Comments from the Victorian Department of Health and the Victorian Department of Jobs, Precincts and Regions.

Due date of submission – 7 July 2021

The Victorian Departments of Health and Jobs, Precincts and Regions (the departments) welcome the opportunity to respond to this consultation paper P1028– Infant formula: Safety and food technology.

The departments recognise that breastfeeding is the normal and recommended way of feeding infants and that the regulation of infant formula has implications for breastfeeding rates as well as the health outcomes of formula-fed infants. Infant formula products are essential products for a vulnerable population and careful consideration is vital to ensure that infants' health and interests are the primary focus of regulatory decisions.

General comments on scope

The departments note that FSANZ has stated that P1028, and this Consultation Paper focusing on safety in relation to food additives, contaminants and labelling for preparation and use, only relates to infant formula while follow-on formula, for six to 12 month olds, is out of scope. The departments consider many aspects of P1028 apply equally to infant and follow-on formula. For example, *Schedule 15 – Substances that may be used as food additives* applies equally to infant formula and follow-on formula, so it is not clear why this current safety assessment, and resulting changes to regulatory provisions, would only apply to one of these products. This will result in two sets of food additive permissions and contaminant levels being created for these products, with the potential for undesirable safety and trade implications. **The departments strongly support applying the approaches for food additive permissions, contaminant Maximum Levels (MLs) and relevant labelling of preparation and use considered in this consultation paper to all infant formula products for infants under 12 months, in line with the current regulatory approach. Changing the regulatory approach for products targeted to infants 6 months or over represents a new regulatory question that would need proper assessment of risks and benefits.**

Section 2 - Food Additives

The departments support FSANZ's risk management framework for food additive permissions for infant formula products and its three principles, which are:

1. Protection of infant health and safety.
2. The number of food additives used in infant formula should be the least number necessary to achieve the required technological functions, and
3. Consideration of harmonisation with international standards.

The departments highlight that consideration should be given to the regulatory gap created in the review of the Australia New Zealand Food Standards Code (the Code) in 2016, when the clear prohibition on adding food additives unless permitted was unintentionally altered, with the prohibition only seeming to apply when substances are 'used as food additives'. This created a potential loophole for manufacturers to add these substances for other reasons without the need for pre-market assessment. The regulatory implications of this for Standard 2.9.1 are unclear. The redrafting of Standard 2.9.1 must make clear that pre-market assessment must occur for all new substances, in line with the Policy Guideline for the regulation of infant formula and the original intention of this standard.

The questions posed by FSANZ on Section 2 are targeted to health professionals and the food industry and so have not been directly addressed. Comments on each of FSANZ's preferred approaches is provided below.

2.2 Food class system for food additive permissions

The departments support the proposed approach to reduce the number of food classes and use qualification notes and conditions as this appears to simplify the regulation of food additives in infant formula products. It is also similar to the approaches taken in Codex and in the EU while being consistent with the three principles of the risk framework being used by FSANZ for P1028. **The drafting of the qualification notes and conditions will be particularly important to meet the second principle of the risk framework (to limit the number of additives used)**.

2.3 Carry-over principle for food additives and infant formula products

Consistent with our comments last consultation in 2016, **the departments support FSANZ's proposed approach to prohibit the use of carry-over provisions**. This best protects infant health and safety, reflecting the principle that food additive use should be minimised in infant products and is consistent with the original intent of the Standard. This also provides harmonisation with international standards.

2.4 Harmonisation of food additive permissions

The departments recognise the importance of harmonisation of regulations, particularly for Infant Formula Products for Special Dietary Use (IFPSDU), for which we rely on imported products, mainly from the EU. However, support for harmonisation will always be secondary to the protection of infant health and safety; that is, the principles of safety and minimal use of food additives in infant formula are met. **The departments support aligning food additive permissions with Codex or EU permissions subject to there being both safety data and justification of need for certain food additives**, noting this is not the case for all of the additives being considered. Further details on individual food additives are provided below.

Acidity regulators

These comments relate to the acidity regulators identified and discussed in the consultation paper (Calcium carbonates, calcium citrates, calcium hydroxide, sodium carbonates, potassium carbonates, sodium hydroxide, potassium hydroxide, phosphoric acid, sodium phosphates, potassium phosphates, calcium phosphates).

The departments note FSANZ's risk assessment confirmed the safety of the food additives as acidity regulators in infant formula at the levels in the Codex standards and EU regulations, but identified the potential for exceedances of the maximum levels outlined in section S29-9 of the Code. FSANZ proposes, like Codex and EU regulations, that qualifications could be set to specify the use of these acidity regulators must be within the limits on calcium, sodium, potassium and phosphorus content in infant formula.

The departments support permitting the above substances as food additives in IFPSDU and infant formula to align with permitted levels in Codex and EU regulations. It is noted most of these are already permitted forms of minerals or electrolytes in infant formula products. To ensure infant health is protected, **the departments strongly support a condition statement be applied requiring that the use of these acidity regulators must be within maximum limits and ratios set in section S29—9**.

Citric and fatty acid esters of glycerol (CITREM)

The departments note there is a current permission in the Code for citric and fatty acid esters of glycerol (CITREM) and **support the proposed approach to align permissions with Codex and the EU at a lower Maximum Permitted Level (MPL) of 7500mg/kg for powdered products and to retain the 9000mg/kg MPL for liquid products**. This is consistent with the safety data, the principle to minimise food additive use in infant formula (with a lower MPL in powdered products) and the technological purpose of these additives. We note that the Joint FAO/WHO Expert Committee on Food Additives (JECFA) confirmed safety at the typical levels in powered formulas of up to 2700mg/L when reconstituted. At the high end of potential uses (up to 9000 mg/L), equivalent to estimated citrate exposure of 1140 mg/kg bw/day for the very young infant at the 95th percentile energy intake, diarrhoea might occur in some infants, however JECFA noted that the risk of this was considered to be low.

Starch sodium octenylsuccinate (INS 1450)

The departments note that starch sodium octenylsuccinate is not permitted in the Code for use in any types of infant formula products and that Codex and EU regulations have permissions in certain infant formula products only. **The departments support the proposed approach for a new provision to permit starch sodium octenylsuccinate, limited to IFPSDU containing hydrolysed protein** in line with safety principles to minimise the use of food additives and to harmonise with overseas regulations.

Locust bean (carob bean) gum (INS 410)

The departments query FSANZ's change in approach to retain a permission for locust bean gum in standard infant formula products up to 1000mg/L when there is no clear technological purpose in standard infant formula and therefore this does not meet the minimum use of food additives principle. We note information provided in the Consultation Paper on reported use by industry also centres on its use as a thickener for specialised products. The departments note the EU only permits the food additive in special purpose formula for the management of gastro-oesophageal reflux at a level of 10,000mg/kg, but is currently reassessing its safety.

The departments note that industry submissions suggested raising the MPL from 1,000 mg/L to 10,000 mg/L for all infant formula (both standard and specialised). The primary technological function appears to be as a thickener for products that assist in managing gastro-oesophageal reflux. **More information from industry on the need for locust bean gum in standard infant formula would be helpful in order to support retaining this permission in these standard products.**

The departments support in principle permissions in IFPSDU, where there is a justified technological purpose, but note questions remain around the safety of the MPL of 10,000 mg/L currently permitted in the EU. The departments note that specialised products are dependent on imports from the EU and recognise the importance of harmonisation, but also that FSANZ, JECFA and EFSA do not currently support addition of this food additive up to 10,000 mg/L and that the EFSA re-evaluation of the substance for infants below 16 week of age is still pending. We also note that the studies presented only tested tolerance up to 6,000 mg/L. FSANZ is seeking further information from health professionals about the need to permit locust bean gum at 10,000 mg/L in IFPSDU and about current industry use levels. **To support a permission for addition up to 10,000 mg/L in IFPSDU, it will be important that safety and tolerance above 6,000 mg/L can be demonstrated.** The departments also consider that a decision on permissions for locust bean gum (in standard formula or IFPSDU) should not be made until EFSA's current pending safety assessment for infants under 16 weeks of age has been completed.

The departments also note that a number of additives being considered are gum-based thickeners, that have been the subject of a number of case reports of necrotising enterocolitis in premature infants (noting a clear causal link yet to be determined). In terms of the principle of limiting the number and use of food additives, FSANZ should justify the need for permissions for all of these gum-based thickeners.

Pectins (INS 440)

The departments note pectins are not currently permitted in the Code or by Codex for infant formula products, while the EU has a limited permission in certain specialised products at a MPL of 10,000 mg/L. **We do not support FSANZ's proposed approach to permit pectins for IFPSDU at a MPL of 5000 mg/L (mg/kg)** on the basis that JECFA concluded that exposure at this level was of concern in infants and therefore it does not meet the principle of protecting infant health and safety.

JEFCA's recent assessments in 2016 and 2017, detailed by FSANZ, concluded that exposures up to 2,000mg/L did not raise health concerns but those at ≥ 5000mg/L (FSANZ's proposed level) were of concern. This resulted in a recommendation that a proposed MPL should be reduced from 5000mg/L to 2000 mg/L. We also note that EFSA this year re-evaluated the safety of pectins and recommended reducing the EU MPL, pending a further re-evaluation. One of the concerns raised by EFSA was infants' exposure to methanol. FSANZ has calculated that a maximum use level of 2000mg/L of pectin was not expected to result in adverse effects from methanol but has not then explained why a MPL of 5000mg/L is proposed.

The departments note that FSANZ is seeking additional information from stakeholders on the need for and use of these food additives**. The departments consider that data on safety over 2,000 mg/L is also necessary to provide a sufficient evidence base for the proposed level of 5,000 mg/L given JECFA's conclusion that exposures of ≥ 5000mg/L are of concern.**

Xanthan gum (INS 415)

The departments do not support the proposed approach for a new permission for xanthan gum in order to align with permissions with EU regulations at a MPL of 1200mg/L in IFPSDU at this stage. We note that the MPL of 1200 mg/L has been permitted in the EU for some years and on this basis, FSANZ assumes safety at this level, but also note that JECFA concluded safety only at a maximum use of 1000mg/L for infants 0-12 weeks of age. It is also not known whether companies in the EU using xanthan gum have been using this additive at 1200mg/L to be able to establish a history of safe use at this level. We also note Codex currently does not permit its use in infant formula.

The departments are cognisant of preventing regulatory barriers for new IFSPDU that might use this food additive given the reliance on imported products, however need further information on the safety of xanthan gum at the proposed levels. **In addition to information from health professionals about the need for a higher than recommended MPL, it would be helpful to know what levels are being used in current products in the EU** and whether a slightly lower MPL of 1000mg/L would impact on the importation of existing IFPSDU.

Guar gum (INS 412)

The departments note that guar gum is currently permitted in the Code in all infant formula products at 1000 mg/L, however in 2017, FSANZ proposed to remove the permission for use in standard infant formula at up to 1000 mg/L, and restrict permission to use in specific IFPSDU: liquid products containing hydrolysed proteins, peptides or amino acids. The rationale was that this would be consistent with Codex provisions and EU regulations and align with the minimal use principle. There

does not appear to be a technological need for guar gum in standard infant formula. The departments understand from the consultation paper that FSANZ has been unable to draw a conclusion on the safety of guar gum at the proposed levels in IFPSDU and therefore does not yet have a proposed approach for permissions.

The EU assessment of safety of guar gum for young infants (under 16 weeks) is pending but it noted infants using these specialist products may be more susceptible to reported gastrointestinal side effects of guar gum. **In addition to seeking information on the need for a higher MPL of 10,000 mg/L in IFPSDU, FSANZ should also await the outcome of the EFSA re-evaluation of guar gum safety in young infants prior establishing a permission in certain IFPSDU and an associated MPL**.

Sodium alginate (INS 401)

The departments note sodium alginate is not currently permitted in infant formula in the Code or in Codex, but there is a very limited permission in the EU in certain specialised products after four months of age. In its recent 2017 reassessment, EFSA concluded that the available data did not allow an adequate assessment of the safety of alginic acid and its salts in infants and young children consuming foods from these food categories. JECFA has also not considered its safety in infant formula. It is noted that industry provided comments in 2017 requesting that sodium alginate be considered for permission in general infant formula but, given the lack of safety data, FSANZ deems this inappropriate. However, FSANZ is proposing to align with the EU and permit sodium alginate (INS 401) in the Code for IFPSDU at a MPL of 1000 mg/L (mg/kg) specifically for products suitable for infants from four months onward in special food products with adapted composition, required for metabolic disorders and for general tube-feeding. On the basis of limited evidence of current use in the EU, FSANZ is seeking data from industry on the current use levels to inform the final decision.

In terms of a new permission for IFPSDU, the departments would expect there to be both evidence of safety and a clear justified need before considering a new permission for sodium alginate in the Code for any infant formula. **Based on the current gaps in the safety assessment, the departments do not support FSANZ's proposed approach at this stage to align permissions for this additive with EU regulations at a MPL of 1000mg/L in IFPSDU**.

Sodium carboxymethylcellulose (INS 466)

The departments support FSANZ's proposed approach to not create a new permission to use sodium carboxymethylcellulose in the absence of adequate safety data for young infants or a technological need, in line with the principle to minimise the use of food additives in infant formula products. We note this additive is not permitted by Codex and while it has limited permission in EU, its safety is being re-evaluated and EFSA did not find any evidence that it was being used.

Sucrose esters of fatty acids (INS 473)

The departments do not support the proposed approach at this stage to create a new permission for the use of sucrose esters of fatty acids (INS 473) for IFPSDU containing hydrolysed proteins, peptides and amino acids up to 120 mg/L (mg/kg) given the lack of data on safety, the current re-evaluation of safety in infants under 16 weeks by EFSA, and the lack of clarity regarding the use and need for these additives in these specific products. We note these food additives are also not permitted by Codex. FSANZ indicates it has not conducted any risk assessment for the use of sucrose esters of fatty acids in infant formula, or conducted any review to determine whether there is a history of safe use at the proposed levels, and can therefore not establish whether the proposed levels are safe in the target population. FSANZ notes concerns raised in international risk assessments and

therefore is seeking additional information from health professionals, about the need to permit addition of these food additives and the use by industry. **The determination of a proposed approach should wait until this information is available.**

Diacyltartaric and fatty acid esters of glycerol (472e)

The departments note that Diacyltartaric and fatty acid esters of glycerol are currently permitted for use as an emulsifier for IFPSDU based on a protein substitute with a MPL of 400 mg/kg but that there are no Codex provisions or EU permissions for the food additive for any form of infant formula.

The departments also note no information to justify use was supplied in submissions and no evidence of current use in products was provided, however two industry submissions did not support removal of the permission on the basis that manufacturers should have access to a range of food additives to select the most appropriate food additive for the product. Based on FSANZ's assessment and the principle to minimise use of food additives in these products, **the departments support FSANZ's preferred approach to remove these permissions for infant formula products.**

2.5 Clarifications to the Code

The departments note the current MPL for hydroxypropyl starch for soy-based formula is understood to be an error and support FSANZ's proposed approach to amend the MPL to 5000mg/L to be in line with Codex and industry's understanding of the intended level.

2.5.2 Carrageenan permission for liquid soy-based infant formula products

The departments support FSANZ's proposed approach to retain the current carrageenan permission (300 mg/L for liquid infant and 1000 mg/L for infant formula products for special dietary use based on a protein substitute) and clarify it can be used in all liquid formula, including soy-based products, on the basis of its safety, justified use and consistency with Codex.

2.5.3 Permitted starches, removal of qualification statements

The departments agree that the unity principle outlined in Standard 1.3.1 sufficiently covers infant formula and therefore the qualification statement "*Section 1.3.1 – 6 applies"* for the three starches (INS 1413, 1414 and 1450) can be removed.

2.6 Updates to nomenclature and INS numbers

The departments note there are some inconsistencies in the nomenclature and INS numbers used for food additives in the Code and Codex, and agree that due to the widespread impact, it would be more appropriate to review nomenclature and INS numbers in a separate dedicated proposal. The departments therefore support FSANZ's approach to retain the current nomenclature and INS numbers for infant formula products.

Section 3 Contaminants

General comments

The departments note FSANZ's principles for determining Maximum Levels (MLs) of contaminants in infant formula focus on protection of health and safety as well as consistency with Codex levels where possible, noting harmonisation with Codex is secondary to measures to protect public health and safety. The departments note that the EU stipulates a more comprehensive list of MLs than Codex but

FSANZ indicates that full alignment with EU may not be necessary on the basis that the lack of alignment was not creating trade issues. Given alignment with contaminant MLs can also confer protection, and a significant amount of infant formula products (particularly IFPSDU) are imported from the EU, **the departments consider harmonisation with the EU to be an important health and safety measure**. A lack of harmonisation for contaminant levels creates a situation where products that exceed contaminant levels overseas are able to sold in Australia. This occurs already in other commodities. Therefore despite previous surveys that show contaminant levels in Australian infant formula products may be low, **the departments support aligning with MLs where they exist in Codex or the EU to ensure both imported and Australian infant formula contaminant levels remain low into the future.**

The departments also note that recent innovation in new sources of plant-based proteins for infant formula, such as pea, potato and rice, create the potential for presence of contaminants not previously found in milk-based formula. **In order to ensure infant formula regulations are fit for purpose into the future, consideration should be given to potential contaminants in these new plant ingredients.**

Comments on each of FSANZ's preferred approaches is provided below, with views on the single question about cadmium included.

3.3 Specific contaminants assessed by FSANZ

Acrylonitrile

The departments support FSANZ's proposed approach to retain the current ML of 0.02 mg/kg for acrylonitrile in the Code, which is aligned with Codex levels (noting the EU has no ML).

Aluminium

The Code currently has MLs for aluminium of 0.1 mg/100mL in soy-based infant formula and 0.05 mg/100mL in all other infant formula, based on the potential for higher aluminium present in soy products. There are currently no aluminium MLs in Codex or the EU. The departments note that the results from the 23rd and 24th ATDS indicated some products approached the ML of 0.05 mg/100 mL and FSANZ's conclusion that retaining the ML will keep exposure to aluminium as low as reasonably achievable. **The departments support FSANZ's rationale and proposed approach to retain an ML for aluminium, set a single ML of 0.05 mg/100 mL for all infant formula and move the ML from Standard 2.9.1 to Standard 1.4.1 and Schedule 19**. The departments note FSANZ's conclusion that there is no indication that this level cannot be met by manufacturers.

Arsenic

The departments support FSANZ's proposed approach to not creating an ML for total or inorganic arsenic on the basis that FSANZ indicates there are not currently MLs for infant products overseas and recent surveys show low or not detected in infant products, including rice based products. **The departments note and support FSANZ continuing to monitor the need for an ML** either in infant products or rice that may be used as an ingredient in infant formula.

Cadmium

Of the two options presented:

1. Do not establish an ML for infant formula in the Code on the basis that dietary exposures to cadmium in infant formula are not considered likely to be of health concern, noting that no data is available for soy-based infant formula; or

2. Harmonise with the EU MLs listed in Table 3.1 on the basis that soya protein isolates, alone or in a mixture with cows' milk proteins, can contain higher cadmium levels than milk-based products since soya beans naturally take up cadmium from the soil,

the departments support Option 2. This is on the basis that harmonisation should occur with EU to avoid export of products to Australia that do not meet EU MLs, that there is a lack of data on cadmium levels in soy based formula (which is likely to be higher than cow based) and the 25th ATDS which showed a slight exceedance for 9 months olds in cow's milk based formula. The departments consider this will have little impact on trade and domestic products if levels are already low.

Lead

The departments support FSANZ's proposed approach to reduce the ML in the Code from 0.02 mg/kg to 0.01 mg/kg and to apply this on a ready-to-consume basis. This brings the Code into alignment with Codex, which lowered its ML in 2014. We also note that advice from industry and results of recent Australian and New Zealand Total Diet Studies indicate these lower levels are achievable.

The departments also note that updated lead levels in food additives that can be used in infant formula set by JECFA will also need to be met, because JECFA monographs are referenced in Schedule S3-2.

Melamine

The departments support FSANZ's position to not establish an ML for melamine in the Code on the basis that the Codex ML for melamine was created not because it is a natural contaminant but was used in an isolated adulteration incident. Regulatory action would still be able to be taken against any future adulteration with melamine.

Tin and inorganic tin compounds

The departments support FSANZ's clarification that the ML for canned food of 250mg/kg captures tinned infant formula products. The departments note that FSANZ has not assessed whether the EU ML for inorganic tin of 50mg/kg for liquid infant formula products should be adopted in the Code. Given the reliance on imported special purpose infant formula from the EU, which includes liquid formulas, and the potential for an increasing market in ready-to-feed liquid formula given its use overseas, **the departments support harmonising with EU MLs for these products to future proof the Standard and protect infant health and safety**.

Vinyl chloride

The departments support FSANZ's proposed approach to retain the current ML for vinyl chloride of 0.01 mg/kg, which aligns with Codex.

Mycotoxins: aflatoxins B1 and M1

The departments do not support FSANZ's proposed approach to not establish an ML and therefore not harmonise with EU MLs for aflatoxins M1 and B1. The departments note that aflatoxins are genotoxic and carcinogenic and that it is acknowledged that it is difficult to completely eliminate mycotoxin contamination at this time. While the 23rd Australian Total Diet Study did not detect M1 in infant formula samples, **the departments support aligning with the EU given the importation of EU infant formula products, noting local products should have no problems achieving this ML**.

Mycotoxins: Ochratoxin A

The departments do not support FSANZ's proposed approach to not establish an ML and therefore not align with the EU ML for ochratoxin A in IFPSDU. FSANZ indicates it has limited information on the presence of ochratoxin A in infant formula, however Australia is reliant on the importation of IFPSDU

from the EU, therefore the same ML should apply to ensure products that do not meet the EU ML are not exported to Australia to the detriment of infant health and safety.

The departments also note that industry innovation is resulting in new plant-based ingredients such as pea protein. For this reason, previous analyses of milk-based formula may not adequately reflect mycotoxin contamination that can occur in plant-based ingredients.

Polycyclic aromatic hydrocarbons

The departments do not support FSANZ's proposed approach to not set an ML for polycyclic aromatic hydrocarbons. Instead the departments support harmonising with the EU, which has an ML of 1.0 µg/kg in IFPSDU to protect infant health and safety noting local products should have no problems achieving this based on FSANZ's assessment.

Perchlorate

The departments do not support FSANZ's approach to not set an ML for perchlorate. The departments note FSANZ's rationale is that it has no data on perchlorate levels in infant formula products. Given the trade in infant formula products between the EU and Australia, **the departments instead support aligning with the EU ML** for infant formula products.

Chloropropanol, glycidol and their esters

The departments note that at its 83rd meeting in 2016 JECFA recommended efforts continue to reduce 3-MCPD and esters and glycidol and glycidyl esters in infant formula and that the EU has set MLs for glycidyl esters and 3-MCPD and esters in liquid formula with the intention of reducing these in 2022. We also note that FSANZ's laboratory analysis and risk assessment found that estimated exposures for 3 month olds were in the range of concern by JECFA for glycidyl esters in powdered infant formula sampled, but that FSANZ concluded this was only a preliminary risk assessment and therefore decided to not set an ML. For the protection of infant health and safety, **the departments support aligning with the EU ML in liquid formula and considering MLs for powdered products for glycidyl esters based on FSANZ's analytical findings.**

3.4 MLs for infant formula in the dry powder form or as consumed

The departments support FSANZ's preferred approach that MLs for infant formula apply to an as consumed form in mg/kg for the reasons outlined by FSANZ, including that it is consistent with international requirements.

Section 4 Lactic acid Producing Microorganisms

The departments are of the view that the current unrestricted blanket permission for the addition of L(+) lactic acid producing microorganisms to infant formula products does not provide adequate safety assurance, even if clarification is provided regarding non-pathogenic microorganisms; and is not consistent with the regulatory intent of Standard 2.9.1 or the Policy Guideline for the Regulation of Infant Formula Products.

In order for the departments to support ongoing permissions for L-lactic acid microorganisms as food additives and to support new permissions to add these substances as probiotics, to permit DL – lactic acid producing microorganisms and fermented formulas, we would expect there to be a clear justification of technical need (as a food additive) and benefit (for addition as a probiotic for a health effect), accompanied by a comprehensive safety risk assessment for all formula types (general and IFPSDU) which addresses the range of concerns raised in the literature about the use of probiotics

in infants, which have not been fully considered by FSANZ. The departments do not oppose in principle the use of probiotics in infant formula but consider the appropriate regulatory processes that assesses the safety and suitability for infants in order to create a permission need to occur.

FSANZ's proposed approach for L(+) - lactic acid producing microorganism permissions requires further clarification. It appears from its discussion that FSANZ is proposing a broad permission for L-lactic acid producing microorganisms, including as probiotics (without specifying permitted strains or levels). This appears to include a permission for DL-lactic acid producing microorganisms and a permission for fermented formula in all infant formula categories (including IFPSDU). The departments understand that Standard 2.9.1 currently permits the addition of L(+) lactic acid producing microorganisms in all infant formula products. This permission was created to allow these microorganisms to be added as a food additive to regulate acidity, limited by Good Manufacturing Practice (GMP). This is consistent with the EU regulations, which list as a food additive non-pathogenic L(+) lactic acid producing cultures for the manufacture of acidified milks for infant formula and Dietary foods for infants for special medical purposes and special formulae for infants.

FSANZ indicates some manufacturers appear to be using this permission to add microorganisms as probiotics for health effects (presumably in greater amounts than GMP used for acidity regulation) despite a lack of pre-market assessment and approval for this new role and levels. FSANZ recognises some microorganisms captured by this food additive permission may be pathogenic, but otherwise concludes these microorganisms are safe for full term, healthy infants. Due to case reports of sepsis in infants with clinical complications (including preterm, low birth weight and immunocompromised) FSANZ indicates safety cannot be concluded for these infants. FSANZ has also provided conclusions that DL-lactic acid microorganisms are safe, as are fermented infant formula products for healthy, term infants.

An unrestricted blanket permission for the addition of L(+) lactic acid producing microorganisms for any purpose and in a variety of products is contrary to the regulatory intent of Standard 2.9.1 to permit only those substances which have undergone a comprehensive risk assessment to determine safety and a clear need and role in infant formula. It is also not consistent with the Policy Guidelines for the Regulation of Infant Formula that stipulates pre-market assessment is required for new substances, or new amounts of substances, which includes demonstration of a benefit for infants. A broad permission on the basis that some manufacturers are adding these substances as probiotics also sets a concerning precedent, and provides the impression that adding new substances to formula (or existing substances in different amounts for a health effect) without undergoing pre-market assessment is a way to circumvent the Application process for new substances.

Specific concerns to be addressed

Safety and efficacy

Several scientific reports have raised concerns about the overall efficacy and safety of administering probiotic products to vulnerable populations, including term and preterm infants[1,2]. Scientific literature suggests that there are potentially at least 5 types of adverse effects linked to probiotics

[1] van den Akker CHP, van Goudoever JB, Shamir R et al. Probiotics and preterm infants: a position paper by the European Society for Paediatric Gastroenterology Hepatology and Nutrition Committee on Nutrition and the European Society for Paediatric Gastroenterology Hepatology and Nutrition Working Group for Probiotics and Prebiotics. J Pediatr Gastroenterol Nutr 2020; 70: 664–680.

[2] Lerner A, Shoenfeld Y, Matthias T. Probiotics: If It Does Not Help It Does Not Do Any Harm. Really?. Microorganisms. 2019;7(4):104.

consumption. These include systemic infections, deleterious metabolic activities, excessive immune stimulation, antibiotic resistance gene transfer, and gastrointestinal side effects such as intestinal gas formation[3,4]. Many journal articles recommend that more scientific studies are required to establish the safety and efficacy of probiotic (and prebiotic) products in children[5,6,7,8,9].

Many of the safety risks associated with probiotic microorganisms vary across different strains. For example, case reports for probiotic-associated bacterial sepsis are reported to be more common in relation to Lactobacilli compared to Bifidobacterium[10]. As another example, only selected lactic acid producing species have the ability to produce D-lactate and pose a risk of elevated D-lactate and blood acidosis[11]. While FSANZ's risk assessment did not identify any health and safety risks associated with currently available lactic acid-producing microorganisms in healthy infants, we note that this does not provide assurance for future strains that may be identified and added to infant formula products or for the safety for infants with transient or chronic illnesses. We understand that FSANZ's proposed approach would not prompt consideration or assessment of potential risks associated with newly identified or used lactic acid producing microorganisms. This is of concern given there is likely to be continuing innovation in this area to support consumer interest in probiotics and gut health.

The departments also question the safety of the broad permission for L-lactic acid producing microorganisms on the basis of FSANZ's conclusion that they are safe for healthy, term infants. Even if FSANZ was proposing a restriction to permit L-lactic acid producing microorganisms in standard formula only and not IFPSDU, this would not necessarily address the risk to infants with underlying conditions. It is important to note that infants with underlying medical conditions are also fed standard infant formula (sometimes concentrated to increase energy and nutrient density). That is because IFPSDU are only for those medical conditions which require a specialised formula to help manage the condition. Many medical conditions that would make infants susceptible to adverse effects of probiotics conditions (such as those associated with compromised immune systems) do not require a specialised infant formula. It is concerning that in its consultation paper, FSANZ appears to minimise risks of food additives to more vulnerable infants by indicating that these infants are under medical supervision. Clinical staff dealing with complex medical and feeding issues have the expectation that the highly regulated formula products provided will be safe. It is unlikely that these staff would be aware that the safety of certain ingredients in these products is not assured and is something they

[3] Doron S, Snydman DR. Risk and safety of probiotics. Clin Infect Dis 2015;60(Suppl 2):S129–34.
[4] Kothari D, Patel S, Kim SK. Probiotic supplements might not be universally-effective and safe: a review. Biomed Pharmacother 2019;111:537–47.
[5] Agostoni C, Axelsson I, Braegger C, et al. Probiotic bacteria in dietetic products for infants: a commentary by the ESPGHAN Committee on Nutrition. J Pediatr Gastroenterol Nutr. 2004;38(4):365–374
[6] van den Akker CHP, van Goudoever JB, Shamir R et al. Probiotics and preterm infants: a position paper by the European Society for Paediatric Gastroenterology Hepatology and Nutrition Committee on Nutrition and the European Society for Paediatric Gastroenterology Hepatology and Nutrition Working Group for Probiotics and Prebiotics. J Pediatr Gastroenterol Nutr 2020; 70: 664–680.
[7] Garland SM, Tobin JM, Pirotta M, Tabrizi SN, Opie G, Donath S, Tang ML, Morley CJ, Hickey L, Ung L, Jacobs SE; ProPrems Study Group. The ProPrems trial: investigating the effects of probiotics on late onset sepsis in very preterm infants. BMC Infect Dis. 2011;4;11:210.
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[11] Sanders, M.E., Akkermans, L.M., Haller, D., Hammerman, C., Heimbach, J.T., Hörmannsperger, G. and Huys, G., 2010. Safety assessment of probiotics for human use. Gut microbes, 1(3), pp.164-18

need to consider in their clinical assessments of symptoms. Therefore, decisions about permissions for standard infant formula also need to consider the potential effect on immunocompromised infants. **If a permission for these microorganisms is to remain, FSANZ should consider a mandatory warning statement to the effect that formula with these microorganisms should not be used by infants with underlying medical conditions.**

Microorganism preparation purity and contamination

Concerns have also been raised in the literature about the quality control and contamination of probiotics[12,13,14] with some health services withdrawing the use of probiotics in preterm infants due to preparations being contaminated with strains and not always containing the labelled microorganisms[15]. FSANZ has not assessed whether or how infant formula manufacturers control for strain purity and contamination when there appear to be difficulties even in therapeutic quality preparations. This also raises questions about the applicability of clinical trial outcomes using live cultures (which would presumably control for strain purity for a clinical trial) to formula for general sale.

Use of fermented formulas to add new substances and bypass pre-market assessment processes

FSANZ concludes fermented formula are safe but acknowledges the very limited evidence. The departments note that only four studies were presented to establish safety and all four used a fermented formula with the same two microorganisms, potentially indicating use of the same formula. The concept of fermented formula raises a number of regulatory questions and safety concerns that have not been considered by FSANZ. For example, an online search indicates a growing interest in potential health benefits of fermentation-produced metabolites (so called 'postbiotics'), including substances relevant to infant formula, such as human milk oligosaccharides (HMOs)[16]. These metabolites and byproducts of fermentation can be numerous and raises questions about how safety will be established for all of the byproducts as well as highlighting the potential to use this as a loophole to add novel substances to infant formula, such as HMOs, without undergoing appropriate pre-market assessment and approval.

Transferable antibiotic resistance genes

FSANZ's risk assessment needs to consider longer-term issues, such as antimicrobial resistance as a result of horizontal gene transfer (HGT)[17,18] . While HGT in the human gut is an emerging area of research, evidence suggests several lactic acid producing microorganisms carry some antimicrobial

[12] Fusco V, Fanelli F, Chieffi D. Authenticity of probiotic foods and dietary supplements: A pivotal issue to address. Critical Reviews in Food Science and Nutrition. 2021:1-18.

[13] Lewis, Z., Shani, G., Masarweh, C. *et al.* Validating bifidobacterial species and subspecies identity in commercial probiotic products. *Pediatr Res* **79,** 445–452 (2016).

[14] Poindexter B. Use of Probiotics in Preterm Infants. Pediatrics. 2021;147(6).

[15] Vermeulen MJ, Luijendijk A, van Toledo L, van Kaam AH, Reiss IK. Quality of probiotic products for preterm infants: contamination and missing strains. Acta Paediatrica. 2020;109(2):276-9.

[16] Salminen, S., Stahl, B., Vinderola, G. and Szajewska, H., 2020. Infant formula supplemented with biotics: current knowledge and future perspectives. Nutrients, 12(7), p.1952.

[17] Zheng, M., Zhang, R., Tian, X., Zhou, X., Pan, X. and Wong, A., 2017. Assessing the risk of probiotic dietary supplements in the context of antibiotic resistance. Frontiers in microbiology, 8, p.908.

[18] Lerner, A., Matthias, T. and Aminov, R., 2017. Potential effects of horizontal gene exchange in the human gut. Frontiers in immunology, 8, p.1630

resistance genes and have the ability or potential to transfer genetic materials[19,20]. This has led to the recent recommendation in the Position Statement by the European Society for Paediatric Gastroenterology Hepatology and Nutrition Committee that the use of probiotic strains with plasmids containing transferable antibiotic resistance genes should be avoided[21]. This is particularly relevant given FSANZ's involvement in the national Antimicrobial Resistance Strategy.

Section 5 Labelling

Prepare bottles individually

The departments support FSANZ's proposed approach to retain the existing direction to prepare bottles individually. This assists in reducing the risk of incorrect proportions of formula to water being used, is supported by the consumer research and consistent with *WHO Guidelines - Safe Preparation, Storage and Handling of Powdered Infant Formula 2007* (WHO PIF Guidelines) and the infant feeding guidelines for Australia and New Zealand.

Storage of made up formula

The departments support FSANZ's proposed approach to retain the current requirement to include a direction instructing that if a bottle of prepared formula is to be stored before use, then it must be refrigerated and used within 24 hours. This is consistent with the Australian Infant Feeding Guidelines and the WHO PIF Guidelines. While this is longer than the New Zealand recommendation of 4 hours, we note FSANZ's reassessment that there was no difference in risk between prepared formula stored at or below 6 degrees Celsius for 24 hours versus four hours.

Water used to reconstitute powered infant formula

The departments support retaining instructions regarding the use of potable, boiled water. Noting FSANZ's risk assessment that the temperature of the water used had a greater influence on the microbiological risk than the time spent in refrigeration and that only 33% of respondents in consumer research always use cooled water**, the departments also support FSANZ's suggestion to include the word 'cooled'**. This is consistent with infant feeding guidelines. This would also address the variation in manufacturer instructions that do not always specify cooling before use (or recommend temperatures of 40 degrees Celsius, which FSANZ assessed as presenting a risk).

Discarding leftover formula

The departments note FSANZ's consumer research indicates some caregivers do not understand the instruction to discard unfinished formula, with many not having noticed the instruction or not understanding how soon after feeding it should be discarded. Other research indicated approximately half of caregivers did not discard leftover formula.

[19] van den Akker CHP, van Goudoever JB, Shamir R et al. Probiotics and preterm infants: a position paper by the European Society for Paediatric Gastroenterology Hepatology and Nutrition Committee on Nutrition and the European Society for Paediatric Gastroenterology Hepatology and Nutrition Working Group for Probiotics and Prebiotics. J Pediatr Gastroenterol Nutr 2020; 70: 664–680.

[20] Lerner A, Shoenfeld Y, Matthias T. Probiotics: If It Does Not Help It Does Not Do Any Harm. Really?. Microorganisms. 2019;7(4):104.

[21] van den Akker CHP, van Goudoever JB, Shamir R et al. Probiotics and preterm infants: a position paper by the European Society for Paediatric Gastroenterology Hepatology and Nutrition Committee on Nutrition and the European Society for Paediatric Gastroenterology Hepatology and Nutrition Working Group for Probiotics and Prebiotics. J Pediatr Gastroenterol Nutr 2020; 70: 664–680.

The departments support the proposed approach to change the current directions to instruct caregivers to discard unused formula within a specified time. We note that FSANZ is recommending 'within 2 hours', which aligns with the WHO PIF Guidelines and New Zealand infant feeding guidelines, but is longer than the one hour recommended by the Australian infant feeding guidelines. **FSANZ has not assessed the microbiological risk between one or two hours and the departments suggest this is needed before confirming the time specified.**

The departments also consider that the instruction to 'discard unfinished formula within X hours' is not clear whether this refers to X hours from the beginning or end of the feed. Feeding times can vary greatly depending on the infant and its age, with young infants taking up to an hour to feed on occasion. **The departments recommend this be clarified**.

Advice from the Victorian Maternal and Child Health Nurse service is that other factors contribute to carers keeping unused formula, such as larger reconstitution ratios, which produce more wastage when increasing volume of formula provided as infants grow. This is discussed further under standardised ratios.

Application of preparation and use directions to concentrated and ready-to-drink formula

To 'future proof' Standard 2.9.1, FSANZ is proposing clarifying directions for concentrated and ready-to-feed formula, which are not routinely available to the general public in Australia. **The departments support the proposed approach to alter the directions as needed for ready-to-drink formula** (that is, not including the directions to use potable water, prepare individually and store for up to 24 hours prior to use).

Standardised wording or pictures for directions for preparation and use

The departments support a more prescriptive approach for directions based on FSANZ's evidence. FSANZ's proposed approach is to continue not prescribing the exact wording or pictures to be used for directions on the basis that there is little consumer research to indicate whether consumers would benefit from prescribed text and pictures for directions. This is at odds with the consumer research presented in Supporting Document 4, which shows that a significant proportion of test subjects misunderstood certain instructions (for example, after reading the instructions, 32% of participants thought left over formula could be put in the fridge and reheated, 28% believed flavourings and other food could be added to made up formula and 28% believed any scoop could be used). When the wording was improved, there was a statistically significant increase in participants understanding the instructions around not adding other foods or flavourings to the formula, ensuring water is added first when making up formula and not keeping remaining formula after feeding. This study was also supported by the Malek (2017) research quoted by FSANZ that found a lack of understanding of instructions was one reason some caregivers were preparing or using infant formula incorrectly.

In our 2016 comments, the departments did not have a position on standardised wording given a lack of evidence. **While we supported flexibility for manufacturers we noted the primary aim of providing directions for preparation is to ensure all caregivers can safely prepare formula using the instructions on the tin and that if consumers found instructions unclear then these should be clarified, which may include prescribed wording**. FSANZ has now presented consumer research which shows that a large proportion of participants did not understand current wording, which could be significantly improved with changes to wording. **This provides clear evidence that instructions need a greater level of prescription, even if it is to include a greater number of prescribed elements, rather than prescribing the entire phrasing**. The elements from FSANZ's research which showed a larger proportion of participants misunderstood instructions should be the starting point for prescribing of elements. Proposed changes around adding 'cooled' and a time to discard unused formula will help address some, but not all of the issues identified. Prescribing information could address manufacturers that presenting inappropriate information and confusing instructions such as the instruction that qualified cooling to lukewarm as being 40°C (when this temperature was shown to increase the

microbiological risk) and the major brand which states cool water must be used to maintain living cultures (which is not the main reason for using cooled water).

Date marking

The departments support the proposed approach to continue the requirement for a date mark due to deterioration in nutrient content over time. FSANZ proposes to provide flexibility in the use of a use-by or a best-before date noting that a use-by must be used if the formula should not be consumed past the date for health or safety reasons (which includes nutrient deterioration). It is unclear what would trigger a use-by date in terms of nutrient deterioration (for example if any levels fall below minimum) and **FSANZ should provide written guidance on the expectation for use of the use-by date.**

Storage instructions for infant formula

The departments support FSANZ's proposed approach to maintain the existing requirements for storage instructions, which includes a specific requirement for an opened tin, on the basis that consumers appear to understand this instruction and it is consistent with Codex.

5.4.3 Measuring scoop

Directions regarding enclosed scoop

There is currently a requirement for instructions to indicate that only the enclosed scoop in infant formula should be used because these differ in size. FSANZ indicates the majority of caregivers reported using the measuring scoop provided in the tin and has no evidence that the existing requirement is unclear or not understood. However, FSANZ's consumer research found a significant proportion of caregivers (28%) believed 'Any scoop is the same as the scoop that's provided in the tin to measure the formula powder with'. **This provides evidence that for whatever reason, the instruction to use only the enclosed scoop is not clear. Given the risks posed to infants from incorrect reconstitution, the wording or the placement of this wording needs reconsideration**.

Standardised scoop size

FSANZ considered standardised scoop sizes and proposes not to standardise these. FSANZ indicates that standardising the scoop size would be difficult and costly due to different bulk densities of powders and a need for significant reformulation to achieve this. Industry submissions also reflected this. **The departments accept that standardised scoop sizes are too difficult to achieve for industry** and believe the risk is lower given the provision of the scoop in the tin and the consumer research indicating most people use the scoop provided, even if they are not aware they need to. **The departments therefore support FSANZ's proposed approach.**

Standardised ratio of water for preparation

FSANZ also considered standardised ratios for preparation (for example, 1 scoop of formula powder per 30ml water across all products, regardless of scoop size) and noted there are few benefits to requiring a consistent reconstitution ratio of formula to water across all brands and that it has not identified any evidence to indicate incorrect usage. FSANZ's proposed approach is to not standardise reconstitution ratios. **The departments do not agree with FSANZ's rationale or proposed approach for reconstitution ratios.** FSANZ's consumer research shows that the majority of people (59%) did not recheck instructions when they changed the brand of formula. If most people do not read the instructions, it is more than likely that they do not realise that different brands use different ratios of water, even if they are using the correct scoop in the tin. There is also some published literature of case studies where changes in water ratios from different brands have resulted in errors and hypernatremic dehydration in infants[22].

[22] Leung C, Chang WC, Yeh SJ. Hypernatremic dehydration due to concentrated infant formula: report of two cases. Pediatr Neonatol. 2009 Apr;50(2):70-3. doi: 10.1016/S1875-9572(09)60036-X. PMID: 19453082.

In our 2016 comments, the departments raised the problem of different reconstitution ratios for groups with lower literacy or English language skills. From discussions with our stakeholders, health professionals indicated that in some indigenous communities for example, caregivers are instructed to use only one brand of formula and are verbally taught how to prepare this formula by maternal health nurses due to the variation in recipes. However, it was noted problems often arise when caregivers change the formula and are unable to read the tin to determine that a different ratio of water is required. Discussions with the Victorian Maternal and Child Health service also indicated that some caregivers, particularly those with financial difficulties, frequently take advantage of infant formula brands that are on sale and as such are more likely to switch brands. Recent fluctuations in formula availability due to exports may also increase the risk of this practice.

In 2016 our response also indicated that in the UK, all infant formula brands appear to use a standard reconstitution ratio of 1 scoop to 30 ml of water. A review of the main UK supermarkets (Tesco and Sainsbury's) and the seven infant formula brands available (each containing variations) shows this is still the case. In contrast, a review of supermarket brands in Australia shows that of the main seven brands, two use a water ratio of 30ml per scoop, two use 60ml and three use 50ml, creating a risk of over or under concentration of feeds which presents health risks for infants. The departments note that health professionals, such as the Australian College of Midwives, also advocated for standardised water ratios and recommended 1 scoop to 30ml to allow smaller increments to support reducing overfeeding. The departments also note an industry submitter indicated that a standard reconstitution ratio can be applied, even though a standard scoop size would not be possible. Despite the practice in overseas jurisdictions, the Australian market has not adopted this safety measure, indicating a need to regulate this aspect.

The departments support a standardised reconstitution ratio to protect the health and safety of infants based on the consumer evidence that most people do not recheck instructions when changing brands, the ability to do so as indicated by industry and evidence of this practice in the UK. The standardised ratio should be **1 scoop to 30ml** to allow smaller increments in making up formula as infants grow, thereby reducing wastage and the risk of unused formula being kept and reused for economic reasons. It also aids in reducing overfeeding.

5.5 Warning statements

Legibility requirements for warning statements

The departments support FSANZ's proposed approach to retain the existing legibility requirements for generic or specific warning statements noting industry practice is to emphasise warning statements through the use of bolding or capitalisation.

Warning statements about following instructions exactly

The departments support FSANZ's proposed approach to insert text into the existing warning statement on instructions to make it clear not to add anything to formula as follows:

> 'Warning – follow instructions exactly. Prepare bottles and teats as directed. Do not change proportions of [powder/concentrate] *or add anything to* this formula except on medical advice. Incorrect preparation can make your baby very ill'.

This aligns it with the warning statement for ready-to-feed formula and is supported by the consumer research presented, which indicated this practice is likely to be common, and consumers preferred this wording of the ready-to-drink warning statement.

Warning statement that breast is best

In line with our 2016 position, **the departments support the ongoing 'breast is best' statement** rather than a risk-based statement, given no research has been provided on the relative merits of gain-framed versus loss/risk-framed statements and the impacts on intention to breastfeed or use formula.

5.6 Product identification

Prescribed name

The departments support the proposed approach to retain the prescribed name of 'infant formula' to ensure the true nature of the product is clear and can be clearly differentiated from other similar-looking products on the market for older children.

Statement that infant formula product may be used from birth

The departments support the proposed approach to continue the requirement that infant formula states it may be used from birth. This provides clear information about appropriate use for caregivers and is consistent with Codex.

Statement about age to offer foods in addition to infant formula

The departments support continuation of the requirement for the statement indicating that it is recommended that infants from the age of 6 months should be offered foods in addition to the infant formula product. This is consistent with Australian and New Zealand infant feeding advice.

Statement on protein source and co-location with the name of the food

The departments support FSANZ's proposed approach to retain the requirement for the label to state the specific source of protein, being the origin of the protein and not protein fractions such as casein or whey. This enables caregivers of infants with allergies or intolerances to correctly identify suitable products. **The departments agree with FSANZ's position that declaration of the protein fraction (e.g. casein or whey) has the potential for consumer confusion** and there is a lack of nutritional justification for it but note this will addressed in later consultation papers.

The departments support FSANZ's proposed approach to retain the requirement for the co-location of the protein source statement and the name of the product. The departments note that the 'name of the product' will be clarified as the prescribed name, which will mean the protein source will not necessarily be located next to the brand name and that it will not be required every time the prescribed name appears on the label. Given the prescribed name can appear on different areas of the label and not always in a prominent position, **the departments also support aligning with section 8.1.4 of the Codex General Standard for the Labelling of Pre-packaged Foods that requires the name of the food to appear in a prominent position**.

The departments also raised in 2016 that Standard 2.9.1 should mandate a list of permitted protein sources, as occurs in the EU. If specific permitted protein sources are not listed, this enables new protein sources to be used without pre-market assessment, which is not consistent with the Policy Guideline on the Regulation of Infant Formula Products. This is important because some plant protein sources (such as soy) are known to contain substances that interfere with the absorption of nutrients, and measures are taken to address this. For this reason, it is important that new protein sources also undergo independent (rather than manufacturer-based) pre-market safety and suitability assessments. The department is aware of industry innovation around new plant protein sources for infant formula, such as pea and potato, that have not had a history of use in infant formula and have not undergone premarket assessment for suitability for infants in Australia. **The departments understand that nutritional compositional requirements will be address in a later consultation paper and request this be considered then.**

Section 5 questions:

14. Do you support the amendments proposed (see section 5.7)? If not, what new evidence can you provide to support a different approach?

Refer to comments on each proposed amendment above.

15. Are you aware of any further data on infant illnesses that can be attributed to incorrect preparation as a result of unclear labelling or warning statements on products?

Despite the numerous and persistent anecdotal evidence provided by maternal and child health nurses about reconstitution errors, which can be potentially attributed to a number of factors such as labelling and varying scoop sizes and water ratios, there appears to be a gap in published literature. One study from 1992 studied infants fed a ready-to-feed formula versus those fed a reconstituted powder formula found a significantly increased body weight and skinfold thickness gains, and infants became significantly heavier (above 90th and 97th percentiles) with the powder formulas which they attributed to reconstitution errors[23]. Another study from 1988 found 30% of mothers made reconstitution errors, most of which were considered potentially serious errors from over-concentration, which was confirmed by osmolality analysis of milk samples[24]. A case study reporting on hypernatremic dehydration from reconstitution errors associated with changes of brand and water ratios has also been published[25].

[23] Lucas A, Lockton S, Davies PS Randomised trial of a ready-to-feed compared with powdered formula. *Archives of Disease in Childhood* 1992;67:935-939.

[24] Lilburne AM, Oates RK, Thompson S, Tong L. Infant feeding in Sydney: a survey of mothers who bottle feed. Aust Paediatr J. 1988 Feb;24(1):49-54. doi: 10.1111/j.1440-1754.1988.tb01333.x. PMID: 3355446.

[25] Leung C, Chang WC, Yeh SJ. Hypernatremic dehydration due to concentrated infant formula: report of two cases. Pediatr Neonatol. 2009 Apr;50(2):70-3. doi: 10.1016/S1875-9572(09)60036-X. PMID: 19453082.