



‘Feeding young children aged 1 to 5 years’
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Annex 6

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Annex 6: Systematic reviews considered after public consultation

Table A6.1 Drinks and dietary components

Study	Methods	Main results of included relevant studies	Comments
<p>Vanderhout et al (2020)</p> <p>'Whole milk compared with reduced-fat milk and childhood overweight: a systematic review and meta-analysis'</p> <p><u>Funding</u> Canadian Institutes of Health Research (CIHR) Institute of Human Development, Child and Youth Health</p> <p><u>Declaration of interest</u> One author received an unrestricted research grant from Dairy Farmers of Canada (2011-2012)</p>	<p><u>Research question</u> To systematically review and meta-analyse the relation between whole cows' milk (3.25%) relative to reduced fat (0.1 to 2%) cows' milk and adiposity in children aged 1 to 18 years.</p> <p><u>Search criteria</u> <i>Search dates:</i> until 23 March 2018; updated 2 August 2019</p> <p><i>Study design:</i> CS, cohort, case-control, longitudinal studies, as well as intervention trials (controlled and not controlled)</p> <p><i>Population:</i></p> <p><i>Exposure or intervention:</i> cows' milk (fat content), categorised as skim (0.1% fat), 1% fat, 2% fat, or whole or homogenised (3.25% fat).</p> <p><u>Primary outcome</u> Childhood adiposity (BMI/BMI z-score, weight-for-age, body fat mass, body fat %, waist circumference)</p> <p><u>Statistical analyses</u> - Random effect model. - Heterogeneity: I² statistic. - Publication bias: funnel plot and Egger regression test.</p>	<p>28 studies (8 PCS, 20 CS). Of the 8 PCS, 4 were in children aged 1 to 5 years. 3 of the 4 PCS were also included in Dougkas et al (2019) (AMSTAR 2 rating: low).</p> <p>See Annex 9, Table A9.30 for results of all 4 PCS.</p>	<p><u>Risk of bias or quality</u> Newcastle-Ottawa Scale</p> <p><u>Confounding factors</u> SR identified the following confounding factors as being important: birth weight or baseline weight, milk volume consumed and parental BMI.</p> <p><u>AMSTAR 2 rating:</u> low</p>

Study	Methods	Main results of included relevant studies	Comments
<p>World Health Organization et al (2022)</p> <p>'Health effects of the use of non-sugar sweeteners'</p> <p>Note that this is an update of a 2019 review that was commissioned by the WHO to inform its guidelines on NSS.</p> <p><u>Funding</u> Financial support was provided by the Government of Japan.</p> <p><u>Declaration of interest</u> None declared.</p>	<p><u>Research question</u> To address both any inherent health effects of non-sugar sweeteners (NSS) (that is, health effects attributable to NSS regardless of comparator), as well as health effects of NSS when compared with sugars or water, when consumed at safe levels as established by authoritative bodies.</p> <p><u>Search criteria</u> <i>Search dates:</i> 1 January 2017 to 26 July 2021 <i>Study design:</i> RCTs, PCS, case-control studies and CS. <i>Population:</i> generally healthy populations of adults and children (age <18 years) or pregnant women. <i>Intervention or exposure:</i> use of NSS within the acceptable daily intake (ADI) (studies were included if it was unclear whether an ADI had been exceeded, for example, in PCS) <i>Comparators:</i> no or lower doses of NSS consumption; any type of sugar, placebo, plain water or no intervention.</p> <p><u>Primary outcomes</u> Measures of adiposity, type 2 diabetes and pre-diabetes, cardiovascular diseases, cancer, dental caries, chronic kidney disease, eating behaviour, sweet preference, neurocognition, mood and behaviour, asthma and allergies (for children only).</p>	<p>283 studies, of which 5 RCTs and 16 PCS included children (either exclusively or together with adults). Of these, 3 PCS included children aged 1 to 5 years and examined the relationship between use of NSS and change in body weight. 2 of the 3 PCS (Newby, 2004 and Kral, 2008) are included in the SR by Karalexi et al (2018) (AMSTAR 2 critically low). Of the 3 PCS, 2 PCS (Newby, 2004 and Zheng, 2015) were included in a MA. See Annex 9, Table A9.28 for details.</p>	<p><u>Risk of bias or quality</u> - Risk of bias in nonrandomised studies of intervention (ROBINS-1) for PCS and case-control studies and confirmed with the Newcastle-Ottawa Scale. - Cochrane risk of bias tool for RCTs. - Certainty of evidence graded assessed using GRADE.</p> <p><u>AMSTAR 2 overall confidence rating:</u> moderate</p>

Table A6.2 Eating and feeding behaviours

Reference	Methods	Results	Comments
<p>Hodder et al (2020)</p> <p>'Interventions for increasing fruit and vegetable consumption in children aged 5 years and under'</p> <p>To note that this is a living systematic review and an update of Hodder et al (2018).</p> <p><u>Funding</u></p> <p>Salary support from a variety of organisations including the Hunter Medical Research Institute, Australia; The University of Newcastle, Australia; Deakin University; Hunter New England Area Health Service, Australia; Cancer Council NSW, Australia; Cancer Institute NSW, Australia</p> <p><u>Declaration of interest</u></p> <p>Two of the authors declared that they were authors on a RCT included in the review but were not involved in the determination of study eligibility, data extraction or risk of bias assessment for the review</p>	<p><u>Research question</u></p> <p>To assess the effectiveness, cost effectiveness and unintended adverse events of interventions designed to increase eating of fruit or vegetables or both among children aged 5 years and under.</p> <p><u>Search criteria</u></p> <p><i>Search dates:</i> 25 August 2019 to 25 January 2020</p> <p><i>Study design:</i> RCTs (including cluster-RCTs and cross-over trials)</p> <p><i>Population:</i> children aged 5 years and under (trials including children older than age 5 years were included only if the mean age of the trial sample at baseline was 5 years or less)</p> <p><i>Intervention:</i> educational, experiential, health promotion or psychological or family or behavioural therapy or counselling or management or structural or policy or legislative reform interventions designed to increase consumption of fruit or vegetables or both in children aged 5 years and under</p> <p><i>Comparator:</i> any alternative intervention to encourage fruit or vegetable consumption or a no-intervention control, usual care, or attention control or wait-list control.</p> <p><u>Primary outcome</u></p> <p>Children's fruit and vegetable consumption (change in number of portions or serves or grams or biomarkers of consumption of vegetables or fruit)</p> <p><u>Statistical analyses</u></p> <ul style="list-style-type: none"> - Fixed-effects model if low or no statistical heterogeneity; otherwise random-effects model - Trial estimates adjusted for potential confounding variables for selected for inclusion in MA if available - Heterogeneity: I^2 statistic 	<p>80 trials included in qualitative synthesis and 38 trials included in quantitative synthesis.</p> <p>See Annex 9, Table A9.34 for results of MAs on the effect of feeding practices to increase vegetable consumption in children aged up to 5 years.</p>	<p><u>Risk of bias or quality</u></p> <ul style="list-style-type: none"> - Study quality assessed using the Cochrane Collaboration tool - GRADE approach used to assess the quality of the evidence for the primary outcome of fruit and vegetable intake <p><u>AMSTAR 2 overall confidence rating:</u> high</p>

Reference	Methods	Results	Comments
	<ul style="list-style-type: none"> - Several subgroup analyses planned to investigate heterogeneity - Sensitivity analysis planned - Publication bias (funnel plots) 		
<p>Kininmonth et al (2021)</p> <p>'The association between childhood adiposity and appetite assessed using the Child Eating Behavior Questionnaire and Baby Eating Behavior Questionnaire: A systematic review and meta-analysis'</p> <p><u>Funding</u> First author supported by an Economic and Social Research Council Advanced Quantitative Methods Studentship.</p> <p><u>Declaration of interest</u> None to declare.</p>	<p><u>Research question</u> To conduct a systematic review to assess how CEBQ- and BEBQ-assessed appetitive traits relate to adiposity and prospective weight gain from birth to 18 years and establish the size of the associations using meta-analysis.</p> <p><u>Search criteria</u> <i>Search dates:</i> until February 2019 <i>Study design:</i> observational studies <i>Population:</i> children aged <18 years <i>Exposure and comparators:</i> studies that reported at least one CEBQ- or BEBQ-measured appetitive trait (for example, food approach or avoidance traits) To note: CEBQ has 8 scales: 4 assess food approach traits (food responsiveness, enjoyment of food, desire to drink and emotional overeating), 4 assess food avoidance traits (food fussiness [FF], emotional undereating [EUE], satiety responsiveness [SR], slowness in eating [SE]). BEBQ has 5 scales (food responsiveness [FR], enjoyment of food [EF], slowness in eating [SE], satiety responsiveness [SR], general appetite).</p> <p><u>Primary outcome</u> Any measure of adiposity (BMI z-score, BMI percentile, waist circumference or any measure of body composition)</p>	<p>67 studies (55 CS and 12 PCS) examined relationships between CEBQ scales and adiposity and 5 studies examined relationships between BEBQ scales and adiposity (1 CS and 4 PCS). 6 PCS were in children aged 1 to 5 years – none included in meta-analyses. CEBQ scales and later adiposity (6 PCS, of which 4 PCS reported on >1 scales) – all adjusted for baseline adiposity</p> <p><u>Food avoidance scales:</u> - Food fussiness (FF) (3 PCS): 3 PCS reported no association between FF and later BMI z-score. - Satiety responsiveness (SR) (2 PCS): 1 PCS reported an inverse association between SR and later adiposity (BMI z-score or weight-for-age z-score). 1 PCS reported no association. - Slowness in eating (SE) (2 PCS): Both PCS reported no association between SE and later BMI z-score.</p> <p><u>Food approach scales:</u> - Enjoyment of food (EF) (2 PCS): both PCS reported no association between EF and later BMI z-score. - Food responsiveness (FR) (1 PCS): the PCS reported no association between FR and later BMI z-score.</p> <p>No PCS in children aged 1 to 5 years reported on DD, EUE, EOE</p>	<p><u>Risk of bias or quality</u> Risk of bias assessed using the Newcastle-Ottawa Scale.</p> <p><u>AMSTAR 2 overall confidence rating:</u> critically low</p>

Table A6.3 Oral health

Reference	Methods	Main results of included relevant studies	Comments
<p>Cascaes et al (2022)</p> <p>'Ultra-processed food consumption and dental caries in children and adolescents: a systematic review and meta-analysis'</p> <p><u>Funding</u> Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Brazil and by The National Council for Scientific and Technological Development</p> <p><u>Declaration of interest</u> None to declare.</p>	<p><u>Research question</u> To examine the association of ultra-processed foods (UPF) consumption with dental caries.</p> <p><u>Search criteria</u> <i>Search dates:</i> until 18 October 2021.</p> <p><i>Study design:</i> cross-sectional, case-control, cohort; all types of interventions</p> <p><i>Population:</i> children and adolescents (aged ≤19 years)</p> <p><i>Exposure and comparison:</i> higher consumption versus lower or no consumption of groups of UPF (for example, snacks, fast foods, junk foods and convenience foods) or specific UPF (for example, sugar-sweetened beverages, sugary cereals, chocolate, sausages, hamburgers and instant noodles) Note that this SR used the definition of the UPF as described by the NOVA Food Classification System to select studies for inclusion. However, none of the primary studies assessed food processing.</p> <p><u>Primary outcome</u> Dental caries assessed through the decayed, filled and missing surfaces or teeth indices based on the WHO criteria.</p>	<p>42 studies included in qualitative synthesis; of this, 27 were included in meta-analyses (MAs). Subgroup MA of 5 prospective cohort studies (PCS) including children aged <6 years (4 of 5 studies includes children aged 1 to 5 years)</p> <p>See Annex 9, Table A9.48 for results of the subgroup MA.</p>	<p><u>Risk of bias or quality</u> Risk of bias assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Cohort and Analytical Cross-sectional studies.</p> <p><u>AMSTAR 2 overall confidence rating:</u> low</p>
<p>Moore et al 2022</p>	<p><u>Research question</u> To report an update of the systematic review (Moynihan and Kelly 2014) to include all data published between 2011 and 2020 pertaining to the relationships between the amount of</p>	<p><u>Results of additional studies identified in children aged 1 to 5 years</u></p> <p>7 observational studies (including 2 PCS) were identified to answer the question</p>	<p><u>Risk of bias or quality</u> - Risk of bias was assessed using the National Toxicology Program Office of Health Assessment and Translation (OHAT) tool. Studies</p>

Reference	Methods	Main results of included relevant studies	Comments
<p>'Systematic review of the effect on caries of sugars intake: ten-year update'</p> <p><u>Funding</u> None.</p> <p><u>Declaration of interest</u> One author is a member of the EFSA working group on added sugars and as member of the UK Scientific Advisory Committee on Nutrition Subgroup on Maternal and Child Nutrition, providing advice on the evidence pertaining to dietary sugars and dental caries to both committees.</p>	<p>sugars consumption and levels of dental caries for both adults and children.</p> <p><u>Search criteria</u> <i>Search dates:</i> studies published since November 2011. Search strategy applied in Moynihan and Kelly 2014 was used. <i>Study design:</i> intervention or observational studies, including randomised and nonrandomised controlled studies, quasi-experimental studies, cohort, case-control, cross-sectional and ecological studies. <i>Population:</i> healthy humans (without acute illness). <i>Intervention or exposure and comparison:</i> interventions intended to alter sugars intake in 1 study arm compared with diet with a different sugars content in another stud arm. Observational studies that reported absolute sugars or change in sugars intake. Sugars included total sugars (and any component of – that is, free, non-milk extrinsic, added sugars, or mono- and disaccharides, expressed as grams or kg per day or per year or as a percentage of total energy intake or per capita population intake or availability. <u>Primary outcome</u> Dental caries or comparisons between caries and no caries or higher caries versus lower caries rates.</p>	<p>'what is the effect of restricting intake of free sugars to below 10% energy intake in children?'</p> <p>5 observational studies (including 1 PCS) were identified to answer the question 'what is the effect of restricting intake of free sugars to below 5% energy intake in children?'</p> <p>See Annex 9, Table A9.40 for findings for each question.</p>	<p>were classified into 3 tiers where tier 1 is low, tier 2 is moderate and tier 3 is high risk of bias. Risk of bias of cohort studies identified in the original review was reassessed using OHAT.</p> <ul style="list-style-type: none"> - The best available new data (based on study design) was amalgamated with original data from the original review for GRADE assessment of the evidence pertaining to any effect on caries of restricting free sugars intake to <10% energy intake and <5% energy intake. - Vote counting method used for evidence synthesis. <p><u>AMSTAR 2 overall confidence rating:</u> high</p>
<p>'Systematic review of evidence pertaining to factors that modify risk of early childhood caries'</p> <p>Moynihan et al (2019)</p> <p><u>Funding</u></p>	<p><u>Overall research question</u> To systematically identify and review all a available published evidence pertaining to the effect of modifiable risk and protective factors on early childhood caries (ECC). Overall research question: which is the best way to main health of the primary dentition? <u>Search criteria</u></p>	<p>The review presents 12 research questions, of which 7 are relevant to this risk assessment (Q1 to Q7)</p> <p>See Annex 9, Tables A9.41, A9.42, A9.45 and A9.47 for findings for Q1 to Q7.</p> <p>Q1: Does breastfeeding beyond 1 year increase the risk of ECC compared with</p>	<p><u>Risk of bias or quality</u></p> <ul style="list-style-type: none"> - Cochrane Collaboration tool (RCTs) - ROBINS-I for nonrandomised trials and all other studies. - Certainty of evidence assessed using the GRADE Framework.

Reference	Methods	Main results of included relevant studies	Comments
<p>Borrow Foundation and Newcastle University WHO Collaborating Centre for Nutrition and Oral Health.</p> <p><u>Declaration of interest</u> None to declare.</p>	<p><i>Search dates:</i> year 2000 to 2020 <i>Study design:</i> RCTs, other intervention studies and observational studies (PCS, case-control, ecological and CS) <i>Population:</i> healthy participants (without acute illness but possibly overweight or with chronic illness such as diabetes) aged <72 months and their caregivers living in countries across the socioeconomic spectrum (that is, low, middle or high income) <i>Intervention or exposure, and comparator</i> (only those that are relevant to this risk assessment are listed):</p> <ul style="list-style-type: none"> - Breastfeeding >1 year (versus breastfeeding <1 year or cows' milk (or similar) consumption as main milk source from 1 year of age) - Breastfeeding >2 years (versus breastfeeding <2 years or consumption as main milk source from 2 years of age) - Consumption of liquids containing free sugars from an infant feeding bottle (versus no or lower free sugars-containing liquids consumed from an infant feeding bottle) - Consumption of complementary drinks containing free sugars (versus no or lower free sugars-containing complementary drinks) - Consumption of free sugars in complementary foods (versus no or lower consumption of free sugars in complementary foods) <p>The review also examines the impact of fluoridation (of water, salt and milk) and oral health education for caregivers, which are outside the scope of this risk assessment.</p> <p><u>Primary outcome</u></p>	<p>breastfeeding until <1 year of age? (1 PCS)</p> <p>Q2: Does breastfeeding beyond 1 year increase the risk of ECC compared with cows' (or similar) milk consumption as the main milk source from age 1 year? No evidence identified</p> <p>Q3: Does breastfeeding beyond 2 years increase the risk of ECC compared with breastfeeding until age <2 years? (2 PCS).</p> <p>Q4: Does breastfeeding beyond 2 years increase the risk of ECC compared with cows' (or similar) milk consumption as main milk source from age 2 years?</p> <p>Q5: Does consumption of liquids that contain free sugars from an infant feeding bottle increase the risk of ECC? (3 PCS)</p> <p>Q6: Does consumption of complementary drinks that contain free sugars increase the risk of ECC? (4 PCS)</p> <p>Q7: Does consumption of complementary foods to which free sugars have been added increase the risk of ECC? (1 PCS)</p>	<p><u>AMSTAR 2 overall confidence rating:</u> moderate</p>

Reference	Methods	Main results of included relevant studies	Comments
	Early childhood caries (ECC) (primary dentition only) or comparisons of higher or lower levels of dental caries.		