of pre-determined options with an 'other' open ended option). This question was framed around other parents' perceptions due to uncertainty in the proportion of parents purchasing and providing toddler milk themselves. The most common reasons reported were because they

provided nutrients (72% and 62% in the pilot and full-scale study, respectively), supported growth (52% and 55%) and supported brain development (41% and 41%). Thirty nine percent of parents in the pilot study believed that it would be healthy for a child to drink toddler milk every day. Most parents in the full-scale study thought toddler milk was as healthy (38%) or healthier (44%) than cow's milk and 57% responded that it would be healthy for a child to consume toddler milk every day.

Parents were more likely to perceive toddler milk as healthful if they consumed sugary beverages 7 or more times per week (compared to fewer than 7 times per week, p <.001), used SNAP in the last year (compared to not using SNAP, p = .02) and lived in the US for fewer than 10 years (compared to being born in the US, p = .002) (Duffy et al. 2021a).

Impact of nutrition claims on use and understanding

*New evidence*

The rapid scoping review identified two studies that directly tested the impact of nutrition and health claims on caregivers' perceptions of young children formula including one from Australia (McCann et al. 2022; Richter et al. 2022). Three additional studies from the US reported general findings related to interpretations of nutrition and health claims on young child formula products (Duffy et al. 2021a; Duffy et al. 2021b; Richter et al. 2023a).

McCann et al. (2022) conducted two online discrete choice experiments (DCEs) to examine the influence of different on-pack regulated and unregulated claims on perceived healthiness for toddler snack food and toddler milk. The study recruited Australian caregivers of at least one child aged between 1 and 3 years who were responsible for most of the food shopping for this child. Claim types (attributes) and sub-types tested in this study were determined by a previous audit of Australian toddler foods and milk. For the toddler milk DCE, the choices included four attributes and four levels within each attribute (

Table **1**).

***Table 1: Claim types and sub-types for the toddler milk DCE, adapted from McCann et al. (2022)***

| Claim type | Sub-type level 1 | Sub-type level 2 | Sub-type level 3 | Sub-type level 4 |
|---|---|---|---|---|
| *Regulated nutrition-content claim* | 2 serves = up to 50% of RDI recommended dietary intake of 14 vitamins and minerals | Enriched with 10 vitamins and minerals | Contains Omega 3 DHA | None (reference) |
| *Regulated general health claim* | Zinc for immune function, Iron and iodine for cognitive development, Vitamins A,C,D and E for growth and development, Calcium and vitamin D for strong bones and teeth | Iron and vitamin C for growth and development, calcium and vitamin D for strong bones and teeth | Calcium for normal function of digestive enzymes, DHA to support brain development | None (reference) |
| *Unregulated health-related ingredient claim* | No added colours, flavours, or preservatives | With added prebiotics and probiotics | Made from milk from Australian grass-fed cows | Easy to digest, with partially hydrolysed protein (reference) |

| | | | | |
|---|---|---|---|---|
| *Unregulated 'other' claims* | Nutritionally complete | Message about research and science | Careline, dental hygiene message, recipe ideas | Advertising of stage 1 and 2 infant formula products (reference) |

Caregivers were asked to choose the most and least healthy products between three alternatives over seven choice sets, resulting in 256 possible product options. The study used a balanced overlap design to ensure each level within an attribute appeared an equal number of times to participants. The products did not include any additional information including brand, nutrition information panel or ingredients list to remove the impact of these elements in determining product healthiness. Reference categories were the option with the lowest selection rate by participants within each attribute. 207 adults (98% female, mean age 34y) completed the toddler milk DCE. 94% of caregivers had a formal qualification (trade school, diploma or university), all caregivers had multiple children, 49% were from a high SEIFA postcode, 21% were employed full-time and 48% were employed part-time.

Participants were significantly more likely to choose a toddler milk as most healthy if it contained any of the level 1, 2 and 3 claims (except for the unregulated health-related ingredient claim "made from milk from Australian grass-fed cows") compared to the reference level. The strongest impact on perceptions of healthiness was for the regulated nutrition-content claim "2 serves = up to 50% of RDI recommended dietary intake of 14 vitamins and minerals", with 2.65 times higher odds (95% CI: 2.14, 3.29) of selecting a product as most healthy with this claim compared to no claim. The second strongest association was for the regulated general health claim "Zinc for immune function, Iron and iodine for cognitive development, Vitamins A,C,D and E for growth and development, Calcium and vitamin D for strong bones and teeth" with 2.36 times higher odds (95% CI: 1.91, 2.91) of selecting a product with this claim as most healthy compared to no claim. Likelihood-ratio test results indicated that the most important contribution to the model was the variation in the regulated nutrition-content claim ($x^2 = 42.76$).

The study used snowball sampling through social media with mostly highly educated, mid-to-high socioeconomic status women participating and therefore the results may not be generalisable to the Australian population. The DCE design also could not account for other factors in real-world scenarios that impact product choice including cost, time constraints, other branding elements, nutrition knowledge and the presence of children while shopping. It is also unclear how generalisable the findings are to different types of claims. The presence of claims on toddler milks increased perceptions of product healthfulness. While regulated claims (nutrition-content and general health) were the most influential, unregulated claims also significantly impacted perceptions.

As previously described, Richter et al. (2022) conducted a randomised, three-arm control trial with 2,190 US parents of children aged 1 to 5 years to understand the impact of structure/function claims on parents' perceptions of toddler milks. The study involved a virtual shopping task where parents chose beverages and a snack for their child and were randomly assigned to view a toddler milk product featuring either an unrelated control claim ("new and improved"), a brain development claim ("supports brain development omega 3 DHA"), or an immunity-related claim ("immune health dual prebiotics & vitamins"). Following the shopping task, parents completed an online survey assessing agreement with statements related to toddler milk healthfulness, intended provision and claims.

Parents exposed to the brain or immunity claim were more likely to believe toddler milk was

as healthy or healthier than cow's milk compared to the control claim (89% for brain claim (Cohen's *d* = 0.28), 87% for immunity claim (*d* = 0.20), 79% for control claim, p <.001 for both comparisons). It is worth noting that this perception was comparatively high even in the control group. After viewing the brain or immunity claim, parents were also more likely to intend to provide toddler milk to their child (mean score of 4.20 on a 7-point scale for brain claim (*d* = 0.22), 4.13 for immunity claim (*d* = 0.18), 3.78 for control claim, p <.001 for both comparisons), perceive toddler milk as healthy to drink every day (5.09 for brain claim (*d* = 0.24), 5.07 for immunity claim (*d* = 0.22), 4.76 for control claim, p <.001 for both comparisons) and believe toddler milks would be recommended by a paediatrician compared to the control claim (5.09 for brain claim (*d* = 0.24), 5.06 for immunity claim (*d* = 0.24), 4.76 for control claim, p <.001 for both comparisons). Parents exposed to the brain claim held a stronger belief that toddler milk could make a child smarter (4.59 for brain claim (*d* = 0.26), 4.16 for control claim, p <.001), while exposure to the brain or immunity claim increased belief that toddler milk consumption could prevent illness (mean score of 4.56 for brain claim (*d* = 0.16), 4.93 for immunity claim (*d* = 0.39), 4.33 for control claim, p = .003 and <.001 respectively).

Effect sizes were small with limited effect moderation from demographic factors (Latino ethnicity resulted in a weaker perception of product healthfulness when exposed to the brain claim compared to the control claim, p = .04; no other significant modifying factors). The study used a convenience sample recruited from online panels, which limits generalisability to the wider US population. Parents were briefly exposed to product labels on a computer screen rather than a real-world setting which may have affected the assessment of the product claims.

Caregivers from three additional US studies (one focus groups/in-depth interview and two surveys) noted how they used and interpreted nutrition and health claims (Duffy et al. 2021a; Duffy et al. 2021b; Richter et al. 2023a). When viewing toddler milk packages, caregivers in Richter et al. (2023a) noted their attention was drawn to front-of-pack health claims. These claims reinforced beliefs about benefits for brain and immune development, with only limited scepticism about such claims. Most Latino parents in Duffy et al. (2021b) provided a positive open-ended response for their interpretation of claims, with exemplary quotes including "it helps children grow" (pg 7), "…has many vitamins for children" (pg 7) and "helps them from not getting sick as often…" (pg 8). Open-ended interpretations of claims from parents in Duffy et al. (2021a) were primarily positive, with the most common responses to the healthy growth claim related to growth (34%), vitamins and nutrients (32%) and general health (13%) and the most common for the immunity claim related to protection of disease or helping the immune system (61%) and vitamins and nutrients (10%).

Conclusion

The prevalence of young child formula use in Australia ranged from 1.9% (ever used) to 31.8% (used once or more in the past week) across four studies, with one New Zealand study reporting use at 6.0% (ever used). The Australian estimates likely varied based on differences in study population characteristics, sample selection, child age and measure of use (e.g. absolute use compared to frequency of use in the past week). The highest reported Australian rate (31.8%) came from a small convenience sample of middle-class families from three major cities, while the 6.0% reported in Bolton et al. 2018 was based on a sub-sample from a larger, randomly selected national sample. As such, the latter estimate is more likely to be a representative snapshot of young child formula consumption in Australia.

There was no reported inappropriate young child formula provision to infants under 12 months. Overall, study populations mostly comprised of highly educated women from generally socioeconomically advantaged areas and with a spouse at home. As such these estimates may not be applicable to the entire Australian population, particularly those from low income and single caregiver households.

Six international studies reported prevalence of use for the US, Mexico, Indonesia, Thailand and Singapore, which ranged from 8.5% to 78.5% with some evidence of inappropriate provision prior to 12 months in the US. These studies also varied in design, sample demographics, child age and measures of use. Further, differences in cultural and population dynamics within each country, greater focus and targeting of lower socioeconomic groups for study samples, local regulations for young child formula and exposure to marketing and advertising likely influenced the variance between countries and specifically in relation to Australia and New Zealand.

In Australia and New Zealand, caregivers commonly used young child formula as a supplementary drink. Reasons for use included convenience, to aid in the transition from breastmilk or infant formula to cow's milk and solid foods and as a comforter in the evenings. Some Australian and New Zealand caregivers used young child formula to provide missing nutrients, particularly iron and protein, and perceived benefits for growth and development especially for fussy eaters and for concerns with an unbalanced diet. There was evidence that Australian and New Zealand caregivers used young child formula as a continuation from infant formula products, however there was no exploration of factors influencing this behaviour.

Some caregivers from the US perceived young child formula as an essential next step after infant formula or breastfeeding and to aid the transition between infant formula or breastmilk to cow's milk. Recommendations from health professionals and perceived health benefits including supporting brain development, immunity and growth influenced caregivers' attitudes and behaviours towards young child formula. Some caregivers also perceived young child formula as healthier or more nutrient-rich compared to cow's milk and as a better alternative to snack foods.

Nutrition claims led caregivers in the US to be more likely to view young child formula as healthier than cow's milk (noting this was also objectively high in the control group), able to make children smarter, help prevent illness, increased intent to provide, were healthy for everyday consumption, and would be recommended by a paediatrician. Some caregivers noted that they were drawn to read the claims first when viewing packaging. Perceived benefits of young child formula often aligned with the nutrition or health claims present on the labels. One Australian study found that regulated and unregulated claims contributed to perceptions of product healthiness, with regulated claims (nutrition-content and general health) the most influential.

Overall, while young child formula in Australia and New Zealand was generally considered a supplement to address perceived gaps in energy and nutrient intake, the decision to use it was influenced by several factors. Caregiver beliefs about child nutrition, convenience, taste preferences and advice from healthcare professionals or family all affected the choice to provide young child formula. Additionally, packaging and health claims played a role in shaping perceptions of need and benefit.

## Research question 2: How do caregivers use and understand stage labelling on young child formula products (e.g. stage 3 and 4)?

Caregiver understanding of stage labelling (in the context of infant formula and follow-up formula) was assessed during Proposal P1028 – Infant Formula. This previous assessment sought to investigate consumer understanding of stage labels including whether they encouraged caregivers to progress through the stages and any perceived nutritional benefits from progressing through the stages (FSANZ 2022, 2023).

*Previous evidence*

The targeted labelling literature review (FSANZ 2022) considered evidence from a report commissioned by New Zealand Ministry for Primary Industries (Yockney and Comfort 2013). Yockney and Comfort reported that Australian and New Zealand caregivers differentiate between formula products by stage (e.g. Stage 1, 2 or 3), age range (e.g. from birth to 6 months, suitable from 1 year) and product name (e.g. infant formula, follow-on formula or toddler milk) (Yockney and Comfort 2013, pg 16). Caregivers considered age information (e.g. “suitable from 1 year”) as the most useful part of a label to accurately identify the correct product for their child (Yockney and Comfort 2013) (pg 53–54). They acknowledged that products were designed for infants and toddlers of different ages, with one caregiver stating “I think it’s important to use age appropriate formula as babies’ and toddlers’ needs are different” (Yockney and Comfort 2013, pg 17). Caregivers used age information to identify the appropriate product for the age of their child, with one caregiver noting that “stage formulas are for babies a certain age. So stage 1 is for less than 6 months, stage 2 is for 6 to 12 months, and stage 3 is for one year plus” (Yockney and Comfort 2013, pg 17). Another caregiver stated “my 12 month old has Karicare Stage 2 but when he has finished the tins we have, we will then be going on to stage 3” (Yockney and Comfort 2013, pg 38). These quotes also indicate a perceived progression between products in the range. However, there was no further exploration in the forum discussion on whether these perceptions were due to the stage labelling itself or other elements of the products. Caregivers also tended to perceive follow-on formula (products suitable for use from 6 to 12 months of age and labelled as ‘Stage 2’ formula) and toddler milk as more similar to each other than infant formula (Yockney and Comfort 2013, pg 17).

Two additional studies were considered during the rapid evidence summary to support the Proposal P1028 – Infant Formula 2nd CFS (FSANZ 2023). Cattaneo et al. (2015) tested consumer understanding, in the context of broader advertisement, in an Italian cohort of mothers of infants aged 6–12 months (n = 572, results not reported) and pregnant women (n = 80) (Cattaneo et al. 2015). Pregnant women were recruited from antenatal clinics across eight sites in Italy in 2013 to participate in in-depth interviews. The majority of women were highly educated (56% with a university degree or higher) and had a paid occupation (75%). When asked about initial product identification during interviews, participants reported being misled by the numeral ‘2’. When asked specifically about the numeral ‘2’, 65% of women were unable to assign proper meaning at first glance. Incorrect interpretations included ‘added value’, ‘two cups’, ‘better than one’, ‘for two month old babies’ or ‘for two year old babies’. After careful reading, incorrect interpretation decreased to 38%. However, ‘two cups’, ‘better than one’ and ‘added value’ remained as incorrect interpretations.

FSANZ previously highlighted study limitations and differences in regulatory environments and population characteristics that limit the generalisability of these findings to the Australian

and New Zealand context. Nevertheless, the study provided some evidence that the meaning of stage labelling is not always well understood particularly at first glance. This evidence is for a different product class (follow-on formula) and different age group (i.e. less than 12 months of age) that are outside the scope of the current assessment.

M&C Saatchi World Services conducted a study for the World Health Organization and United Nations Children's Fund (M&C Saatchi World Services 2022) exploring the impact of marketing of breast milk substitutes[9] on infant feeding decisions and practices, including a focus on women's attitudes towards marketing of formula milk. Findings from the United Kingdom indicated that formula stages are influential in decision making, with one caregiver stating ""If you look at...Stage 2 and Stage 3..It's, kind of, 'Let's continue your journey. Let's help you.'...I felt like...the formula milk is a good thing because it will support your child's growth later on as they're growing…So, I feel like I was tricked into follow-on formula, to be honest" (M&C Saatchi World Services 2022) (pg 52). There is a strong sentiment in the United Kingdom that Stage 3 and 4 milks are not required, with messages from healthcare professionals also reflected in women's opinions. Of caregivers in the United Kingdom who were aware of Stage 3 and Stage 4 formula milks, 12% and 11% respectively perceived them as necessary compared to 71% to 92% for Stage 3 and 60% to 86% for Stage 4 in other countries[10].

*New evidence*

This scoping review identified one study from South Africa (Pereira-Kotze et al. 2022) that provided evidence towards how caregivers use and understand stage labelling.

Pereira-Kotze et al. (2022) conducted a qualitative study to explore South African mothers' exposure to marketing of commercial formula products and the impact of marketing on their attitudes to formula milk and infant feeding behaviours. Pregnant women (n = 7) and mothers of children aged 0 to 18 months (n = 13) living in Cape Town or Johannesburg were recruited in 2020 to complete a phone marketing diary for one week (taking screenshots and photos when they saw an advert or picture of a product or brand they considered as commercial formula or direct email and social media marketing). Ten of the 13 mothers were selected to complete semi-structured in-depth interviews. All participants were aged between 27 and 36 years and were predominantly of Black African ethnicity (n = 12). No information was reported on socioeconomic status, educational attainment, employment status, relationship status or parity.

South Africa regulates the marketing of commercial formula products for children under 36 months. Most participants reported that infant formula was not advertised but did report advertising of powdered drinks for growing children (products marketed for children older than 36 months). The authors noted that product packaging was used to cross-promote infant formula with products for older children. For example, a shelf talker illustrated new packaging for a range of products where cross-promotion was evident between the old and new packaging through brand names, colour schemes, font type, layout of labelling and imagery used for Stage 1, 2, 3 and 4 products.

There was confusion and misunderstanding regarding whether infant formula could be given

[9] Toddler and junior milks are not considered breast milk substitutes in Australia and New Zealand in line with the breastfeeding and infant and young child nutrition guidelines.
[10] Other countries included in the report by M&C Saatchi World Services (2022) were Bangladesh, China, Mexico, Morocco, Nigeria, South Africa and Vietnam

to an older child and vice versa. One mother of a 12-week-old infant was confused by what the number 4 (Stage 4 labelling) indicated on the tin, stating “I think it said four months if I’m not mistaken. I remember seeing a 4 on the actual can but I don’t really know specifically what age it’s for” (pg 5). These results provide some suggestion that caregivers may be confused by stage labelling, however it is a small convenience sample with very little detail provided for participant characteristics from a country with different regulations and cultural background to Australia and New Zealand.

Conclusion

The limited available evidence suggested that caregivers may have used stage labelling on young child formula products to guide purchasing decisions, however comprehension of stage labelling elements differed based on the population. In Australia and New Zealand, caregivers were familiar with product stages, but they prioritised age information for correct product identification. Some caregivers felt that stage labels implied progression between product stages was appropriate (progressing from Stage 1 and 2 products to Stage 3)(Yockney and Comfort 2013; M&C Saatchi World Services 2022). Internationally, particularly in Italy and South Africa, some caregivers highlighted confusion regarding the meaning of stage numbers including misinterpreting numerals as age or serving size indicators.

It was not clear whether caregiver perceptions and behaviour were due to the influence of stage labelling, other on-pack marketing or from other influences outside of the packaging of young child formula products. Some included studies had small non-representative samples that lacked demographic information. International findings are unlikely to be generalisable to Australia and New Zealand due to differences in population characteristics, cultural practices, national regulations and exposure to advertising.

## Research question 3: Does proxy advertising on young child formula products (i.e. referring to infant or follow-on formula or next/previous stage toddler/junior milks on products) influence caregivers’ perceptions and purchase decisions of young child formula?

FSANZ previously considered the influence of proxy advertising of later stage formulas (12 months +) on infant or follow-on formula packaging on caregivers’ perceptions and purchase intentions toward infant formula during Proposal P1028 – Infant Formula (FSANZ 2022, 2023). In the current assessment of young child formula, proxy advertising refers to the practice of representing other products within a range on the packaging of young child formula (e.g. references to infant formula, follow-on formula and/or “junior milk” on “toddler milk” packaging).

More broadly, cross-promotion captures the use of similar brand names, colour schemes, font types, packaging layouts and imagery across products within a range (World Health Organization 2019). During Proposal P1028 – Infant Formula, FSANZ clarified regulations related to product differentiation of infant formula and follow-on formula products and explicitly stated that these products must be differentiated from formulated supplementary foods for young children which includes young child formula. Therefore, the present assessment specifically focuses on references to products within a range on the labels of young child formula products.

*Previous evidence*

FSANZ considered five studies that explored elements of toddler milk packaging and broader marketing strategies that may have impacted caregivers' perceptions and purchasing behaviour, including four studies that included Australian or New Zealand caregivers (Berry et al. 2010; Berry et al. 2011; Berry et al. 2012; Yockney and Comfort 2013; Fleming-Milici et al. 2022). At the time of assessment of Proposal P1028 – Infant Formula, most manufacturers and importers of infant formula products in Australia and New Zealand were restricted from advertising infant formula products through voluntary agreements[11] that did not extend to toddler and junior milks (retailers were exempt).

Berry and colleagues conducted three studies to provide insights into Australian caregivers' perceptions and understanding of toddler milk advertising (Berry et al. 2010; Berry et al. 2011; Berry et al. 2012). Two studies using semi-structured interviews found that some caregivers considered toddler milk as a part of a broader range of 'formula' products and that some misattributed toddler milk advertising as adverts for infant formula products (Berry et al. 2010; Berry et al. 2011). Additionally, survey participants associated common marketing claims for toddler milks as being for infant formula products (Berry et al. 2012).

FSANZ previously noted that caregivers with one or more children may understand the advertisements differently than those with limited experience with infant formula products and/or toddler milk. Participants who viewed toddler milk advertisements and perceived them as for infant formula may have done so because they were either unaware of toddler milk as a concept or because the only glanced at the advertisements and didn't read enough text to understand what the product was.

Two additional studies noted that brand trust, particularly for brands that have a connection to infant formula products, influenced caregivers' decision-making (Yockney and Comfort 2013; Fleming-Milici et al. 2022). Fleming-Milici et al. (2022) noted that toddler milk and infant formulas were generally offered by the same brands with similar packaging and that caregivers transferred trust from infant formula brands to toddler milks. Yockney and Comfort (2013) noted that caregivers tended to continue purchasing products from the same brand and progressed through the product stages offered by the brand. Finding a brand that they considered trustworthy and reputable was important to reassure them that the product was safe for their child to consume.

No studies examined the effect of on-pack representations of other products within a range on caregivers' perceptions or purchasing decisions of young child formula or infant formula products.

*New evidence*

This scoping review did not identify any studies that specifically examined the effect of proxy advertising (references to other products on toddler milk packaging) on toddler or junior milk labels.

Conclusion

Based on studies previously considered by FSANZ, there was evidence that elements of proxy advertising (including labelling elements and likeness to infant formula products) could confuse caregivers into believing they have seen marketing for infant formula when they had

[11] The Marketing in Australia of Infant Formulas: Manufacturers and Importers Agreement 1992 (MAIF Agreement)

actually been exposed to young child formula products. There was limited evidence to indicate whether on-pack references to other products within a line impacted caregivers' perceptions and purchasing behaviours for young child formula.

# 4. Conclusion

This rapid scoping review of young child formula examined consumer evidence from January 2000 to July 2025 on three research questions:

1. How do caregivers use, and understand the purpose of, young child formula (marketed as toddler and junior milks)?
2. How do caregivers use and understand stage labelling on young child formula products (e.g. stage 3 and 4)?
3. Does proxy advertising on young child formula products (i.e. referring to infant or follow-on formula or next/previous stage toddler/junior milks on products) influence caregivers' perceptions and purchase decisions of young child formula?

Eleven primary research papers were identified during the review that provided evidence in addition to the 10 studies assessed during Proposal P1028 – Infant Formula. This included 10 studies (five new studies) with findings directly related to Australia and New Zealand for prevalence of young child formula use, factors associated with use, and the impact of nutrition content claims. Sixteen studies were assessed as high quality and five studies as medium quality.

Key findings

- Caregivers in Australia and New Zealand generally used young child formula for supplementary nutrition in addition to, or as a replacement for, cow's milk. Reasons for use included convenience, to assist with the transition from breastmilk or infant formula to cow's milk and solid foods, or for child comfort. In some cases, young child formula was chosen for its perceived nutritional benefits, particularly for children with fussy eating habits or where there were concerns about an inadequate diet.
- There was a belief among some caregivers from international studies that young child formula was a necessary next step to infant formula or breastfeeding. This view was influenced by healthcare professional recommendations and marketing strategies about possible health benefits and product positioning
- However, in certain countries (e.g. the United Kingdom), healthcare professionals and caregivers regarded young child formula as unnecessary, reflecting broader scepticism about its benefits.
- Nutrition and health claims were often noticed by caregivers and influenced perceptions including that young child formula was beneficial for health, superior to cow's milk, able to prevent illness and aided brain development.
- While Australian and New Zealand caregivers were aware of product stages (stage 1, 2, 3 and 4), they tended to rely more on age labelling information ('suitable for ages…') to select the appropriate formula.
- International research highlighted confusion among some caregivers regarding the meaning of stage numbers, with some caregivers mistaking them for child age, added nutritional value, or serving size, especially when their exposure to advertising was

brief and without careful reading.

- There was limited evidence regarding the specific impact of stage labelling on caregivers' progression through products, as opposed to other forms of marketing or external influences.
- Certain forms of proxy advertising, such as similar branding or packaging to infant formula, could lead to confusion among caregivers, causing them to mistake young child formula promotions for infant formula adverts. Brand trust, especially when associated with recognised infant formula brands, was a notable factor in purchasing decisions and movement through product stages.
- No studies were identified that directly examined the influence of on-pack references to other products within a range on caregivers' perceptions or purchasing behaviours with respect to young child formula.

Limitations

Most studies relied on convenience or non-probability samples and opportunistic recruitment methods, restricting the ability to generalise findings to wider populations. Limited demographic information in some studies made it challenging to determine how representative the results were or to account for confounding factors. Cross-sectional designs were frequently used which limited the ability to assess causality between young child formula labelling elements and related behaviours. Analyses were often descriptive, with only minimal statistical testing of relationships between variables. Australian cohorts tended to be highly educated, of higher socioeconomic status, predominantly female and living with a partner, whereas studies from other countries included more socioeconomically diverse populations, including representative of lower income caregivers. These differences, along with varying nutrition literacy, cultural influences, regulatory environments, and advertising exposure, may affect how applicable the findings are to the Australian and New Zealand context.

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# Appendix 1 – Method

*Searching*

Online database searching including six online databases accessed through the FSANZ library using the EBSCO Discovery Service:

- Science Direct
- Food Science Source
- FSTA - Food Science and Technology Abstracts
- MEDLINE with Full Text
- SocINDEX with Full Text
- EconLit with Full Text

The search terms were also run through the Web of Science online database.

Online database searches were undertaken with two Boolean search term strings for the initial bridging search from Proposal P1028 – Infant Formula. Searches were limited to peer-reviewed papers available in English and published between May 2022 (end date of the previous review) and July 2025.

Search string for Proposal P1028 – Infant Formula Research Question 1:

(“Infant formula*” OR “follow on formula*” OR “baby formula*”) AND (“Toddler milk*” OR “toddler formula*” OR “toddler drink*” OR “growing up milk*”) AND (Advert* OR market* OR claim* OR proxy OR promot* OR conflat* OR stage label* OR age* OR label* OR line market* OR packag* OR caregiver OR perception* OR understand* OR knowledge* OR behav* OR react* OR purchas* OR intent* OR buy* OR shop*)

Search string for Proposal P1028 – Infant Formula Research Question 2/3[12]:

TI (“infant formula*” OR “baby formula*” OR “follow on formula*” OR “toddler milk*” OR “toddler formula*” OR “growing up milk*”) AND AB (label* OR market* OR advert* OR promot*) AND AB (stage* OR line OR proxy OR number* OR age OR “cross promotion”)

Due to the identification of two published scoping literature reviews (Richter et al. 2023b; Cavalcanti et al. 2024) that included additional relevant peer-reviewed studies that weren’t captured in these searches, an additional search was conducted using the same databases and limitations between January 2000 and July 2025. Due to the scoping nature of this search, the search terms were purposefully broad.

New search string:

(“growing up milk*” OR “young child formula*” OR “growth formula” OR “growing up formula” OR “toddler milk*” OR “toddler formula*” OR “toddler drink*” OR “junior milk*” OR “stage 3 formula*” OR “stage 4 formula*”) AND (Claim* OR proxy OR promot* OR conflat* OR “stage label*” OR age* OR label* OR “line market*” OR package* OR caregiver OR perception* OR understand* OR knowledge* OR behave* OR react* OR purchas* OR intent* OR buy* OR shop* OR use* OR “cross promotion” OR number*)

[12] TI indicated that the term must be in the title of the study. AB indicates that the term must be in the abstract of the study.

*Screening*

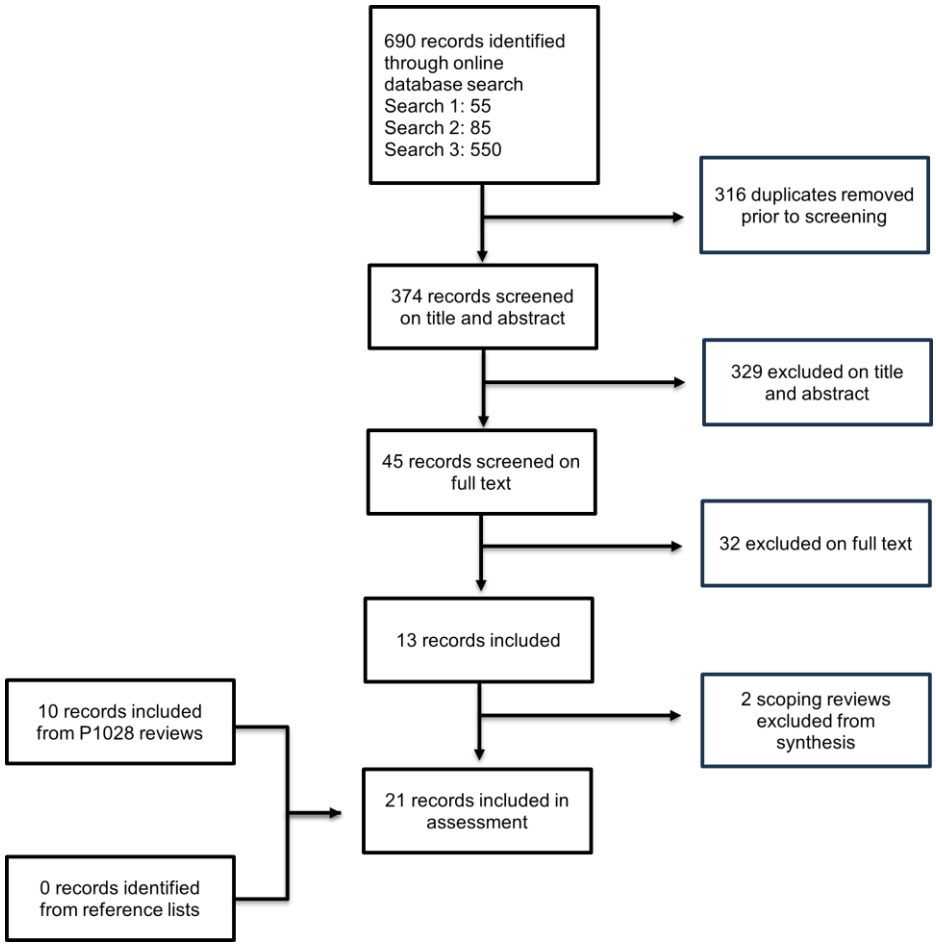
Screening was undertaken by one officer using EPPI Reviewer. Exclusion criteria were determined prior to the literature review process commencing. Search string one identified 35 potential documents after duplicates were removed. Search string two identified 57 potential documents after duplicates were removed. Search string three identified 282 potential documents after duplicates were removed.

The exclusion criteria for research questions included:

- Clinical studies – e.g. on the effect of infant formula ingredients on outcomes
- Studies of nutrient deficiencies in populations
- Studies only exploring infant formula or follow-on formula
- Effect of off-pack marketing
- Market surveys
- Any studies that did not explore caregivers' perceptions, attitudes or behaviours or prevalence of young child formula use.

Papers were first screened on title and abstract, before being screened on full text. This resulted in the inclusion of 13 full text documents. 2 scoping reviews were excluded from the narrative synthesis. No additional studies were identified from the reference lists of any included studies (all relevant papers already captured). Figure A1 shows the number of documents retrieved and screened at various stages of the review process.

**Figure A1: Number of documents retrieved at various stages of the review process.**



No additional grey literature reports were identified that directly addressed the research questions.

*Data extraction and synthesis*

Data extraction and a narrative synthesis was undertaken by one officer. This involved summarising and critiquing the available evidence for each research question and integrating with previous research assessed during Proposal P1028 – Infant Formula (FSANZ 2022, 2023). Peer review was undertaken by one FSANZ social scientist.

*Quality assessment*

The quality of each study and report was assessed against the following criteria (a revised Quality Assessment Tool for Studies with Diverse Designs) to deliver a rating of low, medium or high:

- Research background and aims: the study is appropriately justified and located in the body of existing theory and has clear aims
- Sampling and recruitment: the population being sampled is relevant to the aims of the study; the sampling approach is appropriate and clearly detailed
- Methods and measures: the methodology is clear and appropriate to the sample and aims of the study; measures, tools, questionnaires and guides are reliable/validated and clearly described
- Analysis: the analytical approach is appropriate for the data collected and includes details of statistical tests performed, qualitative analysis approach and explanation of coding frames
- Ethics approval obtained or reason for exemption explained
- Reporting: the strengths and limitations of the study have been identified and critically discussed

The two scoping reviews were assessed using a modified version of the Joanna Briggs Institute (JBI) Checklist for Systematic Reviews and Research Syntheses (Aromataris et al. 2015).

# Appendix 2 – Summary of studies

### *Table A2.1: Studies and reports contained in the review*

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
|---|---|---|---|---|---|
| *(Berry et al. 2010)*<br><br>*2007* | Australia<br><br>Women >18y pregnant with their first child<br><br>N = 15 | To examine pregnant women's beliefs of what toddler milk advertisements were trying to tell them and how they responded to these messages. | Qualitative – Semi-structured interviews.<br><br>Pregnant women were shown print advertisements for toddler milk products. | At first glance, most women reported the product as 'formula' or 'infant formula'. After reading through the advertisement, they reported the products were for toddlers. Most women noted that they wouldn't normally read through the full advertisement enough to identify that the product was for toddlers. | High |
| *(Berry et al. 2011)*<br><br>*2009* | Australia<br><br>1 general practitioner, 1 community dietician, 4 mothers/expectant mothers, 4 grandmothers/expectant grandmothers, 7 Child and Family Health nurses<br><br>N = 17 | To explore sources of information on formula milk products, how toddler milk advertisements are interpreted and how claims in advertisements are evaluated. | Qualitative – Semi-structured individual and group interviews.<br><br>Interviewees were shown print advertisements for toddler milk products. | All participants identified health professionals as important sources of information about infant formula. Other mothers and grandmothers were also a source of information for mothers.<br><br>When shown toddler milk advertisements, participants often identified them as 'formula' despite understanding the product was intended for children >12 months. | Medium |
| *(Berry et al. 2012)*<br><br>*2008* | Australia<br><br>Parents with a child <5 years or expecting a child<br><br>N = 439 | To investigate if parents recalled seeing advertisements for infant formula products and messages from the advertisements. | Quantitative – Survey conducted face-to-face using a convenience sample | 92% of respondents believed they had seen an advertisement for formula. 67% reported seeing a formula product suitable from birth in an advertisement, 45% from 4 to 6 months, and 56% from 12 months. Of 5 infant formula products depicted on the survey, 91% reported seeing advertisements for at least one product.<br><br>Advertising of infant formula was prohibited by the MAIF at the time of the study and no breaches were reported indicating that parents likely conflated toddler milk advertising as infant formula advertising. | High |
| *(Yockney and* | Australia and New Zealand | To examine consumer | Qualitative – Analysis of three | Caregivers used toddler milk mainly as a | High |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
|---|---|---|---|---|---|
| *Comfort 2013)*<br><br>*2013* | Caregivers of infants and young children aged 6 to 36 months<br><br>N = 137 | understanding, perceptions and uses of infant formula, follow-on formula and toddler milk. | online discussion forums developed for research participants | dietary supplement. For children aged 12–24 months, it was offered as a drink, in food, for comfort at bedtime, or as a snack. From 24–36 months, its use declined and was primarily for comfort or in cases of cow's milk allergy.<br><br>Caregivers accurately identified the appropriate age for each product (infant formula, follow-on-formula and toddler milk) and purchased products accordingly. | |
| *(Cattaneo et al. 2015)*<br><br>*2013* | Italy<br><br>Pregnant women between 32- and 36-weeks gestation and mothers of children aged 0 to 3 years<br><br>N = 80 pregnant women<br>N = 562 mothers of children aged 0 to 3 years | To assess how advertisements for follow-on formula were presented to and understood by pregnant women and mothers of young children. | Mixed design including in-depth interviews and a cross-sectional survey | When asked specifically about the numeral 2 during interviews, (a component of stage labelling), 65% of pregnant women were unable to assign correct meaning at first glance with interpretations including '2 cups', 'for two-month-old babies' and 'for two-year-old babies'. After careful reading, incorrect interpretations decreased to 38%. | High |
| *(Cairncross et al. 2017)*<br><br>*2012* | New Zealand<br><br>Children aged 2 to less than 5 years and their caregivers<br><br>N = 1,329 | To determine predictors of vitamin D status and develop a tool to predict low vitamin D concentrations | Quantitative – blood testing and cross-sectional survey | 6% of children sampled ever consumed toddler milk.<br><br>Toddler milk consumption had no risk of vitamin D deficiency (<25nmol/L of 25(OH)D). Children who did not consume toddler milk had over 3 times higher odds (OR 3.19, 95% CI: 1.85, 5.48) of being at risk of vitamin D inadequacy (<50nmol/L of 25(OH)D). | High |
| *(Bolton et al. 2018)*<br><br>*2010–2011* | Australia<br><br>Chinese-born mothers and a randomly selected equal-sized sub-sample of Australian-born mothers of infants aged 0 to 24 months<br><br>N = 602 per group | Using data from the 2010 Australian National Infant Feeding Survey, this study examined feeding practices and compared differences between infants of Chinese-born and Australian-born mothers. | Quantitative – Cross-sectional nationally representative survey | 11.7% of infants of Chinese-born mothers and 6.0% of infants of Australian-born mothers ever consumed toddler milk.<br><br>Infants of Chinese-born mothers were over 3 times more likely to have ever consumed toddler milk compared to infants of Australian-born mothers (OR 3.39, 95% CI: 1.60, 7.18). | High |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
|---|---|---|---|---|---|
| *(Romo-Palafox et al. 2020)*<br><br>*2017* | United States<br><br>Caregivers of children aged 6 to 36 months<br><br>N = 1,645 | To measure milk type provision to children, assess caregiver confusion between infant formula and toddler milk and assess agreement with claims and expert recommendations | Quantitative – Cross-sectional online survey using non-probability sample | In the past month, 22% of infants aged 6 to 11 months (11% as most common product), 44% of toddlers aged 12 to 23 months and 41% of toddlers aged 24 to 36 months consumed toddler milk.<br><br>60% of caregivers agreed that toddler milk provided nutrition that toddlers don't get from other food and drinks. Caregivers were 1.59 times (95% CI: 1.41, 1.79, p <.001) more likely to serve toddler milk in the past month if they agreed with this claim. | Medium |
| *(Romo-Palafox and Harris 2021)*<br><br>*2017* | United States<br><br>Caregivers of children aged 6 to 36 months<br><br>N = 1,607[1] | To assess prevalence of serving non-recommended beverages and exploring differences in milk provision by sociodemographic factors | Quantitative – Cross-sectional online survey using non-probability sample | In the past month, 22% of infants aged 6 to 11 months consumed toddler milk, however 18% were also served infant formula (4% only received toddler milk). 33% of toddlers aged 12 months (16% as most common milk product), 45% of toddlers aged 13 to 23 months (23% most common product) and 41% toddlers aged 24 to 36 months (21% most common product) received toddler milk.<br><br>No significant relationship between the provision of toddler milk and infant formula (β –0.05, 95% CI: –0.15, 0.05; p = 0.36). | High |
| *(Duffy et al. 2021b)*<br><br>*2019* | United States<br><br>Latino parents with a child aged 2 to 18 years; 24% with a child aged 0 to 3 years<br><br>N = 58 | To examine Latino parents' experience with toddler milk, understand perceptions of healthfulness and nutrition-related claims, and describe exposure to toddler milk advertising | Pilot study – naturalistic laboratory shopping task and online survey using a convenience sample | 93% of parents had ever seen toddler milk in a retail setting. 44% reported ever purchasing toddler milk including 21% purchasing toddler milk 10 or more times. 51% specifically reported purchasing 'Nido' brand of toddler milk, suggesting that 7% may not consider the brand as a toddler milk product.<br><br>Parents reported purchasing toddler milk as they provide nutrients, support growth, support brain development, they previously drank toddler milk themselves | Medium |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
|---|---|---|---|---|---|
| | | | | as children, and their child likes the taste.<br><br>Most parents responded positively when interpreting claims related to growth and immunity. | |
| *(Duffy et al. 2021a)*<br><br>*2019* | United States<br><br>Latino (48%) and non-Latino (52%) parents with a child aged 2 to 12 years; 35% with a child aged 0 to 3 years<br><br>N = 1,078 | To explore why parents provide toddler milk to children, describe interpretations of claims, and explore correlations between perceived healthfulness and past purchasing | Quantitative with qualitative component – Cross-sectional online survey with one open-ended response question using a convenience sample | 79% of parents reported ever seeing toddler milk in a retail setting. 51% previously purchased toddler milk include 23% purchasing toddler milk 10 or more times.<br><br>Parents reported purchasing toddler milk as they provide nutrients (57%), support growth (51%), support brain development (38%), perceived toddler milk as healthy (32%) and their child liked the taste (25%). Most parents though toddler milk was as healthy (38%) or healthier (44%) than cow's milk.<br><br>Parents were more likely to have ever purchased toddler milk if they drank sugary beverages daily or more frequently, completed a college degree or higher, aged between 18 – 29 years compared to 40+, lived in the US for less than 10 years, were male and if they were Latino. | Medium |
| *(Willcox et al. 2021)*<br><br>*2017* | Australia (Sydney, Brisbane, Melbourne), Indonesia (Jakarta), Singapore, Thailand (Bangkok)<br><br>Mothers with a child aged 12 to 36 months<br><br>N = 1,051 (252 Australia, 275 Indonesia, 261Singapore, 263 Thailand) | To evaluate the frequency of growing-up milk use and to understand associations with demographic factors | Quantitative – cross-sectional survey using a convenience sample | Feeding frequency of growing-up milk significantly varied between countries: 78.5% (Singapore), 75.3% (Thailand), 63.7% (Indonesia) and 31.8% (Australia) of mothers fed growing-up milk to their child once or more per week.<br><br>Mothers in Thailand, Indonesia and Singapore had significantly higher odds of feeding growing-up milk once or more per week compared to Australian mothers. | High |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
|---|---|---|---|---|---|
| | | | | Mothers 31–35 and 36+ years (compared to ≤30 years) and those with a secondary education or less (compared to tertiary educated) were less likely to provide growing-up milk once or more per week. Mothers that worked full time and who fed infant formula to their child in the first 12 months were more likely to provide growing-up milk once or more per week. | |
| *(M&C Saatchi World Services 2022)*<br><br>*2019–2021* | Multiple countries: Bangladesh, China, Mexico, Morocco, Nigeria, South Africa, United Kingdom, Vietnam<br><br>Pregnant women and mothers of children 0 to 18 months, health professionals, partners, family and friends<br><br>141 phone diaries<br>91 focus groups (pregnant women and mothers)<br>70 in-depth interviews (pregnant women and mothers)<br>302 interviews (health professionals)<br>22 focus groups with partners, family, friends<br>10 in-depth interviews with marketing executives (China only)<br>3 focus groups with full-time child minders (China only)<br>8,258 face-to-face quantitative surveys (approximately 1,050 pregnant women and mothers per country) | To explore how women and mothers make decisions regarding infant and young child formula (using consumer and market research methods) | Mixed methods – desk review and marketing analysis, qualitative focus groups and in-depth interviews and quantitative cross-sectional surveys using convenience and non-probability samples | Some caregivers from the United Kingdom indicated that formula stages are influential in decision making and progressing through products. Caregivers in the United Kingdom who were aware of stage 3 and 4 products were less likely to perceive the stage 3 (12%) and 4 (11%) products as necessary compared to caregivers in other surveyed countries (between 71% and 92% for stage 3 and 60% and 86% for stage 4; 94% for stage 3 and 4 combined in Vietnam).<br><br>The authors noted the widening of product ranges normalises the feeding of formula beyond infancy and into early childhood with stage labelling setting an implied order. | High |
| *(Moumin et al. 2022)* | Australia | Using data from the 2021 Australian Feeding and | Quantitative – Cross-sectional phone survey using a | 13.5% of children aged 12 to 24 months consumed toddler milk on the day of the | High |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
|---|---|---|---|---|---|
| *2020–2021* | Caregivers of children 0 to 24 months<br><br>N = 976 | Toddlers Study, estimated mean energy and nutrient intake of the population including inadequate intake against nutrient reference values. | convenience sample | survey. No inappropriate toddler milk provision (prior to 12 months) was reported. | |
| *(Fleming-Milici et al. 2022)*<br><br>*2019* | United States<br><br>Parents with children 9 to 36 months<br><br>N = 9 focus groups with 50 parents | To explore parents' perceptions of marketing tactics of sweetened fruit drinks and toddler milk, to see if these mislead parents to believe the drinks are necessary and healthy, and parents' responses to information about drink ingredients and package claims | Qualitative – focus groups using convenience sample | Parents raised that the connection between infant formula brands conveys toddler milks as necessary and the next step, particularly during transition phases. One parent thought of toddler milks as a better alternative to snack foods.<br><br>Trust for infant formula brands was transferred to toddler milks from the same brands. | Medium |
| *(Richter et al. 2022)*<br><br>*2020* | United States<br><br>Parents of a child aged 1 to 5 years<br><br>N = 2,190 | To determine the impact of structure/function claims on parents' intention to serve toddler milk and perceived healthfulness of toddler milk | Quantitative - Randomised experiment using a convenience sample through an online panel | 40% of parents ever served toddler milk to their child: 36% <9 months, 49% between 9 and 12 months, 68% between 13 and 24 months, 54% between 25 and 36 months, 38% ≥37 months.<br><br>Parents exposed to a brain development claim or an immunity claim were more likely compared to a control claim to consider toddler milks as healthier or as healthy as cow's milk, intend to provide toddler milk to their child, perceive toddler milk as healthy for everyday consumption, believe they would be recommended by a paediatrician, and believe toddler milk could prevent illness.<br><br>Parents exposed to the brain development claim were more likely to believe toddler milk could make a child smarter. | High |
| *(Zahra et al. 2022)* | Australia<br><br>Vietnamese-born mothers and | Using data from the 2010 Australian National Infant Feeding Survey, this study | Quantitative – Cross-sectional nationally representative survey | 15.9% of infants of Vietnamese-born mothers and 1.9% of infants of Australian-born mothers had ever | High |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
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| *2010–2011* | a randomly selected equal-sized sub-sample of Australian-born mothers of infants aged 0 to 24 months<br><br>N = 261 per group | examined feeding practices and compared differences between infants of Vietnamese-born and Australian-born mothers. | | consumed toddler milk.<br><br>Infants of Vietnamese-born mothers were over 16 times more likely to have ever consumed toddler milk compared to infants of Australian-born mothers (OR 16.72, 95% CI: 3.11, 90.09). | |
| *(Vilar-Compte et al. 2022)*<br><br>*2020* | Mexico<br><br>Pregnant women and mothers of children 0 to 18 months<br><br>N = 1,044 | To describe maternal awareness, beliefs and sources of information of follow-up formula and growing-up milk | Quantitative – Face-to-face cross-sectional survey using a non-probabilistic sample | 14.8% of women (8.5% pregnant women, 17.2% mothers, p <.001) intended to use or actually used growing-up milk. Women mostly commonly reported a recommendation from a doctor to use growing-up milk.<br><br>19.0% of women (12.8% pregnant women, 21.4% mothers, p = .003) were aware of growing-up milk. Of these, 60% believed older infants required the product.<br><br>Perceived benefits included for their child's future, brain development, growth, reduction in hunger and for allergies. Pregnant women were more likely to perceive that breast milk did not have sufficient nutrients as a reason for providing growing-up milk. | High |
| *(McCann et al. 2022)*<br><br>*2020* | Australia<br><br>Caregivers with a child aged 1 to 3 years<br><br>N = 284 for first DCE (snack food), 207 for both DCEs (snack food and toddler milk) | To identify the impact of different regulated and unregulated claims on caregivers' perceptions of healthiness of toddler snack food and toddler milk | Quantitative – online discrete choice experiment (two DCEs: i) toddler snack food and ii) toddler milk) | Participants were significantly more likely to select a toddler milk as healthier if it contained any regulated and unregulated claim compared to the reference level (except for one unregulated health-related ingredient claim).<br><br>The strongest perceptions of healthiness were for "2 serves = up to 50% of RDI recommended dietary intake of 14 vitamins and minerals" (OR 2.65, 95% CI: 2.14, 3.29, p <.001) and "Zinc for immune function, Iron and iodine for cognitive development, Vitamins A,C,D and E for | High |

| Authors, year of study | Country, study population and sample size | Study aim | Design | Key findings | Study quality |
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| | | | | growth and development, Calcium and vitamin D for strong bones and teeth" (OR 2.36. 95% CI: 1.91, 2.91, p <.001). | |
| *(Pereira-Kotze et al. 2022)*<br><br>*Sub-study of (M&C Saatchi World Services 2022)*<br><br>*2020* | South Africa<br><br>Pregnant women and mothers of children aged 0 to 18 months<br><br>N = 20 for phone marketing diaries (7 pregnant women and 13 mothers); 10 of these mothers for in-depth interviews | To understand the exposure of pregnant women and mothers to commercial formula product marketing | Qualitative – mobile phone marketing diaries and in-depth interviews using snowball convenience sample | Participants described limited exposure to infant formula marketing but highlighted multiple strategies to market products for older infants and young children including cross-promotion with products that are prohibited from advertising.<br><br>One mother noted confusion with what the numeral '4' meant. | High |
| *(Richter et al. 2023a)* | United States<br><br>Caregivers of children 9 to 36 months<br><br>N = 4 focus groups with 18 participants and 15 in-depth interviews | To understand caregivers' perceptions and intentions around toddler milk, reactions to health claims and product warnings, and differences in perceptions by Latinx and non-Latinx ethnicity | Qualitative – focus groups and in-depth interviews | 60% of caregivers fed their child toddler milk once or more daily.<br><br>Caregivers reported confusion between toddler milk and infant formula due to similarities in appearance and small age labelling. Some perceived toddler milks as healthy and healthier compared to cow's milk due to nutrient content.<br><br>Reasons for use included convenience and flexibility, their child liked the taste, they help with immunity and growth and aid with the transition from formula to regular milk. | High |

Notes: Berry et al. 2010; Berry et al. 2011; Berry et al. 2012; Yockney and Comfort 2013; Cattaneo et al. 2015; Romo-Palafox et al. 2020; Romo-Palafox and Harris 2021; Fleming-Milici et al. 2022; M&C Saatchi World Services 2022; and Moumin et al. 2022 were previously assessed during Proposal P1028 – Infant Formula. [1] The study population reported by (Romo-Palafox and Harris 2021) includes all participants in the multivariable model (participants with missing data for any adjusted variables were removed).