



Australian
National
University

A rapid evidence assessment

**Does marketing of commercially
available complementary foods affect
infant and young child feeding?**

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Executive summary

This report contains the rationale, methods and outcomes of a rapid evidence review conducted to identify the available evidence to inform two research questions asked by the World Health Organization (WHO) Scientific Technical Advisory Committee;

1. *What does the literature report on the effects of marketing of commercially available complementary food (including drink) products for infants and young children, on the feeding attitudes and behaviours of their caregivers?*
2. *What do recent systematic reviews of the literature report regarding the effects of marketing of: child-oriented food products, pharmaceutical products, BMS, alcohol, tobacco and tobacco related products to women especially parents, on outcomes which will usefully inform the primary research question?*

The review was conducted over eight weeks in April-May 2015. The review used a systematic search and review strategy to identify relevant articles. This report summarises the number, range and broad quality of studies providing evidence of actual or potential effects of marketing of commercial available complementary foods (CACF) on caregiver Infant and Young Child Feeding (IYCF) attitudes or behaviours regarding complementary feeding. Articles were included if they described investigations pertaining to the effect of IYC food product marketing to caregivers of infants or young children under 3 years of age, and also considered IYCF outcomes > 6 months, or early introduction of complementary foods (CF) or follow-up formulas/formula milks (< 6 months). Studies that considered a relevant marketing exposure and described a relevant IYCF outcome were included, even if the outcome could not be causally attributed to, or statistically associated, with the marketing exposure. The scope of the review included commercially available ready-to-use food (RUF) or nutrient supplements and studies of social marketing or food assistance programs, where there was a private sector partner and/or the product was available for sale. All study designs were eligible for inclusion. Included were studies from peer-reviewed and grey literature, with publication date after 1 January 1981 (the year the WHO Code of Marketing of Breast-milk Substitutes (“the WHO Code”) was introduced) to the search date.

The review identified and synthesised available evidence from 22 relevant industry marketing studies, and 75 academic publications on the effects of marketing of CACF on the optimal feeding of children 6 to 24 months, and the effects of marketing which ‘spill-over’ to feeding practices of infants (aged to < 6 months). It also identified, summarised and synthesised 16 relevant systematic reviews on: marketing techniques; marketing effects, and marketing regulation of tobacco, alcohol, pharmaceutical products and breast milk substitutes (BMS); and food and beverage marketing to children.

Literature informing research question 1

Industry marketing studies

The 22 industry accounts of marketing campaigns provide valuable contemporary and real world context and new information and perspectives which informed our review of the evidence from academic studies on effects of marketing of IYC food products.

The studies describe the marketing of CACF by leading companies and brands in the IYC food product industry, and identify a variety of marketing techniques. They illustrate key features of marketing including emerging marketing innovations and corporate competitive strategies. Of concern are industry accounts of exploiting mothers' high motivations and lack of confidence and knowledge, to promote their CACF products.

The industry accounts of successful marketing campaigns provide evidence that industry perceives expenditures on marketing of CACF as effective in increasing market share and sales.

These studies also provide information on industry perspectives and responses to regulatory constraints on marketing of IYC food products and/or successful health promotion of breastfeeding. They show that industry marketing perceives and adapts to the adverse effects of marketing regulation on sales, and health promotion (especially promotion of breastfeeding) which adversely affects sales of CACF. Industry perceptions are no doubt informed by evidence on sales which is available to advertisers, but these are unlikely to be published due to commercial sensitivities.

Academic studies

Optimal IYCF involves continued breastfeeding to 2 years and beyond, as well as early and exclusive breastfeeding for 6 months. After 6 months, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond. As well as being *timely*, complementary feeding should be *adequate*, meaning that the CF should be given in amounts, frequency, consistency and using a variety of foods, to cover the nutritional needs of the growing child while maintaining breastfeeding. The academic literature reported evidence of movement both towards and away from optimal IYCF in association with marketing of CACF.

The review of academic studies provided evidence that marketing of CACF affects the IYCF knowledge, attitudes, preferences and behaviours of caregivers. The 75 included studies contained diverse quality of evidence that marketing of CACF, including drinks and formula milks, increases their use (including where public/private partnerships make such products cheaper or free) and negatively impacts exclusive breastfeeding, breastfeeding duration, or early introduction of solids. A total of 53 academic studies measured or included observations on IYCF behaviours influenced by marketing. In 35 studies the

review categorised these reported effects of marketing as 'harmful' (i.e. moving away from optimal IYCF), in 12 studies as positive (i.e. moving towards optimal IYCF), and in eight cases as mixed or ambiguous.

Marketing of CACF is pervasive and common, and this is reflected in the difficulties the literature reported on identifying, attributing, and accurately measuring its effects. Further, IYCF practices are closely interrelated: as industry marketing focusses on the IYC food product market segment rather than BMS or CF separately, distinguishing the effects of BMS marketing from CF marketing is also problematic. Most academic studies identified and reviewed did not have a primary focus on CF or CACF marketing, and most described rather than measured behaviour or attitude changes. Few studies were identified which quantitatively and causally link CACF exposure and IYCF outcomes.

Caregivers studied were mainly mothers or health professionals, in a variety of countries, and with diverse socioeconomic characteristics. Caregivers were exposed to marketing in both community and health services settings, and through a variety of media. The included studies show marketing of a range of commercial IYC food products, through diverse techniques, especially promotion through direct-to-consumer advertising.

The literature reported two potential types of effects of CACF marketing of most relevance to optimal IYCF practices; direct effects on practices 6-24 months, and indirect 'spill-over' effects on infants < 6 months and for other food products. Broadly, these were reflected in evidence of,

- ❖ Movement away from exclusive breastfeeding in infants < 6 months
- ❖ Reduction in the duration of breastfeeding
- ❖ Increased use of CACF products including formula milks for children 6-24 months, with displacement of home-prepared CF (whether of inadequate, adequate or superior quality) and of breastfeeding or breast milk intake, and;
- ❖ Reduced exclusive breastfeeding and increased prevalence of early introduction of CF and BMS < 6 months, to the extent that CACF marketing activity exposes the wider public and influences attitudes and behaviours, including of caregivers of infants < 6 months.

Furthermore, there is some evidence that marketing of CACF is associated with changes in nutrition quality which may:

- ❖ move IYCF away from optimal nutrition by increasing consumption of foods with excessive sugar, salt, or fats, or
- ❖ move IYCF towards optimal nutrition by increasing nutritional quality of home-prepared CF.

The review found evidence of marketing of CACF through public/private partnerships and social marketing programs, and through providing such products free or at low cost

through public or humanitarian food and nutrition programs. Along with pricing, gaining the endorsement of public or non-profit agencies in this way is an important marketing technique. There was some evidence that such pricing interventions and endorsements:

- ❖ make nutritionally adequate CACF products affordable for disadvantaged populations and displace poor quality home CF or BMS offered for older infants and young children
- ❖ increase the affordability of timely and adequate CF (including frequency of feeding and serving size, as well as quality).

There were 13 higher quality academic studies categorised as 'silver', 'gold' or 'platinum' studies (including some with funding contributed by industry). These were mainly of populations targeted by public or humanitarian programs involving public/private partnerships and/or involving social marketing. They showed that marketing of CACF using pricing (free or low cost product) CACF is effective in influencing CF behaviours, though effects are potentially both positive and harmful to optimal IYCF. Spill-over effects to caregivers of infants < 6 months, or influences on other IYCF behaviours such as continued breastfeeding or provision of home prepared CF were not evaluated in most such studies.

Marketing of CACF is based on understanding and playing to mothers' concerns about their children's nutrition and health needs and marketing their products based on such concerns and vulnerability.

Attitudinal outcomes of marketing were examined in 50 of the studies. These showed that marketing of CACF can mislead and confuse caregivers about nutrition- and health-related qualities of CACF, and about age-appropriate and safe use. Such marketing strategies included: promotion using apparently scientific-sounding appeals from the authority of experts or science; advertising; labels; branding and brand crossovers; and placement of promotional materials in authoritative (e.g. healthcare services) settings or public or humanitarian programs. Marketing which promoted the merits of CACF also led some mothers to question the comparative nutritional value of breast milk and breastfeeding or home-prepared CF foods.

Product warning labels were valued by consumers, but were difficult to read and understand, and lacked necessary information to prevent inappropriate use.

Brands/logos/pictures and labelling including health claims were generally found to affect caregiver attitudes and were actually or potentially confusing or misleading about necessary, appropriate or safe use. Warnings or information labels often did not contain necessary warnings, such as about appropriate age of use, serving size or frequency, and were poorly adhered to.

Summary

The concern that marketing of CACF may reduce rates of optimal IYCF and spill-over to non-target caregivers' attitudes and behaviours through making CACF desirable and normal (including among those for whom CACF are unaffordable) is supported by the evidence identified in this review. There is evidence that marketing indirectly encourages early introduction of CF and BMS, and the displacement of suitable home-prepared CF. Early introduction or excessive servings, energy density or frequency of CF will also displace rather than add to the nutritional value of breast milk intake thereby undermining continued breastfeeding for young children 6-24 months.

Literature informing research question 2

In addressing our secondary research question regarding relevant marketing of child-oriented food products, pharmaceutical products, BMS, alcohol, and tobacco and tobacco related products, the review of reviews mostly suggests strong benefit of suitably comprehensive regulatory measures to restrict marketing of unhealthy products in order to create environments that support healthier choices and to direct interventions at the cause of the problem. It provided considerable high quality evidence from other areas of marketing research that show that marketing is effective.

The ethical question about marketing to a vulnerable group, such as mothers of children, is the extent to which they can actually exercise 'free choice' against the strong and pervasive pressures of marketing, and the extent to which they can make informed choices. Marketing of complementary foods has considerable potential to unethically exploit the vulnerability of caregivers in this transitional stage of their lives. This is especially so given the growing number of more affluent but relatively 'marketing-naïve' consumers in middle income countries.

A number of marketing practices identified in this review, such as relationship building via social media sites, endorsements by health professionals, sponsorship of mothers groups or baby clubs, giveaway samples of branded products, and provision of branded educational materials, can be argued to constitute degrees of 'stealth marketing' whereby mothers may not fully realise that particular products are being promoted to them. If they trust the source endorsing the product, they may be being misled, or even coerced, into purchasing the product.

Against this background, it can be argued that it is necessary to identify evidence justifying the absence of regulation of IYC food product marketing, rather than the justification for it. The onus is on opponents of such regulation to show that CACF marketing is beneficial for optimal IYCF overall, including without harmful spill-over effects. Such evidence appears to be lacking.

Conclusions

This review summarises a diverse body of literature addressing the association between marketing of CACF on IYC caregiver attitudes and behaviours on optimal IYCF. This body

of literature describes caregiver use of CACF and indicates that marketing of CACF can move caregivers away from optimal IYCF practices. There is insufficient evidence to conclude that marketing of CACF is not undermining optimal IYCF.

Our review of reviews confirms that evidence exists from high quality studies on marketing of health-related products, such as tobacco, alcohol, pharmaceuticals, BMS, and marketing of foods to children, that marketing is effective, and conversely for most of these products, that comprehensive and evidence based regulation works to constrain it. There is no specific evidence to suggest that such findings are not applicable to the marketing or social marketing of commercial IYC food products.

Discussion

Food systems are changing rapidly. In the past decade there has been rising concern that the spread of modern food systems and marketing is adversely affecting population nutrition and health. Such concerns particularly apply to infant and young child feeding, because of the pervasive and sometimes dire effects on health and development of infants and young children, and on formation of future eating habits and adult chronic disease risk. Diet-related chronic disease is a rapidly growing problem in low and middle income countries, as well as high income countries, implying a 'double burden' of malnutrition for countries where the same population contains both undernourished and overweight children. CACF and supplements are seen as a potentially cheap and cost effective way of improving CF quality in malnourished IYC populations, in the same way that commercial BMS are argued to improve BMS quality by replacing poor quality home prepared milk products fed to infants < 6 months.

Marketing of CACF is just one factor shaping nutrition and health behaviours regarding infant and young child feeding. Important wider determinants of CF practices, and longer term nutrition and health include gender and household income inequalities, and the degree of exposure to modern food systems and food marketing. There is also the varied and complex influence of variables such as the quality of maternal and child health services, education of caregivers (including on optimal IYCF particularly continued breastfeeding), maternal employment and maternity protection, and urban residence. An important determinant of early CF appears to be whether the mother has also initiated bottle- or formula milk feeding.

While improving CF availability and affordability can target short-term nutrition and health of infants and young children, it is important to address these key longer term social and economic determinants.

This review identified pervasive IYC food product marketing, brand extension or brand stretching of CACFs and cross media marketing, strategic industry marketing responses to avoid constraints of narrow regulation, and ineffectiveness of voluntary regulation by industry. Marketing is occurring in a variety of settings, and with growing use of electronic

media is affecting IYCF attitudes and behaviours across national borders. In the light of such findings, it is suggested that the harms of unregulated marketing exceeds the benefits of continued marketing of CACF. The responsible and proportionate public health response is a comprehensive approach to controlling the marketing of such products in all settings and countries. As industry adapts to regulation, a comprehensive and integrated response is needed, and the response to cross border marketing and e-commerce needs to be global.

This study has also highlighted a need for independent funding to conduct more quality primary studies, with access to improved data collection on infant and young child feeding practices, and using sophisticated methodologies to account for mixed feeding, to explore and measure the complex relationship between specific marketing activities and the knowledge, attitudes and behaviours of caregivers of infants and young children.

Recommendations

Several studies in the review highlighted the importance of addressing the system and structural factors such as poverty, gender and poor access to quality health care, education and maternity protection that lead to malnutrition of infants and young children in both high income and low income countries and populations.

As findings of benefits of marketing of CACF are limited to public or humanitarian programs, while evidence of harm from CACF marketing is widespread for the general population, a public health ethical framework and the balance of risks and harms suggests that optimal IYCF would be most improved by governments taking actions to,

- ❖ regulate to prohibit or constrain the extent as well as the types of marketing of CACF;
- ❖ ensure all caregivers including health professionals have accurate and appropriate information on the benefits of protecting optimal infant and young child feeding including exclusive breastfeeding to 6 months, timely and adequate CF, and continuing breastfeeding to 2 years and beyond;
- ❖ address the structural factors including gender inequalities and lack of maternity protection, which increase the appeal of CACF over home-prepared complementary foods of adequate quality.

In low income or socioeconomically disadvantaged populations, improved social protection policies or direct income support payments for caregivers of young children or improving financial incentives for optimal IYCF may be considered, rather than providing free or low cost CACF 'in kind' through public or humanitarian programs.

Introduction

Improving Infant and Young Child Feeding (IYCF) practices is well recognised as a global and national public health priority. The WHO/UNICEF *Global Strategy for Infant and Young Child Feeding* (GSIYCF) states that, “as a global public health recommendation, infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to 2 years of age or beyond.” The Global Strategy recommends “the widest possible use of indigenous foodstuff”, so that complementary foods are readily available and affordable, while industrially processed complementary foods should be considered “an option for some mothers who have the means to buy them and the knowledge and facilities to prepare and feed them safely” (World Health Organization 2003). As well as being *timely*, CF should be *adequate*, meaning that the complementary foods should be given in amounts, frequency, consistency and using a variety of foods, to cover the nutritional needs of the growing child while maintaining breastfeeding (World Health Organization (WHO) 2015).

In May 2012, the Sixty-third World Health Assembly (WHA) called upon Member States to “end inappropriate promotion of food for infants and young children”, and requested clarification and guidance from the World Health Organization on what constitutes inappropriate promotion of foods for infants and young children. The WHO established a Scientific and Technical Advisory Group (STAG) that provided guidance (WHO Scientific and Technical Advisory Group (STAG) 2013).

There is a large body of literature on marketing in general but it is unclear how much literature exists about marketing of complementary foods for infants and young children. In preparation for formulating a recommended set of actions to Member States, WHO commissioned a review of literature in April 2015. The review was to be completed before the meeting of the STAG in Geneva, 8-9 June 2015.

The aim of the study was to conduct a review of the literature on the effect of marketing of commercial complementary foods for infants and young children on caregivers’ attitudes and behaviours, informed by a ‘review of reviews’ of other relevant product marketing.

Objectives and context

The objectives of this study were to review the evidence describing the impacts of marketing of CACF on the attitudes and behaviours of caregivers of young children. The investigators were asked to locate literature which may inform these specific questions:

- a. Do warning or preparation labels (e.g. regarding quantity to feed, not to use as sole source of nutrition, prepare with boiled water) influence purchase or usage patterns?
- b. Does cross-promotion through use of similar logos, alignment with other brands, designs, or store placement increase purchase or use of breast milk substitutes?
- c. How are (implicit and explicit) marketing messages (e.g. a picture of fruit on a product that is only fruit-flavored) understood by consumers?
- d. How do strategies used to promote complementary foods (comparisons to home-prepared foods) affect the use of home-prepared foods?
- e. Does marketing of complementary foods lead to inappropriate use (e.g. through pictures of babies or use of terms like “first food”)?
- f. How does health, nutrition, or functional claims (implicit and explicit) on complementary foods influence caregiver purchase and use of CACF?
- g. How does marketing shape the consumption of high fat, high sugar or high salt containing foods?
- h. How does marketing affect portion size?

In consideration of the broader context, the investigators were also asked i) what lessons can be learnt from the marketing of foods to children, breast milk substitutes (BMS), tobacco marketing, and drug marketing that are relevant to the marketing of CF?

Marketing was defined as the management process through which goods and services move from concept to the customer. It includes coordination of the four main elements of marketing, product development, price, placement, and promotion, known as the 4 P's of marketing: “(1) identification, selection and development of a product, (2) determination of its price, (3) selection of a distribution channel to reach the customer's place, and (4) development and implementation of a promotional strategy.” (WebFinance 2015).

The study was informed by guidance from WHO on what is meant by ‘inappropriate promotion’, and on what is meant by ‘complementary foods for infant and young children’ for the purposes of this study (WHO Scientific and Technical Advisory Group (STAG) 2013).

1. **Promotion is inappropriate** if it undermines recommended breastfeeding practices
 - a. Products should not be promoted as suitable before 6 months.
 - b. Products should not be promoted to be given by bottles or using teats.
 - c. Products should not be portrayed as equivalent or superior to breast milk.
 - d. Products should not be promoted as a replacement for breast milk.

- e. Products should not be promoted using brands/labels/logos that are the same/similar to those used for breast milk substitutes.
- f. Daily ration size should not exceed the amount of energy needed from complementary foods by breastfed children.
- 2. Promotion is inappropriate if it contributes to childhood obesity and non-communicable diseases
 - a. Products should be limited in saturated fat, trans-fatty acids, free sugars, and salt.
 - b. The portion size shown or recommended should provide an appropriate energy amount for the meal or part of a meal that it is designed to provide.
- 3. Promotion is inappropriate if the product does not make an appropriate contribution to infant and young child nutrition in the country
 - a. Products should adhere to all applicable standards for safety and nutrient composition.
 - b. Products should provide essential nutrients other than calories.
 - c. Promotion should encourage a diet based on a wide variety of foods, including minimally processed fruits, vegetables, and animal-source foods.
- 4. Promotion is inappropriate if it undermines the use of suitable home-prepared and/or local foods
 - a. Products should not be marketed as a complete substitute for home-prepared and/or local foods.
 - b. Promotion should not suggest that commercial products are inherently superior to home-prepared foods.
 - c. Promotion should not imply that home-prepared or local foods should be delayed until after commercial products are fed.
- 5. Promotion is inappropriate if it is misleading, confusing, or could lead to inappropriate use.
 - a. Health claims should not be allowed unless specifically approved by national or international authorities.
 - b. Information and instructions should be clear and correct and appropriate for the language and literacy of the target population.
 - c. Promotion should not imply that products contain more of an ingredient than they in fact do.

Children between 6 and 24 months should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to 2 years of age or beyond, and focused on suitable locally available foods. **Complementary foods** are defined as 'any food, whether manufactured or locally prepared, suitable as a complement to breast milk or to infant formula, when either becomes insufficient to satisfy the nutritional requirements of the infant, which will be either 1) home-prepared foods and drinks; or 2) CACF and drinks (both from international food companies and local production facilities)'

(WHO Scientific and Technical Advisory Group (STAG) 2013). Breast milk substitutes for infants under 6 months covered by the WHO International Code are excluded from the scope of the study. However, products such as 'follow-on' or follow-up' formula/formula milk, or 'toddler milk' are included, as are drinks such as juice or water if marketed for children under 3 years. CACF are often fortified, and nutrient supplements including lipid-based nutrient supplements (LNS) or micronutrient powder products (MNP) may be marketed to caregivers in the general population to be mixed with home-prepared CF. Such products including RUFs are included where they are available for sale. The definition of inappropriate promotion is applicable to both non-profit and for-profit sectors (WHO Scientific and Technical Advisory Group (STAG) 2013); social marketing, and promotion and distribution of these products free or at low cost by public or humanitarian food and nutrition programs, are included in this review of marketing when there is a private sector partner.

Although some processed foods and drinks that are promoted for the general population may be consumed by infants and young children, these are not considered in this study.

Methods

In view of the time constraints and available resources, a rapid evidence review (REA) was determined to be the appropriate review methodology (Government Social Research Service (GSR) and Evidence for Policy and Practice Information and Co-ordinating (EPPI) Centre, Bevan et al. 2010; Khangura, Konnyu et al. 2012).

The review was conducted between 8 April and 29 May 2015. The methodology and implementation was informed by the PRISMA guidelines for reporting quality systematic reviews (Liberati, Altman et al. 2009; Moher, Liberati et al. 2009), the authors' experience in conducting systematic reviews for the purpose of preparing evidence-based recommendations for policy and practice (Sargent, Pilotto et al. 2011; Sargent, Forrest et al. 2012), and the advice of four international experts on marketing to children, BMS, pharmaceuticals, alcohol and tobacco products.

Relevant Annexes

[Annex B: Detailed methods with search strategies](#)

Key questions

Two key research questions were developed and finalised in collaboration with WHO and expert advisors, and these guided the search strategy and scope of this review. These key questions were

The primary question to guide the review was:

What does the literature report on the effects of marketing of commercially available complementary food (including drink) products for infants and young children, on the feeding attitudes and behaviours of their caregivers?

The secondary question to guide the 'review of reviews' was:

What do recent systematic reviews of the literature report regarding the effects of marketing of: child-oriented food products, pharmaceutical products, BMS, alcohol, tobacco and tobacco related products to women especially parents, on outcomes which will usefully inform the primary research question?

Information sources and search strategies

A purposive and targeted approach, rather than a comprehensive approach, was taken to identify the best-available evidence in the limited time frame available to conduct this review (eight weeks). Locating literature relevant to addressing the key questions required a multi-faceted approach. The strategies used are summarised in Figure 1 and described in detail in Annex B. There were three key sources of literature:

Source A. Structured keyword searches of an electronic database of marketing industry literature (informing the primary research question).

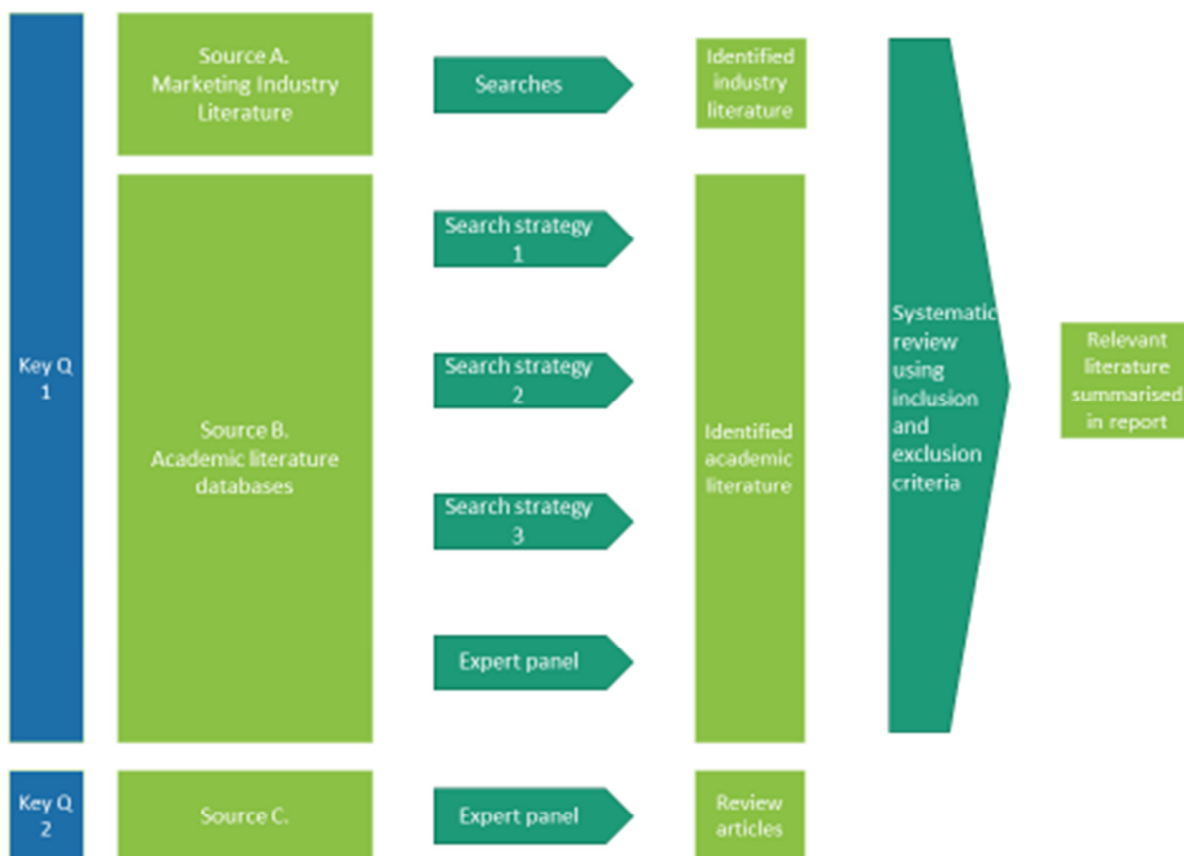
Source B. Structured keyword searches of relevant electronic databases of peer-reviewed literature supplemented by suggested papers from the investigators and expert panel (informing the primary research question).

Source C. Identification of high quality reviews to inform this review in consultation with experts (informing the secondary research question).

Studies describing the impact from marketing of CACF were retrieved to 15 May 2015.

Articles identified from all sources to answer the primary research question were reviewed using the same process of screening and the same inclusion and exclusion criteria (Table B2). Studies that considered a relevant marketing exposure and described a relevant IYCF outcome were included, even if the outcome could not be causally attributed to, or statistically associated, with the marketing exposure.

Figure 1 Diagrammatical representation of strategies to identify literature to inform this review (details in Annex B).



Quality appraisal

Quality was only assigned to academic articles that had undergone peer-review. The quality of each rated article is indicated in the data summary tables, using the study design. This rating system followed that used by the Cochrane Musculoskeletal Group (Available at <http://www.Cochranemsk.org>, Accessed 01 May 2015), which has since been used in a variety of REA (eg OHRI-Chanplain LHIN 2010).

Rating	Study design included
Platinum	Systematic reviews and meta-analyses of randomised controlled trials
Gold	Randomised controlled trials, systematic reviews of non-controlled studies
Silver	Studies with a comparison including: those with a comparison group, before-and-after comparison, longitudinal cohorts and case-control, non-systematic literature reviews of controlled studies
Bronze	Non-controlled studies with no comparison group, surveys, qualitative research, non-systematic literature reviews of peer-reviewed literature (other)

All other articles were not quality rated (NQR), this includes all industry and grey literature reports.

Analysis and reporting

Outcomes from the included articles are presented in four ways:

1. A list of included studies (Annex D)
2. Summary tables describing the types of studies identified by the review (Results section)
3. A descriptive narrative summary of each article (Annex E, Annex G and Annex H), presented according to outcomes (sorted chronologically):
 - a. Studies reporting on effects of marketing on caregiver attitudes, knowledge and preferences
 - b. Studies reporting on effects of marketing on caregiver behaviours
4. Data describing the research and its outcomes were extracted from included articles and tabulated (Annex I). These tables are organised by quality rating, with most recent articles reported first. Data is split into three tables, according to reported outcomes:
 - a. Studies reporting both behavioural and attitudinal outcomes of marketing (Table 1, Annex I)
 - b. Studies reporting only behavioural outcomes of marketing (Table 2, Annex I)
 - c. Studies reporting only attitudinal outcomes of marketing (Table 3, Annex I)

Results

Study selection

The industry database search (Source A) yielded 82 studies, and 22 were assessed as eligible for addressing the primary study question (Annex C).

The academic literature searches (Source B) identified 2235 documents, and 75 met the inclusion criteria based on full text review (Annex C).

Expert consultation yielded 13 systematic reviews relevant to the secondary study question.

Narrative summaries for these 110 studies are at Annex E, Annex G and Annex H.

Relevant Annexes

[Annex C: Flow of papers](#)

[Annex D: List of included studies](#)

[Annex E: Narrative summary of industry literature](#)

[Annex F: CACF product descriptions](#)

[Annex G: Narrative summary of academic literature](#)

[Annex H: Narrative summary for secondary question](#)

[Annex I: Summary table of individual studies](#)

The study selection process is summarised in the PRISMA flow diagram (Annex C).

Evidence from the review to answer primary research question

Below we summarise the key characteristics of studies identified through each of the three methods. First, we consider the results from searches of the industry database (Annex E), next the academic literature (Annex G), and then the key systematic reviews of evidence on marketing of a wider range of products (Annex H).

Industry literature – study characteristics, and summary of findings

The 22 included studies were published between 1983 and 2015, and were carried out in UK (6), USA, Vietnam, Philippines, Malaysia, Ireland, and Hong Kong, China (2) and Australia (2). One was global and one of Asia/Latin America and North America/Europe. Advertising campaigns were the focus of 16 of these studies, and three were analyses of IYC food companies' market share and value. Two were before and after studies of campaigns addressing falling sales from revised health guidelines or changing market preferences, and one reported market research on attitudes of mothers and their motivations during the first 12 months of their child's life. Thirteen of the studies reported on consumer sales and behavioral responses to campaigns, while nine focused on the effects of campaigns on consumer attitudes. Marketing effectiveness was typically measured in terms of company sales growth, or market share.

All of these studies were industry funded, not conducted as academic studies, and represent 'grey' literature. The findings represent the advertisers' claims on causation

regarding the effects of marketing of complementary foods. The methodology, sample size or other design aspects including recruitment method, are rarely detailed. It is not clear how representative such studies are of the effects of industry marketing, or how reliable the findings. Study populations were generally pregnant women or mothers of children < 12 months (variously described as ‘mothers’, ‘mums’, ‘mums-to-be’ (or sometimes ‘parents’), ‘pregnant’, ‘in late pregnancy’, ‘first-time’, ‘info-hungry post-natal’, with ‘babies aged 0–12 months’, ‘12 months’, ‘children under 12 months’, ‘0-5 years old’, ‘kids aged 0-3 years old’, and ‘preschool children’.

Academic literature – study characteristics, quality and summary of findings

There were 75 included studies from this search (Source B). Study characteristics, study design and results for each of the studies is summarised in Annex I. Quantitative summaries of some study characteristics are included here.

Summary statistics Table 1. Number of papers included in review by country, country income status, and study population of children by age.

Study characteristic		No. of papers
Country	USA	20
	Australia, Global	6
	China, United Kingdom	5
	Lao PDR, Philippines	4
	Mexico, Vietnam	3
	Cambodia, Ghana, Italy, Nigeria, Peru, South Africa	2
	Afghanistan, Burkina Faso, Canada, Caribbean, Hong Kong, Indonesia, Iraqi Kurdistan, Madagascar, Malaysia, Mali, Nepal, New Zealand, Sri Lanka, Uganda	1
Country - income status	High-income	35
	Upper-middle-income	13
	Lower-middle-income	17
	Low-income	7
Study population*	Children aged < 12 months	18
	Children aged < 24 months	20
	Children aged < 5 years	12
	Children aged < 15 years	3
	Children ages unknown	1

* 21 studies did not target children

Studies were carried out in both developed (39) and developing (37) **countries**, with most in the USA (20), but covering also seven low income countries, and 30 middle income countries. Six were global studies.

Populations studied were mainly mothers of infants or young children, with only children aged < 24 months in 38 of the studies. In six studies, health professionals were among the

caregivers being studied. Three studies considered products for children from age zero to up to 15 years of age, with 12 for infants or young children aged no older than 5 years.

Study quality/risk of bias

Summary statistics Table 2 summarises characteristics such as study design, quality rating and funding source. Most (59) were published in 2003 or later, after changes in WHO IYCF recommendations regarding the timing of introduction of complementary foods.

Summary statistics Table 2. Number of papers included in review by study design, quality rating, funding source, year of publication and sample size.

Study characteristic		No. of papers
Study design	Cross-sectional survey	26
	Qualitative (interviews)	17
	Qualitative (focus groups)	11
	Longitudinal study	8
	Non-systematic review of observational studies	6
	Descriptive study	4
	Before and after study (no control group), discrete choice experiment, quasi-experimental study, review	2
	Market review	1
	Before and after study (controlled), case series, pre-post survey, qualitative (observations)	1
	randomised controlled trial, systematic literature review	1
Study quality rating	Bronze	59
	Silver	12
	Gold	2
	No quality rating	2
Funding source	Government	28
	Private research funding (non-industry)	12
	Educational institution	6
	Industry, Industry-Government	3
	Private research funding (non-industry but includes US and non-US government grants)	1
	Not mentioned at all	20
	No conflict of interest declared	4
Year	2002 and earlier	16
	2003 and after	59
Sample size of caregivers with children**	≤200	15
	>200	35

** 4 studies did not provide sample size.

Note: Total number may be more than 75 as some papers capture more than one study characteristic. For example, a paper could have two types of study design, such as cross-sectional survey and qualitative (interviews).

Regarding **study design and quality**, most included studies used cross sectional (26) or qualitative (28) design, with eight longitudinal studies and six non-systematic reviews of observational studies identified. Four were experimental or could be considered quasi experimental. We found no systematic reviews addressing the question of the effects of commercial complementary food marketing. Fourteen were rated silver or gold but most (59) were rated bronze. Twenty studies made no conflict of interest declaration, and six declared industry funding. Thirteen reported private (non-industry funding). Most studies (59) were published in 2003 or later, after changes in WHO IYCF recommendations regarding the timing of introduction of complementary foods. Thirty five studies had sample size exceeding 200, while 15 were 200 or less.

Exposure to marketing

Marketing exposures for the studies reviewed can be categorised within the four marketing 'P's.

- ❖ **Products:** formula or other milk products; beverages (such as juices and water); nutrient supplements including RUF; and processed or solid complementary foods..
- ❖ **Promotion:** advertising; product labels; packaging; health claims/nutrient content claims; brands/logos; brand crossover promotion; formula samples/coupons.
- ❖ **Placement:** settings such as hospitals; community; child care centres; internet and social media.
- ❖ **Pricing:** discounts; government-provided humanitarian aid relief; government-provided food or formula coupons (WIC); free or low-cost humanitarian aid.

The most common **product** focus for included studies was formula or other milk products marketed or used for infants and young children, discussed in 55 studies (Summary statistics Table 3). (Where the product could be further categorised, the product was infant formula targeted at children < 6 months (17), infant formula (targeted at children > 6 months) (11) or follow-on formula/toddler milk (11); five did not specify the age of the child for 'infant formula' being discussed in the study. A further 12 studies reported on non-specialised milk products being marketed or used for IYC).

There were 12 studies which reported on nutrient supplements (including RUF such as LNP, FBF, and MNP (11), with one also considering (RUTF). Eight studies focused on beverages such as juices and water. Five studies considered commercial IYC products such as 'processed or solid complementary foods, and three considered CACF variety, or several types of CACF. [Annex F](#) contains detailed descriptions of the products as described in the studies.

Summary statistics Table 3. Marketing exposures in included papers. These have been categorised according to the 4 Ps of marketing (see text) i.e. products, promotion, placement and pricing.

Study characteristic		No. of exposures in included papers
Product	Formula or other milk products	55
	Nutrient supplements and RUF products	12
	Beverages (such as juices and water)	8
	Processed or solid CACF or other CACF	8
Promotion	Advertisements	34
	Product labels	21
	Hospital discharge packs	16
	Social marketing	16
	Promotions	15
	Brands/ logos	12
	Health claims/nutrient content claims	10
	Market integration or access/distribution channels	8
	Brand crossover promotion, relationship building, written material (mailings/brochures/posters/books)	6
	Social media, formula samples/coupons	2
Placement	Community	52
	Hospitals	14
	Child health centres	8
	Healthcare facilities	2
	Child care centres, magazine article, market review	1
Price	Pricing	11
	Pricing (government-provided food or formula coupons)	9
	Pricing (government-provided humanitarian aid relief)	2

Note: Total number is more than 75 as some papers capture more than one study characteristic.

In most studies (34) advertising was a **marketing exposure**. In 21 studies, marketing took the form of labelling, and in ten it was health or nutrient claims; a further 18 considered brands/logos or brand crossover promotion. Sixteen studies included marketing via hospital discharge packs or health care advice as the exposure. There were also studies involving relationship building (6), or materials such as books, brochures or posters (6). Several considered marketing strategies such as relationship building (6) and social media (2). Sixteen were classified as including social marketing.

Eight included studies could be considered as marketing exposure via 'placement', such as being integrated into a market economy, having access to markets or being near distribution channels.

In the studies examined, the most frequent observations of marketing activities were in community **settings** (52). Hospitals and health care facilities (16), child health centres (8)

or childcare centres (1) were settings for some studies. In eight studies the study design did not involve a specific setting but for example used country level data on product sales to investigate the effects of marketing activity on IYCF feeding practices.

Eleven studies examined marketing of food products for IYC through *pricing*. Eleven studies which involved pricing considered government-provided food or formula coupons or vouchers for commercial food such as the Women Infants and Children program (WIC), or via humanitarian programs.

Effects of marketing

The **potential outcomes** of marketing of CACF can be grouped into four categories related to optimal IYCF. These are direct effects (A) improving (or (B) worsening) complementary feeding practices 6-24 months, and likewise ‘spill-over’ effects on breastfeeding practices to age 0-5.99 months (C & D).

There were 28 studies including marketing exposures which considered both behavioural and attitudinal outcomes, 25 considered only behaviours, and 22 considered just effects on attitudes (Summary statistics Table 4a).

Summary statistics Table 4a Effects of marketing exposure – behaviour or attitudinal.

Study characteristic		No. of papers
Study considered impact of marketing exposure on:	Both behaviour and attitudes	28
	Behaviour	25
	Attitudes	22

Eleven studies reported marketing exposures and positive behaviours which can be characterized as improving IYCF, while 34 reported harmful effects involving moving away from optimal IYCF (Table 4b).

Few studies considered IYCF outcomes in detail (Summary statistics Table 4c). There were 12 reported outcomes that were categorised as positive, towards improving IYCF; more timely introduction of complementary foods (2), and improved nutrient intake (10).

Summary statistics Table 4b Studies of marketing exposure, harmful or positive outcomes.

Study characteristic		No. of papers
IYCF behaviours	Harmful	34
	Positive	11
	Ambiguous	7
	Both harmful and positive	1
	N/A	22
IYCF attitudes	Harmful	37
	Positive	5
	Ambiguous	7
	Both harmful and positive	1
	N/A	25

However, the most common outcome reported (47) in included studies were adverse effects on breastfeeding— early introduction of non-exclusive breastfeeding and/or reduced breastfeeding duration. Five studies reported outcomes involving excessive nutrients.

Summary statistics Table 4c Studies of marketing exposure by outcomes.

Outcome		No. of papers
Early introduction of non-exclusive breastfeeding	Yes, < 6 months	12
	Yes (time unknown)	13
	No	3
	Ambiguous (different results for different marketing)	1
	N/A	46
Duration of breastfeeding reduced	Yes, < 6 months	8
	Yes, > 6 months	3
	Yes (time unknown)	11
	No	1
	N/A	52
Excessive nutrients	Yes	5
	No	2
	Ambiguous	2
	N/A	66
Timely introduction of good CF	Yes	2
	No	2
	Ambiguous	1
	N/A	70
More nutrients in CF where previously inadequate	Yes	10
	No	1
	Ambiguous	3
	N/A	61

Three studies had a before-after design (two uncontrolled). Sun (2011) was an industry funded before-after study conducted to test the use of public-private partnerships (PPPs) to market a complementary food supplement (CFS) called Ying Yang Bao (YYB) in rural China to low-income families of children 6–24 months of age. The study reported increased prevalence of use, meeting minimal dietary; minimal acceptable diet, consuming iron-rich food; and product awareness. Of surveyed caregivers, 59.6% were aware of the product and 13.5% purchased it. Retail sales volumes were lower the further the distance from wholesale to retail store ($r = 0.35$, $n = 35$, $p = .038$). Declines in rates of continued breastfeeding at 1 year (76% to 67%) and 2 years (42% to 37%) were not statistically significant; declines in the introduction of solid, semi solid or soft foods (93% to 71%) ($p = 0.098$) were also observed during the study.

Andreyeva (2013) was a government funded study describing changes in purchases of 100% juice and other beverages among WIC participants following reduced commercial juice product subsidies for disadvantaged mothers with children aged less than 5 years. The study found that total juice purchases declined by 23.5% and WIC juice purchases reduced by 43.5% of juice volume after the changes.

Dickinson (2013) was a government funded study that assessed whether new controls on presentation and advertising of follow-on formula in the UK were effective in clarifying to caregivers that follow-on formula is for babies over 6 months, and ensuring such marketing was not perceived or confused as infant formula advertising, which is prohibited. The study found only two product statements in the text of advertisements clarifying that use of the product with infants before they are 6 months old should only occur on the advice of a suitably qualified medical or health professional. However, an age of use recommendation on pack shots in the advertisements was more likely in 2008–2009 (24; 73%) than in 2006 (5, 31%). Ads in 2008–2009 were more likely to contain statements about the health benefits

Randomised controlled trial

A government funded randomised trial in the US health care setting (Frank, Wirtz et al. 1987) assessed the effects of commercial versus evidence-based discharge packs and breastfeeding counselling on infant-feeding practices including timing of introduction of solids. The commercial discharge pack contained two bottles of sterile water, two nipples, and several pamphlets in English (or Spanish) provided by Mead Johnson, Ross, or Wyeth Laboratories. The pamphlets contained information on health education and product promotion. Women who received the research discharge pack, compared with those who received the commercial pack, were more likely to prolong exclusive breastfeeding ($p = 0.004$), to be partially breastfeeding at 4 months postpartum ($p = 0.04$) and to delay the daily use of solid foods in the infant's diet ($p = 0.017$). The study concluded that commercial discharge packs containing educational/advertising pamphlets and bottles of formula or water may pose an independent and significant risk to the duration of breastfeeding.

of these products than those appearing in 2006. The study's main finding was that advertisers had changed marketing strategies in response to the controls on the advertising of formula products introduced in 2007.

There was one randomised trial by Frank et al (1987) (see Box) and four experimental or quasi experimental studies. Two discrete choice experiments investigated the potential impact and consumer willingness to pay for certification of quality or organic infant foods in China (Sanogo and Masters 2002; Wu, Yin et al. 2014). One study was funded by government another by an educational institution.

Longitudinal studies (8) mainly aimed to evaluate effects of changing the products included in food packages offered to disadvantaged mothers and children, on their overall diet quality, nutrient and food group intake, and food availability (such as through WIC, social marketing, or humanitarian programs). Longitudinal study designs considered feeding decisions that included: breastfeeding intentions, initiation and duration; effects of health professional advice and package labelling on formula brand switching through the infant's first 9 months of life; and proper handling of infant formula.

Most studies did not consider effects of marketing exposure on breastfeeding or breast milk intake 6-24 months. However, a review of uncontrolled trials promoting FBFs (Perez-Exposito 2009) identified one study which assessed breast milk intake when corn-soy blend or ready-to-use fortified spreads were provided as complementary food for one month in infants aged 5.5–6.49 months, and found declines in breast milk intake, but no differential effect on breast milk intake of the different types and quantities of nutrient supplements provided. (Further information on humanitarian food and nutrition programs and WIC is at Annex K: Humanitarian programs and the Women Infants and Children (WIC) program.)

Systematic review

A systematic literature review of uncontrolled trials (Perez-Exposito 2009) evaluated the efficacy and effectiveness of promoting free distribution of fortified blended foods (FBFs) in humanitarian relief programs for IYC with moderate malnutrition or at risk of under-nutrition. The study observed 'positive effects on recovery from moderate acute malnutrition and weight gain when fortified blended foods were distributed as dietary supplements'. Only one of the reviewed studies assessed breast milk intake.

Evidence to answer secondary research question

The appointed content experts recommended 16 systematic reviews of studies describing the impact of marketing of tobacco (2), alcohol (5), pharmaceutical products (2), food and beverage marketing to children (4) and breast milk substitutes (3). See Annex E for narrative summaries of each.

Summary – Reviews of marketing of health-related products

The primary focus of the reviews can be thematically categorised as: marketing techniques; marketing effects; and, regulation.

Marketing techniques

All reviews addressed marketing techniques to some extent. The reviews on food and beverage marketing to children, took a broad view of marketing and referred to multiple media. For example, Cairns, Angus et al. (2013) and Bellew et al. (1995) referred to: advertising on broadcast, print and digital media; product packaging, labelling and point of sale promotions; branding and sponsorship; merchandising and the use of licensed or brand-based characters. They also reported that marketing predominantly promoted foods and beverages of low nutritional value containing excessive amounts of fats, salts and sugar. It is possible that the study of marketing of health-related products is most strongly developed in the field of ‘food and beverage marketing to children’ as a consequence of widespread International policy focus in this area. In contrast the five reviews on alcohol marketing represented a narrower perspective on marketing, concentrating mainly on advertising on print and broadcast media. The analysis of the primary question revealed a range of marketing techniques and it can be assumed that all of the marketing techniques identified in the secondary review could be expected to apply to the marketing of complementary foods.

Some specific techniques identified by the secondary reviews are of relevance to the marketing of complementary foods.

Product packaging: The review by Stead, Moodie et al. (2013) identified that product packaging is an important component of marketing communications, and invested highly by marketers.

Sponsorship: The review by Kelly, Baur et al. (2011) on children’s exposure to food and beverage sponsorship found widespread and sophisticated sponsorship activities in school and sport settings, including professional and community sport. Food corporations marketing less healthy foods dominated the sponsorships.

Endorsements: The review by Smits, Vandebosch et al. (2015) highlighted that endorsements by celebrities and children’s characters, is a prevalent technique used to market foods and beverages to children.

The Spurling, Mansfield et al. (2010) review identified marketing through medical doctors of pharmaceutical products. Techniques included visits by sales representative, journal advertisements, sponsorship of professional meetings and clinical trials, mailed information, and provision of prescribing software.

Marketing effects

Most of the reviews analysed evidence for the persuasive effects of marketing, and found some positive effects.

Bellew et al. (2015) reported that marketing of breast milk substitutes reduces breastfeeding, as did an earlier evidence review of harmful marketing effects on children (World Health Organization 2013).

Cairns, Angus et al. (2013) reported a strong positive association between food promotion and children's food choices, requests and purchasing behaviour at category and brand level, and a modest positive association with children's food preferences, nutrition knowledge, food consumption behaviours and health status. These findings are consistent with earlier reviews (not analysed here) by Hastings, McDermott et al. (2006) and McGinnis, Gootman et al. (2006). Smits, Vandebosch et al. (2015) reported that use of endorsements to market food and beverages to children do effect their food choices with the effect being stronger for unhealthy foods.

Two of the alcohol reviews, Smith and Foxcroft (2009), and Anderson, De Bruijn et al. (2009), found positive associations between exposure to alcohol marketing and increased consumption, particularly for adolescents. Bryden, Roberts et al. (2012) were more cautious in their assessment of the persuasion effects but found a probable association between community level availability and marketing of alcohol on consumption, particularly for adolescents. While the Kelly, Baur et al. (2011) review of food and beverage sponsorship did not find persuasion effects, they nevertheless cited a number of studies showing effects of alcohol and tobacco sponsorship on children's knowledge, attitudes and consumption behaviours.

The Stead, Moodie et al. (2013) review into potential effects of plain packaged tobacco, found evidence of the potential for packaging to influence consumer perceptions, preference and choices.

Spurling, Mansfield et al. (2010) found some effects of marketing by pharmaceutical companies on physician prescribing behaviours, namely, higher prescribing frequency, higher costs, and lower prescribing quality. While evidence for marketing effects was mixed, nevertheless the authors concluded with cautionary advice to physicians to avoid exposure to promotions by pharmaceutical companies. The Mintzes (2012) review of direct-to-consumer advertising (DTCA) of pharmaceuticals, found that this form of marketing increased consumer demand and led to more inappropriate physician

prescription behaviours, such as increased volumes and less cost-effective pharmaceuticals.

Regulation

A number of the reviews discussed regulation of marketing. Mozaffarian, Afshin et al. (2012) reviewed population health interventions and concluded that structural approaches such as restricting marketing of unhealthy products (e.g. unhealthy food and tobacco), taxes and incentives, were more effective than individual strategies such as education and consumer information. Bellew et al. (2015) advocated a rights based approach for developing policy to protect children's health, while the earlier review of marketing harms on children (World Health Organization 2013) identified the need for a single transparent and sustainable international agency to take on the role formally of monitoring international compliance with the WHO Code.

The Cairns, Angus et al. (2013) and Kelly, Baur et al. (2011) reviews on food and beverage to children both advocated regulations to restrict children's exposure to marketing of unhealthy foods. Bellew et al. (2015) also recommended promulgation of the WHO Code. This was supported by Galbraith-Emami and Lobstein (2013) who reviewed the efficacy of statutory and voluntary regulations and found that scientific studies reported sustained high levels of children's exposure to unhealthy food advertising, while industry reports claimed reductions in children's exposure. They concluded that adherence to voluntary codes may not sufficiently protect children from exposure to advertising of unhealthy foods. Bellew et al. (2015) also suggested social marketing to promote counter-messages that were health promoting.

The alcohol reviews were more equivocal about regulations. Siegfried, Pienaar et al. (2014) found no effects on restriction of alcohol advertising on consumption habits of adults and adolescents, consequently recommended stronger evaluation of regulatory interventions. The review by Gallet (2007) of alcohol demand elasticities found a complex picture of many factors influencing demand; these included price and advertising and were nuanced by beverage group (e.g. beer, wine, spirits) and consumer demographics. For example, teenagers are least sensitive to price and therefore Gallet suggested that fiscal policies such as taxes had to be augmented with health education for this group; demand for spirits was most sensitive to advertising and consequently he recommend that advertising restrictions be targeted at marketing media used by distillers.

Stead, Moodie et al. (2013) examining evidence for the efficacy of regulations on packaging of tobacco products found evidence of the potential for packaging to influence consumer perceptions, preference and choices. The analysis of the primary question in this report reveals exploitation by marketers of confused distinctions by consumers between infant, follow-on and toddler milks, and this indicates an important area of focus for policy and regulation.

Overall the reviews suggest strong benefit of regulatory measures to restrict marketing of unhealthy products in order to create environments that support healthier choices (World Health Organization 1986) and to direct interventions at the cause of the problem (Rogers 2008). Complementary foods can be considered in a similar way to 'child-oriented foods and beverages'; while these are not unsafe per se, they can contribute to risk of poor health outcomes. Similarly, risks can be applied to consumption of complementary foods if they displace breastfeeding, are introduced too early or consumed in inappropriate quantities, thereby justifying regulations on marketing that exploits women's vulnerabilities or uses inappropriate methods to persuade women to consume these products.

Discussion

This study has searched the electronic and print literature as comprehensively as possible within the constraints of the minimum eight week timetable usually taken even for a rapid evidence review (Davies, Prothero et al. 2010). General limitations of a rapid evidence assessment include the greater likelihood of not identifying all key literature because of the short time frame. This can result in publication bias if important unpublished or 'grey' literature is not identified. This review attempted to reduce this risk by strategies including, for example, several diverse sources of information, using no filters on type of literature collected from the academic databases, and synthesis of results with the review of reviews from the tobacco, alcohol, pharmaceutical, BMS and food marketing to children literature.

The review identified and synthesised available evidence from 22 relevant industry marketing studies, and 75 academic publications on the effects of marketing of CACF on the optimal feeding of children 6 to 24 months, and the effects of marketing which 'spill-over' to feeding practices of infants (aged to < 6 months). It also identified, summarised and synthesised 16 relevant systematic reviews on: marketing techniques; marketing effects, and marketing regulation of tobacco, alcohol, pharmaceutical products and breast milk substitutes (BMS); and food and beverage marketing to children.

Industry studies – summary of key findings and interpretation

Annual industry data on global sales of baby food products including CACFs and BMS products shows this IYC food product category sales is growing rapidly (Annex J). The 22 industry accounts of marketing campaigns provide valuable contemporary and real world context and new information and perspectives which informed our review of the evidence from academic studies on effects of marketing of IYC food products.

The studies describe marketing of complementary foods by leading companies and brands in the IYC food product industry, and identify a variety of marketing techniques. They illustrate key features of marketing including emerging marketing innovations and corporate competitive strategies. Of concern are industry accounts of exploiting mothers' high motivations and lack of confidence and knowledge, to promote CACF products.

The accounts of successful marketing campaigns provide evidence that industry perceives expenditures on marketing of CACF as effective in increasing market share and sales. Industry accounts interpret results in terms of market share, but this may not reflect their wider impact, as many brands or companies involved are market leaders, so total IYC food product category sales may also be increased by marketing activity.

These studies also provide information on industry perspectives and responses to regulatory constraints on marketing of IYC food products and/or successful health promotion of breastfeeding. They show that industry marketing perceives and adapts to the adverse effects of marketing regulation on sales, and health promotion (especially

promotion of breastfeeding) which adversely affects sales of CACF. Industry perceptions are no doubt informed by evidence on sales which is available to advertisers, but these are unlikely to be published due to commercial sensitivities.

Academic studies – summary of key findings and interpretation

Optimal IYCF involves continued breastfeeding to 2 years and beyond, as well as early and exclusive breastfeeding for 6 months. The academic literature reported evidence of movement both towards and away from optimal IYCF in association with marketing of CACF.

Marketing of CACF is pervasive and common, hence the literature reported difficulties in identifying, attributing, and accurately measuring its effects. Few studies were identified which quantitatively and causally link CACF exposure and IYCF outcomes. Further, IYCF practices are closely interrelated. As industry marketing focusses on the IYC food product market segment rather than BMS or CF separately, distinguishing the effects of BMS marketing from CF marketing is also problematic.

The literature reported two potential types of effects of CACF marketing of most relevance to optimal IYCF practices; direct effects on practices 6-24 months, and indirect 'spill-over' effects on infants < 6 months and for other food products. Broadly, these were reflected in evidence of,

- ❖ Movement away from exclusive breastfeeding in infants < 6 months
- ❖ Reduction in the duration of breastfeeding
- ❖ Increased use of CACF products including formula milks for children 6-24 months, with displacement of home-prepared CF (whether of inadequate, adequate or superior quality) and of breastfeeding or breast milk intake, and;
- ❖ Reduced exclusive breastfeeding and increased prevalence of early introduction of CF and BMS < 6 months, to the extent that CACF marketing activity exposes the wider public and influences attitudes and behaviours, including of caregivers of infants < 6 months.

Furthermore, there is some evidence that marketing of CACF is associated with changes in nutrition quality which may:

- ❖ move IYCF away from optimal nutrition by increasing consumption of foods with excessive sugar, salt, or fats, or
- ❖ move IYCF towards optimal nutrition by increasing nutritional quality of home-prepared CF.

The review found evidence of marketing of CACF through public/private partnerships and social marketing programs, and through providing such products free or at low cost through public or humanitarian food and nutrition programs. Along with pricing, gaining the

endorsement of public or non-profit agencies in this way is an important marketing technique. There was some evidence that such pricing interventions and endorsements:

- ❖ make nutritionally adequate CACF products affordable for disadvantaged populations and displace poor quality home CF or BMS offered for older infants and young children
- ❖ increase the affordability of timely and adequate CF (including frequency of feeding and serving size, as well as quality).

Most academic studies identified and reviewed did not have a primary focus on CF or CACF marketing, and most described rather than measured behaviour or attitude changes. Caregivers studied were mainly mothers, or health professionals, in a variety of countries, and with diverse socioeconomic characteristics. Caregivers were exposed to marketing in both community and health services settings, and through a variety of media. The included studies show marketing of a range of commercial IYC food products, through diverse techniques, especially promotion through direct-to-consumer advertising.

The review of academic studies provided evidence that marketing of CACF affects the IYCF knowledge, attitudes, preferences and behaviours of caregivers. The 75 included studies contained diverse quality of evidence that marketing of CACF including drinks and formula milks increases their use (including where public/private partnerships make such products cheaper or free) and negatively impacts exclusive breastfeeding, breastfeeding duration, or early introduction of solids. A total of 53 academic studies measured or included observations on IYCF behaviours influenced by marketing. In 35 studies the review categorised these reported effects of marketing as 'harmful' for optimal IYCF, in 12 studies as positive, and in eight cases as mixed or ambiguous.

There were 13 higher quality academic studies categorised as 'silver', 'gold' or 'platinum' studies (including some with funding contributed by industry). These were mainly of populations targeted by public or humanitarian programs involving public/private partnerships and/or involving social marketing. They showed that marketing of CACF using pricing (free or low cost product) CACF is effective in influencing CF behaviours, though effects are potentially both positive and harmful to optimal IYCF. Spill-over effects to caregivers of infants < 6 months, or influences on other IYCF behaviours such as continued breastfeeding or provision of home prepared CF were not evaluated in most such studies.

Marketing of CACF is based on understanding and playing to mothers' concerns about their children's nutrition and health needs and marketing their products based on such concerns and vulnerability. Attitudinal outcomes of marketing were examined in 50 of the studies. These showed that marketing of CACF, including through promotion using apparently scientific-sounding appeals to the authority of experts or science, in advertising or via labels, branding and brand crossovers, or via placement in authoritative (e.g. healthcare services) settings or public or humanitarian programs, can mislead and confuse

caregivers about nutrition- and health-related qualities of CACF, and about age-appropriate and safe use. Marketing promoting the merits of CACF also led some mothers to question the comparative nutritional value of breast milk and breastfeeding or home-prepared CF foods.

Product warning labels were valued, but were difficult to read and understand, and lacked necessary information to prevent inappropriate use. Brands/logos/pictures and labelling including health claims were generally found to affect caregiver attitudes and were actually or potentially confusing or misleading about necessary, appropriate or safe use. Warnings or information labels often did not contain necessary warnings, such as about appropriate age of use, serving size or frequency, and were poorly adhered to.

Limitations of the data at the study and outcome level

Detailed analysis of the quality and other characteristics of individual studies was not possible in this rapid evidence review. Limitations at the study level are most systematically indicated by study characteristics, study quality, and study design, as summarised in Annex I.

The most important limitation of this study is that it focuses on just one determinant of infant and young child feeding behaviour, marketing, within a context of food and nutrition, rather than within the context of wider biological, social, demographic, psychosocial, behavioral, health and care, community, or public policy determinants. A systematic review of early introduction of solids and unmodified cows' milk in developed countries observed that to improve infant and young child feeding practices it is necessary to understand their determinants (Wijndaele, Lakshman et al. 2009). The wider determinants within the contemporary context of a major transformation of global and national food systems are discussed briefly in Annex A, as are possible policy implications at national and global levels.

A further and related issue is that this study limited its focus to commercially available complementary foods, but it was not always possible or meaningful to exclude studies of marketing effects on use of breast milk substitutes. This highlights important methodological issues because breastfeeding, bottle feeding, formula feeding and feeding of complementary foods are closely correlated behaviours (Akin, Griffin et al. 1985; Fabrizio, van Liere et al. 2014).

At the practical level this results in a multiplicity of definitions of IYC food products, feeding behaviours and practices, which adds to difficulties evaluating impacts of exposures or interventions, including due to inadequate data on feeding patterns and dietary intake of infants and young children. Furthermore, some studies of determinants of IYCF are methodologically ill equipped to identify determinants of specific aspects of IYCF because household decision making on infant and young child feeding is not adequately specified. That this problem remains is revealed in a recent study (Fabrizio, van Liere et al. 2014),

which cited the difficulties for evaluating effective interventions of behaviour change arising from the failure of studies to consider breastfeeding, solids and other milk feeding behaviours together.

Future research

The main knowledge gaps and themes which we identify as emerging from the industry literature include:

- ❖ The implications for IYC food product marketing of rapid integration of digital marketing and e-commerce (negligible in China in 2009 to 14% in 2015) (Euromonitor International 2015), and an expanding retailing channel through which companies have direct contact with parents, sell baby food and build brand relationships with children from toddlerhood (WARC 2011; Cruz 2013; Wong and Lau 2014)
- ❖ Health and nutrition claims that appeal to mothers as well as marketing through engagement with and targeting of health professionals knowledge, attitudes and preferences, recognising their influence on parents' IYCF decisions and purchases (Moes and Neighbour 2002);
- ❖ Marketing through powerful authoritative association of the brand or product with health and scientific 'independence' in 'marketing-naïve' or poorly educated populations;
- ❖ The comparative effectiveness of marketing via pricing appropriate to market segments which enables 'premiumisation' of products targeted at more affluent consumers or marketing to more price conscious low income consumers;
- ❖ Marketing activity increasingly focussed on less regulated developing country markets;
- ❖ The extent to which industry perceives public health promotion and legislative protection as barriers to sales, and invests in innovation and relationship building in response to the constraints of regulation.

The evidence from the industry study database also raises the question of the extent to which it is possible for major brands or industry leaders to market CACF to promote higher sales without displacing suitable home-prepared foods including breastfeeding, even if such marketing and promotion is competing only for 'commercial market share'.

Key research gaps and limitations identified in the academic literature on complementary food marketing include, as noted earlier, adequate dietary data and conceptual and practical framework for measuring and monitoring infant and young child feeding.

We also summarise below the key areas identified by the reviewed studies as requiring further investigation.

Data and methodology

- ❖ A critical need to strengthen and harmonise data (Nguyen, Menon et al.)
- ❖ A slim evidence base of availability of good trend data on all IYCF indicators, determinants of these practices, and interventions to improve them. Strengthening the evidence base across these three areas will require substantial investments". (Nguyen, Menon et al.)
- ❖ Larger samples for ethnographic studies of remote indigenous communities are desirable. Studies that combine observation and survey methods, gather retrospective and prospective data, and employ quantitative analysis of sufficiently large samples are critical to thoroughly understand and manage the complex relationships between socioeconomic circumstances, infant feeding routines, and infant health (Vitzthum 1992).
- ❖ Analysis of the entire diet of the infant is an important topic for future research. The consumption model which focuses on whether a woman breastfeeds at all, and if so, for how long, may lead to a system of demand equations that improperly excludes goods that are close substitutes for breast milk. Not properly accounting for the correlations between breastfeeding, bottle feeding and feeding other e.g. solid foods 'introduces serious statistical problems in the analysis of infant feeding behaviour' (Akin, Griffin et al. 1985).

Countries and settings

- ❖ More research is needed on the marketing and increased access of breast milk substitutes in Cambodia, and South East Asia as a whole (Prak, Dahl et al. (2014).
- ❖ Cross-border impacts of promoting formula milk should be addressed globally, in particular where culture and language are common (Phouthakeo, Otsuka et al. (2014).
- ❖ Further research that samples sociodemographically diverse populations and separates the effect of discharge bags from maternity care practice is needed to expand upon these results (Sadacharan, Grossman et al. (2013).
- ❖ A need for further, more comprehensive research to investigate whether the health professionals who advise mothers have access to sufficient independent information they feel they need; whether it is realistic for them to be informed about all the products on the market; and what counter-marketing strategies might effectively counteract the persuasive influence of infant formula marketing (Berry, Jones et al. (2011).

Promotion techniques

- ❖ Quantitative enquiry is required to investigate the extent of the perception that toddler milk advertising also effectively advertises infant and follow-on formula in the wider population (Berry, Jones et al. 2010).
- ❖ Further research to learn about the relationship between promotion, product and brand choice, and product use (Gilly and Graham 1988).

- ❖ A need for additional research on why caregivers may not follow recommendations for safe infant formula handling. The results of such research could help to identify ways of increasing compliance with the recommendations designed to help protect infants (Labiner-Wolfe, Fein et al. 2008).
- ❖ Future research should explore the impact of the revised WIC food packages on dietary intake in WIC participants nationwide, and the effects of the recent change in the infant WIC food package on infant's consumption of 100% fruit juice (Hurley and Black 2010)
- ❖ It is important to evaluate the nutritional knowledge and behaviours of WIC participants with those of higher income and better-educated individuals who routinely have better health outcomes. The nutritional knowledge and attitudes of higher income and better-educated individuals should be the endpoint goal for intervention studies that hope to reduce nutritional deficiencies. (Wojcicki, Gugig et al. 2009).

Translational research

- ❖ Mission-based research and policy development that is oriented to sustain and encourage exclusive breastfeeding and opportune introduction of nutritious complementary foods to improve health and adequate development of young children of working mothers (Rodriguez-Oliveros, Bisogni et al. 2014)
- ❖ Lack of rigor in the evaluation of programs [in behaviour change communication], prevents a definitive assessment and the attribution of impact to the respective programs on their targeted populations (Nguyen, Menon et al. 2011).
- ❖ A need to strengthen the evidence base for action (Nguyen, Menon et al.)
- ❖ Future research should evaluate the efficacy of intervention strategies that target the identified critical beliefs in changing mothers' behaviour in relation to the timely introduction of solid foods when their infants are 6 months of age. (Hamilton, Daniels et al. 2012)
- ❖ Further work that can explore [mothers' interpretations of infant formula advertising] closely would seem to be increasingly overdue (Dickinson, Gunter et al. 2013).

Conclusions

Food systems are changing rapidly. In the past decade there has been rising concern that the spread of modern food systems and marketing is adversely affecting population nutrition and health. Such concerns particularly apply to infant and young child feeding because of the pervasive and sometimes dire effects on health and development of infants and young children, and on formation of future eating habits and adult chronic disease risk. Diet related chronic disease is a rapidly growing problem in low and middle income countries, as well as high income countries, implying a 'double burden' of malnutrition for countries where the same population contains both undernourished and overweight

children. CACF are seen as a potentially cheap and cost effective way of improving CF quality in malnourished populations of infants and young children, in the same way that commercial BMS are argued to benefit nutrition by replacing poor quality milk products fed to infants < 6 months.

Against this is the concern that such marketing of CACF may be inappropriate including by spill-over to non-target groups attitudes and behaviours, such as through making CACF desirable and normal (including in groups for whom CACF are unaffordable), and thereby indirectly encouraging early introduction of CF, and displacement of suitable home CF. Also, unless provided free or low cost, CACF marketing may increase consumption among more affluent consumers rather than sustainably improving access to adequate nutrition and health for populations by improving quality CF including home produced CF. When children are fed CF foods which are high in salt, sugar or fats, or are consumed in excessive amounts, increasing their consumption may increase prevalence of obesity and later life chronic disease. Early introduction or excessive servings or frequency of CF will also displace rather than add to the nutritional value of breast milk and breastfeeding for young children 6-24 months.

The ethical question about marketing to a vulnerable group such as mothers of children is the extent to which they can actually exercise 'free choice' against the strong and pervasive pressures of marketing, and the extent to which they can make informed choices (Baker, Gentry et al. 2005). Marketing of complementary foods has considerable potential to unethically exploit vulnerability of caregivers in this transitional stage of their lives. This is especially so given the growing number of more affluent but relatively 'marketing-naïve' consumers in middle income countries.

A number of marketing practices identified in this review, such as relationship building via social media sites, endorsements by health professionals, sponsorship of mothers groups or baby clubs, giveaway samples of branded products, and provision of branded educational materials, can be argued to constitute degrees of 'stealth marketing' whereby mothers may not fully realise that particular products are being promoted to them. If they trust the source endorsing the product, they may be being misled, or even coerced, into purchasing the product (Rogers 2008).

This review concludes that a timely research and policy focus on the effects of marketing of complementary foods has been lacking. There is sufficient research evidence that BMS marketing is harmful, and little reason to expect that marketing of complementary foods will be less effective in changing attitudes or behaviours, even if the potential balance of harm and benefit is different in the case of complementary feeding.

Against this background, it can be argued that it is necessary to identify evidence justifying the absence of regulation of IYC food marketing, rather than the justification for it. The onus is on opponents of such regulation to show that commercial complementary food

marketing is beneficial overall, and without harmful spill-over effects. Such evidence appears to be lacking.

This review concludes there is: insufficient evidence to conclude that marketing of commercial complementary food is not harmful; and a body of evidence that it is possibly harmful. There is considerable evidence from other areas of marketing research that show that marketing is effective. There is also considerable evidence that suitably comprehensive regulation can be effective regarding the marketing of tobacco, alcohol, child oriented foods and breast milk substitute products. There is no specific evidence to suggest that such findings are not applicable to the marketing or social marketing of commercial IYC food products.

Our review of reviews confirm that evidence exists from studies on marketing of health related products, such as tobacco, alcohol, pharmaceuticals, BMS, and marketing of foods to children, that marketing is effective, and conversely for most of these products, that comprehensive and evidence based regulation works to constrain it.

Marketing of CACF is just one factor shaping nutrition and health behaviours regarding infant and young child feeding. Important wider determinants of CF practices, and longer term nutrition and health include gender and household income inequalities, and exposure to modern food systems and food marketing, as well as the varied and complex influence of variables such as health services, maternal employment, education, and urban residence. An important determinant of early CF appears also to be whether the mother has also initiated bottle or formula milk feeding.

While CF availability and affordability can target short term nutrition and health of infants and young children, it is important to recognise the key longer term role of social and economic determinants including income and gender inequality, maternal access to quality hospital maternity care and maternal and child health care services, appropriate education for health and family caregivers on infant and young child feeding, and social protections including maternity leave.

In light of the findings of studies identified in this review of harmful and pervasive marketing or cross marketing of complementary foods, strategic industry marketing responses to avoid constraints of narrow regulation, and the ineffectiveness of voluntary regulation by industry, marketing occurring in a variety of settings, and with growing use of electronic media affecting IYCF attitudes and behaviours across national borders, it is suggested that the harm of unregulated marketing exceeds the benefits of continued marketing of CACF.

The responsible and proportionate public health response is a comprehensive approach to controlling the marketing of such products in all settings and countries. As industry adapts to regulation, a comprehensive and integrated response is needed, and the response to cross border marketing and e-commerce needs to be global.

This study has also identified a need for independent funding to conduct more quality primary studies, with access to improved data collection on infant and young child feeding practices, and using sophisticated methodologies to account for mixed feeding, to explore and measure the complex relationship between specific marketing activities and the knowledge, attitudes and behaviours of caregivers of infants and young children.

Recommendations

Several studies in the review highlighted the importance of addressing the system and structural factors such as poverty, gender and poor access to quality health care, education and maternity protection that lead to malnutrition of infants and young children in both high income and low income countries and populations.

As findings of benefits of marketing of CACF are limited to public or humanitarian programs, while evidence of harm from CACF marketing is widespread for the general population, a public health ethical framework and the balance of risks and harms suggests that optimal IYCF would be most improved by governments taking actions to,

- ❖ regulate to prohibit or constrain the extent as well as the types of marketing of CACF;
- ❖ ensure all caregivers including health professionals have accurate and appropriate information on the benefits of protecting optimal infant and young child feeding including exclusive breastfeeding to 6 months, timely and adequate CF, and continuing breastfeeding to 2 years and beyond;
- ❖ address the structural factors including gender inequalities and lack of maternity protection, which increase the appeal of CACF over home-prepared CF of adequate quality.

In low income or socioeconomically disadvantaged populations, improved social protection policies or direct income support payments for caregivers of young children or improving financial incentives for optimal IYCF may be considered, rather than providing free or low cost CACF 'in kind' through public or humanitarian programs.

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Annexes

Annexes

Annex A: Further context for consideration

Wider context for complementary feeding practices

To develop effective regulation and interventions on IYCF, it is important to have evidence and understanding of its wider determinants. IYCF practices are influenced by a wider social and economic context which includes the rapidly transforming global food system, and the socio-demographic, economic, and other determinants of nutrition and health. Marketing activity is just one influence among many on IYCF practices.

Women traditionally play an important role in the household economy and local food systems as producers of food including through breastfeeding and human milk production. In Australia for example, women are still the primary food providers for families (Coveney 2006) and with more than half the female population engaged in paid employment (ABS 2009), more women (61%) report feeling time pressured compared to men (47%) (Pocock, Trivedi et al. 2010).

As market food systems have evolved and spread, women's interaction with the food economy is rapidly changing towards being consumers and purchasers of food, with their role as food producers for their families (including breastfeeding) or for local markets rarely acknowledged. Women's changing interactions with the modern market system have an important bearing on infant and young child feeding practices. Their capacity to deliver appropriate nutrition and health for infants and young children depends on how public policy provides practical support for women to integrate their market and non-market contributions to economic and food production. Nutrition is known to be a priority for mothers in their food provision role, however women who are time poor may use more convenience meals or fast foods (James, Kjøholt et al. 2009). Convenience foods, which are ready-to-eat or easy to prepare, are mostly considered to be unhealthy because they contain too much salt, fat and sugars which are implicated in obesity and chronic diseases (Commonwealth of Australia (2013)). Commercially available complementary foods (CACF) for infants and young children have long been viewed as valuable to mothers because of their convenience and time saving (Callor 1984; Knight 2000).

Around the world and historically a wide range of different ages has been observed for both the commencement of weaning, and the cessation of breastfeeding (Dettwyler 1995; Sellen 2001; Sellen 2001; Abrahams 2012). Also around the world a wide range of complementary feeding practices are observed. It has been proposed that such diversity in part reflects evolutionary adaptability: when resources are scarce the mother or the family will make trade-offs in the optimal breastfeeding of the child and conserve maternal or

family resources by earlier commencement of weaning, even if compromising infant or child health.

As economic development and market employment opportunities expand, women's capacity for 'biologically appropriate' feeding of human infants and young children increasingly depends on the adequacy of cultural and social support particularly maternity protection systems such as that represented in relevant ILO conventions on Maternity Protection, as well as the universal provision of health services which promote, protect and support optimal breastfeeding of the infant and young child as recommended by WHO. More broadly it depends on the realisation of human rights for women and children as specified in international instruments such as the Convention on the Rights of the Child, and the Convention on the Elimination of Discrimination Against Women. It also depends on reconciliation of the sometimes competing priorities of global trade liberalisation and public health.

For these reasons, our review has been informed by our consideration of emerging evidence on the wider structural determinants of infant and young child feeding especially complementary feeding practices in developed and developing countries.

We have not given detailed consideration to the crucial but even wider transformations of the global food system, other than to note that while modern food systems and marketing may improve awareness and availability of safer and more diverse foods (Hawkes 2008), they also establish new distribution channels (such as hypermarkets, modern supermarkets, and the internet) for ultra-processed foods, and it is suggested they may encourage food consumption generally (Hawkes 2006; Hawkes 2008; Popkin, Adair et al. 2012). There is a growing literature responding to the double burden of malnutrition in developing countries, but we do not further consider it here.

Also, the 'placement' 'P' in the four 'P's of marketing is a proxy for how closely integrated a community is into the market economy. For example, rural populations may have further to travel to the nearest supermarket to buy commercial IYC products, and may thus rely more on home produced or locally available foods. Likewise indigenous populations in very remote areas of some countries may be less exposed to modern marketing and retailing systems, as well as having only limited access to modern health systems and health care including for maternal and child health. The implications for the nutrition and health of such communities are not entirely clear.

Studies which shed light on this aspect of marketing were not the focus of this review but add to our understanding of the wider implications of modern marketing systems, and so are considered as 'determinants' of IYCF practices, rather than as 'marketing'. Interpretation of industry studies of marketing of complementary foods through 'influencers' is also assisted in this study by consideration of the roles of peers and families in some such 'determinants' studies.

Public health and vulnerability to exploitation by marketing

A public health approach is concerned with addressing the social determinants of health so as to maximise individual control over their health (World Health Organization 1986). Social determinants encompass the broader environments in which people make their health decisions, including societal norms, such as the 'good mother' discourse (Baker 2009), and marketing by companies persuading citizens to purchase products such as CACF that can displace healthier and more affordable home-prepared foods (Baum 2008).

Some populations may be especially affected by, responsive to, and vulnerable to exploitation during such rapid food system transformations. Modern food systems and marketing may ameliorate or exacerbate psycho-social vulnerabilities. While early in such transition, urban high income consumers are targeted with increasing diversity of products, product offerings and distribution channels increasingly come to target low income and rural consumers (Reardon and Timmer 2005; Hawkes 2006).

Other new vulnerabilities may be found in such 'marketing-naïve' populations especially in emerging middle and higher income countries, and those encountering marketing in the unregulated frontiers of the internet and social media, as well as groups already identified as vulnerable to marketing by existing research.

Effectiveness of marketing on all groups especially vulnerable groups

New mothers and their infants and young children have long been identified as a uniquely vulnerable to marketing of breast milk substitutes. Indeed the WHO International Code evolved out of such recognition, in both developed and developing countries.

All new mothers are considered a vulnerable group because of the transitional nature of their life-stage and the need for adjustment to: their own physical and psychological effects post-partum; breastfeeding; lack of sleep; dependency of new infant; changes to family structure; social expectations of 'good mothering'; and, making consumer choices about correct goods and services to purchase (Davies, Prothero et al. 2010). This period can be filled with anxiety for the mother about her infant's health and wellbeing, and her own skills and competencies as a mother (Davies, Prothero et al. 2010). Mothers are known to place a high value on child nutrition, development and learning (Roberts 2006) and this puts pressure on their mothering practices and their consumer choices of baby products. Mothering is a moralistic social space wherein mothers worry about being judged as 'good' or 'bad' (Douglas and Michaels 2005; Baker 2009).

Marketers can, and do, exploit such vulnerabilities by upholding the 'good mother' standard and, promoting products and services ostensibly to assist mothers to attain this ideal (Prothero 2002). They utilise health and medical expertise to confer credibility to the products, through a range of marketing strategies including endorsements by health professionals and free samples (Davies, Prothero et al. 2010). Mothers of all socio-economic groupings are susceptible to the aspirational effects of marketing, simply

because they are citizens of a predominantly capitalistic world (Bauman 2000; Jackson, Harrison et al. 2014).

‘Spill-overs’ from marketing activity

Marketing targets the needs and desires of particular demographic ‘segments’ in order to efficiently sell products to them. To the extent marketing activity exposes the wider public to achieve greater audience ‘reach’ and ultimately sales, it also influences the aspirations and behaviours of the population more widely, including non-target groups.

To avoid the potential harms of excessive or inappropriate use, certain products such as pharmaceuticals and breast milk substitutes have traditionally being marketed through health systems and health professionals, in order to protect consumers. Other products such as tobacco were historically promoted freely, including through association with medical science and with health claims, but are now comprehensively regulated by a global Convention Framework for Tobacco Control, which is a global regulatory evolution of the WHO International Code (Zimmerman and Guttman 2001). Many high quality studies now provide valuable evidence which is relevant to this review, on the effects of tobacco and pharmaceutical marketing, as well as the effects on population health of regulating such marketing.

For the above reasons, our review is informed by a ‘review of reviews’ of marketing effects across a wider field which includes tobacco, pharmaceutical and alcohol marketing, as well as marketing of breast milk substitutes, and food marketing to children. The last of these areas also overlaps with our review of CF because of its investigation of the dynamics of the mother-child relationship through ‘pester power’ of older children. The insights and evidence from research in this area for our review of marketing of CF are thus incorporated in this study through the ‘review of reviews’, and enabled clearer and relevant boundaries to be drawn around our study regarding the age of child.

Defining infant and young child feeding outcomes effects of for marketing CACF

This review did not attempt to rigidly differentiate breast milk substitutes and complementary foods, because to do so is impractical, and conceptually of doubtful validity. Research and regulatory definitions of infant formula may include the period 0-12 months or to 6 months. ‘Milk formula’ may refer to milks targeting children over 6 months but consumed by infants much younger. The multiplicity of understandings and definitions of ‘breast milk substitutes’, ‘infant formula’, ‘formula milk’, and ‘complementary foods’ present challenges to selecting studies relevant to marketing effects on complementary feeding (which includes ongoing breastfeeding). Instead of excluding all studies of milk formula, we have attempted to most rapidly and efficiently draw on evidence of BMS marketing effects from recent systematic reviews, whilst identifying new evidence from primary studies focused more specifically on complementary feeding. It is hoped this overarching approach to identifying relevant studies assists in informing a more

comprehensive understanding of the evidence, which is relevant to the effects of marketing of IYC food products.

Conceptually, CF are also difficult to deal with, as unlike IYC food products consumed by infants of an age when exclusive breastfeeding is optimal, they can both enhance and detract from optimal infant and young child feeding including exclusive breastfeeding and sustained breastfeeding. This is particularly so given the pressing issue of using commercially available CF and supplements in public/private partnerships, including both production and marketing. One longstanding example of such a scheme is the US WIC, which provides food assistance to around half the US population of mothers and their young children. The scheme is increasingly recognised as a form of marketing of commercial IYC products including milk formulas and complementary food products, which can have important detrimental as well as beneficial effects on optimal IYCF practices in the target populations. This review included WIC and similar schemes in developing countries which provide free or low cost commercial IYC foods and supplements to disadvantaged populations including through partnerships with private sector organisations. However, this is not a comprehensive compilation of such research and studies of this kind are included to provide a comprehensive picture of research which may inform or provide evidence on marketing effects of complementary feeding. In particular on the responsiveness of IYCF practices in disadvantaged or deprived populations to marketing of CACF which uses financial incentives such as price subsidies, free food supplies or commercial marketing techniques to achieve social goals.

Marketing of CACF can be both potentially harmful and beneficial. It may harm optimal infant and child feeding where it encourages, for example, premature introduction of CF, displacement of breast milk with less nutritious food, or premature cessation of breastfeeding. This could occur, for example, through early introduction of CF, introduction of poor quality CF (whether commercial or home prepared), and through excessive CF amounts or frequency of feedings.

On the other hand, in some deprived populations, CF may be insufficient or poor quality, and appropriate marketing of CACF and supplements may be considered to have a role in promoting optimal IYCF.

Nutrition & health concerns

Commercial complementary foods (CACF) are marketed as convenient, 'superior' alternatives to fresh, home-prepared complementary foods, and while they are generally nutritionally adequate, they have nevertheless been shown to be less nutrient-dense than home-prepared foods (Garcia et al 2013). They are often higher in sugar (Elliott 2010) and lower in essential minerals (Zand, Chowdhry et al. 2011; Zand, Chowdhry et al. 2012; Mir-Marques, Gonzalez-Maso et al. 2015).

Nutritional problems associated with CACF may lie in their psycho-social effects on development of infant and child eating patterns. The regular consumption of CACF has the potential to cause nutritional consequences for infants through reducing exposure to, and acceptance of, flavour variety, texture and appearance. CACF are often blends of various food groups, for example, fruits and vegetables mixed together, to increase palatability, yet this masks the taste of the individual foods, thus reducing exposure to flavours that are not innately preferred by infants, such as bitter, sour or bland flavours, and for which preference is learned (Birch 1998) through repeated dietary exposure (Skinner, Carruth et al. 2002; Wardle, Cooke et al. 2003).

'Lumpy CACF are often marketed to infants later than recommended (Northstone, Emmett et al. 2001) which can lead to reduced acceptance of textured foods later in childhood. As CACF are generally squeezed or spooned directly from the packet into the mouth or onto the spoon, there use limits infant's kinesthetic learning about foods through the seeing, touching and smelling of foods, which is important for overcoming neophobia (Heath, Houston-Price et al. 2011), the rejection of novel foods in infancy (Birch 1999).

These characteristics of CACF can therefore contribute to inappropriate dietary patterns and behaviours later in life (Coulthard, Harris et al. 2010; Nicklaus 2011; Brazionis, Golley et al. 2012). Such as, lower fruit and vegetable intake (Foterek, Hilbig et al. 2015) and unhealthy dietary patterns throughout infancy (Brazionis, Golley et al. 2012). Highlighting the negative influence of CACF marketing on the food sensory experiences that are necessary for establishment of food preferences and healthy eating behaviours from infancy.

Despite lack of data to allow linking of health outcomes to CACF dietary intake for children under 2 years of age (Smithers, Golley et al. 2011), exposure to CACF in infancy combined with aggressive marketing of child-oriented products during childhood can pose health risks by shaping children's preferences for commercial foods over home-prepared foods. Parents, as the 'gate-keepers' to children's food environment (Birch 2006), may continue to provide packaged, convenience food to their children because they trust in food marketing (Hughner and Maher 2006) and because highly palatable, energy-dense commercial products are abundant, readily accessible and affordable (McMichael, Powles et al. 2007). Children also have an innate preference for salty and sweet foods (Birch 1999). When children gain greater independence and control over their food environment, they may continue to favour commercial products over home-prepared foods. As commercial processed foods tend to be higher in salt, fat and sugars, this establishes dietary patterns known to be linked with obesity and chronic diseases (World Health Organization 2003). These characteristics of CACF can therefore contribute to inappropriate dietary patterns and behaviours later in life (Coulthard, Harris et al. 2010; Nicklaus 2011; Brazionis, Golley et al. 2012), such as lower fruit and vegetable intake (Foterek, Hilbig et al. 2015) and unhealthy dietary patterns throughout infancy (Brazionis,

Golley et al. 2012). The above highlights the potential negative influence of CACF marketing on the food sensory experiences that are necessary for establishment of food preferences and healthy eating behaviours from infancy.

Public health approach to marketing of health-related products

Marketing is an acceptable and essential part of business activity, but there are social expectations that profit-driven practices will be legal and ethical. This means reflecting honesty, fairness and transparency in dealings with consumers (Martin and Smith 2008; Handsley, Nehmy et al. 2012).

A central tenet of ethical business practice is that consumers are able to make informed choices. In other words that they are aware that they are being marketed to, that they are not misled in any way, nor coerced into purchasing products (Rogers 2008). The very nature of marketing to mothers during the vulnerable period of parenting infants makes it difficult for parents to assert consumer sovereignty in this way.

Regulation of marketing practices and consumption – a public health approach

Ethicists argue that governments have a prima facie responsibility to protect and promote the health of the population, a responsibility based on both attribution and efficacy (Rogers 2008). Justifications for government interventions on ethical grounds include: reasonable means; proportionality; harm avoidance; and fairness. Matters located in the social environment (such as marketing) are neither of the individual's making nor under the individual's control to change, but are attributed to the state which has the power to alter the environment in physical, economic and political ways.

For example, government intervention to restrict energy-dense nutrient-poor (EDNP) food marketing to children is justified by reference both to the considerable 'health risks' associated with obesity, and to legislative measures being 'reasonable' in the face of demonstrated inadequacy of health education and industry self-regulation (Rogers 2008).

Annex B: Detailed methods with search strategies

Source A. Marketing industry literature search

INFORMATION SOURCE AND SEARCH STRATEGY

To achieve a balanced review in a short period of time, the investigators chose to search the WARC database of industry literature. This database is a document repository used by the marketing and advertising industry and contains reports of marketing campaigns of many products, including those marketing CF.

This industry literature and the cataloguing of the database is quite different from the academic literature (Source B), hence three structured keyword searches were conducted to locate industry literature describing the marketing of CF (Box 1).

Box 1. Three sets of simple but structured search strategies used to locate relevant literature for the review from the WARC database.

- | |
|--|
| 1. Infant, limited to food (sector) |
| 2. Infant, limited to food (sector), limited to research |
| 3. Infant, limited to Line brand |

Source B. Systematic review of academic literature

INFORMATION SOURCES

The investigators searched five electronic databases which catalogue relevant peer-reviewed research. These were selected based on institution access to databases with content relevance whilst ensuring broad disciplinary coverage. The databases searched were: MEDLINE (biomedical literature), SCOPUS (social sciences and humanities literature as well as sciences more broadly), POPLINE (global reproductive health literature), PsychINFO® (psychological, social, behavioural, and health science literatures) and ERIC (education related literature).

DEVELOPING THE SYSTEMATIC SEARCH STRATEGIES

Development of the search strategy for the academic literature was guided by the primary research question which was formatted as a PICO question (Khan, ter Riet et al. 2001) (Population / Intervention / Comparison / Outcome). There is a temporal component to the intervention, that is, the intervention can be conceptualised as exposure to marketing over time, and hence this component will be expressed as exposure (E) from hereon.

What does the literature report on the effects (O) of marketing of commercially available complementary food products (E) for infants and young children (P), on the feeding attitudes and behaviours of their caregivers (O)?

The PECO components were guided by the following:

- The Population (P) is primary caregivers of infants and young children (0-24 months), particularly mothers, in all countries.
- The Exposure (E) of interest is marketing of commercially available CF for infants and young children. This marketing can take various forms including cross promotion of breast milk substitutes.
- The Comparison (C) is not defined, as uncontrolled descriptive studies are likely to inform the research questions.
- The Outcomes (O) of interest are the evidence of effect of marketing on behavioural (A) and/or psychosocial (B) outcomes (Box 2). This also has a time dimension.

We used three electronic search strategies in order retrieve the most relevant papers, described in peer-reviewed literature from a variety of disciplines. The investigators used two targeted strategies and one with more comprehensive parameters.

Box 2: A non-exhaustive list of behavioural and psychosocial outcomes considered of relevance to the research questions.

Behavioural outcomes include

- a. increased use (or purchase or consumption) or amounts (or portion size or serving size) of commercially available complementary foods;
- b. increased use (or purchase or consumption) or amounts (or portion size or serving size) of foods with excess saturated fat, trans-fatty acids, free sugars, salt);
- c. increased use of CACF which do not meet safety and nutrient composition standards, or of nutritionally inappropriate foods which do not provide essential nutrients other than calories and discourage dietary diversity, including use of processed foods;
- d. increased use of commercial or home-prepared breast milk substitutes (BMS) or of foods and drinks other than breast milk before 6 months of age;
- e. reduced use or consumption or amounts of suitable home-prepared and/or locally available foods, or substitution of CACF as first foods or as complete diet;
- f. reduced breastfeeding of children between 6 and 24 months.

Psychosocial outcomes include

- g. caregivers' knowledge and attitudes (including preferences and beliefs) on appropriate, necessary or desirable infant and young child feeding behaviours and feeding or care practices, as above;

- h. caregivers being confused or misled about normal infant or young child behaviours, or about the qualities of the product, its necessity, or its preparation, storage, handling or appropriate use.

This search strategy was constructed using keywords combined into groupings of the P, E₁, E₂, O₁, and O₂ components of PECO (outlined in Table B1). Articles retrieved by this search strategy had at least one term from each grouping (Box 3), in the form: P AND I₁ AND I₂ AND (O₁ OR O₂).

Table B1. Indicative groups of keyword used to construct the database search strategies, organised according to PECO groups.

PICOS	Groupings	Example search terms
Participants (P)	Caregivers	Caregiver, family, parent, carer, mothers, health professionals, child care workers, grandparent, father
Exposure 1 (E ₁)	Marketing	Marketing, promotion, advertising, brand, health claims, warning claims, nutrition information, packaging, labelling, product placement
Exposure 2 (E ₂)	CF or drinks	Infant nutrition, food (solid foods, semi-solid foods, soft foods, commercial foods) drinks, beverages, milk, formula, complementary food, baby food, child feeding
Outcomes 1 (O ₁)	Behaviours or psychosocial outcomes	Purchasing, consumption, decision, choice, use of, feeding, knowledge, attitudes, beliefs, preferences
Outcomes 2 (O ₂)	Evidence of effect	Effect, evidence, impact, findings, influence

Following a process of scoping relevant literature, we designed the search strategies around identified targeted keywords (Table B2). These terms were searched in either ‘all fields’ or in the title only (as specified). The investigators used database specific wildcards to allow for variations in spelling and word endings. MeSH headings (or similar library categorisations in databases other than MEDLINE) were not used: although these would have increased the comprehensiveness of the search strategy, this was not feasible in the scope of this REA.

Searches were constructed using Boolean operators; the OR operator was used to combine keywords within a group and the AND operator was used to combine groups. Hence each article identified by the search included at least one term from each of the groups described.

The search strategies were refined using a number of tests. The search terms were the same for each database, but the wildcards and format was adjusted according to each databases’ requirements. No search limits or filters were used to restrict research or publication type on this academic literature database.

Three search strategies were developed to ensure the searches retrieved relevant literature to address the research question. All five databases were searched using the following three search strategies.

SEARCH STRATEGY 1: TARGETED STRATEGY FOR MARKETING OF COMPLEMENTARY FOODS TO PARENTS.

This search strategy specifically aimed to retrieve relevant papers where the main focus (as described by the title and keywords) was marketing (E₁) of complementary foods (E₂) for infants and young children to parents (P). Keywords describing outcomes on parents are not included in this strategy.

Box 3. Search strategy 1-used in all 5 electronic databases

- 1.(P) (toddler* or infant* or baby* or preschool* or parent* or mother* or mom* or maternal) in title
- 2.(E1) (marketing or promoting or brand* or commercial* or advertis* or label* or purchas* decision*) – in title
- 3.(E2) (complementary food* or infant food* or toddler food* or baby food* or weaning food* or toddler milk* or toddler formula or follow-on formula or follow-up formula) – keyword in all fields
- 4.1 AND 2 AND 3

SEARCH STRATEGY 2: TARGETED STRATEGY FOR MARKETING OF BEVERAGES THAT MAY BE REGARDED AS COMPLEMENTARY FOODS

This search strategy specifically aimed to retrieve relevant papers where the main focus (as described by the title and keywords) was marketing (E₁) of beverages which may also be classified as complementary foods (E₂) for infants and young children to parents (P). Keywords describing outcomes on parents are not included in this strategy.

Box 4. Search strategy 2-used in all 5 electronic databases

- 1.(P) (toddler* or infant* or baby* or preschool* or parent* or mother* or mom* or maternal) – in title
- 2.(E1) (marketing or promoting or brand* or commercial* or advertis* or label* or purchas* decision*) – in title
- 3.(E2) (drink* or beverage* or juice* or bottled water) – in all fields
- 4.1 AND 2 AND 3

SEARCH STRATEGY 3: BROAD STRATEGY TO IDENTIFY LITERATURE DESCRIBING EVIDENCE OF THE EFFECT OF CACF MARKETING ON PARENTS

This strategy focused on identifying evidence of effect using the keywords for O1, and O2 (Table B1). The outcomes terms were compiled following a scoping of marketing research as well as the academic research. Hence these are consistent with marketing literature as well as health literature describing behavioural and psychosocial outcomes (Box 2).

Box 5. Search strategy 3-used in all 5 electronic databases

- 1.(P) (carer* or caregiv* or mother* or maternal or mom* or parent* or father or paternal or grandparent* or grandmother* or nan* or famil* or child* or toddler* or infant* or baby* or preschool*) – in title
- 2.(E1) (market* or Promot* or brand* or advert* or commercial* or packag* or label* or claim* or appeal* or media or value or product loyalty or repeat usage or sustainability or demand or customer* or product demonstrat* or direct consumer promotion) – in title
- 3.(E2) (complementary food* or complementary feed* or weaning food* or infant food* or infant feed* or toddler food* or toddler feed* or baby food* or food* or drink* or beverage* or juice* or bottled water or toddler formula or toddler milk) – in all fields
- 4.(O1) (purchas* or consum* or feeding or decision* or practice* or intent* or drive* or harm minimisation or perceiv* or perception* or educat* or communicat* or knowledge or aware* or attitude* or belief* or preferenc* or familiari* or perform* or distribut* or reliab* or sustainability or stigma* or product performance or market failure* or affordab*) in
- 5.(O2) (effect* or efficacy or finding* or impact* or influence* or appeal* or react* or change* or driver* or compar* or differen* or survey or study or research or estimat* or increas* or insight* or analys* or associat* or factors or understanding or role or how or systematic review) – title
- 6.4 OR 5
- 7.1 AND 2 AND 3 AND 6

IDENTIFICATION OF RELEVANT PAPERS BY INVESTIGATORS AND EXPERT PANEL

The vast library of literature accumulated by the investigators were collated and reviewed using the same systematic criteria as the literature identified by the electronic database searches.

Source C. Identification of papers by expert panel to inform the second research question

In consideration of the broader context, the investigators also conducted a review of reviews to find evidence from other fields to address the key gaps remaining from the primary study, and identify further evidence from these wider fields addressing emerging themes in the primary study.

The secondary question to guide the 'review of reviews' was:

What do recent systematic reviews of the literature report regarding the effects of marketing of: child-oriented food products, pharmaceutical products, BMS, alcohol, tobacco and tobacco related products to women especially parents, on outcomes which will usefully inform the primary research question?

The expert panel was asked to suggest relevant literature which they thought would inform this review. The appointed content experts recommended systematic reviews of studies describing the impact of marketing of tobacco, alcohol, pharmaceutical products, and food marketing to children which met the inclusion criteria, namely that they answered the secondary question. In this way, the search strategy was selective rather than comprehensive.

Study selection and review procedure

Articles identified by the search strategies from sources A and B, were subject to three review stages for eligibility: title and abstract screening, full text screening and full text eligibility verification. A summary of the number of articles which were included in each stage is illustrated in the flow diagram (Annex C) using the format suggested by the PRISMA guidance for reporting of systematic reviews (Liberati, Altman et al. 2009).

If concordance was less than 90% the inclusion and exclusion criteria was reviewed and the concordance tested again. Reviewers shared the review of the remaining titles and abstracts using the refined eligibility criteria (first screening stage). The full text articles were reviewed in order to exclude ineligible manuscripts (second screening stage).

Stage 1 review. Screened for eligibility using the titles and abstracts.

This process was conservative and only excluded papers that were describing something with no relevance to the research question. Articles which described relevant research but did not describe any outcomes were included for the Stage 2 review.

An initial trial of the inclusion and exclusion criteria was conducted by two reviewers on 100 titles and abstracts. Two reviewers used the eligibility criteria (Section 3D) to review the same 100 papers achieving 82% concordance. Several items on the inclusion and exclusion criteria (Table 1) were then clarified and the same two reviewers then completed

another two reviews of 100 papers each and achieved 90% concordance. They then divided the remaining titles and completed screening independently.

Stage 2 review. Screening of the full text

The full text of those included in Stage 1 were then screened for eligibility by one reviewer using the inclusion and exclusion criteria (Table 1). Articles that did not report outcomes of marketing were excluded. Any that were equivocal were submitted to a second reviewer and included/excluded accordingly.

Stage 3 review. Verification of eligibility of extracted data

Data was extracted from articles included as a result of stage 2 reviewing. The reviewer who was extracting the data identified some articles that did not inform the research question and flagged these for exclusion. Another reviewer verified articles which were to be included and excluded at this stage.

ELIGIBILITY CRITERIA

The investigator team developed and finalised inclusion and exclusion criteria for the review in consultation with one expert advisor and WHO. All PECO components were applied using the inclusion and exclusion criteria in the reviewing stages.

Articles were included if they described investigations pertaining to the effect of IYC food product marketing to caregivers of infants or young children under 3 years of age, and also considered IYCF outcomes > 6 months, or early introduction of complementary foods (CF) or follow-up formulas/formula milks (< 6 months). Studies that considered a relevant marketing exposure and described a relevant IYCF outcome were included, even if the outcome could not be causally attributed to, or statistically associated, with the marketing exposure. The scope of the review included commercially available ready-to-use food (RUF) or nutrient supplements and studies of social marketing or food assistance programs, where there was a private sector partner and/or the product was available for sale. All study designs were eligible for inclusion. Included were studies from peer-reviewed and grey literature, with publication date after 1 January 1981 (the year the WHO Code was introduced) to the search date.

Publications from the WARC database were available from 1 January 1984.

Articles were excluded if they described only the extent or nature of marketing or implementation of the International Code or national law or regulation, individual company marketing campaigns without wider impact on IYC food category sales or breastfeeding, or only described feeding practices or attitudes or IYCF policies; if participants were not the familial or health caregivers of infants or young children, or if the study identified that only marketing of infant formula for infants < 6 months, or only IYCF outcomes for < 6 months, were considered. Letters, commentaries or editorials were excluded. Articles published before 1 January 1981 or after April 2015, or in a language other than English were

excluded, as were those with no English abstract and where the full-text could not be acquired. Those articles that did not clearly describe the involvement of marketing influencing caregiver attitudes or behaviours regarding complementary foods or which focused solely on other outcome measures were excluded.

Studies identified as relevant to the secondary question were included in the review if they were high quality systematic reviews, published since 2010, which provided relevant evidence on effects of marketing on the attitudes or behaviours of female caregivers in relation to the nutrition or health of their children.

DATA EXTRACTION/COLLECTION PROCESS

Prior to extracting data, categories of behavioural outcomes of interest along with impacts on caregiver knowledge, attitudes or beliefs were identified and summarised in the study protocol. Additional categories were identified during data extraction and these categories were reviewed across included studies. Similarly, the categories of feeding-related outcomes that were identified were synthesised into the following categories: early introduction of complementary foods & drinks; reduced duration of breastfeeding; reduced use of home-prepared foods; provision of liquids other than BM; nutrient poor foods; excess nutrients; reduced dietary diversity; inappropriate meal frequency; inappropriate textures for age; increased portion size; change in knowledge/perception/attitudes.

Data from included studies was extracted by two reviewers into purpose-built tables. The tables captured details covering: study design, population and country setting, participants/marketing target, marketing type (social, commercial) and nature of marketing exposure (advertising, labelling, packaging, etc.), in addition to the psychosocial and behavioural outcomes. All IYCF related outcomes reported in the article were extracted, even when the study design did not establish association between outcomes and the marketing exposure. Further details were recorded that related to identified marketing exposure as described by the study definition of the 4 Ps of marketing.

To address a request from STAG to assess the number of articles reporting outcomes towards or away from optimal IYCF, the extracted outcomes were further divided into harmful, beneficial or ambiguous.

Studies identified in the 'review of reviews' were also included in the data extraction process, and separately identified in tables capturing study details.

Table B2. Summary of literature inclusion and exclusion criteria

Criteria	Exclude	Include
Date of Publication	Pre 1981 (1)	1981 to search date
Language of Publication	No English abstract, letter, commentary or editorial (2) Full text not available in English (published) (3)	
Participants	Non familial caregivers (4)	Caregivers of infants and young children
Marketing of commercial complementary foods and drinks including milks (CACF)	<p>Contains only information on marketing of 'BMS' or 'formula' or 'infant formula' (5) for children aged less than 6 months (6), where 'formula' or 'infant formula' or 'BMS' is specifically identifiable as not being complementary food or drinks including milks (e.g. 'follow up' or 'follow-on' formula or 'toddler milks' or 'growing up milks')</p> <p>Marketing of BMS to health professionals and hospitals, and discharge bags, where this involves only 'formula' or 'infant formula' or 'BMS' (see above) for infants aged less than 6 months (7)</p> <p>Products marketed for the general population that are also consumed by young children (8)</p> <p>Processed foods and drinks that are promoted for the general population but which may be consumed by infants and young children (9)</p> <p>Supplementary foods to rectify undernourishment where these are not marketed or available for sale on the open market (10)</p> <p>Only contain information pertaining to health promotion programs of governments and NGOs without a commercial partnership, to improve the nutritional intake of populations whose diets might otherwise be deficient (11)</p> <p>Promotion of IYCF guidelines (12)</p> <p>Only contain appropriate health promotion programs of governments and NGOs to promote complementary feeding. (13)</p> <p>Effects of marketing, where children are the direct target of the marketing. (14)</p> <p>Evidence on successful marketing campaigns affecting market share or company sales (17)</p> <p>Regulation of marketing of BMS (18)</p>	<p>Contains information pertaining to effects of marketing of CACF (see Glossary) which may affect age appropriate breastfeeding or the consumption of age-appropriate or nutritionally adequate or safe foods or drinks</p> <p>Marketing to health professionals and hospitals, and discharge bags, where this involves CACF</p> <p>CACF that are marketed or used for infants or young children (aged 0-36 months)</p> <p>Complementary foods, baby foods, weaning foods.</p> <p>'Follow up' or 'follow-on' formula or 'toddler milks' or 'growing up milks'.</p> <p>Drinks such as juice and water, if commercially produced and marketed or used for infants or young children</p> <p>Ready-to-use foods (RUFs) where these are marketed or available for sale. Nutrient supplements or micronutrient powder products designed to be mixed with CF are included</p> <p>All forms of marketing including: commercial marketing, advertising, product promotion, communication, information, labelling, packaging, pricing, distribution/marketing channel</p> <p>Social marketing and health promotion programs are only included when marketing commercial complementary foods, or when there is a private sector partner</p> <p>Effects of marketing to parents on parent outcomes.</p> <p>Effects of marketing on company sales, where the marketing affects product category growth, (e.g. market leaders) or where competition with breastfeeding is noted or implied.</p> <p>Effects of regulation of marketing of CF or drinks including milks</p>
Outcomes	<p>Attitudes or behaviours unrelated to IYCF (15)</p> <p>Health or development outcomes of IYCF only (16)</p>	Attitudes or behaviours directly relating to IYCF
Settings		<p>All country income or development settings</p> <p>Health systems, institutions or services, childcare services, healthcare or childcare workers</p>

Annex C: Flow of papers

Figure 3. Flow diagram of study identification, screening and inclusion (Source A)

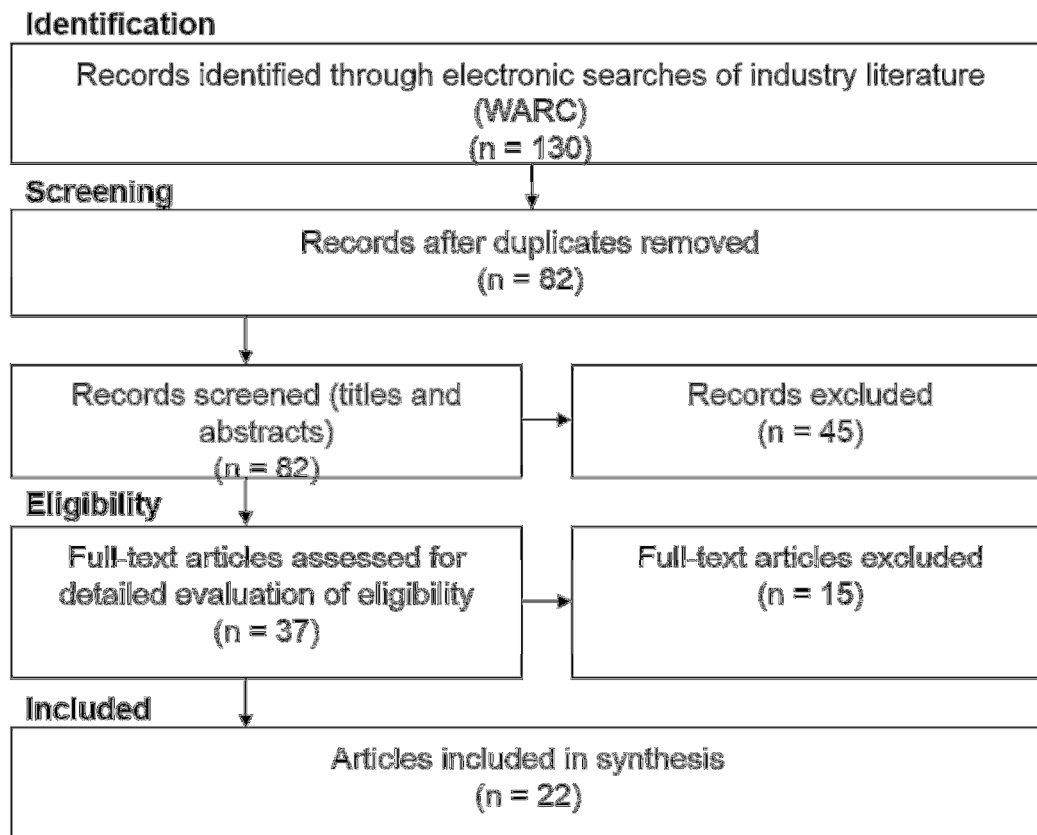
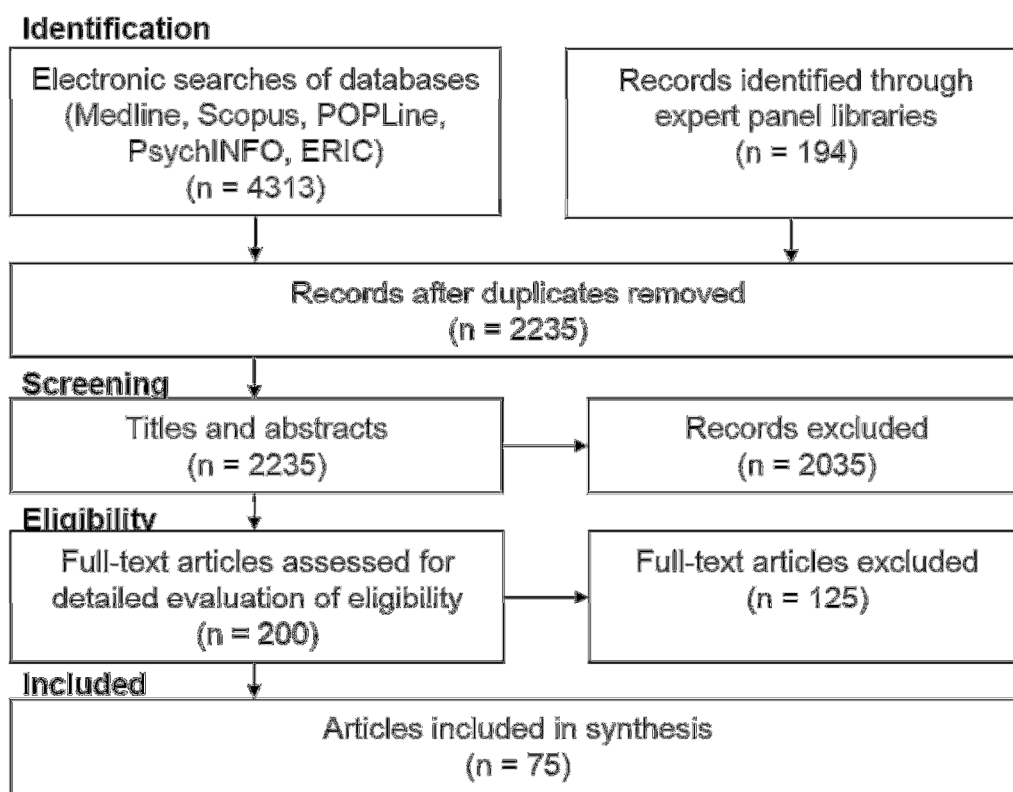


Figure 4. Flow diagram of study identification, screening and inclusion (Source B)



Annex D: List of included studies

Marketing industry literature (Source A)

1. Caller L. The relaunch of Cow & Gate baby meals. Institute of Practitioners in Advertising. Silver, IPA Effectiveness Awards 1984: WARC 1984.
2. Cruz S. Gain: The Biggest GAINer Caravan - winning the approval of Asian tiger mothers. Warc Prize for Asian Strategy Entrant, 2013 WARC 2013.
3. Euromonitor International. The First Age: birth to three years old – Executive Briefing. July 2010. Euromonitor International Ltd, London 2010.
4. Euromonitor International. Bristol-Myers Squibb in Packaged Food -World. Euromonitor International Ltd, London 2010.
5. Euromonitor International. Nestlé SA in Packaged Food: Baby Food and Dairy (World). Passport, Euromonitor International Ltd, London 2015.
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7. Knight J. Gerber Products Company: Gerber Baby campaign. *Encyclopedia of Major Marketing Campaigns*. 2000;1.
8. Moes A, Neighbour L. The Australian choice: the launch of Golden Circle Baby Food in Australia. The Communications Council. Gold, Advertising Effectiveness Awards 2002 WARC 2002.
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10. Price F, Wells C, Hindmarch J. 'It's as vital as the air that they breathe ...'. *International Journal of Market Research*. 2005;47(5).
11. Puehse T. Nielsen Breakthrough Innovation Report. Southeast Asia – 1st Edition. Nielsen, New York 2014.
12. Tran PT. Friso Gold: to grow is to let go. Warc Prize for Asian Strategy. Entrant, 2011 WARC 2011.
13. WARC. Simply Organic. Institute of Practitioners in Advertising. Gold, Scottish IPA Effectiveness Awards, 2001 WARC 2001.
14. WARC. Nestlé: NESLAC experts talk. Warc Prize for Innovation Entrant, 2010 WARC 2010.
15. WARC. Wyeth Gold: Wyeth DIY flashcards. Warc Prize for Asian Strategy. Shortlisted, 2011 WARC 2011.
16. WARC. Heinz Taste of Home: from zero to mum's hero Design Business Association. Bronze, Design Effectiveness Awards 2012 WARC 2012.
17. WARC. Milupa Cereals: spoon by spoon Integrated Marketing Communications Council Europe. Silver, IMC European Awards 2012 WARC 2012.
18. WARC. HiPP Organic branding and packaging redesign. Design Business Association. Silver, Design Effectiveness Awards 2013 WARC 2013.

19. WARC. Danone: Karimums - connecting mums and mums-to-be on the journey. Design Business Association. Bronze, Design Effectiveness Awards 2014 WARC 2014.
20. Warren TM. Organix brand relaunch. Direct Marketing Association - UK. Silver award, 2010 WARC 2010.
21. Wong D, Lau A. Wyeth Gold: see the world at home. Warc Prize for Asian Strategy. Entrant, 2014 WARC 2014.
22. Woo J, Han I. Nutrilon: capture every 7 days of Chinese mom. Warc Prize for Asian Strategy. Entrant, 2014 WARC 2014.

Academic literature (Source B)

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Review of reviews literature (Source C)

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Annex E: Narrative summary of industry literature

Studies of attitudes, knowledge, preferences (n = 9)

1. Wong 2014 reported an advertising campaign for Wyeth Gold infant milk powder including follow-on formula and toddler milk that built brand relationships with Hong Kong parents by developing an early childhood mobile phone app of electronic flashcards. Use of the app also involved parents and within two months the app became a top-five education app with more than 20,000 downloads from 327 parents a day and press recommendations worth HK\$674,000. Performance measures were: 99% user agreement that “Wyeth is a trusted parenting partner” and 95% “Willing to recommend to other parents”. A campaign return on investment of 26:1 and an increase in year-to-date sales of 30%.
2. WARC 2014 reported a marketing campaign to build brand image and brand relationships with mothers from pregnancy through to toddlerhood for Danone/Nutricia’s Karicare products in Australia, that include follow-on formula and toddler milks. A website, “Karimums” was launched in 2012 that enabled pregnant women, new mothers and mothers of toddlers to interact with each other online, via mobile phone and social media and “drive contact to the “Careline” (Nutricia’s information line for parents) by phone, live chat and email. The sites use a colour scheme and logos consistent with Karicare products, and branded the company presence on the site by using a blue theme as it had been identified as ‘authoritative’, offered a “welcome pack” and ran a competition for ‘Australia’s Happiest Thriving Toddler’. Unquantified results were: “exceeded expected numbers of visits from both pregnant and first time pregnant mums”, “changes in perception” and increased time mothers spend on the site.
3. Puehse, 2014 reported that Nestle used Malaysia to pilot growing up milks for markets in other parts of the world. Lactogen 4, a growing up milk for children older than 3, was developed to counter loss of market share to alternative brands or milk for adults from this age. The new product included a patented ingredient (L.Comfortis) marketed as the “unique benefit of a happy tummy” to mainstream mothers with poor knowledge of nutrition, preparing their children for school where they would be exposed to more germs. The marketing strategy included using educational roadshows and healthcare professionals and nurses working in government clinics to teach mothers about the importance of nutrition and benefits of the patented ingredient. Packaging, colours and shapes (heart shape, Nestlé bird nest icon) were designed for the target audience without images of kids/toys to convey a more scientific image.
4. WARC 2012b reported an advertising campaign in Ireland for Milupa cereals, the leading brand in weaning foods, designed to overcome consumers weaning children

with 'adult' foodstuffs in response to the economic recession in 2009/2010, when 49% of Irish parents agreed that “baby-tailored weaning products” were luxuries and not necessities. A website for first-time mothers was designed to provide “expert” nutritional advice around “4 key stages of weaning (4/6/8/10 months)”, banner ads that encouraged emotional and practical engagement, and feelings of success by enabling parents to create a movie of their children throughout the weaning journey that could be shared via social media. Online registration provided incentives to engage via ongoing communications that sent timely weaning advice, recipes, and coupons for Milupa and 3rd party brands. Press and in-store advertising included a QR code to a mobile phone version of the website which was also highly optimised for search engines. Results were: “conversion rates of 13+%”, over 18,284 website visits and 13,870 unique visitors (in the 4th quarter of 2011), 2,500+ registered members with 60%+ of registered parents with a child aged over 5 months old and time on site exceeding 3.5 minutes (“a benchmark”).

5. To counter competitor label claims and the many baby foods in shopping aisles, Precourt (2012) reported an advertising campaign for Nestle that revised the packaging and labels of its Gerber brand wet baby foods, new formula and toddler products and beverages for children for the first 48 months of their lives, as well as a "Graduates" line for more mature babies. Research showed that the Gerber (baby's head) logo was highly recognised (100% awareness and an 80 percent market share) and emotionally appealing "among all kinds of audiences ... In fact, when we conducted some [neuroscience] studies, it set new norms for positive emotions." Results of the campaign included unspecified packaging "aesthetic appeal", increased brand equity, more appealing "shelf presence" and increased sales.
6. WARC 2011 reported an advertising campaign to build brand attention and relationships for Pfizer's "Wyeth Gold" infant milk formula brands, "Wyeth Progress Gold" (for toddlers aged 1-3 years") and "Wyeth Promise Gold" (for children aged 3 years and above) with Hong Kong mothers of 1-3 year old children to convince them that formula needed ingredients other than DHA to improve brain and nervous system development. Customisable flashcards on a mobile app in 2 languages, that also demonstrated the benefit of AA+DHA, were available from the Apple Store, and 2 leading Hong Kong online parenting forums. Use of the mobile app enabled reach to consumers and created content that could be applied to other markets.
7. WARC 2010 reported a public relations exercise by Nestle in 2009 to limit loss of its Chinese markets for Neslac brand of milk formulas following the melamine contamination of milk products sourced in China. Rather than reassure customers of the safety of their products as had their competitors, Nestle researched online forums used by under confident Chinese parents and developed branded online videos with parenting advice from nutritionists and Nestle experts. Negative brand comments on

bulletin board postings decreased from 500,000 to 150,000 in 3 months and the videos were viewed 13 million video times in 3 months, with searches on Google or Baidu (China's biggest search engine) for parenting concerns prioritising “Neslac Experts' Talk” videos.

8. Knight, 2000 reported the value of the Gerber baby face logo to the USA-based Gerber Products Company which produces 200 foods and juices, including infant formula, cereal, foods and juices for toddlers: "In some countries, the Gerber Baby is recognised even though we've never sold baby food there" (President and CEO Al Piergallini, 1996)
9. WARC, 2001 reported an advertising campaign by Simply Organic baby food in the UK that used controversial posters that emphasised risks from pesticides.

Studies including behaviour changes (n = 13)

1. An industry analysis of Nestle SA baby food operations and growth prospects 2014-19 (Euromonitor International 2015) reported that baby food manufacturers overcame globally declining birth rates and “strong campaigns promoting breastfeeding” by developing new products for toddlers and children aged up to 36 months and beyond and that toddler milk was expected to drive growth in baby food sales over 2014-2019.
 - ❖ Nestle was the global leader in the follow-on formula and toddler milk categories, though its top ten baby food brands did not rank among the top five global labels in toddler milk. By acquiring Pfizer Wyeth Nutrition in 2012 to expand in China, Hong Kong and Saudi Arabia, Nestle improved its share of rapidly expanding toddler milk markets beyond Latin America.
 - ❖ “Strongly publicised health claims boosted sales of toddler milks”, giving the example of a new toddler formula in February 2015 containing the patented probiotic *Lactobacillus reuteri* *Protectis* mainly for emerging markets, especially the Asia-Pacific region. As well as toddler milk, “Further moves to extend the age group include the entry of toddler food products into other packaged food categories, such as yoghurt, soup, ready meals, pasta, confectionery and snacks, which offer growth potential in terms of adding value.”
 - ❖ Online retailing for baby food in China increased rapidly from a negligible share of sales in 2009 to 14% in 2015, which exceeds growth in other regions globally.
2. Woo 2014 studied how consumers in China evaluate infant milk formula brands across all digital media (internet sites, mobile phones) and word-of mouth, before their final purchase. Results of research by digital behaviour monitoring (n = 600), a cross-media online survey (n = 300) of women pregnant or with a child 0-1 year old in 3 cities, digital behaviour tracking (146,977 active users) and “social listening” was used to integrate brand exposure with a search engine, social media and e-commerce for Danone’s

Nutrilon infant milk formulas (including follow-on and toddler milks) that improved brand image, increased brand awareness and preference by 21%, 'brand of first choice' share by 400% and e-commerce value market share by 3.3% and sales by 177%.

3. Cruz 2013 reported an advertising campaign for Gain School Advance, Abbott's premium growing-up milk brand in the Philippines that featured digital and printed branded workbooks and on-ground activities that helped parents understand their kids' learning styles and was integrated into the curriculum of 33 different schools all over metropolitan Manila and reached 3,500 children and their parents, resulting in a 20% increase in market share in 2012.
4. WARC 2012 reported an advertising campaign in the UK in 2011 for Heinz "The Taste of Home" wet infant food in plastic containers with re-sealable lids (savory pots) that integrated labelling, online and in-store samples and promotions designed to overcome mothers' beliefs "that bought baby food is somewhat inferior to home-made", and communicate "Taste of Home's understanding of mothers' and babies' needs, emphasising the brand's expertise in quality and nutritious baby food" and "connected the new range to the entire Heinz Infant Feeding portfolio, baby club and internet marketing", resulting in an increase for this category of unit sales overall by 36%, and the largest unit share and the second largest value share in the 2-pack savory pots market.
5. Euromonitor International, 2010 analysed packaged food operations in global markets for 2009-14 for Bristol-Myers Squibb, noting that
 - ❖ "Government health campaigns to promote breast milk over infant formula have not helped Bristol-Myers Squibb in the mature markets. In other markets, however, where there is a more positive attitude towards the use of milk formula, growth is expected to be strong. Asia Pacific, Eastern Europe and the Middle East and Africa are expected to post the strongest percentage growth in milk formula over the forecast period." "In North America ... Milk formula has been negatively impacted by a decline in birth rates and by positive perceptions of breast milk. In order to convince mothers of the benefits of milk formula companies such as Bristol-Myers Squibb have to provide an incentive in the form of functionality, convenience, etc." "Toddler milk formula is expected to post the strongest growth in milk formula in the region. Toddler milk formula is less negatively impacted by health campaigns promoting breastfeeding."
 - ❖ "Outside of China, growth in baby food will be relatively modest. A combination of high birth rates in markets such as Vietnam, Indonesia and India and rising incomes as is mainly the case in China will drive sales ... Successful government campaigns are reducing the penetration of milk formulas to infants, and parents are beginning to delay the use of milk formulas until toddlerhood. This combined with restrictions

on the advertising of milk formula products and the melamine scandal are boosting the return to breast milk.”

- ❖ "Functional baby food is another key trend, which is particularly important against 'breast is best' health campaigns. Mead Johnson promotes its Enfamil LIPIL DHA and ARA enriched formula as “now even more like breast milk”, with a chart showing that this formula contains the same level of DHA as the worldwide breast milk average."
- ❖ “Bristol-Myers Squibb supports its brands with a wide range of marketing and promotion initiatives. As well as conventional advertising, it sponsors a number of mother and child welfare programmes, offering information websites, email newsletters and free samples. This comprehensive and instructional approach helps underpin the company’s authoritative standing in baby food."
- ❖ “In Latin America, Bristol-Myers Squibb is well positioned with a strong presence in the Mexican market, where baby food sales are set to grow by US\$418 million over the forecast period. The vast majority of this growth will be in milk formula, in particular, toddler milk formula, which is expected to grow by US\$173 million, representing 41% of milk formula absolute value growth in Mexico.” "In France, growth will be driven by toddler milk formula, with the French Academy of Medicine recommending in 2009 the consumption of toddler milk formula for 1-3 year-old children instead of standard food to meet nutritional requirements."
- ❖ Brand extension across food categories, including via infant formula to complementary food products for older children was noted in the Indian market. “Entry into the Indian market is made easier by Bristol-Myers Squibb’s existing presence in milk formula. Extension therefore into child-specific meal replacement products would be a natural move for the company."

6. Using data on demographic and socioeconomic trends, the Euromonitor International 2010b report on the global market and drivers for baby and toddler products emphasised the predicted value of markets for milk formulas for children older than 6 months: "The Chinese market ... growth will be driven by standard, follow-on and toddler milk formulas, which are set to expand by US\$1.1 billion, US\$1.3 billion and US\$2.6 billion, respectively." Factors driving these markets were: smaller families, rising education, delayed parenting, larger middle class, mothers in paid workforce, time pressures likely to drive need for convenience products and more spending per child, changes in social values and their effects on personal identity and anxieties associated with personal choice and roles, government concerns with ageing populations and tax incentives and benefits (e.g. maternity provision) to encourage families and government regulation of advertising to children.

7. Price, 2005 reported market research with 38 in depth interviews and a large telephone survey of mothers in the UK for SMA Nutrition's infant formula milk for babies less than 12 months, that was used to direct SMA sales team activities with healthcare professionals (level and frequency of contact and content) and grocery accounts and tailor information to market segments at a local level for pregnant women, low-income, underage, first time and subsequent mothers, and users of products for special dietary needs, differentiated into eight groups by values, behaviour, information-seeking, brand use, key influences, communication style, messages that influence their choice of formula milk and understanding mothers' feeding experience by stages in babies' development. Results were that SMA's volume share grew 1 percentage point during 2004, increased market leadership and more first-time bottle feeding mothers than ever using the SMA brand, which was significant in this market characterised by strong brand loyalty.
8. Moes, 2002 reported an advertising campaign in 2002 for Golden Circle, a fruit and vegetable manufacturer, to launch their canned wet baby food in Australia and establish them as a credible, local manufacturer of quality baby food. The campaign aimed to increase brand bonding, appeal and conversion based on perceptions of choice, nationalism and the influence of health professionals delivered through multiple channels: packaging, advertising on television and in parenting magazines and baby change rooms, a branded fridge magnet and nutrition brochure in hospital discharge bags, a website, information and free samples to parents at Baby Expos, in-store competitions and educational materials developed with health professionals and distributed via a seminar and direct marketing to maternal and child health nurses nationally, that resulted in 36.4% share of the canned wet baby food market and 22.2% of the total market within 12 months of launch.
9. Hatton, 1996 reported a £1.3 million advertising campaign in 1994-95 for the UK National Dairy Council, following 1992 UK health guidelines that changed the recommended age of introduction of cows' milk from 6 months to 12 months. The campaign aimed to: counter competition for "throat share" (decreased consumption in 6-12 month olds who were consuming follow-on formula); establish in 1-5 year olds a lifelong taste for cows' milk, that was threatened by exposure to sweeter infant and follow-on formulas, and counter negative statements about cow's milk in follow-on formula advertisements. A before and after study attributed to the campaign an 11.5% increase in milk consumption (19 million litres) by 0-5 year olds and decreased use of follow-on milk.
10. Caller, 1984 reported market research for Cow and Gate brand jars of wet food baby food in the UK in 1983 that led to improved product formulation and range; separate medical and retail distribution; maintained price premiums, consumer awareness and interest through advertising and samples in hospitals discharge bags and pharmacy-

distributed “weaning packs”. They found that mothers considered commercial baby meals inferior to “real” food, but were convenient and used widely. The advertising claim: “Cow & Gate help babies grow up to adult food” targeted mothers with babies aged 2 to 9 months and aimed to establish “Cow & Gate baby meals as a regular part of the repertoire of mothers who are feeding babies”. Market penetration data for June 1983-March 1984 showed that use of Cow and Gate baby meals among mothers with children aged 0-2 years old increased from 16% to 19% due to increased use in children over 6 months old. In contrast, the percentage of babies that used wet meals (all brands) was 33% at 0-3 months and 75% at 3-6 months. Sampling via the “bounty bags” alongside competitors was not considered to have had a large effect on sales.

11. Tran (undated) reported an advertising campaign for FrieslandCampina Vietnam’s Friso infant toddler milk formula that appealed to influential progressive Vietnamese mothers who valued independence in their children. The campaign associated toddler milk ingredients (pre-biotics and pro-biotics) with immunity in addition to intelligence (from DHA) using branded content, events, television, print, internet and social media. Resulting in an increase in sales of 45% in 2010, despite a 10% decline in the super-premium toddler milk category, and Friso increased market share to second position. Competitors Dumex and Mead Johnson subsequently used health claims for immunity in their marketing.
12. WARC 2013 reported redesign of branding and packaging using high quality images of ingredients for HiPP’s brand of organic wet baby foods in jars and tray meals in preparation for launch into wet baby food pouches. HiPP total wet foods value sales increased by 10% (£3.4 million), compared with a static market and at a time when the premium for ‘organic’ was being devalued in jars due to permanent promotions across supermarkets allowing consumers to buy any brand for the same price.
13. Warren, 2010 reported an advertising campaign for Organix baby foods in the UK that aimed to build brand relationships and trust in commercial baby food through targeted advertising to mothers in late pregnancy with print and “info-hungry post-natal mums” with digital media and a website. A data base of mothers who signed up for a free recipe folder enabled ongoing communication via personalised emails and data capture on the target audience. The website received 32,337 visitors, compared to 22,000 in June, with 11% signing up for emails. The average dwell time increased from three to four minutes and the number of Facebook fans doubled.

Annex F: CACF product descriptions reported in reviewed academic studies

Complementary food category	Product descriptions
Solid, soft, or semi soft foods	<p>Complementary foods, infant foods, solid foods, baby food; commercial baby food, infant cereal, jarred baby food, Fresh cheese, cookies, purees, yogurt, and sweetened cereals, strained baby food; porridge, arrowroot starch; bread, biscuits; glucose, salted snacks, pastries, sweets and chocolates, custard; meat, vegetables or beans, chocolate; cod liver oil; tonic; cassava, suri, banana, eep, fish, squash, egg, fruit, chicken, animal organs, fried food, aguaje, chapo, palm heart, koko, lugaw, infant cereal preps, new fortified, non-instant cereal, cereals, breakfast cereals; wheat biscuits (sweetened cookies), fruits and vegetables, whole grains, meats, eggs, whole grains, cereal grains (millet, maize), legumes (cowpea, peanut), sugar, locally prepared products, low-fat products,</p> <p>Cocoa Crispy, Corn Flakes, Fruit Kickers, Nestlé's instant, fortified cereal Cerelac, Milo; Ovaltine, Raisin Bran; Shredded Wheat, Toasted Oats</p>
Milk products	<p>Formula, milk, milk formulas, formula milk, commercial infant formula, infant formula, infant milk formula, term formulas, formula for infants (<12 months), artificial baby milk, baby milk and baby bottle, powdered formula, ready-to-feed formula, follow-on formula, follow-on milks, toddler formula, breast milk substitutes, commercial breast milk substitutes, Milk products, commercial milks, ready-to-feed, concentrate, liquid and reconstituted milk, home-modified fresh or powdered cows' milk, dried skim milk, powdered, evaporated or condensed milks, sweetened condensed milk; tin milk, non-designated brand of milk-based-cereal product, whole milk drink, bottle-fed canned milk</p> <p>Bear Brand coffee creamer, Bellamy's Organic Infant Formula; Heinz Nurture Gold Starter, Lactogen, Nestlé Nan 1 Gold Starter, Nutricia Karicare Gold Plus From Birth, Wyeth S26 Gold Alpha Pro</p>
Juices, bottled water, teas	<p>Baby water, juices, water, cultured drinks and yoghurt, bush tea; sweetened beverages, other liquids</p>
Other (RUF, micronutrients, value-added complementary foods)	<p>Ready-to-use therapeutic food (RUTF) and ready-to-use fortified spreads (RUFs), multiple micronutrient powders (MNP), lipid-based nutrient supplements (LNS)</p> <p>Activia®, Adria® cookies, Ades® drink, Bauny® cookies, Becel® margarine, Bio Soja® yoghurt, Delícia® margarine, 5 flavors cereal, Mucilon® maize cereal, Nutributter®, Sprinkles®</p>

Annex G: Narrative summary of academic literature for primary question

Academic studies – Impacts of marketing CF on attitudes, knowledge, preferences (n = 50)

1. The study by Cattaneo (2015) found that advertisements of follow-on formula in the three magazines for parents with highest circulation in Italy are perceived by pregnant women and mothers as promoting infant formula.
2. Bylaska-Davies (2015) compared data from interviews with pregnant and postpartum women from Massachusetts in face-to-face interviews (n = 20) with analysis of text and visual representation of infant feeding on 12 relevant Internet sites identified by the women, and concluded these presented a deterrent to breastfeeding.
3. A study by Priel and others for Helen Keller International (2015) in Phnom Penh, Cambodia found that promotion of commercial infant and young child (IYC) food products is prevalent inside and outside the health system, with 86% of mothers of children under 24 months of age (n = 253) reporting seeing, hearing, or reading a commercial promotion for a breast milk substitute since the birth of their youngest child, and 29.3% (n = 86), a promotion for a commercial complementary food product. Of mothers of children 6-23 months, 15.6% (n = 46) aspired to feed BMS and 9.9% infant cereal if they had more money. Among mothers of children 6-23 months of age who fed a commercial complementary food to their youngest child in the day prior to interview (5.4%, n = 12); nearly all fed an infant cereal. Mothers who reported aspiring to feed a commercial breast milk substitute to their child believed that it was healthy (78.3%) and that it would make the child smart (32.6%).
4. A 2015 discussion paper by the Hong Kong Food and Health Bureau Centre for Food Safety cited arguments that nutrient function, nutrition and other claims on formula can better communicate information, enabling more informed purchasing decisions on formula IYC food products, and enable trade to distinguish their product, motivating research and development. On the other hand, it reported that such claims may provide no health benefits compared to other products, may mislead caregivers that formula is superior to breast milk or that claims for follow on formula apply for infant formula of the same presentation, may divert caregiver attention from essential constituents to non-essential nutrients of infant formula, and may give the impression that follow up formula or IYC food products are better than regular food.

5. Wu (2014) tested consumers' willingness to pay for organic certification labels on infant milk formula in China and found it increased consumers' willingness to pay to reduce food safety risks. So organic certification labels may be an effective approach to improve consumer confidence in China-made infant milk formula.
6. Klaus (2014) reports a court finding in Italy. That an advertisement in an article about the early postnatal period of a very famous Argentinean show girl, which also included two pictures of advertised products marked by boxes and captioned by the name and brand of the product, its price and its characteristics indirectly promoted a powdered milk for babies and had promotional effect as it was the substantial purpose of the article itself and was therefore likely to affect the economic behaviour of consumers.
7. Wu, Scherpbier et al. (2014) assessed the IYCF knowledge and practices of caregivers of children 0-23 months in one county in rural China and found poor feeding practices and knowledge, with leading sources of feeding information for mothers being family members, neighbours, friends and popular media (newspaper, magazine, book, radio and television).
8. Phouthakeo (2014) studied 1022 Lao mothers' whose exposure to the Thai media's promotion of formula use was high including TV commercials (89.9%), logos (76.9%) and TV programs (73.5%). Surprisingly, exclusive breastfeeding was associated with a favourable attitude towards Thai TV formula commercials (positive/negative) adjusted odds ratio (AOR) 0.25. There were no significant associations between exclusive breastfeeding and: frequency of exposure to Thai TV formula commercials (a lot/other) AOR 0.84; frequency of exposure to formula logo (a lot/other) AOR 0.89; attitude towards formula logo (positive/negative) AOR 2.17. The study also reported that mothers tended to believe the information in the commercials, and even relatively well educated urban mothers, viewed formula milk positively being more health conscious and susceptible to the 'scientific' advantages of formula milk promoted by manufacturers.
9. Prak (2014) examined breastfeeding trends in Cambodia, using the Cambodia Demographic Health Surveys from 2000, 2005 and 2010 and showed that BMS use increased among children aged 6-23.9 months from 2000 to 2010 (4.8% to 9.3%). "For urban areas, the use of BMS among children 6–23.9 months nearly doubled from 2005 to 2010. For rural areas and the poorest wealth quintile, there was no change over the last five years. These trends may be the result of increased promotion of "follow-on milk ... Even though the levels of early initiation and EBF have increased substantially

in Cambodia, the illegal promotion of breast milk substitutes by the private sector and others could be threatening the recent gains made in IYCF." "An additional concern in Cambodia is the vast amount of imported brands that do not provide instructions or information written in Khmer. This, in addition to misleading pictures and messages to idealise formula, may be contributing to low levels of understanding causing inappropriate use of BMS. Mothers are attracted to the new products on display and in-store promotions, however they may not be able to differentiate between appropriate and inappropriate products".

10. Fornasaro-Donahue, Tovar et al. (2014) examined formula feeding costs for non-breastfeeding WIC mothers in Rhode Island and how these additional costs affected mothers' perception and decision to breastfeed, showing that for Afro American mothers these out of pocket expenses had no effect, but for Latino mothers it increased intention to breastfeed
11. Parry (2013) conducted a study of US women's interpretations of infant formula advertising using four focus groups of preconceptional, pregnant, exclusive breastfeeders, and formula feeders. Thematic content analysis of a protocol guided discussion concluded that participants perceived advertisements as conveying an expectation of failure with breastfeeding, and of formula as a solution to fussiness, spitting up, and other normal infant behaviours. Participants reported that the advertisements were confusing in terms of how formula-feeding is superior, inferior or the same as breastfeeding, with claims such as 'You'll feed his imagination. We'll help feed his immune system.' Mothers' confusion was exacerbated by an awareness of distribution by health care practitioners and institutions which were seen as suggesting provider endorsement of infant formula. The author concluded that formula marketing may decrease mothers' confidence in their ability to breastfeed, especially when promotion is by health care practitioners and institutions.
12. Bacardi-Gascon (2013) examined the foods advertised on TV on two national broadcasting channels, and interviewed 721 mothers of children aged 8 months to 5 years old in Mexico on TV advertisement viewing during June through October 2011. Ninety nine percent of households had a TV set. The most frequent advertisements broadcasted on national broadcasted channels during the hours (17:00 to 22:00) when women are most exposed to television on working days were milk and milk products (17%), sweetened beverages (10%), salted snacks (9%), pastries (8.8%), sweets and chocolates (6.0%) and juices (5%). The least advertised foods in both states were fruits and vegetables (3%). The foods advertisements the mother remembered the most

were sweetened drinks (30%), fast food (19%), salted snacks (17%), pastries, cookies, and sweetened cereals (13%).

13. Pelto, Armar-Klemesu et al. (2013) explored perceptions about commercial and home-prepared foods in Ghana, South Africa, and Afghanistan to identify future actions with respect to social, public health or nutrition interventions, and for public–private partnership activities. In Ghana, a proposed fortified cereal was found inappropriate, because of complex balancing of time, costs and health concerns of urban caregivers. Commercial cereal-based foods especially Cerelac was regarded as very healthy compared to traditional foods. In South Africa, home fortification products such as micronutrient powders and small quantity, lipid-based nutrient supplements (LNS) are potentially feasible though requiring “thoughtful behaviour change communication programmes”. In Afghanistan there is little cultural recognition of the concept of special foods for infants, and food procurement for infants and young children is in the hands of men, whereas food preparation and feeding are women’s responsibilities.
14. Dickinson’s (2013) analysis of UK advertising of follow on formula before and after regulatory changes in 2007 aimed to assess whether the change had been effective in making clear to parents/parents-to-be and carers that advertisements for follow-on formula are meant only for babies over 6 months and are not perceived or confused as infant formula advertising. The study found that promotional strategies of formula manufacturers altered in the later period towards higher frequency and more widely distributed advertising, while the nature of the advertising changed, containing a greater emphasis on brands, and being more likely to contain statements about the health benefits of the products than before 2007. Although a statement that use of the product with infants before they are 6 months old should only occur on the advice of a suitably qualified medical or health professional occurred more often, and an age of use recommendation on pack shots in the advertisements was more likely in 2008–2009, a statement on the superiority of breastfeeding appeared more often. There was a doubling in the use of emotion-promoting themes, known to enhance product recall and trigger positive attitudes. The study found advertisements for follow-on formula were perceived or confused as infant formula advertising (which is prohibited) with “most respondents (66.8%) reporting that they had seen a formula product suitable for use from birth (infant formula) advertised.”
15. Bui’s (2013) experimental study in the USA examined how varying front-of-package (FOP) nutrition information type on products altered the hypothetical choices of parents' of children 15 years or younger for healthier food options and concluded that

'summary indicator systems' were less effective than 'food group information systems' (which have specific nutrient content claims complementing less familiar health nutrient symbols).

16. A study by the Millennium Development Goals Achievement Fund 2013 conducted an intervention trial of micronutrient sachets "Ying Yang Bao (YYB)", in China as an in-home complementary food supplement. Food Supplements, paved the way for the production and promotion of YYB. However, issues such as compliance, involvement of healthcare professional in social marketing, and motivation of manufacturers are still to be addressed. See Sun (2011).
17. Huang (2013) found that mothers in the USA who were exposed to formula information during pregnancy including receiving formula samples or coupons at hospital discharge, indirect exposure via health professional marketing activities, and direct-to-consumer marketing such as formula samples sent to the home, labelling statements, or sales or other promotions, were less likely to switch formula if it were recommended by a health professional than if their exposure was outside the health care system.
18. Sadacharan (2013) used data from women in the USA with healthy term singleton babies recruited from a nationally distributed consumer opinion panel (IFPS II) in the third trimester of pregnancy and found that receipt of different types of bags was negatively associated with exclusive breastfeeding during the first 6 months of life, and that 81.4% of women received formula bags and were exposed to promotional information, coupons and product samples.
19. The aim of the study by Sweet (2013) was to field-test, in South Africa, the interim guidance provided by the Maternal, Infant and Young Child Nutrition Working Group's Draft Guide for Marketing Complementary Foods. This guidance was used to develop a checklist of questions and criteria for each possible answer, and 160 product labels of 35 manufacturers were analysed. Fifty-six (35%) labels did not provide an appropriate age of introduction while 37 (23%) used images of infants appearing younger than 6 months. Nineteen (12%) labels suggested a daily ration too large for a breastfed child, and 32 (20%) potentially promoted the manufacturer's infant formula. Only 58 (36%) labels were easy to read. The majority (69% and 92%) of labels provided instructions for safe and appropriate preparation/use and storage, respectively.
20. Berry (2012) found from parents of children < 5 years old or who were expecting a child that brand identifiers link toddler milk so strongly to the same brand of infant formula

that respondents believed that they had seen advertisements for infant formula products even though most of them could not have.

21. Crawley (2012) considered the composition of fortified milk drinks sold for consumption by children over the age of 1 year, reviewing the ingredients added to these products, and their usefulness in the diets of children. It considered whether there is evidence for claims made. It argued that "TV adverts for Cow & Gate toddler milks were misleading consumers in terms of the amount of iron needed by toddlers"; "many of the milk names themselves suggest claims ... many of the marketing campaigns focus on the role a fortified milk might play in a child's growth and health, intelligence, future opportunities, sporting prowess or resistance to disease"; "Significant marketing claims can be found on almost all websites relating to growing-up milks, and increasingly on TV and web-based films and advertising, 'mummy blogs', Facebook and chat-based websites and displays and talks in public settings."
22. Barennes (2012) examined the use of all available breast milk substitutes (BMS, "formula, sterilised milk, coffee creamer, sweetened condensed filled milk, cereal, advanced formula, powdered milk") in 90 villages in 12/17 provinces in Laos among 1057 mothers with infants under 24 months of age, finding that Thai TV was the main source of information on BMS for mothers and that 19.6% gave BMS before 6 months of age (of them: 83% non-dairy or cereals; mean age: 2.9 months; 95% Confidence interval: 2.6-3.2). One formula and one non-formula product accounted for 85% of BMS.
23. Dykes (2012) conducted a qualitative, descriptive study at two maternity/primary health care settings in England to explore inter-disciplinary professionals' perceptions of Infant Feeding Information Team (IFIT) implementation of the WHO Code. The study reported the difficulties health-care staff face including being "constantly undermined through mixed messages and misleading product information" including "complementary foods being labelled as suitable from 4 to 6 months and the marketing of follow-on formula milk"; "misleading product information contained within advertisements in 'glossy mother and baby magazines' and via the media, family or friends"; "implicit marketing of artificial milk displayed in hospital".
24. A study by Harris (2001) examined parents' beliefs about the meaning of common front-of-package nutrition-related claims on children's cereals and determined whether the claims would make them more willing to buy the cereals. Parents with children between the ages of 2 and 11 years (n = 306) were recruited through an online panel.

The majority of parents misinterpreted the meaning of claims commonly used on children's cereals, wrongly inferring that cereals with claims were more nutritious overall and might provide specific health-related benefits for their children, and these beliefs predicted greater willingness to buy the cereals. The author concluded that common front-of-package nutrition-related claims are potentially misleading, especially when placed on products with high levels of nutrients to limit (e.g. sugar, sodium) and low levels of other nutrients to encourage (e.g. fibre, protein). Additional regulation is needed to protect consumers in the USA.

25. Berry's (2011) study used qualitative market research strategies to investigate what mothers and those who influence mothers (19 (mothers, grandmothers, Child and family health nurses), one dietitian, one general practitioner) know about formula milk products including follow-on formula/toddler milk. Only 1/19 participants successfully identified product as toddler milk. A number of respondents said that they or mothers they know chose their infant formulas based on the brand they had seen used in maternity hospitals.
26. Sobel (2011) examines factors influencing decisions to formula feed infants including mothers' recall of advertising messages health professionals' recommendations, personal sales representation and other information sources in purposively selected disadvantaged communities in the Philippines. Recall of advertising messages (TV, radio) which contain "make babies healthy" was 45.3% (92) "make children smart" and 8.3% (17) "protects against infections. This study found "59.1% of mothers of young children recalled an infant formula advertisement message and one-sixth reported a doctor recommended using formula. Those who recalled a message were twice and those who reported a doctor recommended using formula were about four times as likely to feed their children infant formula."
27. Nguyen (2011) considered barriers and facilitators to optimal IYCF practices, interventions, policies and their effectiveness, based on review and analysis of existing data. The study found that median duration of breastfeeding was 13-18 months but exclusive breastfeeding for the first 6 months is low (8-17%) and apparently declining over time; early introduction, and low nutrient quality of CF are key challenges. Barriers to optimal IYCF included (1) the lack of enforcement of, and compliance with the code of marketing breast milk substitutes, (2) inadequate knowledge among health care providers; and (3) maternal poor knowledge.

28. A study by Sun (2011) reports on a public-private partnership (PPP) in China to evaluate the effectiveness of marketing a full fat soy powder mixed with multiple micronutrient powders (Ying Yang Bao (YYB)) through a PPP with a grant from GAIN. Biomate, a company with a wide distribution network throughout the country, produced and distributed the product with a name meaning 'Nurture your child sachet' and conducted marketing activities including through Biomate's sales chain, with advocacy and social marketing support from local health care providers in the maternal and child health care system. Caregivers and their 6 to 24 month old children participated in a baseline (n = 226) and the end-line survey (n = 221). At the baseline survey 78% of caregivers were willing to buy YYB at 0.1 USD. After eight months implementation, 59.6% of surveyed caregivers were aware of YYB and 13.5% purchased YYB.
29. Berry (2010) investigated how women expecting a first baby perceived print advertisements for 'toddler milks' in order to determine whether they function as indirect advertising for infant and follow-on formula. Six [toddler formula] advertisements were identified from a convenience sample of Australian parenting magazine titles including Woolworths Parents Practical Parenting Sydney's Child and Coles Baby. Only 3/15 respondents correctly identified that the product was suitable for 'toddlers' on first reading. "All but one of the mothers commented that they would ordinarily not have read far enough into the advertisement to have discovered that the advertisements were not promoting infant formula. Category labels encourage consumers to transfer what they know about a familiar brand or group of products (known as a line) to a new product. The author concluded that 'toddler milk advertising is designed to promote advertisers' entire line of formula products including infant and follow-on formula."
30. A 2010 study led by Quinn addressed the question of how the WHO International Code of Marketing of Breast milk Substitutes could be used to guide the marketing of CF to protect optimal infant feeding practices, including not increasing the risk of early cessation of exclusive breastfeeding or the displacement of breastfeeding after 6 months of age. The study identified that there are significant gaps which the Code does not consider, as well as a crucial need for a broad international normative and legal basis for strengthening accountability of all relevant stakeholders including companies involved in production and distribution of CF and supplements as well as examination of relevant international trade regulations and human rights standards. The study noted that marketing of CF and supplement products is already occurring, identified lack of clarity on how the International Code applies to it, and the urgent need for appropriate regulation. In the absence of a clear international regulatory framework, the study was

prepared to assist commercial enterprises, relevant government offices, and other interested groups to appropriately market such products in a manner that promotes and supports optimal breastfeeding during the first 2 years of life. Using the existing International Code including relevant WHA Resolutions as its framework, the study addressed the following: labelling, advertising and retail sales promotion to the general public and outside the health care system; product samples at retail outlets, contacts outside the health system between personnel of companies manufacturing or distributing CF and supplements and pregnant women and mothers of infants and young children; appropriate sale or use of CF and supplements within the health care system; donations of informational and educational equipment or materials; contacts within the health system between personnel of companies manufacturing or distributing CF and supplements and pregnant women and mothers with infants and young children; product samples and/or free supplies within the health care system; providing information on CF and supplements to health workers; avoiding conflict of interest between companies that produce and distribute CF and supplements and government health authorities.

31. A study by Wojcicki (2009) evaluated maternal nutrition knowledge and its relation to maternal socio-demographics including participation in the Special Supplemental Women, Infants and Children's (WIC) Program among new mothers at two San Francisco hospitals. A cross-sectional study used a structured questionnaire to assess maternal nutritional knowledge and maternal nutritional attitudes towards product nutrient labels, and multivariate logistic regression models were used to evaluate the odds of having high maternal nutrition knowledge and of infrequently reading nutrition labels. The study found that higher maternal nutrition knowledge (defined as answering all four nutrition questions correctly) was associated with higher income levels defined as greater than or equal to \$25 000/year, odds ratio (OR) 10.03 95% confidence interval (CI) (1.51-66.74), and in linear models, higher nutritional knowledge was associated with having more children ($p < 0.01$), a higher income ($p = 0.01$) and not being a WIC participant ($p < 0.01$). Mothers with higher incomes were also more likely to read product nutritional labels OR 4.24, 95% CI (1.24-14.51), compared with mothers with lower incomes as were mothers with higher education levels OR 3.32, 95% CI (1.28-8.63).
32. A 2009 study by Putthakeo aimed to assess exclusive breastfeeding (EBF) at 6 months and continued breastfeeding (CBF) at 2 years through a cross-sectional study using a semi-structured questionnaire in 40 villages in Lao PDR. Mothers with children less

than 2 years old were recruited by multistage random sampling (n = 447). Most mothers (75.0%) had watched television advertisements for infant formula from Thailand, and 48.4% reported wanting to buy formula milk after watching them.

33. The study by Schulze (2009) investigated cultural differences in mothers' views regarding infant feeding in China and the US, using cross-sectional surveys of mothers with children at childcare centres (n = 55 US, 72 China). Mothers in China expressed concerns that breastfeeding is not compatible with work outside of the home while American mothers were more likely to believe that breastfeeding is difficult to establish. Chinese mothers were more likely to agree that "Breastfeeding is socially acceptable" and that "a lot of women do not produce enough breast milk". The study identified the importance of understanding whether hospitals offered assistance consistent with the WHO Code, and of rural versus urban context, as rural mothers may be less likely to see a physician or give birth in a hospital and rely on informal sources, while marketing of infant formula in China currently targets well educated, urban, internet savvy women, and dismisses traditional beliefs as 'myths'. To understand cultural effects on infant feeding practices, the author also identified the need to document marketing compliance with the WHO Code and evaluate impacts of common practices such as advertising text or images that idealise infant formula or discourage breastfeeding.
34. A 2008 study by Othman investigated the attitudes and practices of families in Iraqi Kurdistan regarding breastfeeding and infant feeding during the first 6 months of life. One hundred and eighty mothers, fathers and grandmothers were interviewed through a semi-structured questionnaire at their houses in rural and urban areas. The in-laws and the husband are influential in maternal decisions including on infant and young child feeding. Attitudes which explained low exclusive breastfeeding rates and offering complementary food prematurely included; TV says they are good for baby; 'mother is working'; 'it is given with the food ration'; 'it is useful'; 'for vitamins'; 'to put on weight and strength'; 'to learn eating'; 'they say its good'; 'it makes baby fat'; 'breast milk is not enough'; 'doctors and health staff advice'; 'for hunger'; 'good for the bones'; 'mother illness'; 'convenience'; 'mother working/not home'; 'mother lazy'; 'preserve breast contour'; 'formula makes baby nice'; 'mother wants to be free'; 'mother's pregnancy'; 'lack of wisdom'; 'bottle feeding is stylish'.
35. A 2008 industry strategy report by Euromonitor summarises the global baby food and milk market, including the regulatory environment and marketing strategies. It advised that in China post melamine crisis, "breastfeeding is predicted to become more widespread among Chinese mothers, as a low-cost and healthy alternative to milk

formula. As breastfeeding rates are set to increase in the short term, international companies should focus on launching new products targeting breastfeeding mothers.” It noted that “offering several versions of the product, differentiated by age, makes it appear more scientific and nutritionally sophisticated”.

36. Barennes (2008) investigate the use of Bear Brand coffee creamer as a food for infants and the impact on consumers of the logo of a cartoon baby bear held by its mother in the breastfeeding position, using a survey of 1023 adults and 26 paediatricians. The company uses the same Bear Brand logo on its canned sterilised cows' milk product and on infant formula products for infants from 6 months. The study found that the Bear Brand coffee creamer cartoon logo influences people's perception of the product which belies the written warning that the product is not to be used as a breast milk substitute.
37. McInnes (2007) evaluated compliance with the WHO International Code in primary care, after the introduction of strict local infant feeding guidelines, using an audit form sent to all community-based health professionals with an infant feeding remit and walking tours in a random sample of community care facilities in Greater Glasgow (669 health professionals; 27 community health facilities). The study found that contact between personnel from primary care and BMS companies was minimal and generally unsolicited. Free samples of BMS or feeding equipment were rare but childcare or parenting literature was more prevalent. One-third of facilities were still displaying materials non-compliant with the Code, with the most common materials being weight conversion charts and posters. Due to the high level of bottle feeding in Glasgow, primary-care staff stated a need for information about BMS.
38. Alabi (2007) examined how implementation of WHO Code regulations in Ghana affected promotion of commercial infant foods and mothers feeding options in Ghana after 6 years. Practices are found to be quite different from the years before the Regulations. Enhanced enforcement of the Regulation, awareness creation and further research into impact of the regulations and other infant feeding practices could result in significant gains in compliance.
39. Smith (2007) examined data on breastfeeding prevalence, per capita consumption of infant milk, and numbers of advertisements of baby food in a leading Australian women's magazine and an Australian medical journal, and evidence from social histories on practices in health facilities, and concluded that most Australians born since 1955 were exposed to effects of more aggressive marketing of breast milk substitutes (including through the healthcare system).

40. A 2005 survey of attitudes to feeding in the UK (NOP world) examined awareness of advertisements for formula milk and follow-on milk. The survey conducted by telephone recruited 2000 women pregnant or with a child < 12 months old. Two thirds (67%) of women had heard or seen an advertisement for "formula milk", of which 57% said it was follow-on formula and 58% for infant formula. The survey found that 80% of women were aware of follow-on formula and 72% were aware of both infant formula and follow-on formula. Pregnant women were less likely to be aware of both and less likely to state that the advertising was about follow-on formula, more being unsure. The majority saw the advertising on television or in magazines: (TV (64%); magazine (55%)), though 7% saw it in a healthcare setting; or somewhere else (20%). A quarter (24%) of women saw no difference between infant formula and follow-on formula, and 16% didn't know. About 60% of those aware of both these types of formula thought there is a difference between them, so 4 out of 10 women who are aware of both do not know they are different. Few (1%) would give follow-on formula at < 3 months but 5% considered it OK for 3-6 months. Fourteen per cent would give at 12 months or more and 21% didn't know. The report concluded that awareness of both infant formula and follow on formula is high.
41. TNS Social Research (2004) conducted a qualitative consumer study for the Australian government on food labelling of infant foods. It addressed: (1) how primary caregivers make decisions around the introduction of solids process; (2) the influence of current labelling on these decisions; and (3) alternate labelling options for minimum age suitability of infant foods that will ensure appropriate implementation of public policy in both Australia and New Zealand and protect public health and safety. The release of new Australian guidelines in 2003 [and 2013] created [ongoing in 2015] inconsistency between Australian government policy and current labelling requirements for processed complementary foods, which indicate the age from which the food is suitable is from 4 months. Focus group participants of mothers (n = 36 in major cities in both Australia and New Zealand) were presented with alternate label concepts for the labelling of infant foods"; "'4 months', 'from 4 months' or 'from 4-6 months' food label". Most perceived CF labelling of 'from 4-6 months' to indicate foods should be introduced towards the start of this period, while national guidelines of 'around 6 months' was interpreted to mean aiming for 6 months, with 2-3 weeks leeway on either side. The study concluded that "the current food label encourages the introduction of solids closer to 4 months, rather than closer to 6 months". Notably, some mothers reported using the 'from 4 months' label to justify to others the delaying of solids until 4 months.

Initial triggers for decisions about introducing solids included, whilst in the birthing hospital, via literature from the hospital, infant food manufacturers, or the 'bounty bag', or early prompting by maternal health nurse or grandparents. More active triggers were suggestions by child health nurse at 3-4 months of age responding to parent confusion, distress or uncertainty about infant sleeping or feeding behaviour, and information and advice in books, magazines and reference materials, other mothers or family, and the need to return to work. The most important or trusted sources of information and advice were health professionals. Least trusted were mother-in-law, Internet websites and help & support organisations such as Tresillian, Karitane. Together in the middle as equally trusted were food labels; information given in hospital, particularly the 'bounty bag', introducing solids courses, Coles Baby Club information, family, friends and other mothers, TV programs and advertising, and Heinz information.

42. Greenaway (2002) conducted a qualitative study of milk powder marketing by the New Zealand Dairy Board in Sri Lanka, showing how the market for milk powder in Sri Lanka emerged. Representations of motherhood were found to be central to the process of constituting a market for milk powder in Sri Lanka, and each organisation articulated the needs of mothers in a specific form. Milk product marketing involved a "Nutrition For Life marketing programme" with industry reporting that "our marketing in its simplest form is simply going in talking to the health authorities, the doctors ... and then trying to tailor products towards those issues", but also "educating people about nutrition and informing them how the NZDB's products meet their needs". The study found that "clearly the trust of mothers ... is deliberately cultivated", and this drew on a discourse of science and technology, with advertisements building 'trust in the particular product by emphasising the guarantee of quality'.
43. A paper by Sanogo (2002) analyses the potential impact of introducing quality certification to the market for infant foods in Mali, a very low-income country, where malnutrition is widespread. Using an experimental-economics approach with a sample of 250 mothers with young children, it found that a program to sample, test and certify the nutrient density of products could promote a more competitive market for low-cost fortified foods and be implemented on a self-financing basis in the city of Bamako. Mothers' demand for quality information rose with their education and income level, but was higher than the estimated cost of certification even among the very poor and uneducated.

44. In a report addressing industry, Cutler (2002) describes how US based infant formula companies have historically promoted their products 'ethically' by focusing on gaining a physician to parent recommendation for a brand of infant formula. Until 1988, there was little direct-to-consumer promotion of infant formula. The article recommends a move to 'direct-to-consumer advertising' of infant formula, and provides recommendations on a number of direct-to-consumer strategies including; baby-clubs, checkout coupons, WIC contracts; hospital discharge pack; print advertising television and print advertising.
45. Suleiman (2001) reports a descriptive study in Malaysia which aimed to determine whether milk industry marketing strategies affected infant feeding practice. Fifty Malay mothers with children less than 5 years old and visiting a private hospital antenatal clinic were asked, by questionnaire and by interview, to identify marketing methods which influenced their infant feeding practice. The study found that milk advertisements on television were attractive to mothers (72%). Most (68%) said they were not influenced by their doctors.
46. A study by Stewart (2000) examined the causal relationship between marketing of infant formula and other commercial feeding products and infant health outcomes. The study modelled 2,890 Philippine mothers' feeding decisions, finding that "marketing activities have affected infant feeding choices." The mothers were asked if they had heard or seen any advertisement or read any print media that recommended how their baby should be fed. "The effect of marketing for the Cebu sample was to cause a switch between the patterns of breastfeeding supplemented with indigenous 'other' food to patterns of breastfeeding supplemented with commercial feeding products".
47. The study by Nguyen, Barraclough et al. (2000) investigated the extent to which Vietnam's adoption of the WHO Code had been implemented in health facilities, and the attitudes of health professionals towards formula use and the decree, in Ho Chi Minh City. An audit and semi-structured interviews were used to gather data from 22 health facilities and health staff in Ho Chi Minh City. Results suggest gifts and inducements are commonplace, awareness of the content of the Code is low, and there is considerable resistance to its provisions, based on financial considerations as well as ambivalence about the merits of breastfeeding. Health staff "feared that restrictions on the trading and advertising of BMS would reduce their income since they received gifts from milk formula companies" and felt that: "presentations of formula marketing staff were 'useful for mothers'"; "Several acknowledged feeling a sense of obligation to the companies"; "17/22 health workers agreed that trading and advertising of formula in health facilities could undermine breastfeeding promotion"; "Inducements offered by

formula companies were attractive to poorly paid staff"; "20/22 opposed prohibition of sponsorship of medical seminars because government support is inadequate" but felt that measures were required to prevent 'inappropriate influence' on health facilities. "Several claimed that infant health was at risk only when formula was not properly prepared".

48. The study by Valaitis (1997) examined if consumer infant feeding publications and products distributed by physicians' offices protect, promote, and support breastfeeding in Canada. Of the 127 physicians' offices surveyed, a majority accepted and routinely distributed publications and products which do not "protect, promote and support" breastfeeding. Pamphlets produced by manufacturers of infant formula, food and bottles were generally distributed twice as frequently as those produced by government and non-profit organisations (routinely distributed in 68% physicians' offices versus 33.1%) $p < 0.001$. Offices with a policy concerning distribution of infant feeding materials had $46 \pm 33\%$ of publications from commercial sources compared to $70 \pm 27\%$ in offices without policies. While physicians are most likely to hand materials out to mothers, many other office staff also routinely distribute them. When physicians and hospitals distribute formula and other baby products, they provide unintended endorsements and convey the message that bottle feeding is the norm."
49. Griffin's (1984) study used a 1978 survey of households (632/1903 with at least one child under 24 months of age) and private and traditional health professionals ($n = 1298$) and a 1981 survey of stores and health facilities, to document the availability of breast milk substitutes, promotion of infant food and formula through the medical sector, and the effects of such promotion on the infant-feeding practices of mothers in Bicol region, Philippines. Infant food and formula companies were active in the modern medical sector with promotional efforts that included distributing free formula samples, providing pamphlets and posters, and organising professional meetings. Industry activities had mixed effects on health professionals' knowledge of breastfeeding and attitudes towards the practice.
50. A survey by Greiner (1982) which aimed to measure the influence of infant food advertising on feeding practices in St. Vincent in the eastern Caribbean found that industry written baby books were the reported source of information on how to bottle feed for 19% of mothers. More than two thirds (68%) of mothers who stated they had seen or heard infant formula advertising (42% total sample) said the ads made them feel like they would want to try the product with their own babies.

Academic studies – Impacts of marketing complementary foods on behaviours (n = 53)

1. In a study of IYC promotional practices in Phnom Penh, Cambodia, Priel and colleagues (2015) found exposure was prevalent. Nearly one third (29.3% (n = 86)) of mothers of children less than 24 months reported seeing, hearing or reading a promotion for a commercially produced CF product, and one in five (19%) mothers had observed branding or logos on health facility equipment. Complementary feeding practices of infants and young children were poor. Utilisation of commercial food products to feed infants and young children was common; of children 6-23 months of age, 55.0% (n = 122) had consumed a commercially produced snack food product in the day prior to interview. Among mothers of children 6-23 months of age who fed a commercial complementary food to their youngest child in the day prior to interview (5.4%, n = 12); nearly all fed an infant cereal. Around two thirds (63.9%) of children less than 6 months of age were not exclusively breastfed (n = 46); 26.1% of these were given bottled water, and quarter of infants 4.0-5.9 months of age had consumed soft/semi-soft/semi-solid foods in the previous day. "40% of children 6-23 months of age (n = 88) had consumed a homemade complementary food on the day prior to interview."
2. Compared to those not reporting seeing advertisements, Cattaneo et al ([2015](#)) found no significant difference in use of breast milk, formula or both for pregnant women and mothers in Italy who thought they had seen magazine advertisements for infant formula.
3. Reat (2015) found that when low-income participants of WIC in the USA were offered changed food packages vouchers (included infant cereal, but omitted juice, and were offered infant formula and jarred baby food based on the type of feeding) there were significant changes in the dietary intake of WIC infants and toddlers ages 4–24 months in south central Texas, with delayed age of introduction of formula and complementary foods, and increasing breastfeeding duration.
4. A 2015 discussion paper by the Hong Kong Food and Health Bureau Centre for Food Safety reported arguments that nutrient function, nutrition and other claims on formula does not replace breastfeeding. On the other hand, it reported that such claims may induce caregivers to introduce follow up formula or other IYC food products or influence caregivers on whether to breastfeed or continue breastfeeding, thus undermining

sustained breastfeeding up to 2 years or beyond, and potentially interfering with a child's progression from an infant and young child diet to an adult diet.

5. Wu (2014) assessed the IYCF knowledge and practices of caregivers of children 0-23 months in one county in rural China. Exposure to IYC promotion was reported via advertising in popular media and through maternity health care settings in China. The leading sources of feeding information through which mothers received information included popular media; 41.7% of mothers reported that they received information on breastfeeding and 34.3 % on complementary feeding from popular media (newspaper, magazine, book, radio and television). Seven percent of mothers reported that they received advice on nonexclusive breastfeeding from health workers. Knowledge of caregivers about feeding recommendations and feeding practices were poor, with rates of knowledge and practice of 6 month exclusive breastfeeding 37.3% and 9.7% respectively. Poor feeding practices, included early introduction of complementary foods, and poor quality of CF > 6 months although 38.2% of children were breastfed to 2 years.
6. Rodriguez-Oliveros (2014) conducted a cross section survey (n = 44) and focus groups (n = 12) of mothers of children < 2 years of age using public transport to get to and from work in 14 manufacturing businesses in Mexico, to determine their views on classification, attributes, and consumption/preparation routines of key complementary food. Mothers' responses revealed exposures to CACF marketing via brand names. Citing brand names such as Gerber and Danonino. Working mothers reported using processed foods such as boxed cereal because it was practical ready to eat or easy to prepare. Complementary foods were reportedly introduced early to facilitate child care for alternate caregivers when the mothers were at work. Mothers reported "preparing their children" during the second month of age by introducing some solid foods (and formula) so the children were "ready" when the mothers come back to work, 42 days after delivery. The authors concluded the study findings would help policy development regarding exclusive breastfeeding and opportune introduction of nutritious complementary foods, focussing on barriers and facilitators for promoting desirable feeding choices of home and processed complementary foods in Hispanic working mothers.
7. In a 2014 study Odoms-Young examined the effects of changes in WIC food packages in line with current dietary recommendations and to address the high prevalence of obesity among WIC participants. As a result of the changes in the food assistance package including changes to infant formula > 6 months, and a wider variety of foods,

including fruits and vegetables and whole grains, dietary intake of WIC participants (parent-child dyads with child between 2 to 3.5 years of age) altered towards children drinking more reduced-fat, low-fat and non-fat milk, (and less whole milk) increased low-fat dairy intake among Hispanic mothers (0.21 servings per day, $p = 0.02$); Hispanic children (0.34 servings per day, $p < 0.001$); African-American children (0.24 servings per day, $p = 0.02$). The author concluded that the data provide important insight into how a change in public policy can affect individual behaviour.

8. Phouthakeo (2014) reported that Lao mothers' whose exposure to the Thai media's promotion of formula use was high including TV commercials (89.9%), logos (76.9%) and TV programmes (73.5%) had higher formula use (a lot/other) and exposure to logo on formula use (a lot/other), though results did not show statistical significance.
9. Kong 2014 studies the effects of the USA's WIC program revising its food packages to be consistent with the 2005 Dietary Guidelines for Americans. The revisions provided more whole grains, fruits, and vegetables, and fewer foods with high saturated fat content. Eighteen months after these revisions, nutrient intake and diet quality of children 2 to 3.5 years of age at baseline showed increased reduced-fat milk intake, but no changes to fruit juice intake, fruit, whole grain or sugar sweetened beverage consumption. African American children increased their energy intake over time, but no other significant changes were observed. In contrast, Hispanic children improved in all nutrient categories and in diet quality.
10. Fornasaro-Donahue (2014) examined formula feeding costs for non-breastfeeding WIC mothers in Rhode Island and how these additional costs affected mothers' perception and decision to breastfeed, showing that for Afro American mothers these out of pocket expenses had no effect, but for Latino mothers it increased intention to breastfeed.
11. Thornton (2014) examined changes to the WIC infants' packages among children ages 4–24 months including the omission or reduction of formula for fully and partially breastfed infants (< 12 months) and the omission of juice and the inclusion of baby food fruits and vegetables for all older infants (6–12 months), with additional baby food fruits, vegetables, and meats provided to older, breastfed infants. Out of 3562 infants, 62% were introduced to complementary feeding < 6 months, especially those with a single parent and who attended day care. After the package change, fewer infants exceeded recommended energy intake levels (100% v. 79% in excess of Estimated Energy Requirement). But there was an observed dietary deficiency of vitamin D and low energy intakes among toddlers.

12. Bui (2013) examined the effectiveness of food industry marketing to encourage sales by highlighting health and nutrient content claims on food packaging. A comparison of three "front of pack" label types showed that parents were more likely to choose healthier options for their children when food group information (specific nutrient content claims with a nutrient symbol (e.g. a "WholeGrain Guaranteed" verbal claim and a Whole Grain symbol) was used, over more familiar summary indicators (e.g. "Smart Choice Made Easy") systems.
13. To assess the association between TV foods advertisements and the ones consumed by mothers and children in two Mexican cities, Bacardi-Gascon (2013) examined the foods advertised on TV on two national broadcasting channels, and interviewed 721 mothers of children aged 8 months to 5 years old on TV advertisement viewing during June through October 2011. The most frequent advertisements broadcasted on national broadcasted channels during the hours (17:00 to 22:00) when women are most exposed to television on working days were milk and milk products (17%), sweetened beverages (10%), salted snacks (9%), pastries (8.8%), sweets and chocolates (6.0%) and juices (5%). There was a positive association between the weekly mean consumption of food by children and the advertised foods ($r = 0.79$, $p = 0.0001$).
14. Diaz-Ramirez (2013) found a positive association between recall and frequency of TV advertisements for food products on Mexican TV by 365 mothers ($Rho = 0.44$, $p = 0.03$), and TV food advertisement frequency and foods consumed by these mothers ($r = 0.73$, $p = 0.0001$) and their children aged 8 month-5 years old ($Rho = 0.66$, $p = 0.0001$). Children younger than 1 year of age watched an average of 2.3 hours per day; 1 to 3 years old 2.5 hours per day; and > 3 years old 1.9 hours per day. Twenty-five percent of the foods advertised were introduced in the diet of children before they reached 6 months of age. The type of foods advertised on TV that were purchased the most by mothers and consumed by their children were sweetened fresh cheese (45%), juices (40%), cookies (30%), purees (27%), yogurt (27%), and sweetened cereals (22%). These results suggest that TV advertisements influence the food choices of mothers and children.
15. Huang (2013) found in a USA study of formula choice by 1718 mothers that implicit and explicit health professional recommendations use of a specific formula were associated with mothers' formula choice at infant age 1 month and formula switching behaviours in the first 9 months of their child's life. Mothers who did not respond positively to health profession formula marketing were more responsive to direct-to-consumer marketing

activity. Exposure to information about formula on the internet prenatally increased the likelihood of switching for mothers using the hospital formula at 1 month. Other exposures to prenatal formula information, including TV and radio and print, were not associated with later formula switching.

16. A study by Zhang (2013) investigated whether different types of recalled prenatal media marketing exposure to formula and breastfeeding information are related to breastfeeding intentions and behaviour, using data from the US Infant Feeding Practices Study II, a longitudinal study from pregnancy through the infants' first year. Sample sizes ranged from 1384 to 2530. It found that most pregnant women were exposed to information in the media about both infant formula and breastfeeding, but more women reported seeing information about formula than breastfeeding from each source except websites, from which a similar number of mothers received information. Exposure to infant formula information from print media was associated with shorter intended duration of exclusive breastfeeding, and formula information from websites was related to lower odds of both intended and actual initiation, though this was not significant after multivariate analysis that controlled for other measures of marketing exposure and covariates.
17. Sadacharan (2013) examined how receipt of four different types of hospital discharge was associated with exclusive breastfeeding during the first 6 months of life, using Data from the Infant Feeding Practices Study II, and found that after controlling for sociodemographic and attitudinal variables, sample pack distribution was negatively associated with exclusive breastfeeding even at 6 months postpartum.
18. Andreyeva (2013) examined the effects of reduced juice allowances in food packages for WIC participants before and after program changes in 2009. Scanner data from a New England supermarket chain were used to assess juice and other beverage purchases among 2137 WIC-participating households during a 2 year period (n = 36,051 household-months). Before the revisions, WIC juice accounted for two-thirds of purchased juice volume among WIC households. After implementation of the revisions, WIC juice purchases were reduced on par with allowance changes (43.5% of juice volume, 95% confidence interval [CI] 41.9%-45.1%), a decline in total purchases of 100% juice among WIC households of about a quarter, with little compensation occurring from non-WIC funds for juice and other beverages.
19. A study of a public private partnership by the Millennium Development Goals Achievement Fund (2013) reported on an intervention trial of micronutrient sachets

"Ying Yang Bao (YYB)", an in-home complementary food supplement. Results show that YYBs can significantly reduce the anaemia incidence, and improve stunting and intellectual development. Food Supplements, paved the way for the production and promotion of YYB. However, issues such as compliance, involvement of healthcare professional in social marketing and motivation of manufacturers are still to be addressed.

20. Dykes (2012) conducted a qualitative, descriptive study at two maternity/primary health care settings in England to explore inter-disciplinary professionals' perceptions of Infant Feeding Information Team (IFIT) implementation of the WHO Code. The marketing exposures considered included labelling and advertising which promoted the introduction of CACF from 4 months. The study found health staff at a facility in the UK faced difficulties described as being "constantly undermined through mixed messages and misleading product information through labelling, magazines, via the media, family or friends and implicit marketing of artificial milk displayed in hospital". The study reported health staff concerns about mixed IYCF messages ("complementary foods being labelled as suitable from 4 to 6 months" as well as marketing of follow on formula milk) and misleading product information contained within advertisements in 'glossy mother and baby magazines' and via the media, family or friends. The study reported that marketing messages of this kind were undermining health services staff promotion of exclusive breastfeeding, and appropriate complementary feeding. Health staff considered that marketing of products such as for a baby not sleeping, colic, constipation, being 'hungry' or for infants needing additional iron for healthy development, was encouraging harmful infant feeding practices such as 'moving onto second stage milks and early introduction of complementary foods'.
21. Barenes (2012) examined the use of all available BMS ("formula, sterilised milk, coffee creamer, sweetened condensed filled milk, cereal, advanced formula, powdered milk") in 90 villages in 12/17 provinces in Laos among 1057 mothers with infants under 24 months of age, exposed to BMS advertising on Thai TV. The study found that Lao Loum mothers (the main ethnic group) living in concrete houses with good sanitary conditions, were more likely than others to use BMS before 6 months (OR: 1.79, (1.15-2.78), $p < 0.009$). Unemployed mothers living in rural areas were less likely to consider BMS better than breast milk.
22. Crawley (2013) considered the composition of fortified milk drinks sold for consumption by children over the age of 1 year in the UK, their usefulness in the diets of children and whether there is evidence for some of the claims made. Marketing campaigns

focus on the role fortified milk might play in a child's growth and health, intelligence, future opportunities, sporting prowess or resistance to disease. Significant marketing claims were found on almost all websites relating to growing-up milks, and increasingly on TV and web-based films and advertising, 'mummy blogs', Facebook and chat-based websites and displays and talks in public settings. Ingredients are often added to fortified milks because they have been isolated in human breast milk despite limited, or no, evidence that ingredients found in breast milk and added to milks for older children consuming a mixed diet have any benefits to health and well-being. The authors concluded that adverts were misleading consumers such as on the amount of iron needed by toddlers, and many of the milk names themselves suggest claims.

23. Hamilton (2012) investigated first time mothers' beliefs, motivating and inhibiting factors including commercial messages about the timing of introducing solid foods to infants in Australia, including about spouse and doctor expectations. First-time mothers (n = 375) completed a Theory of Planned Behaviour belief-based questionnaire and follow-up questionnaire assessing the age the infant was first introduced to solids, with 33 mothers interviewed. Being able to access commercial baby foods that are suitable before 6 months was associated with earlier introduction of solid foods ($\beta = -.21$). Normative beliefs about partner/spouse (b = 0.16) and doctor (b = 0.22), and control beliefs about commercial baby foods available for infants before 6 months (b = -0.20), predicted introduction of solids at 6 months.
24. Magnani (2012) used focus groups of mothers and health care and aid agency workers to examine the potential to promote development of complementary food products building on the Micronutrient Initiative (MI) in Nepal. The researchers expected that saving time on food preparation could help ensure that children 6 to 24 months old are fed more frequently each day. Health facilities distributed the product free of cost to mothers or grandmothers of children under 2 years as a take-home ration to be consumed in addition to other foods. Urban mothers and grandmothers were more likely to feed PFCF than those in peri-urban or rural areas. With the exception of Nestlé's Cerelac, carers generally considered CFs to have a bad taste and sometimes not be palatable by their children, and expensive, though carers valued the medicinal and nutritional qualities.
25. Tripp (2011) reported formative research in Niger to assess the acceptability of a micronutrient powder (Sprinkles[®]) and a lipid-based nutrient supplement (Nutr butter[®]), and to explore people's willingness to pay for these products in a resource-poor context

like Niger. In four sites, 84 focus group discussions among mothers, fathers and grandmothers of children 6-23 months were conducted, as well as 80 key informant interviews of mothers who participated in a home study where their children 6-23 months were given either Sprinkles® or Nutributter® to use. The mothers generally used the products correctly and stated they would and could pay for them. The study concluded that there was an excellent opportunity to market nutritional products such as these alongside other health-related products. Any such promotional system should be integrated into a comprehensive infant and young child nutrition strategy to ensure that breastfeeding and other complementary feeding interventions are supported.

26. Nguyen (2011) considered barriers and facilitators to optimal IYCF practices, interventions, policies and their effectiveness, based on review and analysis of existing data in Vietnam. The study found that median duration of breastfeeding was 13-18 months but exclusive breastfeeding for the first 6 months is low (8-17%) and apparently declining over time; early introduction, and low nutrient quality of CF are key challenges. Barriers to optimal IYCF included (1) the lack of enforcement of, and compliance with the code of marketing breast milk substitutes, (2) inadequate knowledge among health care providers; and (3) maternal poor knowledge.
27. Sobel (2011) conducted a household survey (n = 345 households with children < 24 months age) and 3 focus groups (38 respondents) in 2006-2007 in The Philippines to examine the association between mothers' exposure to advertising and other information sources and formula feeding decisions, in 16 randomly selected barangays (communities) within three purposively selected disadvantaged rural (n = 114 households), urban (n = 142) and mixed municipalities (n = 89). Focus groups described how television advertisements, doctors and medical representatives enticed them to use formula. After adjusting for education and economic indicators, logistic regression analysis showed that children were more likely to be given formula if their mother recalled advertising messages, or a doctor, mother or relative recommended it. Those using formula were 6.4 (1.8-23.1) times more likely to stop breastfeeding before 12 months.
28. A study by Sun (2011) reports on a public-private partnership (PPP) in China to evaluate the effectiveness of marketing a full fat soy powder mixed with multiple micronutrient powders (Ying Yang Bao (YYB)) through a PPP with a grant from the Global Alliance on Infant Nutrition (GAIN). Commercial marketing promoted introduction of the CACF food supplement, with Biomate, a company with a wide distribution network throughout the country, producing and distributing the product and

conducting marketing activities including through its sales chain. Commercial marketing of the complementary food supplement and behaviour change communication included promoting optimal breastfeeding practices, and there was advocacy and social marketing support from local health care providers in the maternal and child health care system. Caregivers and their 6-24 month old children participated in a baseline (n = 226) and the end-line survey (n = 221). The marketing intervention was successful in raising product awareness and some feeding practices (prevalence of meeting minimal dietary diversity (≥ 4 food groups), meeting a minimal acceptable diet and consuming iron-rich food), but was associated with declines in the introduction of solid, semi solid or soft foods from 93 to 71% ($p = 0.098$), Breastfeeding at 1 year also declined from 76 to 67% ($p = 0.307$) and at 2 years from 43 to 37% ($p = 0.555$) between the baseline and end-line surveys. The small numbers of breastfeeding mothers (e.g. 38/50 at baseline, and 32/48 at end-line suggest the possibility that Type II error may explain lack of statistical significance for declines in breastfeeding duration. The amount of the product sold by retailers was negatively related to distance from wholesale to retail store ($r = 0.35$, $n = 35$, $p = .038$).

29. Roche (2011) aimed to understand the role of traditional foods in dietary quality and the potential impacts on growth of infants and young children 0-23 months of age of the Awajún Indigenous Peoples in the Peruvian Amazon who practise a subsistence lifestyle. This community was exposed to CACF and other marketing through many commercial foods, including evaporated milk, arriving in colourful packaging and often including posters or advertising for the shops selling these items. Also canned evaporated milk was promoted through donations to families via the government 'Glass of Milk' program. Repeat dietary recalls and infant feeding histories were completed with 32 mothers. Half the mothers surveyed practised exclusive breastfeeding. The study found that many infants got adequate nutrition from home prepared CF and breastfeeding; the energy density of the traditional CF would readily meet WHO recommendations if there were a 'high' breast milk intake, as these were more nutrient dense than commercial foods. However there was variation in breastfeeding and complementary feeding practices among the mothers. Although the government 'Glass of Milk' program was intended for infants and children > 6 months, 25% of children received the [canned evaporated] milk before 6 months. Complementary feeding for young children 12-23 months generally met nutrient recommendations, but mean intakes for iron, zinc, calcium and vitamin A were inadequate in infants 6-11 months.

30. Soekarjo (2011) argued that legislative and policy change was needed in Indonesia to provide the poor with access to affordable ways to improve the quality of complementary foods, the marketing to those who need them, and ensuring that marketing remains appropriate and in full compliance with the WHO Code, because currently, there is no special category for CFS such as MNPs or lipid nutrient supplements, and this is said to limit companies' opportunity to produce and market innovative products to reduce malnutrition as part of the local diet. The complexity of defining when a complementary food becomes a breast milk substitute and the outdated use of 4 months rather than 6 months for age of introduction of solids contributes to parties' reluctance to accept high-quality CF and supplements as indispensable for IYC diets and the need to ethically promote their use. While defining CFS as food supplements (as is currently the case with MNPs) or 'foods for special uses' could provide wider access to products that help fill the nutrient gap of young children, it also opens the way to uncontrolled and misleading promotion and marketing.
31. The 2010 study by Bruyeron reviewed the experiences of existing Nutridev social marketing programs to report on the feasibility of local production and marketing of fortified CF to increase usage of high-quality foods among children of low-income families in Vietnam, Madagascar, and Burkina Faso. It reported that it is possible to produce affordable, high-quality CF and supplements locally in developing countries. However, strategies to make products readily available to the targeted population and to convince this population to consume them yielded mixed results, in a context where many families do not have the facilities to prepare a complementary food in addition to the family dish, and where some meals, such as breakfast, are usually eaten at home. Promotional activities conducted in rural areas were efficient in informing mothers and convincing them to test the product, but generally not to sustain use at high levels. It concluded that the optimal approach was strengthening the existing food distribution network to sell CF and supplements.
32. Hurley (2010) studied commercial baby food consumption and dietary variety in a state-wide sample of infants receiving WIC benefits through a cross-sectional state-wide telephone survey and 24 hour dietary recall of 733 Maryland mothers on WIC in 2004-2005. The WIC food package for infants included infant formula, infant cereal, and 100% fruit juice, though the 100% fruit juice has recently been replaced with commercial baby food fruits and vegetables for infants aged 6 through 12 months. The study found that among infants from birth to age 5 months, 54% had consumed CF in

the past 24 hours; 60% received commercial baby foods. Among infants aged 6 to 12 months, 81% received commercial baby in the past 24 hours. In a multivariate model, infants aged 6 to 12 months who received commercial baby foods consumed a greater variety of fruits and vegetables ($\beta=54$, 95% confidence interval 0.26-0.84; $p < 0.001$) than infants who did not. Among infants aged 6 to 12 months, commercial baby food is associated with dietary variety in fruits and vegetables. The author argued therefore that WIC can increase dietary variety and appropriate introduction of CF among infants either through the provision of commercial baby foods, and/or education and resources related to the preparation of fruits and vegetables for infants.

33. A 2009 study by Putthakeo aimed to assess exclusive breastfeeding (EBF) at 6 months and continued breastfeeding (CBF) at 2 years through a cross-sectional study using a semi-structured questionnaire in 40 villages in Lao PDR. Mothers with children less than 2 years old were recruited by multistage random sampling ($n = 447$). Most mothers (75.0%) had watched television advertisements for infant formula from Thailand. There was a low prevalence of EBF at 6 months; in a univariate logistic regression model, factors having a strong impact on EBF at 6 months included: location of residence (OR: 19.19, 95% CI 6.96-57.01), ethnicity (OR: 3.15, 95% CI 1.63-6.08), encouragement of the child's father (OR: 9.03, 95%CI 1.21-67.57) and inter-spousal communication (OR: 5.20, 95% CI 2.34-11.56).
34. The study by Schulze (2009) investigates cultural differences in mothers' views regarding infant feeding and socialisation in China and the US, using a cross-sectional survey of mothers with children at childcare centres ($n = 55$ US, 72 China). Mothers had similar socio-demographic characteristics and rates of mixed breast and bottle feeding, though Chinese mothers reported poorer health and lower education than American mothers. Chinese mothers using childcare had higher rates of exclusive breastfeeding (37%) compared to American mothers (18%).
35. Perez-Exposito (2009) conducted a review of trials of promoting fortified blended foods used in humanitarian relief programs on the health and nutritional status of infants and young children with moderate malnutrition, or at risk of undernutrition, in developing countries. Fortified blended foods (FBFs) with high protein and micronutrient content, such as corn-soy milk (CSM) and wheat-soy blend (WSB), were developed in 1967 as part of a strategy from the United States to improve child nutrition. Positive effects on recovery from moderate acute malnutrition and weight gain were observed when fortified blended foods were distributed as dietary supplements. Prevention of severe micronutrient deficiencies in populations reliant on food aid has been reported, but

measurements of micronutrient status have rarely been conducted. Evidence of the efficacy of fortified blended foods for improving nutritional outcomes is currently limited and weak.

36. A 2008 industry strategy report by Euromonitor summarises the global baby food and milk market, including the regulatory environment and marketing strategies, and provides indications of the extent and effects of global IYC food product marketing. The study considered global and national marketing strategies for commercial baby foods including CACFs and IYC food products such as toddler and follow on milks for the period 2008-2013. Advertising was stated to be a potent force in developing markets, due to increased breastfeeding, falling birth rates and more stringent marketing restrictions in many developed markets. The study reported that breastfeeding was increased by government efforts to promote breastfeeding (including measures in some countries to constrain IYC food product marketing). The industry forecast flat sales in markets like the UK, Netherlands, Portugal, and Denmark partly due to increased popularity of home-made baby food and increased breastfeeding. Nigeria was predicted to be the worst performing market in retail constant value terms between 2008 and 2012 as a result of poverty and 'the entrenched practice of breastfeeding'. The huge disparity in the retail value of milk formula sales between China and India was said to be mainly due to the significant differences between their official regulatory regimes; in India, all advertising is prohibited, while in China, TV advertising and the use of celebrity spokespeople are allowed.
37. A 2008 study by Othman investigated the attitudes and practices of families in Iraqi Kurdistan regarding breastfeeding and infant feeding during the first 6 months of life. One hundred and eighty mothers, fathers and grandmothers were interviewed through a semi-structured questionnaire at their houses in rural and urban areas. Prevalence of exclusive breastfeeding for 6 months is only 7% and almost all children are given additional food and fluids early in life, half of them right from birth. The in-laws and the husband are influential in maternal decisions. Complementary food is given to 30% of babies aged 3-5 months with reasons for this practice including; 'TV', 'they say it is good', 'mother working' and 'given with the food ration'.
38. Barennes (2008) investigate the use of Bear Brand coffee creamer as a food for infants and the impact on consumers of the logo of a cartoon baby bear held by its mother in the breastfeeding position, using a survey of 1023 adults and 26 paediatricians. The company uses the same Bear Brand logo on its canned sterilised cows' milk product and on infant formula products for infants from 6 months. The study found that the Bear

Brand coffee creamer is used as a breast milk substitute in Laos, as the cartoon logo belies the written warning that the product is not to be used as a breast milk substitute.

39. Labiner-Wolfe (2008) investigated whether US mothers using formula learn about proper handling from health professionals and package labels, and beliefs about germs and safe-use directions and measures, using data from the 2005–2007 Infant Feeding Practices Study II (n = 1533), finding that many mothers of infants aged 1.5 to 4.5 months did not follow safe formula-handling recommendations to prevent foodborne illness and burns. Thirty percent did not read some of the safe-use directions on the formula package label; 38% thought powdered formula was unlikely to contain germs; 30% did not read package directions on discarding leftover formula, 11.7% did not read directions for preparation, 9% found the print size too small to read easily, and 3% mothers found the product label safety information difficult to understand.
40. Alabi (2007) examined how implementation of WHO Code regulations in Ghana affected promotion of commercial infant foods and mothers feeding options in Ghana after 6 years. Marketing of CACF and water was observed through the health system, retail outlets labelling and POS promotion. The study suggests that mothers feeding options have been influenced by the regulation and the Baby Friendly Hospital Initiative. Most mothers breastfeed exclusively or sometimes with water for the first 3 months of their babies life, and supplemented from the fourth month onwards because of employment and other social and economic reasons. These practices are quite different from the years before the Regulations. The study describes current marketing of CACF and bottled water through free samples to health workers, non-compliant labelling of complementary foods sold at retail, and point of sale promotion via posters of a particular brand of bottled water labelled as suitable for babies in Ghana. CACF and BMS products were cross-promoted through promotional displays of CACF with the same company branding and logo. The biggest and most popular baby food company in Ghana is the preferred choice of both rural and urban poor mothers because of price and image, with packages of various portions and sizes making it affordable and accessible to most mothers. The author cites aggressive promotion of commercial complementary foods and the sale of homemade complementary foods by health workers within the health care system as explaining the high rate of infants under 6 months receiving supplementary foods. Enhanced enforcement of the Regulation, awareness creation and further research into impact of the regulations and other infant feeding practices could result in significant gains in appropriate infant feeding practices.

41. Smith (2007) examined the correlation between Australian maternity care practices, commercial marketing, and infant feeding practices since the 1950s, presenting long term data on breastfeeding prevalence, per capita consumption of infant milk, and numbers of advertisements of baby food in a leading Australian women's magazine and an Australian medical journal. The study concluded that most Australians born since 1955 were exposed to being fed artificial baby milk in early infancy, and to associated risks of later obesity, as a result of more aggressive marketing of breast milk substitutes when trade liberalisation increased competition in the Australian infant food industry during the mid-1950s.
42. Daelmans (2003) summarises a 2001 World Health Organization global consultation on complementary feeding. The adoption of revised energy and micronutrient requirements for infants and young children resulted in lower recommendations for minimum meal frequency and energy density of complementary foods, and altered the list of problem nutrients. The author observed that some complementary feeding programs may unintentionally compromise breastfeeding by advocating feeding CF too often or providing too large a proportion of the infant's energy needs from CF, and stated that "the effect of complementary feeding interventions on growth is variable and probably depends on the types of foods promoted, the target age range, the initial nutritional status of the infants, and the degree to which other nutrition and health messages are included in the program."
43. Cutler (2002) describes how US based infant formula companies have historically promoted their products 'ethically' by focusing on gaining a physician to parent recommendation for a brand of infant formula.
44. Suleiman (2001) reports a descriptive study in Malaysia which aimed to determine whether milk industry marketing strategies affected infant feeding practice. Fifty Malay mothers with children less than 5 years old and visiting a private hospital antenatal clinic were asked, by questionnaire and by interview, to identify marketing methods which influenced their infant feeding practice. The study found that mothers were influenced to buy a particular brand of milk formula by free milk samples (65.2%) or other people (38.4%). Half (46%) received free milk samples from the health care facility on the day of discharge; of these, 35% were influenced to buy a particular brand of milk formula.
45. Ukwuani (2001) used data from the 1990 Nigerian Demographic and Health Survey and the 1995 Ugandan Demographic and Health Survey (n = 5422 Nigeria and 4258

Uganda) to examine the implications of mother's work, childhood place of residence, and exposure to the media for breastfeeding patterns (exclusivity and intensity). The study reported that in both Nigeria and Uganda, the mother watching TV or listening to the radio at least once a week was associated with increased number of children given formula or milk, while these activities were also associated with reduced number of times the child was breastfed during the day. The author attributed widespread use of formula and milk to media advertising for these infant foods being so 'powerful and pervasive'.

46. Porter (1999) examined strategies for using packaged CF to improve the nutrition of young children in developing countries, as a complement to breastfeeding. Foods traditionally given to complement breast milk may themselves be inadequate in quantity and nutritional quality. The paper reviewed past project experience with processed infant foods in developing countries, including issues in producing and marketing complementary foods, and processing of infant foods at the community level, as well as large-scale efforts to market industrially processed products across very large areas. There were concerns to ensure that commercial sale of packaged foods not substitute for other essential nutrition services, and avoid packaged foods substituting for more appropriate local foods, or draining away scarce development dollars. The study concluded that nutritious, low cost, packaged foods offer a potentially attractive alternative to many of the first foods traditionally given to older infants. Recognising both marketing challenges and opportunities the study sought to establish guidelines for policy and program managers in donor and government agencies for the development and marketing of a packaged CF.
47. Bruce (1997) reported that infant hyponatremic seizures resulting from water intoxication were being reported in the United States with an increasing frequency, with those living in poverty and uninformed of the risks of feeding fluids other than infant formula to their babies particularly at risk. Most often tap water, either in the form of supplemental feedings or overly dilute formula, was given in excessive amounts over relatively short periods of time, but less frequently, water in other forms such as juice, soda, or tea was implicated. As well as two cases of infants treated for hyponatremic seizures and water intoxication after being fed with the same bottled drinking water product marketed for use in infants, the medical records of all infants < 1 year of age admitted to the author's institution over ten years with the diagnosis of hyponatremic seizures were also reviewed. The "bottled water product was inexpensive and labelled in such a way that it seemed to contain nutrients adequate for use as an infant feeding

supplement" resulting in "an acute overload of solute-free water substantial enough to increase total body water by 7% to 8% or more".

48. Guilkey (1995) aimed to measure the impact that infant food companies have on mothers' infant feeding choices in the Philippines, using data on women (n = 2800) recruited during pregnancy and followed up every 2 months for first 2 years of child's life. The total effects of various industry marketing activities were measured through using a structural model of the mother's decision-making processes, and reduced form estimation techniques. Although mostly directed at highly educated mothers, marketing activities were also found to be associated with a switch away from breastfeeding to other commercial breast milk substitutes for less educated mothers. Taking brand name recall as a proxy for past marketing activities, the study found that for the least educated mothers in the sample, such marketing would reduce breastfeeding of infants by 3% at age 2 months, 3.5% at 4 months, and 4% at 6 months and that the increase in all patterns using commercial products were of the same magnitudes. The study concluded that if advertising and sample distribution had been pervasive in the least educated group, there would have been large reductions in breastfeeding and supplementation with other milks.
49. Vitzthum (1992) observed and interviewed 30 women, each of whom had at least 1 child under 3 years old, to analyse infant feeding behaviour in a remote area of Peru in 1985 where most households had insufficient means to meet their basic dietary needs. As access to a market economy increased, women were exposed to more distribution channels for CACF and drinks through growth of the weekly market and increased commercial foods in local stores. The study asked whether mid SES women (presumed to have greater market access than low SES women) supplement with solid or other foods or drinks sooner, make greater use of bottle feeding, and wean earlier. The study found that nursing ended much sooner in higher SES infants than in low SES. Drinks (other than formula) such as teas and herbal infusions were fed by low SES mothers, while mid SES infants were frequently fed canned milk and fruit juice. Mid SES women ceased day breastfeeding seven months earlier than low SES mothers (23.6 vs. 16.6 months $p < 0.005$). In mothers who had used bottle feeding, the mean age of first solids (12.6 ± 5.7 months) was similar to those in whom bottle feeding was never used (13.8 ± 4.1 months); the average anticipated duration of day nursing was five months less for those who used bottle feeding (22.9 vs. 17.9 months). Shorter day nursing duration was attributed to higher quantity and quality of foods in mid SES households; children were customarily fed family foods from around 1 year; and, mid

SES families consumed more cheese, eggs, milk, and vegetable oil whereas low SES women never reported meat or dairy foods in their infant's diet. The author concluded that current infant feeding practices are probably beneficial for offspring from relatively affluent families but harmful to impoverished infants.

50. A macroeconomic study by Gilly (1988) investigated causal links between infant formula promotion-advertising and consumption of infant formula. The study addressed the question of whether promotion influenced women to switch brands or stop breastfeeding. It analysed trade statistics before and after manufacturers restricted marketing activities, comparing data on infant formula imports by 79 developing countries in 1972-1972 and 1976-1978. Leading infant formula producers agreed in 1975 to curtail promotion of their products in developing countries. Trade statistics data for the 'infant formula' category of imports included "infant cereal preps" and 'infant formula' was not limited to formula for infants < 6 months so may include formula for older infants. The data strongly indicated that infant formula imports, controlling for several economic factors in the developing countries, were reduced by curtailing promotion. The authors concluded that "the empirical evidence in this study supported that promotion affected overall consumption of infant formula and by implication breastfeeding behaviour", because imports declined when promotion was restricted by companies in the 1970s.
51. A 1987 randomised controlled trial was conducted by Frank et al to evaluate two interventions for prolonging the duration of breastfeeding in a multiethnic sample of 343 low-income urban women in the US. One intervention compared commercial discharge packs provided by formula companies with research discharge packs designed to be consistent with the WHO Code. The relevant exposure is hospital discharge packs which included promotion of products other than formula: "bottles of sterile water, two nipples, and several pamphlets from Mead Johnson, Ross, or Wyeth Laboratories containing information on health education and product promotion". Exposure to marketing via commercial discharge packs resulted in earlier introduction of solids in the exposed group compared to research group with non-commercial discharge packs. Women who received the research discharge pack, compared with those who received the commercial pack, were more likely to prolong exclusive breastfeeding ($p = 0.004$, one-tailed), and to delay the daily use of solid foods in the infant's diet ($p = 0.017$, one-tailed). "The median age of infants whose mothers received the research discharge pack at the time of daily solid food introduction was 120 days compared with 112 days for those whose mothers received the commercial pack." The discharge pack

intervention did not have an independent effect on the timing of the first introduction of solid foods.

52. Griffin's (1984) study used a 1978 survey of households (632/1903 with at least one child under 24 months of age) and private and traditional health professionals (n = 1298) and a 1981 survey of stores and health facilities, to document the availability of BMS, promotion of infant food and formula through the medical sector, and the effects of such promotion on the infant feeding practices of mothers in Bicol region, Philippines. Activities of multinationals affected mothers' breastfeeding behaviour indirectly by increasing the probability of their introducing breast milk substitutes within the first 6 months, and thus in practicing a program of mixed feeding. "Putting up products on shelves may set up indirect demonstration effects"; "[hospital discharge packs] intentionally or unintentionally convert into formula users mothers who would otherwise have breastfed". The author concluded that the mother receiving free formula sample at delivery increased likelihood of BMS use at 3, 6 or 9 months; free formula samples at birth did not affect introduction of CF at 3, 6, 9 or 12 months.
53. Greiner (1982) reported on the effects of marketing of commercial IYC food products in St. Vincent in the Eastern Caribbean; infant food advertising was at that time uncommon, and a typical infant feeding pattern combining both breast and bottle feeding, had existed for decades. The survey examined exposure to mass media, recall of infant food advertising, attitudes about breastfeeding and commercial foods, mothers familiarity with and extent of purchase of locally available commercial infant foods, and infant feeding practices. A questionnaire was administered to mothers of about 200 children 1 to 2 years old, nearly a complete sample in each of two towns. Multiple regression analysis suggested that the more a mother was influenced by infant food advertising, the sooner she began to bottle feed and the sooner she stopped breastfeeding. The study found that recall of ads for baby foods (including for strained baby foods and infant cereal) was associated with earlier weaning from breastfeeding. The impact of recalling ads was equal to .63 months less breastfeeding among individual mothers. There was a statistical trend of mothers being more likely to have purchased products they had seen advertised.

Annex H: Narrative summary of academic literature for secondary question

Academic studies – Impacts of marketing tobacco on behaviours (n = 2)

1. Mozaffarian et al. (2012) assessed current scientific evidence for effective population approaches to improve dietary habits, increase physical activity, and reduce tobacco use. They ranked quality of evidence into Class I or II recommendation with grade A or B. Number of studies was not reported. They categorised interventions into: (1) media and educational campaigns; (2) labelling and consumer information; (3) taxation, subsidies, and other economic incentives; (4) school and workplace approaches; (5) local environmental changes; and (6) direct restrictions and mandates. They concluded that regulatory strategies in particular: bans on advertising of energy-dense nutrient-poor foods to children; bans on cigarette advertising; restrictions on addition of specific dietary factors in food processing such as trans-fat, milk fats, palm oil and salt; taxes on cost of cigarettes; and, community and workplace smoking bans have been found to be effective in encouraging healthy behaviours and reducing unhealthy behaviours, and creating healthier environments. They recommended comprehensive rather than partial regulations in recognition of industry attempts to exploit loopholes in regulations. Their findings applied to developing and developed countries.
2. Stead et al (2013), reported on a systematic review of 25 quantitative studies from published and grey literature, on potential impacts of standardised or 'plain' tobacco packaging. Indicators of potential impacts were consistent with International Framework Convention on Tobacco Control, namely: reduced appeal, increased salience and effectiveness of health warnings, and more accurate perceptions of product strength and harm. The review found strong evidence that 'standardised packaging will reduce the appeal of packaging and of smoking in general; that it will go some way to reduce consumer misperceptions regarding product harm based upon package design; and will help make the legally required on-pack health warnings more salient'. The context for the review was recognition of the economic value of packaging as promotional tool by marketers, and increasing International policy interest to address packaging as a regulatory tool, following introduction of plain packaging in Australia in 2012

Academic studies – Impacts of marketing alcohol on behaviours (n = 5)

1. Gallet (2007) reported on a meta-analysis of 132 studies, analysing the effect of policy-relevant factors such as price, income and advertising, on demand for alcohol thereby assessing the 'elasticity' of alcohol consumption. The meta-analysis addressed the following questions: Q (1) Do elasticity estimates differ across types of alcohol? (2) Are short-run and long-run elasticity estimates different? (3) Does specification of the demand equation influence the estimated elasticities? (4) Are elasticity estimates

sensitive to differences in data across studies? (5) Does the method of estimation affect elasticity estimates? and (6) since later studies seek to answer questions raised by earlier studies, does the year of publication, as well as the quality of publication outlet, influence the elasticity estimates? The meta-analysis found alcohol elasticities to be particularly sensitive to demand specification, data issues and various estimation methods. Compared to other types of alcohol, demand for beer appeared to be less sensitive to changes in price, income and advertising variables. Gallet commented on a methodological weakness being that studies into marketing tended to take a narrow focus on advertising, and failed to consider a broader range of strategies used to market alcohol.

2. Anderson et al (2009) assessed the impact of alcohol advertising and media exposure on alcohol use by adolescents. The systematic review evaluated 13 high-quality longitudinal studies that assessed various mass media alcohol exposure, including through television, radio, news-papers, outdoor advertising, billboards, and promotional giveaways. Findings demonstrated a consistent link between alcohol advertising and subsequent alcohol use, with the uptake of drinking among non-drinking young people and increased consumption among their drinking peers in a dose-response manner. They concluded that the strength of the associations and consistency indicates that advertising and promotion does increase drinking initiation and use of alcohol among adolescents. This is consistent with the impact of tobacco and food marketing on young people. As the focus of this review was on mass media advertising, the findings likely underestimate the impact of wider alcohol promotion and marketing.
3. Bryden et al (2012) reported on a systematic review of 26 papers that examined the impact of availability and marketing of alcohol at the community level on alcohol use. Despite inconclusive findings, they reported that there was some suggestive evidence of a link between higher outlet density and alcohol advertising exposure in the community (e.g. billboards, in-store adverts) and greater alcohol use, particularly among adolescents. They concluded that further studies are required to provide more conclusive evidence to better understand the influence of these factors on alcohol use. They advised that policy makers should be aware of the possible influence that community level availability and advertising of alcohol have on drinking, and particularly the possibility that adolescents may be more likely to start drinking if they are exposed to alcohol adverts in their community.
4. Siegfried et al (2014) evaluated the benefits, harms and costs of restricting or banning alcohol advertising on adult and adolescents' alcohol consumption, when compared to no restrictions or counter-advertising. The systematic review of four studies found a lack of robust evidence for or against restricting alcohol advertising to reduce alcohol consumption. They recommended Government and ministers implementing advertising restrictions within a high-quality, well-monitored research programs to ensure

continued evaluation of relevant outcomes to substantiate the evidence base in this area.

5. Smith and Foxcroft (2009) reported on a systematic review of seven prospective cohort studies evaluating the relationship between exposure to alcohol advertising, marketing and portrayal on subsequent drinking behaviour in young people. Marketing media included print and broadcast (TV advertisements and music videos). The review found a modest association between exposure to alcohol marketing and increased risk of drinking, for drinkers and non-drinkers. The authors cautioned that modest effect sizes were limited by the potential influence of residual or unmeasured confounding factors.

Academic studies – Impacts of food & beverage marketing to children on behaviours (n = 4)

1. Cairns et al. (2013) conducted a meta-analysis of the International evidence on (1) the nature and extent of food promotion and non-alcoholic beverages to children; and (2) the persuasion effects on diet, dietary determinants and health. The range of marketing techniques investigated was broad and included: advertising on broadcast, print and digital media; product packaging, labelling and point of sale promotions; branding and sponsorship; merchandising and the use of licensed or brand-based characters. They analysed 115 primary studies and review papers, and found that marketing predominantly promotes foods and beverages of low nutritional value containing excessive amounts of fats, salts and sugars. They found a strong positive association between food promotion and children's food choices, requests and purchasing behaviour at category and brand level, and a modest positive association with children's food preferences, nutrition knowledge, food consumption behaviours and health status. They concluded that unconstrained food marketing promotes non-nutritious foods and influences children's food behaviour and diet-related health. Recommending a reorientation of research from 'if' and 'what' marketing influences children's health, to 'by what means' can unhealthy food promotion be substantively reduced. To fill the evidence gap on policy implementation, they suggested greater emphasis on translational research based on the WHO Set of Marketing Recommendations.
2. Galbraith-Emami et al (2013) report on a systematic review of 21 papers, to examine the data available on levels of exposure of children to the advertising of less healthy foods since the introduction of the statutory and voluntary codes worldwide. Notwithstanding methodological limitations due to different criteria being used in statutory and self-regulatory regimes, they found contrasting evidence from scientific and industry studies. Scientific, peer-reviewed papers showed continued high levels of children's exposure to less healthy food advertising, while industry studies reported reductions in children's exposure following voluntary codes. They concluded that

adherence to voluntary codes may not sufficiently protect children from advertising of foods which undermine healthy diets.

3. Kelly et al. (2011) reviewed scientific literature and industry reports worldwide, on children and adolescents' exposure to food and beverage sponsorship and the effects of sponsorship campaigns. Corporate sponsorship was defined as "the provision of financial or in-kind assistance to a cause or event to support corporate or marketing objectives" in school and sports settings. They found widespread and sophisticated food and beverage sponsorship activities in school and sport settings, including professional and community sport. Considerable sponsorship came from food corporations marketing less healthy foods. The authors were unable however, to find studies measuring the effects of food and beverage company sponsorship on children and adolescents. Studies from tobacco and alcohol sponsorship provided evidence of effects on children's product recall and product-related attitudes and behavioural intentions. Which led the authors to conclude that similar inferences could be applied to food and beverage sponsorship. They recommended a range of policy and structural initiatives to limit children's exposure to food and beverage sponsorship.
4. Smits (2015) reviewed 15 experimental studies on the persuasive effects of the use of endorsing characters, which is considered to be the most prevalent marketing technique targeting children aged 3-12 years. Endorsers include, celebrities, experts, typical consumers and fictional characters. The effects measured were children's attitudes, food preferences, choices and consumption. They reported that endorsements do positively affect children's food choices, with stronger persuasive effects found for familiar characters compared to unfamiliar characters. The persuasive effects of endorsers on healthier foods was less than the effect on unhealthy foods.

Academic studies – Impacts of pharmaceutical marketing on behaviours (n = 2)

1. Spurling et al (2010) reported on a review of 58 studies investigating the relationship between exposure to promotional and education information from pharmaceutical companies and the quality, quantity, and cost of physicians' prescribing. Exposures included pharmaceutical sales representative visits, journal advertisements, attendance at pharmaceutical sponsored meetings, mailed information, prescribing software, and participation in sponsored clinical trials. The studies showed mixed results with exposure to information provided directly by pharmaceutical companies being associated with higher prescribing frequency, higher costs, and lower prescribing quality or no effects at all on prescribing. The authors reported that while none of the studies found improvements in prescribing, this could not be ruled out. They concluded with cautionary advice to physicians to avoid exposure to promotions by pharmaceutical companies.

2. Mintzes (2012) reported on a systematic review of nine studies published between 2005 and 2011, to augment a review published in 2005 (Gilbody et al. comprising four studies), on the effects of direct-to-consumer advertising (DTCA) of pharmaceuticals, on health seeking behaviour, prescribing and medicine use, and ultimately benefit and harm. A particular focus of the review was to assess whether the research evidence supported the U.S. Congressional Budget Office's conclusion of mixed beneficial and harmful effects, in view of increasing policy pressure for DCTA. The Gilbody et al. review found that DCTA increased prescribing volumes, patient demand, and shifts in prescribing but no evidence of effects on health or costs. The additional review found that DCTA "can lead to less appropriate prescribing, effects on prescribing volume and switching to a less cost-effective drugs, especially in the least-price-sensitive patients". No evidence was found that DTCA improves adherence, allows patients to obtain needed care at an earlier stage, reduces stigma, or provides accurate education, despite frequent claimed effects.

Academic studies – Impacts of marketing breast milk substitutes on behaviours (n = 3)

1. The WHO 2013 draft technical report 'When marketing harms our children' examined potential harm to children, of marketing practices in BMS, foods and non-alcoholic beverages, tobacco and alcohol. In relation to BMS the review found widespread violations of the WHO Code (500 violations in 46 countries), contributing to sub-optimal breastfeeding practices.
2. Bellew et al systematically reviewed evidence on the marketing of BMS & foods and non-alcoholic beverages [FNAB] that affects children and adolescents. Regarding BMS the study found there was sufficient evidence (from systematic and other reviews, longitudinal and cross-sectional studies in eight countries and policy compliance audits in 199 countries) that marketing of infant formula in breach of the WHO International Code of Marketing of Breast Milk Substitutes is widely pervasive. The authors also concluded there was sufficient evidence that marketing of infant formula negatively affects breastfeeding practice and is therefore harmful to infant health. Potential policy actions to mitigate the harmful impact of marketing were also identified. These were (1) restriction of unhealthy marketing (2) use of marketing (and counter marketing) to protect and promote health; (3) adopting a 'rights-based approach' to protecting children; and (4) monitoring and research to underpin the above three approaches.
3. Donnelly et al (2000). This systematic review of the impact of hospital discharge packs containing BMS and promotional material, on breastfeeding behaviours, was withdrawn from The Cochrane Database due to being out of date. They found that hospital discharge packs reduced exclusive breastfeeding but had no effect on non-exclusive breastfeeding.

Annex I: Summary table of individual studies

Table 1: Studies reporting both behavioural and attitudinal outcomes of marketing: ordered by quality, most recent first

Citation	Objectives	Study Design; Quality rating	Country; Setting; Study Population, Sample Size	Marketing exposure category	Study outcome and effect estimate
Silver					
Huang Y, Labiner-Wolfe J, Huang H, Choiniere CJ, Fein SB. Association of health profession and direct-to-consumer marketing with infant formula choice and switching. Birth. 2013;40(1):24-31.	To evaluate the associations between formula marketing, reason for choosing the formula fed to the infant at age 1 month, and switching formula brand or product through the infant's first 9 months of life.	Longitudinal study; Silver	USA; Health service/ Health professional, Community; Mothers who fed formula at infant aged 1 month (n = 1700)	Product labels; Hospital discharge packs; Promotions; Pricing	Exposure to print, internet or broadcast information on formula prenatally was not associated with switching behaviour. Mothers who received a sample of formula from the hospital at birth were more likely to use the hospital formula 1 month later (AOR = 1.54, p < 0.05). Mothers were more likely to switch formula in 2 weeks prior survey if they chose formula for direct-to-consumer marketing reasons at 1 month (AOR = 1.38, p < 0.05).
Sun J, Dai Y, Zhang S, Huang J, Yang Z, Huo J, et al. Implementation of a programme to market a complementary food supplement (Ying Yang Bao) and impacts on anaemia and feeding practices in Shanxi, China. Matern Child Nutr. 2011;7(s3):96-111.	To test the use of public-private partnerships (PPPs) to market this CFS (YYB) in rural China to low-income families of children 6–24 months of age.	Before and after study; Silver	China; Community, Health service/ Health professional; Parents of children aged 6-24 months (n = 221 pre; 226 post)	Advertisements; Promotions; Pricing; Product labels; Health claims; Market integration	After developing the product and implementing the intervention for 8 months, 60% of surveyed caregivers purchased YYB.
Bronze					
Cattaneo A, Pani P, Carletti C, Guidetti M, Mutti V, Guidetti C, et al. Advertisements of follow-on formula and their perception by pregnant women and mothers in Italy. Arch Dis Child. 2015; 100(4):323-328.	To assess how follow-on formula milks for infants aged 6-12 months are presented to and understood by mothers.	Qualitative (interviews); Descriptive study; Cross-sectional survey; Bronze	Italy; Community, Content analysis results, Health service/ Health professional; a) Magazines for parents b) Pregnant women c) Mothers of children aged < 3 years (n = 89 formula ads; 80 pregnant women; 572 mothers)	Advertisements	No significant difference in use of breast milk, formula or both for women who thought they had seen advertisements for infant formula.

Food and Health Bureau Centre for Food Safety. Proposed regulatory framework on nutrition and health claims on infant formula, follow on infant formula, follow-up formula, and pre-packaged foods for infants and young children under the age of 36 months in Hong Kong. Food and Environmental Hygiene Department, Hong Kong Government. Hong Kong 2015.	To describe the proposed regulatory framework on nutrition and health claims of complementary foods in Hong Kong.	Literature review; Bronze	Hong Kong; Various (review; N/A	Health claims	Reported arguments that nutrient function, nutrition and other claims on formula does not replace breastfeeding. On the other hand, it reported that such claims may induce caregivers to introduce follow up formula or IYC, or influence caregivers on whether to breastfeed or continue breastfeeding. Thus, undermining sustained breastfeeding up to 2 years or beyond, and potentially interfering with a child's progression from IYC diet to an adult diet.
Helen Keller International. Assessment of promotion of foods consumed by infants and young children in Phnom Penh: Assessment and Research on Child Feeding (ARCH) – Cambodia country report. Helen Keller International, New York 2015.	To assess exposure to promotional practices among mothers utilising the health system in Phnom Penh, Cambodia, as well as to assess their current infant and young child feeding practices, including utilisation of commercially produced foods.	Cross-sectional survey; Bronze	Cambodia; Community, Health service/ Health professional; a) Mothers discharged from a maternity ward after delivery, b) Mothers of children aged < 24 months who were attending public child health clinics (n = 306 (after delivery); 294 (mothers of children < 24 months))	Advertisements; Promotions; Product labels; Brands/ logos; Brand crossover promotion; Pricing; Health claims; Social marketing	An association was found between mothers receiving a recommendation from a health professional to feed their youngest child a BMS and pre-lacteal feeding. Seventy-two percent of mothers of children less than 24 months who reported a health professional's recommendation to use a BMS provided a BMS as a pre-lacteal feed to their youngest child, as compared to 34.6% of mothers who did not receive a recommendation to use a BMS from a health worker ($p < 0.001$). There was no association between mothers having heard, seen or read a promotion for BMSs and utilisation of these products; 33.7% of mothers who reported observing a promotion for a BMS had fed one to their child on the previous day, as compared to 27.5% of mothers who had reported not observing a promotion ($p = 0.578$).
Fornasaro-Donahue VM, Tovar A, Sebelia L, Greene GW. Increasing breastfeeding in WIC participants: cost of formula as a motivator. J Nutr Edu Behav. 2014;46(6):560-569.	To estimate formula feeding costs for non-breastfeeding WIC mothers in Rhode Island and to assess mothers' perception and influence of these costs on their decision to breastfeed.	Cross-sectional survey; Qualitative (interviews); Bronze	USA; Health service/ Health professional; Non-breastfeeding biological mother of an infant aged 1–4 months (n = 30 (survey); 14 (interviews))	Pricing (government-provided food or formula coupons)	Both the breastfeeding and formula feeding groups perceived the cost of formula to be high. Both groups reported noticing an increase in the cost of formula as their child got older. They also noted that breastfeeding was a less expensive option compared with formula feeding.
Phoutthakeo P, Otsuka K, Ito C, Sayamoungkhoun P, Kounnavong S, Jimba M. Cross-border promotion of formula milk in Lao People's Democratic Republic. J Paediatr Child H. 2014;50(1):51-56.	To measure maternal exposure to the Thai media's promotion of formula use; to assess the association between attitudes towards Thai TV commercials on formula use and EBF; and to investigate the media-influenced attitude to formula use and EBF for 6 months.	Cross-sectional survey; Qualitative (focus groups); Bronze	Lao PDR; Community; Mothers with children aged < 2 years (survey); Mothers and mothers-in-law aged 19–70 years (focus group) (n = 1022 (survey); 29 (focus groups))	Advertisements; Brands/logos	90% reported frequent exposure to the Thai media's promotion of formula milk through TV commercials and 79% identified TV commercial as influential for them to develop a positive attitude towards the use of formula milk (AOR = 0.25). Mothers who reported a positive attitude towards the Thai TV commercial on the formula use were approximately 75% less likely to practice EBF for 6 months than those who reported a negative attitude.

Wu Q, Scherpbier RW, van Velthoven MH, Chen L, Wang W, Li Y, et al. Poor infant and young child feeding practices and sources of caregivers' feeding knowledge in rural Hebei Province, China: findings from a cross-sectional survey. <i>BMJ</i> . 2014; (7):e005108.	To assess the breastfeeding and complementary feeding knowledge and practices of caregivers of children 0-23 months in one county in rural China and assess usage and potential of delivery channels for IYCF recommendations.	Cross-sectional survey; Bronze	China; Community; Mothers or other caregivers of a child aged 0-23 months (n = 1601)	Healthcare advice; Advertisement	Poor feeding practices were found for children 0-23 months, including early introduction of complementary foods, and poor quality of complementary foods > 6 months. Although 38% of children were breastfed to 2 years, with leading sources of feeding information for mothers being family members, neighbours, friends and popular media (newspaper, magazine, book, radio and TV).
Bacardi-Gascon M, Diaz-Ramirez G, Cruz Lopez B, Lopez Zuniga E, Jimenez-Cruz A. TV food advertisements' effect on food consumption and adiposity among women and children in Mexico. <i>Nutr Hosp</i> . 2013; 28(6):1900-1904.	To assess the association between TV foods advertisements and the ones consumed by mothers and children, and the body weight of both mother and child, among population from different SES in two Mexican cities.	Descriptive study; Bronze	Mexico; Community; Women with children aged < 6 years (n = 721 mothers; 421 children aged 3-24 months)	Advertisement	There was a positive association between the weekly mean consumption of food by children and the advertised foods (r = 0.79, p = 0.0001).
Bui M, Kaltcheva VD, Patino A, Leventhal RC. Front-of-package product labels: influences of varying nutritional food labels on parental decisions. <i>JPBM</i> . 2013;22(5/6):352-361.	To examine the effects of varying front-of-package (FOP) nutrition information type on parents' food product choices for children.	Quasi-experimental study; Bronze	USA; Community; Current parent to at least one or more children aged ≤ 15 years (n = 220)	Product labels	When the nutrient-specific system was used, the moderately healthy product was more likely to be selected than either the healthy or the unhealthy products (p < 0.001). Compared to the nutrient-specific system, the food group information system increases the likelihood that the healthy product will be selected (HR = 5.48, p < 0.01).
Sadacharan R, Grossman X, Matlak S, Merewood A. Hospital discharge bags and breastfeeding at 6 months data from the Infant Feeding Practices Study II. <i>J Hum Lact</i> . 2013;30(1):73 –79.	To determine whether receipt of four different types of hospital discharge bags was associated with exclusive breastfeeding during the first 6 months of life.	Cross-sectional survey; Bronze	USA; Hospital; Women with healthy term singleton babies (n = 2294)	Hospital discharge packs; Pricing (government-provided food coupons)	Women who received no bags were more likely to be exclusively breastfeeding at 10 weeks, compared to women who received a formula bag (OR = 2.2). Women who did not receive formula bags/coupon bags were significantly more likely to breastfeed exclusively for 6 months, compared to women who received formula bags/coupon bags (AOR = 1.6).
Barennes H, Empis G, Quang TD, Sengkhamyong K, Phasavath P, Harimanana A, et al. Breast-milk substitutes: a new old-threat for breastfeeding policy in developing countries. A case study in a traditionally high breastfeeding country. <i>PLoS one</i> . 2012; 7(2):e30634.	To assess the prevalence of, and factors influencing, the use of BMS for Lao children less than 6 months of age.	Cross-sectional survey; Bronze	Laos; Community; Mothers with infants aged < 24 months (n = 1057)	Product labels; Brands/ logos	26% Mothers had heard about BMS products from TV. 2.4% of mothers stated that advertising was the main reason that BMS was given before 6 months of age. 17.4% of mothers used BMS because of the perceived nutritional values.

Crawley H, Westland S. Fortified milks for children: a worldwide review of unregulated fortified milks aimed at children. First Steps Nutrition Trust. London 2013.	To consider the composition of fortified milk drinks sold for consumption by children over the age of 1 year, and their usefulness in the diets of children. Considers whether there is evidence for some of the claims made.	Literature review; Bronze	UK; Various (review); N/A	Advertisements; Promotions; Health claims	Significant marketing claims were found on almost all websites relating to growing-up milks, and increasingly on TV and web-based films and advertising, 'mummy blogs', Facebook and chat-based websites and displays and talks in public settings. Ingredients are often added to fortified milks because they have been isolated in human breast milk despite limited, or no, evidence that ingredients found in breast milk and added to milks for older children consuming a mixed diet have any benefits to health and well-being. The authors concluded that adverts were misleading consumers, such as on the amount of iron needed by toddlers, and many of the milk names themselves suggest claims.
Dykes F, Richardson-Foster H, Crossland N, Thomson G. 'Dancing on a thin line': evaluation of an infant feeding information team to implement the WHO Code of Marketing of Breast-Milk Substitutes. Midwifery. 2012;28:765-771	To conduct an in-depth evaluation of the Infant Feeding Information Team (IFIT) to implement the WHO Code in North West England.	Qualitative (interviews and focus groups); Bronze	United Kingdom; Health service/ Health professional; Healthcare staff - Infant Feeding Information Team (IFIT) members (n = 34 (focus groups); 68 (interviews))	Advertisements	Health-care staff face difficulties including being "constantly undermined through mixed messages and misleading product information" including "complementary foods being labelled as suitable from 4 to 6 months and the marketing of follow-on formula milk" and "implicit marketing of artificial milk displayed in hospital".
Nguyen PH, Menon P, Ruel M, Hajeerhoy N. A situational review of infant and young child feeding practices and interventions in Viet Nam. Asia Pac J Clin Nutr. 2011;20(3):359.	To document the patterns and trends in IYCF in Vietnam; to review the barriers and facilitators to IYCF practices in Vietnam; and to review policies and programs related to IYCF in Vietnam.	Non-systematic review of observational studies; Bronze	Vietnam; Community, Health service/ Health professional; Mothers of children aged < 24 months (n Not given)	Advertisements; Social marketing	Multiple marketing-related barriers to optimal IYCF practices were identified including DTCA in hospital ward and the mass media and hospital discharge packs. In one study, 98% women were exposed to mass media advertisements for infant formula and 53% decided to buy products after seeing commercial advertisement.
Sobel HL, Iellamo A, Raya RR, Padilla AA, Olive JM, Nyunt US. Is unimpeded marketing for breast milk substitutes responsible for the decline in breastfeeding in the Philippines? An exploratory survey and focus group analysis. Soc Sci Med. 2011;73(10):1445-1448.	To examine factors influencing decisions to formula feed infants, including mothers' recall of advertising messages, health professionals' recommendations, personal sales representation and other information sources in purposively selected disadvantaged communities in the Philippines.	Qualitative (focus groups and interviews); Bronze	Philippines; Community, Health service/ Health professional; Mothers of children aged < 24 months (n = 345 (survey); 38 (focus groups))	Advertisements; Promotions; Health claims; Relationship building	Children were more likely to be given formula if their mother recalled advertising messages (AOR = 2.0-2.2), or a doctor (AOR = 3.7), or mother or relative recommended it (AOR = 2.7). Those using formula were 6.4 times more likely to stop breastfeeding before 12 months.
Putthakeo P, Ali M, Ito C, Vilayhong P, Kuroiwa C. Factors influencing breastfeeding in children less than 2 years of age in Lao PDR. J Paediatr Child H. 2009; 45(9):487-492.	To assess the prevalence of breastfeeding and to evaluate the factors that influence its prevalence in Lao PDR.	Cross-sectional survey; Qualitative (interviews); Bronze	Lao PDR; Community; Mother of children aged < 2 years (n = 447)	Advertisements	75% of the mothers had watched more than ten advertisements for infant formula from Thailand, and 48.4% reported that such advertisements increased their interest in buying formula.

Schulze PA, Zhao B, Young CE. Beliefs about infant feeding in China and the United States: implications for breastfeeding promotion. Ecol Food Nutr. 2009;48(5):345-368.	To investigate the cultural differences in mothers' views regarding infant feeding and socialisation.	Cross-sectional survey; Bronze	China, USA; Child care centres; Mothers of children attending childcare centres (n = 55 US mothers; 72 Chinese mothers)	Social marketing	Mothers had similar socio-demographic characteristics and rates of mixed breast and bottle feeding, though Chinese mothers reported poorer health and lower education than American mothers. Chinese mothers using childcare had higher rates of exclusive breastfeeding (37%) compared to American mothers (18%).
Barennes H, Andriatahina T, Latthaphasavang V, Anderson M, Srour LM. Misperceptions and misuse of Bear Brand coffee creamer as infant food: national cross sectional survey of consumers and paediatricians in Laos. BMJ. 2008; 337(7671):679.	To investigate the use of Bear Brand coffee creamer as a food for infants and the impact on consumers of the logo of a cartoon baby bear held by its mother in the breastfeeding position.	Qualitative (interviews); Bronze	Laos; Community; General population of adults and paediatricians (n = 1023 adults; 26 paediatricians)	Product labels; Brand crossover promotion	19% reported giving the coffee creamer to infants; 96% believed that the can contained milk; 2% identified the contents correctly as coffee creamer.
Othman N. Infant feeding as perceived and practiced by families in Iraqi Kurdistan: a descriptive study. Kurdistan Academicians Journal. 2008;6(1).	To report on the practice of infant feeding in Kurdistan and the beliefs and attitudes behind this practice among the mothers and other influential family members.	Cross-sectional survey; Bronze	Iraqi Kurdistan; Community; Mothers, fathers and grandmothers of a child on breast milk or formula (n = 180)	Advertisements; Pricing	Mothers cited complementary feeding before 6 months due to messages on TV stated "they are good for baby"
Alabi G, Alabi J, Moses IS. Effects of the law on the marketing of infant foods in Ghana. Int Bus Econ Res J. 2007;6(6):61-78.	To determine how the implementation of the Breastfeeding Promotion Regulations 2000 in Ghana has affected both the promotion of commercial infant foods and mothers feeding options.	Cross-sectional survey; Bronze	Ghana; Health service/ Health professional, Community; Nursing mothers, health facilities, point-of-sale displays (n = 157 mothers; 90 health facilities; 153 POS)	Hospital discharge packs; Formula samples/coupons; Posters; Mailings/brochures; Social media; Books	Implementation of the WHO Code regulations was followed by substantial changes promotion of commercial infant foods and mothers feeding options after 6 years. Enhanced enforcement of the Regulation, awareness creation and further research into impact of the regulations and other infant feeding practices could result in significant gains in compliance.
Smith J. The contribution of infant food marketing to the obesogenic environment in Australia. Breastfeeding Rev. 2007;15(1):23-35.	To illustrate the likely links between the current increase in obesity and long term trends for increased artificial milk feeding of infants during the past 60 years, and to show that environmental factors, including the healthcare system and commercial marketing practices, have been important in shaping major change in infant feeding practices since the mid-1950s.	Non-systematic review of observational studies; Bronze	Australia; Literature review; N/A	Advertisements	The increasingly competitive market in commercial infant feeding products from the 1950s in Australia led to more aggressive product promotion, more usage of artificial baby milk, and less breastfeeding.
Cutler BD, Wright RF. The U.S. infant formula industry: is direct-to-consumer advertising unethical or inevitable? H Market Quart. 2002;19(3):39-55.	To advocate direct-to-consumer advertising of infant formula, and to provide recommendations to practitioners on how to go about this process.	Non-systematic review of observational studies; Bronze	USA; Various (review; Consumers, pharmaceutical companies, health professionals (n = N/A)	Market integration; Pricing; Advertisements; Relationship building; Hospital discharge pack	USA based infant formula companies have historically promoted their products 'ethically' by focusing on gaining a physician to parent recommendation for a brand of infant formula

Suleiman A. A study of marketing and its effect on infant feeding practices. Med J Malaysia. 2001; 56(3):319-323.	To determine whether the milk industry marketing strategies have affected the choice of infant feeding practice among mothers with children less than 5 years old visiting a private hospital antenatal clinic.	Qualitative (focus groups); Bronze	Malaysia; Community; Mothers whose last child was aged < 5 years (n = 50)	Advertisements; Hospital discharge packs; Promotions; Pricing; Market integration	12% of respondents felt that milk formula advertisements encouraged parents indirectly to buy milk formula for their babies below one year of age (though this is illegal in Malaysia). 9% of mothers chose a particular brand of milk because they were "attracted to TV advertisement". 46% received free milk samples, all from the health care facility on the day of discharge, of these women, 35% were influenced to buy a particular brand of milk formula.
Griffin CC, Popkin BM, Spicer DS. Infant formula promotion and infant-feeding practices, Bicol region, Philippines. American Journal of Public Health. 1984;74(9):992-997.	To document the availability of commercially produced BMSs, the extent of infant foods and formula companies' promotional activities in the medical sector, and the effects of those activities on both health professionals and mothers in the Bicol region of the Philippines.	Cross-sectional survey; Bronze	Philippines; Health service/ Health professional; Government, private and traditional health professionals; households with at least one child aged < 24 months (n = 1298 health professionals; 1903 households)	Pricing; Hospital discharge packs; Advertisements; Promotions	Mothers who received free formula samples at delivery experienced an increased likelihood of BMS use at 3, 6 and 9 months (p < 0.05; p < 0.01; p < 0.05). The receipt of free formula samples at birth did not affect the introduction of complementary foods at 3, 6, 9 and 12 months.
Greiner T, Latham MC. The influence of infant food advertising on infant feeding practices in St. Vincent. Int J Health Serv. 1982;12(1):53-75.	To examine the extent to which infant food advertising could be shown to measurably influence infant feeding practices.	Cross-sectional survey; Bronze	Caribbean; Community; Mothers of children aged 1-2 years (n = 200)	Advertisements; Promotions; Relationship building	19% of mothers reported that industry written baby books were their source of information on how to bottle feed. 68% of mothers who stated that they had seen or heard infant formula advertising said that the ads made them feel like they would want to try the product with their own babies (not statistically significant).

NQR

Euromonitor International. Global Packaged Food: Market opportunities for baby food to 2013. Euromonitor International Ltd, London 2008.	To summarise the global baby food and milk market in 2008.	Market review; NQR	Global; Market review; N/A	Market integration	Milupa has strong brand recognition. Offering several versions of the product, differentiated by age, makes it appear more scientific and nutritionally sophisticated.
Millennium Development Goals Achievement Fund. Ying Yang Bao: Improving complementary feeding for China's children-Draft. Case Report. Children, Food Security and Nutrition, United Nations, New York 2013.	To review the promotion experiences of micronutrient sachets "Ying Yang Bao (YYB)"	Grey literature (case study); NQR	China; Community, Health service/ Health professional; N/A	Social marketing with private sector advertisements/ promotions	Increased dietary diversity through micronutrient supplementation has resulted in decreased incidence of stunting, low weight, wasting and incidence of anaemia in various studies.

Abbreviations: AOR= Adjusted Odds Ratio; HR= Hazard Ratio; IYC= Infant young child; NQR= No quality rating; N/A= Not Applicable; BMS= breast milk substitute; NS= not statistically significant; CI= confidence interval; OR= odds ratio; WIC= Women Infants Children Program

Table 2: Studies reporting only behavioural outcomes of marketing: ordered by quality, most recent first

Citation	Objectives	Study Design; Quality rating	Country; Setting; Study Population, Sample Size	Marketing exposure category	Study outcome and effect estimate
Gold					
Perez-Exposito AB, Klein BP. Impact of fortified blended food aid products on nutritional status of infants and young children in developing countries. Nutr Revs. 2009;67(12):706-718.	To present an evaluation of published research on the efficacy and effectiveness of fortified blended foods (FBFs) used in humanitarian relief programs to improve the health and nutritional status of infants and young children with moderate malnutrition, or at risk of under-nutrition, in developing countries.	Systematic Literature Review (uncontrolled trials); Gold	Global; Various (review); N/A	Pricing (free or low-cost humanitarian aid)	Positive effects on recovery from moderate acute malnutrition and weight gain were observed when fortified blended foods were distributed as dietary supplements. One study assessed breast milk intake when corn-soy blend or ready-to-use fortified spreads was provided as complementary food for one month in infants aged 5.5–6.49 months but did not find any effect on breast milk intake. Evidence of the efficacy of fortified blended foods for improving nutritional outcomes is currently limited and weak.
Frank DA, Wirtz SJ, Sorensen JR, Heeren T. Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. Pediatrics. 1987; 80(6):845-854.	To assess the effects of commercial discharge packs and breastfeeding counselling on infant feeding practices	Randomised controlled trial; Gold	USA; Health service/ Health professional; Postpartum women who had breastfed at least once in hospital (n = 343)	Hospital discharge packs	Women who received the research discharge pack, compared with those who received the commercial pack, were more likely to prolong exclusive breastfeeding (p = 0.004), to be partially breastfeeding at 4 months postpartum (p = 0.04) and to delay the daily use of solid foods in the infant's diet (p = 0.017).
Silver					
Kong A, Odoms-Young AM, Schiffer LA, Kim Y, Berbaum ML, Porter SJ, et al. The 18-month impact of special Supplemental Nutrition Program for Women, Infants, and Children food package revisions on diets of recipient families. Am J Prev Med. 2014;46(6):543-551.	To examine the longer-term impact of the 2009 WIC food package change on nutrient and food group intake and overall diet quality among African American and Hispanic WIC child participants and their mothers/ caregivers.	Longitudinal study; Silver	USA; Community; Parent-child dyads - child was aged 2-3.5 years (n = 295)	Pricing (government-provided food or formula coupons)	After the food package revisions, African American children increased their energy intake (p = 0.003), Hispanic children decreased their fat intake by 10.5% (p = 0.002); decreased saturated fat by 15.3% (p = 0.0004); and increased in fibre by 17.1% (p = 0.03).
Odoms-Young AM, Kong A, Schiffer LA, Porter SJ, Blumstein L, Bess S, et al. Evaluating the initial impact of the revised Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food packages on dietary intake and home food availability in African-American and Hispanic families. Pub Health Nutr. 2014;17(1):83-93.	To assess the impact of the 2009 food packages mandated by the Special Supplemental Nutrition Program for WIC on dietary intake and home food availability in low-income African-American and Hispanic parent/child dyads.	Longitudinal study; Silver	USA; Community; Parent-child dyads - child was aged 2-3.5 years (n = 273)	Pricing (government-provided food coupons)	Energy intake increased in African-American children (mean change+728 kJ/day, p = 0.07) and approached significance among Hispanic children (mean change +378 kJ/day, p = 0.006). Dietary fibre consumption increased in Hispanic children (mean change +1g/4184 kJ, p = 0.05) Children drank more reduced-fat, low-fat and non-fat milk, (and less whole milk) at 6 months than at baseline (African-American children p = 0.02; Hispanic children p < 0.01).

Thornton HE, Crixell SH, Reat AM, Von Bank JA. Differences in energy and micronutrient intakes among Central Texas WIC infants and toddlers after the package change. J Nutr Edu Behav. 2014; 46(3 Suppl):S79-86.	To assess nutrient intakes after the Special Supplemental Nutrition Program for WIC package changes within an at-risk, majority Hispanic population of WIC infants and toddlers in Central Texas.	Longitudinal study; Silver	USA; Community; Children aged 4–24 months (n = 204)	Pricing (government-provided food coupons)	After the package revisions, usual energy intakes exceeded recommended levels for fewer infants (100% vs. 79% in excess of Estimated Energy Requirement), mean usual intake of vitamin D was below the Estimated Average Requirement for toddlers (6.54 vs. 10 mg - p=0.054). After the package revisions, most toddlers were below Estimated Energy Requirement (88% vs. 17% before changes).
Andreyeva T, Luedicke J, Tripp A, Henderson K. Effects of reduced juice allowances in food packages for the women, infants, and children program. Pediatrics. 2013;131(5):919.	To describe the changes in purchases of 100% juice and other beverages among WIC participants after the WIC revisions.	Before and after study (no control group); Silver	USA; Community; WIC participants (n = 2137 households)	Pricing (government-provided food coupons)	After changes in the allocation of government provided food coupons through the WIC program, WIC subsidised juice purchases fell by 43.5% of juice volume (95% CI 41.9%–45.1%). Total juice purchases declined by 23.5% (95% CI 21.4%–25.4%).
Zhang Y, Carlton E, Fein SB. The association of prenatal media marketing exposure recall with breastfeeding intentions, initiation, and duration. J Hum Lact. 2013; 29(4):500-509.	To measure exposure to different types of media marketing of infant formula and breastfeeding, and their effects on breastfeeding intentions, initiation and duration in the USA.	Longitudinal study; Silver	USA; Community, Health service/ Health professional ; Mothers from late gestation until 12 months postnatal (n = 1384 - 2530)	Advertisements; Hospital discharge packs	Exposure to infant formula information from print media was associated with shorter intended duration of exclusive breastfeeding, and formula information from websites was related to lower odds of both intended and actual initiation. Exposure to breastfeeding information from websites was related to higher odds of both intended and actual initiation and longer intended duration of any breastfeeding. Breastfeeding information from print media was associated with longer duration of any breastfeeding, but information from broadcast media was associated with shorter duration of any breastfeeding. These associations were all statistically non-significant.
Hamilton K, Daniels L, Murray N, White KM, Walsh A. Mothers' perceptions of introducing solids to their infant at six months of age: identifying critical belief-based targets to promote adherence to current infant feeding guidelines. J Health Psychol. 2012;17(1):121-131.	To investigate critical belief-based targets for promoting the introduction of solid foods to infants at 6 months.	Qualitative (interviews), Pre-post survey; Silver	Australia; Community; First time mothers (n = 375 (survey); 33 (interviews))	Product labels	Access to commercial baby foods that are suitable before 6 months was associated with earlier introduction of solid foods (p = 0.004)
Labiner-Wolfe J, Fein SB, Shealy KR. Infant formula—handling education and safety. Pediatrics. 2008;122 (Supplement 2):S85-S90.	To assess the extent to which mothers learn about proper handling of infant formula from health professionals and package labels.	Longitudinal study; Silver	USA; Community; Formula-feeding mothers (n = 1533)	Product labels	3% of mothers found the product label safety information difficult to understand, and 9% found the print size too small to read easily. Although 30% of the mothers did not read the package directions on what to do with leftover formula, 85% believed that it was very important for their infant's health to follow the label directions to refrigerate or discard prepared formula. 11.7% did not read directions for preparing infant formula.

Guilkey DK, Stewart JF. Infant feeding patterns and the marketing of infant foods in the Philippines. Econ Dev Cult Change. 1995;43(2):369-399.	To document and explore the nature and extent of infant formula marketing activities; to model and estimate the effect of marketing activities on the mother's feeding decision.	Longitudinal study; Silver	Philippines; Community; Women recruited during pregnancy, followed up every two months for first 2 years of child's life (n = 2800)	Advertisements; Hospital discharge packs	Those recalling a formula brand name during pregnancy were 3% less likely to exclusively breastfeed at 2 and 4 months. 20% of respondents received free formula samples, among whom breastfeeding was reduced by 3.5% by age 6 months.
Bronze					
Reat AM, Crixell SH, Friedman BJ, von Bank JA. Comparison of food intake among infants and toddlers participating in a South Central Texas WIC Program reveals some improvements after WIC package changes. Mat Child Health J. 2015.	To compare the diet and feeding practices among a majority-Hispanic population of infants and toddlers participating in a WIC clinic in south central Texas before and after the changes to food packages.	Cross-sectional survey; Bronze	USA; Community; Infants and toddlers aged 4–24 months participating in a WIC clinic in 2009 and in 2011 (n = 84)	Pricing (government-provided food coupons)	After WIC package changes, the age of introduction of complementary foods was delayed by two weeks (p = 0.05), the average breastfeeding duration was four weeks shorter (NS), and formula was introduced ten weeks later (p < 0.05).
Rodriguez-Oliveros MG, Bisogni CA, Frongillo EA. Knowledge about food classification systems and value attributes provides insight for understanding complementary food choices in Mexican working mothers. Appetite. 2014;83:144-152.	To determine the classification, attributes, and mothers' consumption/preparation routines of key complementary food.	Cross-sectional survey; Qualitative (focus groups); Bronze	Mexico; Community; Mothers of children aged < 2 years (n = 44 (survey); 12 (focus groups))	Product labels; Brands/ logos	Mothers used at least three different dimensions or criteria when classifying the key foods: food groups, food introduction stages, and food processing (branded foods). Fruits and vegetables were described as natural foods, while Danonino®, yogurt, and Gerber®, among other foods were classified as "packaged" or processed products.
Diaz-Ramirez G, Jimenez-Cruz A, Souto-Gallardo Mde L, Bacardi-Gascon M. Effect of the exposure to TV food advertisements on the consumption of foods by mothers and children. J Pediatr Gastr Nutr. 2013;56(1):86-88.	To evaluate the frequency with which food advertisements are aired during adult programming of two Mexican TV public broadcast channels, and to assess the association between the foods advertised and the ones consumed by mothers and their children.	Descriptive study; Qualitative (interviews); Bronze	Mexico; Community, Content analysis results; Mothers of children aged 8 months to 5 years (n = 365)	Advertisements	75% of advertised foods were unhealthy. An association was observed between the recalled food advertisements and the frequency of TV food advertisements (rho = 0.44). There was a positive association between the frequency of the foods advertised on TV and the consumption of these by children (r = 0.66, p = 0.0001).
Magnani R, Gevorgyan A, Kurz K. Market analysis of complementary foods in Nepal. Global Nutrition (CRSP) Research Briefing Paper no. 12. Nutrition Collaborative Research Support Program. Boston 2012.	To examine the potential for production and consumption of Processed Fortified Complementary Foods (PFCF).	Qualitative (focus groups); Bronze	Nepal; Community ; a) Healthcare and aid agency workers b) Mothers of children aged < 2 years c) Grandmothers of children aged < 2 years (n = 127 healthcare and aid agency workers; 37 mothers; 22 grandmothers)	Pricing (free or low-cost humanitarian aid)	Complementary foods, with the exception of Nestlé's Cerelac, were generally considered to have a bad taste and sometimes were not palatable by their children, and were expensive, though carers valued them for their medicinal and nutritional qualities. Urban mothers and grandmothers were more likely to feed PFCF than those in per-urban or rural areas.

Roche ML, Creed-Kanashiro HM, Tuesta I, Kuhnlein HV. Infant and young child feeding in the Peruvian Amazon: the need to promote exclusive breastfeeding and nutrient-dense traditional complementary foods. <i>Matern Child Nutr.</i> 2011;7(3):284-294.	To understand the role of traditional Awajún foods in dietary quality and the potential impacts on growth of Awajún infants and young children 0–23 months of age.	Qualitative (interviews and focus groups); Cross-sectional survey; Bronze	Peru; Community; Mothers with children aged < 2 years (n = 32)	Advertisements; Product labels; Social marketing	There was variation in breastfeeding and complementary feeding practices among the mothers. Many market foods, including evaporated milk, arrive in colourful packaging and often include posters or advertising for the shops selling these items. Canned evaporated milk was donated to families through the government 'Glass of Milk' program; though intended for infants and children > 6 months, 25% received [canned evaporated] milk before 6 months.
Soekarjo D, Zehner E. Legislation should support optimal breastfeeding practices and access to low-cost, high-quality complementary foods: Indonesia provides a case study. <i>Matern Child Nutr.</i> 2011;7 Suppl 3:112-122.	To identify legislative and policy requirements for supporting breastfeeding and enabling appropriate access to high-quality CFS for children 6–24 months of age.	Non-systematic review of observational studies; Bronze	Indonesia; Various (review); N/A	Social marketing with private sector advertisements & promotions; Pricing	Women whose birth was attended by a health professional were less likely to initiate breastfeeding early and more likely to use pre-lacteal feeds. There are multiple reports of retail level promotion of infant formula, follow-up formula and complementary foods for infants under 6 months. The rate of exclusive breastfeeding for children less than 6 months of age is just 32.4%, and continued breastfeeding at 2 years is 50.3%.
Tripp K, Perrine CG, de Campos P, Knieriemen M, Hartz R, Ali F, et al. Formative research for the development of a market-based home fortification programme for young children in Niger. <i>Matern Child Nutr.</i> 2011;7(Suppl. 3):82-95.	To assess the acceptability of a micronutrient powder (Sprinkles®) and a lipid-based nutrient supplement (Nutributter®), and to explore people's willingness to pay for these products in a resource-poor context like Niger.	Qualitative (interviews and focus groups); Bronze	Nigeria; Health service/ Health professional; Mothers, fathers and grandmothers of children aged 6–23 months (n = 232 mothers; 130 fathers; 147 grandmothers (focus groups))	Healthcare advice	The products were highly acceptable to adults and most children and adults expressed willingness to purchase the products in the future.
Bruyeron O, Denizeau M, Berger J, Trèche S. Marketing complementary foods and supplements in Burkina Faso, Madagascar, and Vietnam: lessons learned from the Nutridev program. <i>Food Nutr Bull.</i> 2010;31(Supplement 2):154-167.	To review the experiences of programs producing and marketing fortified complementary foods and to report on the feasibility of local production and marketing of fortified complementary foods to increase usage of high-quality foods among children of low-income families in a self-sustaining manner.	Cross-sectional survey; Bronze	Burkina Faso, Madagascar, Vietnam; Health service/ Health professional; Children aged 6-24 months (n Not given)	Market access; Relationship building; Promotions	Nutridev experience in Vietnam, Madagascar, and Burkina Faso demonstrates that it is possible to produce affordable, high-quality complementary foods and supplements locally in developing countries. Strategies to make products readily available to the targeted population and to convince this population to consume them yielded mixed results, varying greatly based on the strategy utilised and the context in which it was implemented.
Hurley KM, Black MM. Commercial baby food consumption and dietary variety in a state-wide sample of infants receiving benefits from the special Supplemental Nutrition Program for Women, Infants, and Children. <i>J Am Diet Assoc.</i> 2010;110(10):1537-1541.	To examine the prevalence of fruit and vegetable commercial baby food consumption and its relation to dietary variety during infancy.	Cross-sectional survey; Bronze	USA; Community; Mothers and infants who are WIC recipients (n = 733)	Pricing (government-provided food coupons)	After amendment of government-provided food coupon packages through the WIC program, there was a non-significant trend for infants 6 to 12 months who received commercial baby food to consume less white potatoes (14% vs. 22%) and higher dark-green (6% vs. 5%) and deep-yellow (35% vs. 10%) vegetables.

Daelmans B, Martines J, Saadeh R. Special issue based on a World Health Organization expert consultation on complementary feeding. Food Nutr Bull. 2003;24(1):1-144.	To provide an update to the 1998 WHO/ UNICEF report on complementary feeding.	Non-systematic review of observational studies; Bronze	Global; Various (review); N/A	Social marketing	The effect of complementary feeding interventions on growth is variable and probably depends on the types of foods promoted, the target age range, the initial nutritional status of the infants, and the degree to which other nutrition and health messages are included in the program. When interventions include an emphasis on breastfeeding (particularly exclusive breastfeeding for the first 6 months), not just improved complementary foods, a growth effect is more likely to be observed.
Ukwuani FA, Suchindran CM, Cornwell GT. Influences of mother's work, childhood place of residence, and exposure to media on breast-feeding patterns: experience of Nigeria and Uganda. Soc Biol. 2001;48(1/2):1-20.	To examine the implications of mother's work, childhood place of residence, and exposure to the media for breastfeeding patterns (exclusivity and intensity) in Nigeria and Uganda.	Cross-sectional survey; Bronze	Nigeria, Uganda; Community; Women aged 15-49 years who had at least one child (n = 5422 Nigerian children; 4258 Ugandan children)	Advertisements	Watching TV at least once a week and listening to the radio at least once a week were associated with increased number of children given formula or milk (both $p < 0.001$). Watching TV at least once per week was associated with reduced number of times breastfed during the day in both Nigeria ($p < 0.05$) and Uganda ($p < 0.10$). Listening to the radio at least once per week was associated with reduced number of times breastfed during the day in Uganda ($p < 0.05$).
Bruce RC, Kliegman RM. Hyponatremic seizures secondary to oral water intoxication in infancy: association with commercial bottled drinking water. Pediatrics. 1997;100(6):4.	To describe the cases of two infants treated at [a hospital] or hyponatremic seizures and water intoxication after being fed with the same bottled drinking water product marketed for use in infants.	Case series Bronze	USA; Health service/ Health professional; Patients aged <1 year admitted with diagnosis of hyponatremia and seizure (n = 25)	Product labels	As well as two cases of infants treated for hyponatremic seizures and water intoxication after being fed with the same bottled drinking water product marketed for use in infants, of 25 consecutive cases of hyponatraemic seizures in infants found in medical records, all had been fed at least one form of solute-free water (but only 'infant' water in 2 cases).
Vitzthum VJ. Infant nutrition and the consequences of differential market access in Nunoa, Peru. Ecol Food Nutr. 1992;28(1-2):45-63.	To analyse infant feeding behaviour in a rural Andean community.	Qualitative (interviews); Bronze	Peru; Community; Nuñoa women with current child aged < 3 years (n = 30)	Market access	Children co-slept, weaning periods were extended and feeding routines continually modified. In those who had used bottle feeding, the mean age of first solids (12.6 ± 5.7 months) was similar to those in whom bottle feeding was never used (13.8 ± 4.1 months); the average anticipated duration of day nursing was five months less for those who used bottle feeding (22.9 vs. 17.9 months)
Gilly MC, Graham JL. A macroeconomic study of the effects of promotion on the consumption of infant formula in developing countries. J Macromarketing. 1988;8(1):21.	To discuss some causal links between promotion of infant formula advertising and its consumption.	Non-systematic review of observational studies; Bronze	Global; Food import data; Imports data 1972-1972 and 1976-1978 (n = 79 developing countries)	Advertisements; Promotions; Market integration	Consumption of infant formula was found to be positively related to changes in industry promotional efforts ($p < 0.05$)

NQR					
Porter R, Shafritz L. Packaged foods for complementary feeding: marketing challenges and opportunities. Linkages Project, Academy for Educational Development. Washington, DC 1999.	To establish guidelines relevant to policy and program managers in donor and government agencies for the development and marketing of a packaged complementary food.	Grey literature (case study); NQR	Global; Community; N/A	Social marketing; Brands/logos; Pricing	Commercial sale of packaged foods should not substitute for other essential nutrition services, and avoid packaged foods substituting for more appropriate local foods, or draining away scarce development dollars. The study concluded that nutritious, low cost, packaged foods offer a potentially attractive alternative to many of the first foods traditionally given to older infants. Recognising both marketing challenges and opportunities the study sought to establish guidelines for policy and program managers in donor and government agencies for the development and marketing of a packaged CF.

Abbreviations: AOR= Adjusted Odds Ratio; HR= Hazard Ratio; IYC= Infant young child; NQR= No quality rating; N/A= Not Applicable; BMS= breast milk substitute; NS= not statistically significant; CI= confidence interval; OR= odds ratio; WIC= Women Infants Children Program

Table 3: Studies reporting only attitudinal outcomes of marketing: ordered by quality, most recent first

Citation	Objectives	Study Design; Quality rating	Country; Setting; Study Population, Sample Size	Marketing exposure category	Study outcome and effect estimate
Silver					
Dickinson R, Gunter B, Matthews J, Cole J. The impact of amended controls on the advertising of infant formula in the UK: Findings from a before and after study. Int J Health Promot Educ. 2013;51(1):11-22.	To assess whether the new controls on the way in which follow-on formula is presented and advertised in the UK have been effective in making clear to parents/parents-to-be and carers that advertisements for follow-on formula are meant only for babies over 6 months and are not perceived or confused as infant formula advertising, which is prohibited.	Before and after study (no control group); Silver	United Kingdom; Content analysis; All media in the UK, point-of-sale displays (n = 93 advertisements)	Advertisements	Compared to product labels of UK follow on formula product before 2007, in 2008-2009 there was greater age of use recommendation on pack shots in the advertisements, a statement on the superiority of breastfeeding appeared more often, there was a doubling in the use of emotion-promoting themes known to enhance product recall and trigger positive attitudes. The study found advertisements for follow-on formula were perceived or confused as infant formula advertising (which is prohibited) with 66.8% respondents reporting that they had seen a formula product suitable for use from birth advertised.
Stewart JF, Guilkey DK. Estimating the health impact of industry infant food marketing practices in the Philippines. J Dev Stud. 2000;36(3):50-77.	To look at the causal relationship between marketing of infant formula and other commercial feeding products and infant health outcomes	Longitudinal study; Silver	Philippines; Community; Mothers of infants aged 2-6 months (n = 2890)	Advertisements; Hospital discharge packs; Social marketing	The effect of marketing for the Cebu sample was, to a large extent, to cause a switch between the patterns of breastfeeding supplemented with indigenous "other" food to patterns of breastfeeding supplemented with commercial feeding products. 90% of respondents named a brand of infant formula when asked what types of foods might be fed to an infant.
Bronze					
Bylaska-Davies P. Exploring the effect of mass media on perceptions of infant feeding. Health Care Women Int. 2015;0:1-15.	To explore (a) types of mass media identified by women for context, visual message, and positive or negative influence on their breastfeeding decisions; and (b) other contributing factors associated with breastfeeding decisions that could be incorporated into mass media images/messages.	Qualitative (interviews); Descriptive study; Bronze	USA; Community; Pregnant and postpartum women (n = 20)	Hospital discharge packs; Formula samples/coupons; Mailings/brochures; Posters; Social media; Books	Text and visual representation of infant feeding on 12 relevant Internet sites identified by the women were concluded to present a deterrent to breastfeeding.

Prak S, Dahl MI, Oeurn S, Conkle J, Wise A, Laillou A. Breastfeeding trends in Cambodia, and the increased use of breast-milk substitute-why is it a danger? Nutrients. 2014;6(7):2920-2930.	To provide information on the trends in infant feeding practices, including the provision of BMS to infants and young children and the use of bottles, among different population subgroups in Cambodia, using nationally collected surveillance data.	Cross-sectional survey; Bronze	Cambodia; Community; Infants < 2 years (n = 15,000 households)	Advertisements; Brand crossover promotion	In urban areas, the use of BMS use nearly doubled among children 6–23.9 months from 2005 to 2010, however there was no change in rural areas and the poorest quintile over this period. These trends may be the result of increased promotion of follow-on milk. Misleading pictures idealising formula and lack of appropriate written instructions on imported brands in Khmer may be leading to low levels of understanding causing inappropriate use of BMS.
Wu L, Yin S, Xu Y, Zhu D. Effectiveness of China's organic Food Certification Policy: consumer preferences for infant milk formula with different organic certification labels. Can J Agr Econ. 2014; 62(4):545.	To use consumers' willingness to pay as a criterion for judging the effectiveness of China's organic certification policy.	Discrete choice experiment; Bronze	China; Community; Adults who had purchased infant milk formula (n = 1350 (survey); 81 (focus groups))	Product labels	Organic certification label was more important than brand or country of origin for consumers in China. Consumers' knowledge regarding organic food and their food safety risk perceptions has an impact on the willingness to pay for infant milk formula with different organic certification labels.
Parry K, Taylor E, Hall-Dardess P, Walker M, Labbok M. Understanding women's interpretations of infant formula advertising. Birth. 2013;40(2):115-124.	To explore how women interpret infant formula advertising to aid in understanding the association between exposure to infant formula marketing and supplementation and premature cessation.	Qualitative (focus groups); Bronze	USA; Health service/ Health professional; Preconception, pregnant, exclusive breastfeeders, and formula feeding women (n = 34)	Hospital discharge packs; Advertisements; Promotions; Social marketing	After exposure to infant formula advertising in health care settings, women expressed doubt about the superiority of their own human milk, regarded infant formula as a clinical solution to normal infant issues, and believed that infant formula is now very much like human milk.
Pelto GH, Armar-Klemesu M, Siekmann J, Schofield D. The focused ethnographic study 'assessing the behavioral and local market environment for improving the diets of infants and young children 6 to 23 months old' and its use in three countries. Matern Child Nutr. 2013;9 (S1) :35-46.	To describe the focused ethnographic study (FES) tool that GAIN has developed and its application in three countries.	Qualitative (interviews); Bronze	Ghana, South Africa, Afghanistan; Community; Caregivers with a child aged 6-23 months (n = N/A)	Product labels; Brands/ logos	Afghanistan: commercial products appear to be replacements for traditional complementary foods however cultural concept of 'special foods for infants' is not strong. South Africa: mothers appear to be unaware of any nutrient deficiencies in their IYCs and do not appear to perceive a need for added nutrients. Ghana: Women placed a high value on breastfeeding and breast milk and did not see cereals as alternatives for breast milk; traditional cereal-based foods were regarded as the least healthy food (unless prepared with milk), whereas commercial cereal-based foods (branded products), particularly the Nestlé product, Cerelac, were regarded as very healthy.
Sweet L, Jerling J, Van Graan A. Field-testing of guidance on the appropriate labelling of processed complementary foods for infants and young children in South Africa. Matern Child Nutr. 2013;9 Suppl 1:12-34.	To field-test the Maternal, Infant and Young Child Nutrition Working Group's Draft Guide for Marketing Complementary Foods as a potential tool for use by manufacturers and national governments for guiding the appropriate labelling of complementary foods.	Cross-sectional survey; Bronze	South Africa; Community; Product labels of commercial complementary foods (n = 260)	Product labels; Brands/logos; Health claims; Brand crossover promotion	20% of labels were found to have evidence of brand stretching to infant or follow-on formula. In 63.8% of the labels the product label was not considered easy to read.

Berry NJ, Jones SC, Iverson D. Toddler milk advertising in Australia: infant formula advertising in disguise? AMJ. 2012;20(1):24-27.	To investigate whether the perception that toddler milk advertising promotes infant formula is prevalent amongst Australian parents.	Quasi-experimental study; Bronze	Australia; Community; Parents of a child aged < 5 years, or who were expecting a child (n = 439)	Product labels; Health claims	Amongst parents of children < 5 years old or who were expecting a child, brand identifiers link toddler milk so strongly to the same brand of infant formula that respondents believed that they had seen advertisements for infant formula products even though most of them could not have.
Berry NJ, Jones SC, Iverson D. Relax, you're soaking in it. Sources of information about infant formula. Breastfeed Rev. 2011;19(1):9-18.	To investigate what mothers and those who influence mothers know about formula milk products.	Qualitative (interviews and focus groups); Bronze	Australia; Community; Child and family health nurses, general practitioners, dieticians (n = 19)	Advertisements	Only 1/19 participants successfully identified product as toddler milk. A number of respondents said that they or mothers they know chose their infant formulas based on the brand they had seen used in maternity hospitals.
Harris JL, Thompson JM, Schwartz MB, Brownell KD. Nutrition-related claims on children's cereals: what do they mean to parents and do they influence willingness to buy? Public Health Nutr. 2011; 14 (12):2207-2212.	To examine parents' beliefs about the meaning of common front-of-package nutrition-related claims on children's cereals and determine whether the claims would make them more willing to buy the cereals.	Cross-sectional survey; Bronze	USA; Community; Parents with children aged 2-11 years (n = 306)	Product labels; Health claims	Parents who indicated that the claims increased their willingness to buy the cereals were significantly more trusting of front-of-package labels for all claims, except organic (p < 0.0001). Product labels with health claims increased parents' willingness to buy: 'fibre' (50%); 'Immunity' (46%); 'Wholegrains' (49%).
Berry NJ, Jones S, Iverson D. It's all formula to me: women's understandings of toddler milk ads. Breastfeed Rev. 2010;18(1):21.	To investigate how women expecting a first baby perceived print advertisements for 'toddler milks' in order to determine whether they function as indirect advertising for infant and follow-on formula.	Qualitative (interviews); Bronze	Australia; Community; Women pregnant with their first child (n = 15)	Advertisements; Product labels; Brands/ logos; Brand crossover promotion	Only 3/15 respondents correctly identified that the product was suitable for 'toddlers' on first reading. All but one mother commented that they would ordinarily not have read far enough into the advertisement to have discovered that the advertisements were not promoting infant formula. All mothers expressed the view that 'formula' products would be properly used in place of breastfeeding. All but 3 respondents accepted the claims made by these advertisers.
Wojcicki JM, Gugig R, Kathiravan S, Holbrook K, Heyman MB. Maternal knowledge of infant feeding guidelines and label reading behaviours in a population of new mothers in San Francisco, California. Matern Child Nutr. 2009;5(3):223-233.	To evaluate the relationship between maternal nutrition knowledge and attitudes and a number of socio-demographic variables including socioeconomic status and WIC participation.	Cross-sectional survey; Bronze	USA; Health service/ Health professional; New mothers (n = 363)	Product labels	Higher maternal nutrition knowledge (defined as answering all four nutrition questions correctly) was associated with higher income levels defined as greater than or equal to \$25 000/year, (OR 10.03 95% CI 1.51-66.74), and in linear models, higher nutritional knowledge was associated with having more children (p < 0.01), a higher income (p = 0.01) and not being a WIC participant (p < 0.01). Mothers with higher incomes were also more likely to read product nutritional labels OR 4.24, 95% CI (1.24-14.51), compared with mothers with lower incomes as were mothers with higher education levels OR 3.32, 95% CI (1.28-8.63).

McInnes RJ, Wright C, Haq S, McGranachan M. Who's keeping the code? Compliance with the international code for the marketing of breast-milk substitutes in Greater Glasgow. Public Health Nutr. 2007;10(7):719-725.	To evaluate compliance with the World Health Organization's International Code of Marketing of BMSs in primary care, after the introduction of strict local infant feeding guidelines.	Cross-sectional survey; Bronze	United Kingdom; Health service/ Health professional; Community-based health professionals (n = 669)	Hospital discharge packs; Advertisements; Promotions	The study found that contact between personnel from primary care and BMS companies was minimal and generally unsolicited. Free samples of BMS or feeding equipment were rare but childcare or parenting literature was more prevalent. One-third of facilities were still displaying materials non-compliant with the Code, with the most common materials being weight conversion charts and posters. Due to the high level of bottle feeding in Glasgow, primary-care staff stated a need for information about BMS.
NOP World for Department of Health. Attitudes to feeding. Report of survey findings. UK Crown, London 2005.	Not stated by authors but inferred to be: to determine attitudes and behaviours of infant feeding amongst pregnant women and women with infants up to 12 months old	Cross-sectional survey; Bronze	UK; Community; Women pregnant or with a child aged < 12 months (n = 2000)	Advertisements	67% of women had heard or seen an advertisement for "formula milk", of which 57% said it was follow-on formula and 58% for infant formula. 24% of women saw no difference between infant formula and follow-on formula, and 16% didn't know. About 60% of those aware of both these types of formula thought there is a difference between them, so 4 out of 10 women who are aware of both do not know they are different. 1% would give follow-on formula at < 3 months but 5% considered it OK for 3-6 months. 14% would give at 12 months or more and 21% didn't know. The report concluded that awareness of both infant formula and follow on formula is high.
TNS Social Research. A qualitative consumer study related to food labelling of infant foods. A TNS Social Research report prepared for Food Standards Australia New Zealand Canberra, Australia 2004 April.	To explore how primary caregivers make decisions around the introduction of solids process, the influence of current labelling on these decisions; and to assess alternate labelling options for minimum age suitability of infant foods that will ensure appropriate implementation of public policy in both Australia and New Zealand.	Qualitative (focus groups); Bronze	Australia, New Zealand; Community; First-time mothers and those with more than one child (n = 36)	Product labels	Food label information was regarded as helpful in the selection of infant foods once solids have been first introduced, but the label had little if any influence on the decision to start solids (usually with rice cereal). Label information became much more useful when parents began to regularly buy infant foods, and to assist them in the transition to more textured foods. Most mothers perceived labelling from 4-6months to indicate foods should be introduced towards the start of this period.
Greenaway A, Larner W, Le Heron R. Reconstituting motherhood: milk powder marketing in Sri Lanka. Environ Plan D. 2002; 20(6):719-736.	To describe the shape and marketing of the Sri Lankan milk powder market.	Qualitative (interviews); Bronze	Sri Lanka; Community, Industry; New Zealand Dairy Board and Movement of Mothers to Combat Malnutrition employees, Sri Lankan mothers (n unclear)	Health claims; Social marketing; Relationship building	The study found that "clearly the trust of mothers ... is deliberately cultivated", this drew on a discourse of science and technology, with advertisements building 'trust in the particular product by emphasising the guarantee of quality'.

Sanogo D, Masters WA. A market-based approach to child nutrition: mothers' demand for quality certification of infant foods in Bamako, Mali. Food Policy. 2002;27(3):251-268.	To analyse the potential impact of introducing quality certification to the market for infant foods in a very low-income country, where malnutrition is widespread.	Discrete choice experiment; Bronze	Mali; Community; Mothers with young children (n = 250)	Product labels	The average mother would trade 455g of unbranded uncertified product for 400g of unbranded product with quality certification. Mothers would pay to have product processed and would trade 585g ingredients for 400g of unbranded processed product.
Nguyen TS, Barracough S, Morrow M, Trung DQ. Controlling infant formula promotion in Ho Chi Minh City, Vietnam: barriers to policy implementation in the health sector. Australian Journal of Primary Health. 2000;6(1):27-36.	To investigate the extent to which central government directives and the Prime Ministerial decrees (Vietnam's implementation of the WHO Code) have been implemented in health facilities and the attitudes of health professionals towards formula use and the decree in Vietnam.	Qualitative (observations and interviews); Bronze	Vietnam; Health service/ Health professional; Health professionals (n = 22)	Advertisements; Promotions; Brands/ logos; Pricing; Hospital discharge packs	Results suggest gifts and inducements are commonplace, awareness of the content of the Code is low, and there is considerable resistance to its provisions, based on financial considerations as well as ambivalence about the merits of breastfeeding. Health staff "feared that restrictions on the trading and advertising of BMS would reduce their income since they received gifts from milk formula companies" and felt that "presentations of formula marketing staff were 'useful for mothers'". "Several acknowledged feeling a sense of obligation to the companies". "17/22 health workers agreed that trading and advertising of formula in health facilities could undermine breastfeeding promotion." "Inducements offered by formula companies were attractive to poorly paid staff"; 20/22 opposed prohibition of sponsorship of medical seminars because government support is inadequate" but that felt that measures were required to prevent 'inappropriate influence' on health facilities. "Several claimed that infant health was at risk only when formula was not properly prepared".
Valaitis RK, Sheeshka JD, O'Brien MF. Do consumer infant feeding publications and products available in physicians' offices protect, promote, and support breastfeeding? J Hum Lact. 1997;13(3):203-208.	To determine if consumer infant feeding publications and products distributed by physicians' offices protect, promote, and support breastfeeding.	Cross-sectional survey; Bronze	Canada; Health service/ Health professional; Infant feeding promotional material in physicians' offices (n = 127 office practices)	Hospital discharge packs; Promotions	Of the 127 physicians' offices surveyed, a majority accepted and routinely distributed publications and products which do no "protect, promote and support" breastfeeding. Pamphlets produced by manufacturers of infant formula, food and bottles were generally distributed twice as frequently (68% physicians' offices) as those produced by government and non-profit organisations (33.1%) p < 0.001. When physicians and hospitals distribute formula and other baby products, they provide unintended endorsements and convey the message that bottle feeding is the norm.

NQR

Klaus B, Gherardini M. Hidden advertising: Italian Antitrust Authority fined economic operator for misleading advertising of a powdered milk and baby bottle displayed in a weekly magazine. European Food and Feed Law Review. 2014;9(2):130.	To describe an incident in which 'three economic operators' were fined for hidden advertising of baby milk and a baby bottle displayed in a weekly magazine.	Grey literature (case study); NQR	Italy; Magazine article; N/A	Advertisements	The advertisement was found to indirectly promote a powdered milk for babies. It had a promotional effect as it was the substantial purpose of the article itself and was therefore likely to affect the economic behaviour of consumers.
Quinn V, Zehner E, Scholfield D, Guyon A, Huffman S. Using the Code of Marketing of Breast-milk Substitutes to guide the marketing of complementary foods to protect optimal infant feeding practices. Global Alliance for Improved Nutrition (GAIN), Geneva, Switzerland 2010.	This working paper is intended to assist commercial enterprises, relevant government offices, and other interested groups to appropriately market complementary foods and supplements in a manner that promotes and supports optimal breastfeeding during the first two years of life.	Policy guidelines; NQR	Global; Various; N/A	Advertisements; Promotions; Product labels; Brands/ logos; Brand crossover promotion; Hospital dis-charge packs; Pricing; Health claims; Social marketing; Market integration; Relationship building; Violations of food safety standards; Pricing (government-provided food or formula coupons)	This study provides guidance on the marketing of CF to protect optimal infant feeding practices, including not increasing the risk of early cessation of exclusive breastfeeding or the displacement of breastfeeding after 6 months of age. In particular it discusses labelling, advertising to the general public and complementary foods and supplements within the health care system.

Abbreviations: AOR= Adjusted Odds Ratio; HR= Hazard Ratio; IYC= Infant young child; NQR= No quality rating; N/A= Not Applicable; BMS= breast milk substitute; NS= not statistically significant; CI= confidence interval; OR= odds ratio; WIC= Women Infants Children Program

Annex J: Baby Food, 1999-2013, sales of top ten companies

Ranked by sales value in 1999	\$US million	\$US million
Nestlé SA	4,402.5	13,270.5
Bristol-Myers Squibb Co/Mead Johnson Nutrition Co ¹	2,912.9	-
Abbott Laboratories Inc	2,016.0	3,687.4
Royal Numico NV/Danone ²	1,810.7	0.0
Nestle/Novartis AG ³	1,263.9	0.1
Heinz Co, HJ	1,094.2	1,755.1
Nestle/Wyeth ⁴	767.8	-
Danone, Groupe	725.2	7,669.9
Hipp GmbH & Co Vertrieb KG	533.5	916.9
East Asiatic Co Ltd, The	424.3	-

Ranked by sales in 2013	\$US million	\$US million
Nestlé SA	4,402.5	13,270.5
Danone, Groupe (Royal Numico)	725.2	7,669.9
Mead Johnson Nutrition Co	0.4	5,836.6
Abbott Laboratories Inc	2,016.0	3,687.4
Heinz Co, HJ ⁵	1,094.2	1,755.1
Hangzhou Beingmate Group Co Ltd	25.4	1,496.3
Royal FrieslandCampina NV	-	1,014.8
Biostime International Holdings Ltd	-	956.8
Hipp GmbH & Co Vertrieb KG	533.5	916.9
Yashili International Holdings Ltd	-	867.0
Progress OAO	54.2	777.6
Total world sales	23,868.3	58,045.8

¹ BMS owned Mead Johnson Nutrition Co but spun off in 2009 as an independent firm, main product [Enfamil](#).

² Danone took over Royal Numico in 2007, main brands are Nutricia, Milupa, Mellin, [Cow & Gate](#), and [Dumex](#) Early Life Nutrition, also Blédina, Laboratoire Gallia, Malyutka, Bebelac, Karicare, Nutrilon –Aptamil, SGM

³ In 2007, Novartis sold the Gerber Products Company to Nestlé

⁴ In 2012, Nestlé bought the infant nutrition division of Pfizer and renamed it as Wyeth Nutrition: Wyeth Milk Products: Prenatal:Materna, Wyeth ProMAMA; Hospital S-26 HMF, S-26 LBW GOLD, ;First Age S-26, S-26 Gold, Bonna, Second Age, Bonamil, Promil, Promil Gold; Third Age (Stage 3), Bonakid, Progress Gold, Promil Kid, Fourth Age (Stage 4), Bonakid Pre-School, Promil Pre-School

Progress Pre-School Gold, Special Feeder, Nursoy, Procal Lactose-Free, Promil Lactose-Free, Promise Lactose-Free, S-26 Lactose-Free, Adult, Enerc

⁵ In 2015 merged with Kraft. Kraft Heinz Company is expected to be the fifth largest food company in the world

Annex K: Humanitarian programs and the Women Infants and Children (WIC) program

Traditional local foods fed to infants and young children may be inadequate, or poverty or resource scarcity may limit the supply and distribution of appropriate complementary foods (Porter 1999). Protein-energy malnutrition and iron deficiency become more common after 6 months. Ready-to-use foods (RUF) such as lipid-based nutrient supplements (LNS), fortified blended foods (FBF), or micronutrient powders (MNP) mixed with home-prepared complementary foods, may have a role to play in preventing and treating infant and childhood malnutrition in these populations (Dewey 2008; Magnani 2012; Perez-Exposito 2009). By distributing free or subsidised products and through social marketing, governments and private-public partnerships endorse and promote these products through food and nutrition programs.

Mixed or positive results from industry driven RUF marketing and distribution have been found in several studies (Sun 2011, Wu 2014, Pelto 2013, Bruyeron 2010). However the benefit of the products (and therefore the marketing which promotes their consumption) depends on the adequacy of traditional diets and whether the children continue breastfeeding maintaining the same breast milk intake. Roche and colleagues noted that traditional Peruvian complementary foods may be inadequate in vitamin A, calcium, iron and zinc, but are likely to be adequate if combined with continued breastfeeding (Roche 2001). In well-nourished or undernourished populations with otherwise adequate diet, promoting consumption of RUF may lead to unnecessary or even excessive nutrient intake, or reduced breast milk intake.

Where appropriate local foods are available, marketing of RUF may discourage the provision of an adequate diet composed of diverse traditional foods and breast milk.

In Indonesia, a product similar to an MNP distributed free of charge by the Ministry of Health (MOH) to children aged 6–11 months, is being marketed by a subsidiary of a company that also markets infant formula and cereals (Soekarjo and Zehner 2011). The authors note that social marketing with private sector advertisements or promotions of such products “has the advantage of providing wider access to products that help fill the nutrient gap of young children. Unfortunately, it also opens the way to uncontrolled and misleading promotion and marketing” (Soekarjo and Zehner 2011).

In developed countries also, government-industry price manipulation and social marketing have significant and sometimes negative impacts on IYCF practices. In the US, the Women Infants and Children (WIC) program targets low income, nutritionally at-risk, pregnant, breastfeeding, and non-breastfeeding postpartum women and infants and

WIC is increasingly under scrutiny as a marketing program in the US (Greiner, 2012; Perez-Escamilla, 2012; Jensen, 2011). The value of the WIC package is less for breastfeeding mothers and WIC provision of free formula has been argued to reduce incentives for breastfeeding in WIC mothers.

children up to 5 years of age. Participants are provided with coupons for use of supplemental foods and infant formula. Half of all US women with babies are eligible for free formula under the program, which also provides vouchers for CACF for older infants and young children. WIC seeks bids from formula companies which in turn provide rebates for each can of formula distributed through the program (Jensen 2011).

Exclusively providing one brand is perceived as endorsement of the brand, as well as providing an economic incentive to formula feeding, or mixed feeding, which is reinforced by diminished milk production once the switch to formula has been made (Jensen, 2011). Participant attitudes may be changed as the high cost of formula may propagate the perception of the WIC formula packages as better

value than the breastfeeding packages (Holms, 2009). Compared to WIC eligible non-participants, WIC participants are less likely to initiate and continue breastfeeding (Jensen, 2011).

In 2007, the composition of the WIC package changed to replace juice with canned baby food for infants 6 to 12 months, providing more whole grains, fruits, and vegetables, and fewer foods with high saturated fat content. There were also changes to other IYC food products offered. These changes have led to some improved IYCF practices (Reat, Crixell et al. 2015), increased dietary diversity (Hurley 2010; Kong 2014, Odoms-Young et al 2014), energy intake and fibre intake amongst some recipient groups (Kong 2014, Odoms-Young et al 2014).

These studies provide evidence on the potential for promotion of CACF through such free or cheap food programs to both undermine and encourage more optimal IYCF practices in disadvantaged populations.

Glossary of terms and abbreviations

Advertising exposure	The proportion of the target audience (readers, listeners, viewers, visitors to a website) who received a promotional message at least at the effective frequency. As this data is often unavailable, the alternative used is: the proportion of the target audience who reported having received the message.
Any breastfeeding	Includes partial and exclusive breastfeeding (World Health Organization (WHO) 2015).
Bottle feeding	Feeding of infants food or drink from an infant feeding bottle. The 'bottle feeding rate' is the proportion of infants less than 12 months of age who receive any food or drink from a bottle (World Health Organization (WHO) 2015)
Bounty bag	See: Discharge pack.
Brand	Unique design, sign, symbol, words, or a combination of these, employed in creating an image that identifies a product and differentiates it from its competitors. Over time, this image becomes associated with a level of credibility, quality, and satisfaction in the consumer's mind. Thus brands help harried consumers in crowded and complex marketplace, by standing for certain benefits and value. Legal name for a brand is trademark and, when it identifies or represents a firm, it is called a brand name (WebFinance 2015)
Brand crossover promotion	The use of well established (i.e. familiar) brand identifiers (logos, colours, trademarks, packaging, shape, etc.) to indicate similarities between products ordinarily understood to occupy different product categories. An example is the use of a device (e.g. a bear or a shield) well recognised by consumers due to its association with infant formula, on the packaging or promotional materials associated with a complimentary food product such as yoghurt; or a vitamin supplement intended for mothers.
Brand (or line) extension	Multiproduct branding strategy whereby a firm markets one or more new products under an already established and well-known brand name. (WebFinance 2015).
Brand stretching	Using an established brand name in order to introduce unrelated products, such as a tobacco company that introduces non-tobacco related products in order to circumvent advertising restrictions (WebFinance 2015).
Breast milk substitute (BMS)	Any food being marketed or otherwise represented as a partial or total replacement for breast milk, whether or not suitable for that purpose (UNICEF 2012).
Caregiver	Person who feeds an infant or young child e.g. mother, grandmother, older sibling, health or childcare worker or other carer.
Continued breastfeeding (2 years or more)	Percentage of children 20 to 23.9 months of age who are fed breast milk (World Health Organization (WHO) 2015)

Complementary food (CF)	'Any food, whether manufactured or locally prepared, suitable as a complement to breast milk or to infant formula, when either becomes insufficient to satisfy the nutritional requirements of the infant' (WHO Scientific and Technical Advisory Group (STAG) 2013).
Commercially available complementary food (CACF)	Complementary food (CF) products, including drinks, that are manufactured (both by international food companies and local production facilities but not home-prepared), packaged and sold commercially. These products may, or may not, be nutritionally adequate (WHO Scientific and Technical Advisory Group (STAG) 2013). This may include ready to use foods (RUFs) (see ready-to-use foods (RUF)) and follow-on/follow-up formula (FUF) (see Follow-on/follow-up formula (FUF) in the current study).
Cross media marketing	A form of cross-promotion that exceeds traditional advertisement techniques and includes extra appeals communicated by any mass media such as e-mails, letters, web pages, or other recruiting sources.
Cross marketing	A marketing strategy which combines two offerings from separate companies. The technique is usually used to sell complementary products or services. Also called cross promotion or cross merchandising (WebFinance 2015).
Developing country	Non OECD members (World Bank, 2015).
Developed country	OECD members (World Bank, 2015).
Discharge pack	Package of factual and promotional information, gifts and sometimes samples of infant formula and baby foods and products provided to post-partum mothers by a health facility or retailer e.g. hospital or pharmacy.
Exclusive breastfeeding	The infant receives only breast milk. No other liquids or solids are given – not even water – with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines (World Health Organization (WHO) 2015)
Follow-on/follow-up formula (FUF)	Breast milk substitute formulated for infants aged 6 months or older (UNICEF 2012). Includes 'toddler milks' or 'growing up milks'.
Formula milk/milk formula	Infant formula, or follow-on/follow-up formula
Fortified food	Food with the addition of one or more essential nutrients or micronutrients (trace elements and vitamins), whether or not it is normally contained in the food, for the purpose of preventing or correcting a demonstrated deficiency of one or more nutrients in the population or specific population groups (FAO/WHO 1994). http://www.fao.org/docrep/w2840e/w2840e0b.htm
Fortified blended foods (FBFs)	FBFs are blends of partially precooked and milled cereals, soya, beans, pulses fortified with micronutrients (vitamins and minerals). Special formulations may contain vegetable oil or milk powder. Corn Soya Blend (CSB) is the main blended food distributed by WFP but Wheat Soya Blend (WSB) is also sometimes used (World Food Program (WFP) 2015).

Health claim	Claims by manufacturers of food products that their food will reduce the risk of developing a disease or condition. They are voluntary statements made by food businesses on labels and in advertising about a food and refer to a relationship between a food and health rather than a statement of content. (FSANZ 2015).
High/Middle/Low Income country	Low-income economies are those with a GNI per capita of \$1,045 or less in 2014; middle-income economies are those with a GNI per capita of more than \$1,045 but less than \$12,736; high-income economies are those with a GNI per capita of \$12,736 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of \$4,125 (World Bank (IBRD/IDA) 2015).
Infant formula	Infant formula – A breast milk substitute formulated industrially in accordance with applicable Codex Alimentarius standards. The Codex Alimentarius Commission was established in 1963 by the Food and Agriculture Organization (FAO) and WHO to protect the health of consumers and to ensure fair practices in the international food trade (UNICEF 2012).
Infant and young child (IYC)	Infants (less than 12 months old) and young children (12–23 months old) (UNICEF 2012).
Infant and young child feeding (IYCF)	The feeding of infants (less than 12 months old) and young children (12–23 months old). IYCF programs focus on the protection, promotion and support of exclusive breastfeeding for the first six months, on timely introduction of complementary feeding and on continued breastfeeding for two years or beyond (UNICEF 2012).
Lipid-based nutrient supplement (LNS)	A family of products designed to deliver nutrients to vulnerable people. They are considered “lipid-based” because the majority of the energy provided by these products is from lipids (fats). All LNS provide a range of vitamins and minerals, but unlike most other multiple micronutrient supplements, LNS also provide energy, protein, and essential fatty acids (EFA). LNS formulations and doses can be tailored to meet the nutrient needs of specific groups (e.g. children under 2 years of age) and to fit in particular programmatic contexts (e.g. preventive or therapeutic programs, emergency programs) (iLiNS Project 2015).
Logo	Recognizable and distinctive graphic design, stylized name, unique symbol, or other device for identifying an organization. It is affixed, included, or printed on all advertising, buildings, communications, literature, products, stationery, and vehicles. Not to be confused with a brand, which identifies a product or family of products (WebFinance 2015).

Marketing	The management process through which goods and services move from concept to the customer. It includes coordination of the four main elements of marketing, product development, price, placement, and promotion, known as the 4 P's of marketing: "(1) identification, selection and development of a product; (2) determination of its price; (3) selection of a distribution channel to reach the customer's place; and, (4) development and implementation of a promotional strategy." (WebFinance 2015).
Maternity protection	'Appropriate measures to ensure that pregnant or breastfeeding women are not obliged to perform work which has been determined by the competent authority to be prejudicial to the health of the mother or the child, or where an assessment has established a significant risk to the mother's health or that of her child.' (Convention No. 183 Convention concerning the Revision of the Maternity Protection Convention (Revised), 1952)
Micronutrient powder (MNP) or "Sprinkles"	A tasteless powder containing the recommended daily intake of 16 vitamins and mineral for one person. Can be sprinkled onto home-prepared food after cooking just before eating (World Food Program (WFP) 2015).
Mixed feeding	Giving other liquids and/or foods together with breast milk to infants under 6 months of age (UNICEF). Mixed feeding has the same meaning as 'partial breastfeeding' - giving a baby some breast milk, and some artificial feeds, either milk formula, milk or cereal, or other food.
NQR (no quality rating)	No quality rating allocated due to non-conventional study design including all industry and grey literature reports.
Nutrient supplement	Product designed to be mixed with complementary foods
Nutrition/nutrient content claim	A nutrition claim that describes the level of a nutrient contained in a food. Examples: 'source of calcium'; 'high in fibre and low in fat'.' (Codex Nutrition and Health Claims (CAC/GL 23-1997) These claims need to meet certain criteria set out in national food standards. For example, with a 'good source of calcium' claim, the food needs to contain more than the amount of calcium specified in the standard. (FSANZ).
Premiumisation	A marketing practice of introducing a brand or repositioning an existing one as premium or luxury in a mature category. For manufacturers and retailers higher prices reduce the need to sell in large numbers, and counter competition from private labels (store brands). For consumers, higher prices have appeal when they represent greater value and are associated with pleasure. (http://www.brandingstrategyinsider.com/2008/05/why-brands-are.html#.VWmy2GPIf9E)
Promotion	Encouragement of the sale or use of (a product) by advertising or securing financial support.

Ready-to-use foods (RUF)	Includes ready-to-use therapeutic foods (RUTF) and ready-to-use supplementary foods (RUSF). Better suited to meet the nutritional needs of severely and moderately malnourished children than FBF. RUF distributed by WFP may contain vegetable fat, dry skimmed milk, malt dextrin, sugar and whey (World Food Program (WFP) 2015). See also
Ready-to-use supplementary foods (RUSF)	Specialised ready-to-eat, portable, shelf-stable products, available as pastes, spreads or biscuits that meet the supplementary nutrient needs of those who are not severely malnourished. They are increasingly used for the management of moderate acute malnutrition (MAM) (UNICEF 2012). See also 'fortified blended foods (FBFs)', 'micronutrient powder (MNP)', and 'lipid-based nutrient supplement (LNS)'.
Ready-to-use therapeutic foods (RUTF)	Specialised ready-to-eat, portable, shelf-stable products, available as pastes, spreads or biscuits that are used in a prescribed manner to treat children with severe acute malnutrition (SAM) (UNICEF 2012).
Timely and adequate complementary feeding	When breast milk is no longer enough to meet the nutritional needs of the infant, complementary foods should be added to the diet of the child. The transition from exclusive breastfeeding to family foods typically covers the period from 6 to 18-24 months of age, and is a very vulnerable period. Complementary feeding should be <i>timely</i> , meaning that all infants should start receiving foods in addition to breast milk from 6 months onwards. It should be <i>adequate</i> , meaning that the complementary foods should be given in amounts, frequency, consistency and using a variety of foods, to cover the nutritional needs of the growing child while maintaining breastfeeding (World Health Organization (WHO) 2015).
Special Supplemental Nutrition Program for Women, Infants and Children (WIC)	Serves to safeguard the health of low-income pregnant, postpartum, and breastfeeding women, infants, and children up to age 5 who are at nutritional risk by providing nutritious foods to supplement diets, information on healthy eating including breastfeeding promotion and support, and referrals to health care. The foods provided are designed to supplement participants' diets with specific nutrients. Different foods are provided to each category of participants. WIC foods include infant cereal, iron-fortified adult cereal, vitamin C-rich fruit or vegetable juice, eggs, milk, cheese, peanut butter, dried and canned beans/peas, and canned fish. Soy-based beverages, tofu, fruits and vegetables, baby foods, whole wheat bread, and other whole-grain options were recently added to better meet the nutritional needs of WIC participants. In most WIC State agencies, WIC participants receive checks or vouchers to purchase the foods. (United States Department of Agriculture (USDA) 2014).