USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

Maternal-Infant Dietary Digestible Carbohydrate Intake and Chronic Disease and Other Health Outcomes

An Evidence Scan to Inform Dietary Reference Intakes

Dawanna James-Holly, PhD,[a] Courtney Thompson, MS, RD,[b] James Cain, PhD, RD,[c] Michele Datko, MS,[d] Eric Toole, MSLIS,[e] Stephanie Ritchie, MLS[f]

[a] Technical Information Specialist, Food Safety Research Information Office (FSRIO), Food Safety and Nutrition Program (FNSP), U.S. Department of Agriculture (USDA)
[b] Coordinator, Food and Nutrition Information Center (FNIC), FNSP, USDA
[c] Analyst, FNIC, FNSP, USDA
[d] Evidence Synthesis Librarian, Panum/ARETUM, under contract with the Agricultural Research Service (ARS), National Agricultural Library (NAL), USDA: Evidence Scans: DRI Macronutrients
[e] Evidence Synthesis Librarian, Panum/ARETUM, under contract with the ARS, NAL, USDA: Evidence Scans: DRI Macronutrients
[f] Lead Librarian for Customer Service, Information and Customer Services Branch (ICSB), Information Products Division (IPD), Customer Services Unit (CSU), NAL, USDA

Suggested citation: James-Holly D, Thompson C, Cain J, Datko M, Toole E, Ritchie, S. Maternal-Infant Dietary Digestible Carbohydrate Intake and Chronic Disease and Other Health Outcomes: An Evidence Scan to Inform Dietary Reference Intakes. March 2026. U.S. Department of Agriculture, Agricultural Research Service, National Agricultural Library.

Issued March 2026

Table of Contents

Introduction

The Joint US-Canada Dietary Reference Intakes Working Group (DRI Working Group) has launched an effort to update the Dietary Reference Intakes (DRIs) for macronutrients, including protein, fat, carbohydrate, and fiber.[a,b] The National Agricultural Library (NAL) evidence team, consisting of a librarian and several nutritionists, is supporting this effort by conducting a series of evidence scans on macronutrient topics. These evidence scans describe the volume and characteristics of available research and help inform decision-making related to the review and revision of macronutrient DRI values.

The DRIs are a set of evidence-based nutrient reference values used to plan and assess nutrient intakes of general populations[c] in the United States and Canada. DRI values are established for different age and sex groups, and include values related to maintaining adequacy, reducing risk of chronic disease, and avoiding toxicity.

The DRIs provide authoritative recommendations that guide scientific and health professionals, and underpin a number of federal food and nutrition programs, policies, and regulations. Keeping the values up to date is an important activity.

The United States and Canada have collaborated since the mid-1990s to provide joint support and funding to the independent National Academies of Science, Engineering, and Medicine (NASEM) to develop the DRI values. The DRI Working Group coordinates the identification and prioritization of emerging needs for DRIs.

The DRI Working Group identified that an evidence scan of the available research on dietary digestible carbohydrate intake and health outcomes in the maternal and infant populations (i.e., pregnancy, lactation, and infants/toddlers ages 0-24 months) was needed to help support the planned review of macronutrient DRI values.

The primary role of digestible carbohydrate (i.e., sugars and starches) is to provide energy to the cells in the body.[d] The current DRI values for carbohydrate were based on a narrative review of the literature and were published in 2002/2005.[e]

Values for adequacy of dietary carbohydrate for ages 1 year and older were set based on the amount of digestible carbohydrate that provides the brain with an adequate supply of glucose. In pregnancy this value is increased to also account for fetal brain glucose utilization. Similarly, the adequacy value for lactation is increased to account for the carbohydrate content of human milk.

The values for adequacy for those ages 0-6 months are based on the average carbohydrate of human milk. Values for 7-12 months of age are based on the average intake of carbohydrate

---

[a] Office of Disease Prevention and Health Promotion (OASH). Dietary Reference Intakes (DRIs) development [Internet]: U.S. Department of Health and Human Services. https://odphp.health.gov/our-work/nutrition-physical-activity/dietary-guidelines/dietary-reference-intakes/dietary-reference-intakes-development

[b] Health Canada. Dietary Reference Intakes and their development [Internet]: Government of Canada. https://www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/dietary-reference-intakes/development-dietary-reference-intakes.html

[c] National Academies of Sciences, Engineering, and Medicine. Defining Populations for Dietary Reference Intake Recommendations: A Letter Report. Washington, DC: The National Academies Press; 2022. https://doi.org/10.17226/26733

[d] Institute of Medicine. Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. Washington, DC: The National Academies Press; 2006. https://doi.org/10.17226/11537

[e] Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington, DC: The National Academies Press; 2005. https://doi.org/10.17226/10490

from both human milk and complementary foods. An Acceptable Macronutrient Distribution Range (AMDR)[a] for total carbohydrate was also established for ages 1 year and older based on evidence that intakes above and below the range may be associated with nutrient inadequacy and increased risk of obesity and coronary heart disease. Evidence was insufficient to set values related to toxicity.

Since the macronutrient DRI values were established, the DRI development process has evolved to incorporate systematic reviews [SRs][b] and enhanced methodologies for evaluating evidence related to chronic disease risk reduction[c]. New and relevant scientific research has also been published on the relationship between digestible carbohydrate intake and maternal-infant outcomes.

Accordingly, this evidence scan addresses the following questions:

- **What is the extent of the evidence on the relationship between dietary digestible carbohydrate intake in pregnant/lactating/postpartum women and chronic disease and other health outcomes?**
- **What is the extent of the evidence on the relationship between dietary digestible carbohydrate intake in pregnant/breastfeeding women and chronic disease and other health outcomes *in offspring*?**
- **What is the extent of the evidence on the relationship between dietary digestible carbohydrate intake in infants/toddlers, ages 0 to 24 months, and chronic disease and other health outcomes?**

---

[a] National Academies of Sciences, Engineering, and Medicine. Rethinking the Acceptable Macronutrient Distribution Range for the 21st Century: A Letter Report. Washington, DC: The National Academies Press; 2024. https://doi.org/10.17226/27957
[b] National Academies of Sciences, Engineering, and Medicine. Using Systematic Reviews to Support Future Dietary Reference Intakes: A Letter Report. Washington, DC: The National Academies Press; 2023. https://doi.org10.17226/27031
[c] National Academies of Sciences, Engineering, and Medicine. Guiding Principles for Developing Dietary Reference Intakes Based on Chronic Disease: A Letter Report. Washington, DC: The National Academies Press; 2017. https://doi.org/10.17226/24828

Project Methods

This section provides an overview of the research methods utilized to conduct the series of evidence scans on macronutrient topics. The methodology specific to the topic of maternal-infant dietary digestible carbohydrate intake and chronic disease and other outcomes is described in further detail in the next section. An evidence scan is a systematic and exploratory process used to describe the volume and characteristics of research available on a topic or question, and is characterized by the following:

- Providing objective data to support topic and question development, refinement, and prioritization, and inform development of a protocol for a full, in-depth systematic review
- Not answering a research question, but giving a description of available evidence
- Not involving risk of bias assessment, analysis, or grading the strength of the evidence[a]

Evidence Framework and Protocol

For each evidence scan, the DRI Working Group constructed an evidence framework, listing specific inclusion/exclusion criteria pertaining to review/study designs, PI/ECOTS[b], date ranges, and other criteria to guide development of a formal protocol.

Building on the evidence framework, the NAL evidence team collaborated with the DRI Working Group to create a protocol for each evidence scan. A protocol outlines how an evidence scan will be conducted and includes:

- List of databases and grey literature resources to be searched
- Draft search strategy, based on the criteria in the evidence framework
- Description of the approach to reference selection (i.e., data management tools, list of screening levels, number of team members screening at each level, handling of conflicts)
- Description of the approach to data extraction and specific data elements to be captured
- Description of deliverables (i.e., content and format)

Any changes to the conduct of an evidence scan were made under the direction of the DRI Working Group and recorded as amendments to the corresponding protocol.

Literature Search

Multiple science databases were searched for peer-reviewed literature to support each evidence scan. The NAL librarian worked closely with the NAL nutritionists to develop a preliminary database search strategy utilizing controlled vocabulary, free-text terms, and specialized search filters/limits, in accordance with the evidence framework. The strategy was tested and refined to maximize sensitivity and specificity. A draft strategy was shared with the DRI Working Group via the protocol and peer-reviewed by another medical librarian before finalization (i.e., model search strategy) and translation into syntax for all databases searched for each evidence scan.

---

[a] USDA Nutrition Evidence Systematic Review Branch. USDA Nutrition Evidence Systematic Review: Methodology Manual. February 2023. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition Evidence Systematic Review. https://nesr.usda.gov/methodology-overview

[b] Population(s), intervention(s)/exposure(s), comparators(s), outcome(s), timing, and setting(s)

Literature searches were executed, search results were exported, and references collectively deduplicated by another librarian via the Bramer Method[a].

Some evidence scans required additional searches for grey literature (i.e., evidence published outside of peer-reviewed journals). Key concepts for the grey literature searches were derived from the final database strategy. All database and grey literature search steps were fully documented and provided as an appendix where applicable.

Reference Management and Selection

Deduplicated database and grey literature search results were imported into DistillerSR (DistillerSR, Inc.), a web-based tool for evidence reviews. Reference selection (i.e., screening) was facilitated through the use of customized forms with questions designed to assess the relevance of each reference to the criteria in the evidence framework. Prior to screening for each evidence scan, the NAL evidence team of reviewers met to review inclusion/exclusion criteria, discuss and clarify scope, preview the online DistillerSR screening workforms, and troubleshoot any potential issues. Screening forms were then piloted among team members and refined as needed to ensure accuracy and consistency. PI/ECOTS and other inclusion/exclusion criteria were provided to reviewers live in DistillerSR as they evaluated each reference.

Team members first evaluated only the titles or titles and abstracts of references, answering broad questions about the relevance of each reference to the topic. Irrelevant references were excluded. Potentially relevant references were included, continuing to another level of screening, at which full articles, protocols, and supplementary files (as needed) were made available. Team members consulted these full text documents to make a final decision about the relevance of each reference to the specific criteria in the evidence framework. Team members selected a reason for each reference excluded at the full-text screening level (e.g., review/study type, PI/ECOTS element). References were screened by two, independent reviewers (i.e., dual screening) at most levels. Disagreements in inclusion decisions were automatically flagged in DistillerSR as “conflicts” and typically resolved through team discussion, or by an independent researcher in some cases, with clarifications made to the online screening forms as needed. The DRI Working Group was kept abreast of screening activity and consulted for guidance when interpretation of inclusion/exclusion criteria was unclear.

A PRISMA 2020 flow diagram[b] showing the numbers of references retrieved by the search and then included and excluded at each screening level, was created for each evidence scan.

Data Extraction

References included during full-text screening continued to data extraction level in DistillerSR. Data extraction captures information about the design/scope of each included reference, so that the volume and characteristics of an evidence scan topic can be fully described. Specific data elements extracted for each evidence scan are listed.

As with screening, data extraction was facilitated through customized extraction forms, based on the evidence framework and protocol. Wherever possible, extraction forms provided

---

[a] Bramer WM, Giustini D, de Jonge GB, Holland L, Bekhuis T. De-duplication of database search results for systematic reviews in EndNote. *J Med Libr Assoc*. 2016 Jul;104(3):240-3. https://doi.org/10.3163/1536-5050.104.3.014

[b] Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. https://doi.org/10.1136/bmj.n71

predefined answers to questions (in the form of selectable buttons, radio boxes, and pick lists) to foster accuracy and consistency among extractors and expedite summation of data upon completion of extraction. Free-text boxes were also provided throughout the form to capture unique answers and additional details about references as needed. As with screening, NAL evidence team members met in advance of data extraction efforts to review data elements, preview the online DistillerSR workforms, and troubleshoot potential issues. Data extraction forms were then piloted among team members and refined as needed to ensure accuracy and consistency. Each reference had data extracted by two team members working independently (i.e., dual extraction). The NAL librarian reviewed extraction responses for alignment with the evidence framework and agreement between team members. Uncertainties and frequent inconsistent responses were discussed among team members, and the DRI Working Group was consulted for guidance as needed, with updates made to extraction forms for clarification.

Description of the Evidence

At completion of extraction, data for all included references was exported from DistillerSR into Excel for aggregation and organization by the NAL evidence team. For each evidence scan, the NAL evidence team provided three deliverables to the DRI Working Group:

- **Heatmap** showing counts of identified references for each relationship (intake population-outcome) explored in this evidence scan
- **Evidence summaries** describing the nature of the evidence identified for each relationship
- **Tables providing detailed characteristics of included references** (e.g., designs of included reviews/studies, counts/types of included studies for reviews, date ranges, PI/ECOTS elements)

Summary and Limitations

The key findings and limitations of the evidence scan were summarized.

The DRI Working Group used the results of the evidence scans (i.e., heatmaps, evidence summaries, and reference characteristics) to inform decision-making related to prioritization of topics to undergo systematic review.

Evidence Scan – Maternal-Infant Dietary Digestible Carbohydrate Intake and Chronic Disease and Other Health Outcomes

Specific Methods to Conduct This Evidence Scan

The following research questions were explored in this evidence scan:

- **What is the extent of the evidence on the relationship between dietary digestible carbohydrate intake in pregnant/lactating/postpartum women and chronic disease and other health outcomes?**
- **What is the extent of the evidence on the relationship between dietary digestible carbohydrate intake in pregnant/breastfeeding women and chronic disease and other health outcomes *in offspring*?**
- **What is the extent of the evidence on the relationship between dietary digestible carbohydrate intake in infants/toddlers, ages 0 to 24 months, and chronic disease and other health outcomes?**

Evidence Framework and Protocol

The evidence framework (constructed by the DRI Working Group) specifies the inclusion and exclusion criteria for the scan and is presented in **Table 1**. Building on the evidence framework, the NAL evidence team collaborated with the DRI Working Group to create a protocol for the evidence scan. The NAL evidence team conducted the evidence scan in accordance with the protocol[a]

The evidence scan considered evidence from primary research studies, written in the English language, and published between January 1, 2000 through April 13, 2023. Studies had to evaluate intake of digestible carbohydrates in pregnant, breastfeeding/lactating, or postpartum women; or in infants/toddler ages 0-24 months. If the intake population was pregnant or breastfeeding/lactating, outcomes could be assessed in the same population or in offspring. Intake populations could be healthy or at risk/with chronic disease (exceptions noted in evidence framework). Intake of digestible carbohydrate could be enteral or oral, and from food, beverages, or dietary supplements; or from a dietary pattern that described/quantified macronutrient intake. The comparator had to be intake of a different level of digestible carbohydrate. Outcomes specified by the DRI Working Group included endpoints and intermediate outcomes, and pertained to both daily requirements and risk of chronic disease, including: adverse health outcomes; growth/development parameters, cardiovascular disease, type 2 diabetes, and body composition/weight status. See **Table 1** for a detailed list of PI/ECOTS criteria.

[a] Toole E, Ritchie S, James-Holly D, Thompson C, Parrot M, Dorais V, Ferruzzi M, Borsheim E, Kay C, Jansen, LT. Maternal-infant dietary digestible carbohydrate intake and chronic disease and other health outcomes: An evidence scan. Protocol. Last updated: 2024-4-18 https://doi.org/10.17605/OSF.IO/2VCDN

Table 1. Maternal-Infant Dietary Digestible Carbohydrate Intake and Chronic Disease and Other Health Outcomes

Category	Inclusion Criteria	Exclusion Criteria
Study Designs	Randomized controlled trials (individual, cluster, or crossover) Nonrandomized controlled trials or nonrandomized clinical trials Cohort studies (prospective or retrospective) Nested case-control studies	Review articles (e.g., umbrella, systematic, narrative, scoping) Cross-sectional studies Case series and case reports Commentaries, letters to the editor, perspectives articles Grey literature (e.g., conference literature, presentations, posters, dissertations, theses, unpublished trials)
Study Participants	Human participants • Females • Males	Nonhuman participants (e.g., animal or in-vitro models)
Life Stage/Age of Study Participants	Life stage/age at intervention/exposure or outcome: • Pregnancy, any age • Lactation, any age • Postpartum, any age • Infants/toddlers ages 0-24 months	All other life stages/ages
Health Status of Study Participants	Pregnant women from the general population (healthy or at risk for/with chronic diseases, including overweight/obesity) *Some* participants diagnosed with a disease S*ome* participants classified with severe undernutrition, or as underweight, stunted	Participants with diseases/health-related conditions that impact carbohydrate absorption or metabolism (e.g., cancer, malabsorption syndrome, diabetes) Participants pre- or post-bariatric surgery
Interventions/ Exposures	Studies that examine: • Intake of digestible carbohydrate* from food, beverages, and dietary supplements (*defined as collective starch and sugar; carbohydrate not including dietary fiber) • Dietary pattern that describes and quantifies intake of dietary digestible carbohydrate, total fat, and total protein content. Examples: low/high-carbohydrate diet, low/high-fat diet, ketogenic diet, Atkins diet, Zone diet, high-protein diet, Pritikin diet, Ornish diet	Studies that: • Examine multicomponent interventions and do not isolate the effect/association of digestible carbohydrate • Do not specify the amount of digestible carbohydrate intake (e.g., studies that only report type or source of digestible carbohydrate) • Do not describe the entire macronutrient distribution of the diet (i.e., digestible carbohydrate, total fat, total protein contents of experimental or baseline diets) • Do not control for differences in total energy intake of participants • Only assess digestible carbohydrate intake via infusions (rather than the GI tract) • Involve interventions designed to induce weight loss or treat overweight and obesity through energy restriction or hypocaloric diets • Examine food products or dietary supplements not widely available to U.S. consumers
Comparators	Intake of a different level of digestible carbohydrate	Studies that do not control for differences in total energy intake of participants, such that comparisons are made on an isocaloric basis. Comparisons of available carbohydrate exposure should not be confounded by differences in participants' energy intake
Overall Outcomes	Adverse events, growth and development, selected chronic diseases as described in the rows that follow	Fetal body composition/adiposity Postprandial assessments Type 1 diabetes

Category	Inclusion Criteria	Exclusion Criteria
Outcomes for intake in pregnant/lactating/postpartum women and outcomes in the same individuals	Adverse outcomes and other conditions assessed in pregnant/lactating women: • Hypertensive disorders of pregnancy and/or lactation: chronic hypertension, gestational hypertension, preeclampsia-eclampsia, or chronic hypertension with superimposed preeclampsia • Gestational diabetes • Lactation ketoacidosis Gestational and postpartum weight change in pregnant/ breastfeeding/ postpartum women: • Change in pregnant individual's body weight from baseline (before or during pregnancy) to a later time point during pregnancy and/or right before delivery • Weight gain in relation to weight gain recommendations, based on pre-pregnancy BMI • Change in weight from baseline (postpartum) to a later time point during the postpartum period • Postpartum weight retention if gestational weight gain is controlled for	N/A

Category	Inclusion Criteria	Exclusion Criteria
Outcomes for intake in pregnant/breastfeeding women and outcomes in offspring	Adverse birth outcomes: • Spontaneous abortion or stillbirth • Preterm birth • Clinical status at birth (e.g., low APGAR scores) Fetal and newborn growth parameters: • Fetal growth (e.g., intrauterine growth restriction, fetal growth retardation) • Low birth weight • Small-for-gestational age • Large-for-gestational age, fetal macrosomia • Birth head circumference • Birth weight • Birth length • Birth BMI/BMI z-score, birth weight-for-length, or ponderal index • Birth body composition and distribution (e.g., % fat mass, fat-free mass, skin fold thicknesses) Development domains assessed in offspring, ages 0-18 years and examined via milestone achievement and/or scales/indices, including: • Cognitive • Language/communication • Movement/physical Growth, size, and body composition (GSBC) assessed in offspring, at any age after birth: • Incidence and prevalence of: underweight, failure to thrive, stunting, wasting, healthy weight, overweight/obesity • Weight, weight-for-age • Height/height-for-age/stature-for-age • BMI, BMI z-score, weight-for-length • Body composition and distribution (e.g., % fat mass, fat-free mass, skin fold thicknesses) Cardiovascular disease (CVD) assessed in offspring, at any age: • Incidence of CVD, incidence of stroke, CVD-related mortality • Total cholesterol, LDL cholesterol, HDL cholesterol, triglyceride/triacylglycerol, or blood pressure Type 2 diabetes (T2D) assessed in offspring, at any age: • Incidence of T2D or incidence of (offspring) gestational diabetes • HbA1c, glucose tolerance, insulin sensitivity/insulin resistance	N/A

Category	Inclusion Criteria	Exclusion Criteria
Outcomes for intake in infants/toddlers ages 0-24 months, and outcomes in the same individuals	Developmental domains assessed in ages 0-18 years (examined via milestone achievement and/or scales/indices), including: • Cognitive • Language/communication • Movement/physical GSBC assessed at any age: • Incidence and prevalence of: underweight, failure to thrive, stunting, wasting, healthy weight, overweight/obesity • Weight, weight-for-age • Height/height-for-age/stature-for-age • BMI, BMI z-score, weight-for-length • Body composition and distribution (e.g., % fat mass, fat-free mass, skin fold thicknesses) CVD assessed at any age: • Incidence of CVD, incidence of stroke, CVD-related mortality • Total cholesterol, LDL cholesterol, HDL cholesterol, triacylglycerol, or blood pressure T2D assessed at any age: • Incidence of T2D or incidence of (offspring) gestational diabetes • HbA1c, glucose tolerance, insulin sensitivity/insulin resistance	N/A
Study Durations	No restrictions	No restrictions
Publication Dates	January 1, 2000 to April 13, 2023	Prior to 2000 or after April 13, 2023
Publication Statuses	Articles published in peer-reviewed journals	Articles that have not been peer reviewed and are not published in peer-reviewed journals (e.g., unpublished data, manuscripts, preprints, reports, abstracts, conference proceedings)
Publication Languages	English	Languages other than English

Literature Search

The NAL librarian worked with the NAL nutritionists to construct a preliminary search strategy based on the evidence framework. Following review of the search strategy by another librarian and the DRI Working Group, the NAL librarian translated the "model" search strategy into syntax for all databases and executed all the database searches for the evidence scan. The full model search strategy and a list of all databases searched is provided in **Appendix B**. Note that grey literature searches were not completed for this evidence scan.

Database search results were exported and then collectively deduplicated by another librarian using the Bramer method[a]. Counts of search results (i.e., references) before and after deduplication are reported in the **Results** section.

[a] Bramer WM, Giustini D, de Jonge GB, Holland L, Bekhuis T. De-duplication of database search results for systematic reviews in EndNote. J Med Libr Assoc. 2016 Jul;104(3):240-3. https://doi.org/10.3163/1536-5050.104.3.014

Reference Management and Selection

Deduplicated search results were imported into DistillerSR. Prior to screening, the NAL team met to review the inclusion/exclusion criteria and screening forms. Included references were evaluated by NAL evidence team members in DistillerSR at the following screening levels:

- Level 1 – *one* team member reviewed the title
- Level 2 – *two* team members reviewed the title and abstract
- Level 3 – *two* team members reviewed the full article

At each level irrelevant references were excluded from the evidence scan and potentially relevant references were included, continuing to the next type of screening. At level 3 (full text), team members recorded a reason for any reference that was excluded. Disagreements in screening decisions (i.e., flagged as conflicts in DistillerSR) were typically resolved through team discussion and responses updated in DistillerSR as needed. Counts of references included and excluded at each level are reported in the **Results** section.

Data Extraction

All included references underwent data extraction in DistillerSR (Level 4). Data for each reference was extracted independently by two team members. The NAL evidence team members reviewed the online extraction form and procedures, then extracted the following data elements from each study:

- Study design
- Country, name of larger cohort/study (e.g., The Pregnancy, Infection, and Nutrition [PIN] Study), when data from an existing cohort/larger study was utilized
- Intake population age, stage, health, and other characteristics
  - For pregnant/lactating/breastfeeding intake populations: whether outcomes were measured in the same individuals or in offspring
- Number of study participants (or parent-offspring pairs)
- Text description of intervention/exposure
- Duration of intervention/followup
- Major outcome category (e.g., adverse outcomes, growth parameters, cardiovascular disease)
- Specific endpoints and intermediate outcomes within the major outcome category (as listed in the evidence framework in **Table 1**)
- Study results as reported in the abstract

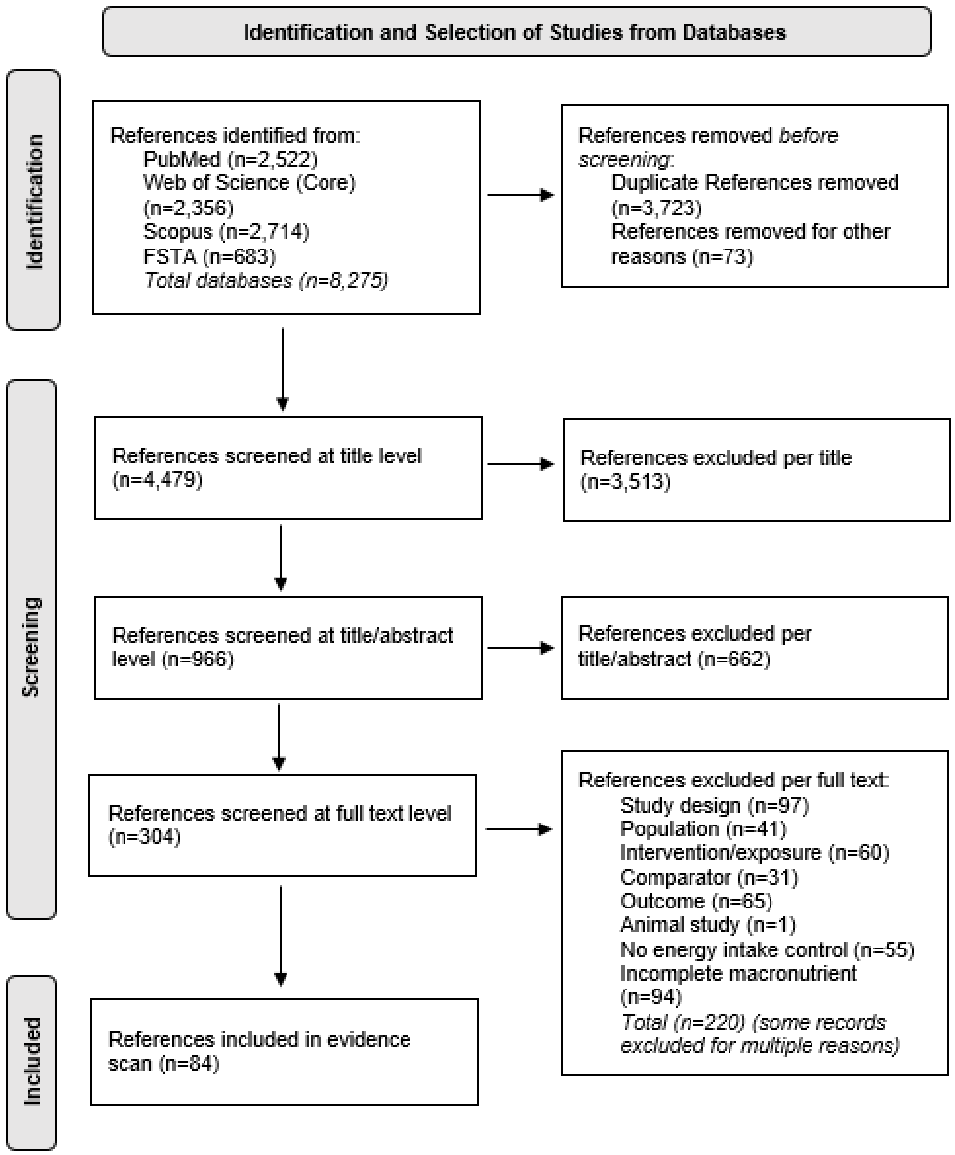
The NAL librarian reviewed extraction responses for alignment with the evidence framework and agreement between team members. Uncertainties and frequent inconsistent responses were discussed among team members, and the DRI Working Group was consulted for guidance as needed, with updates made to extraction forms for clarification.

Results

Literature Search and Screening Results

The literature search (April 13, 2023) retrieved 4,479 references after the removal of duplicates. There were 3,513 references excluded at title screening, 662 excluded at title/abstract screening, and 220 excluded at full-text screening, yielding 84 studies for the body of evidence. A PRISMA flow diagram is provided in **Figure 1** and a list of references excluded at full-text is provided in **Appendix C**.

Figure 1. PRISMA 2020 Flow Diagram[a] for Maternal-Infant Dietary Digestible Carbohydrate Intake and Chronic Disease and Other Health Outcomes



A **heatmap** of all of the relationships explored in this evidence scan and the number of studies identified that examine each relationship is presented in **Table 2**. Following the heatmap are **evidence summaries** that narratively describe the group of studies examining each relationship. Corresponding **tables of study characteristics** (**Tables 3-13**) for each identified study appear after the evidence summaries.

A **summary and limitations** discussion of the entire evidence scan follows the tables.

---

[a] Modified from: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. https://doi.org/10.1136/bmj.n71

Note that the evidence scan results are organized by populations at the age ranges *when dietary carbohydrate intake was assessed*, rather than the age ranges at outcome measurement. While shorter-duration studies generally assessed intake and outcomes within the same life stage (e.g., intake in infants and outcomes in later in infancy), longer-duration studies often measured dietary intake during infancy/toddlerhood or with subsequent health outcomes assessed during childhood or later.

Table 2. Heatmap of Studies Examining Maternal-Infant Dietary Digestible Carbohydrate Intake and Chronic Disease and Other Health Outcomes

Total Unique Studies (N = 84)	Pregnant/ Lactating/Postpartum Women and Outcomes in *Same* Individuals (n = 22)	Pregnant/ Breastfeeding Women and Outcomes in *Offspring* (n = 38)	Infants/Toddlers Ages 0-24 Months and Outcomes in *Same* Individuals (n = 32)
Adverse Pregnancy/ Lactation Outcomes (n = 8)	8	N/A	N/A
Gestational/Postpartum Weight (n = 14)	14	N/A	N/A
Adverse Birth Outcomes (n = 2)	N/A	2	N/A
Fetal/Newborn Growth Parameters (n = 25)	N/A	25	N/A
Developmental Outcomes (n = 5)	N/A	0	5
GSBC (n = 37)	N/A	9	28
CVD (n = 13)	N/A	9	4
T2D (n = 6)	N/A	4	2

Heatmap key:
Darker shading indicates increasing quantity of studies examining each population-intake-outcome combination
N/A = Not applicable

Description of the Evidence

Intake in Pregnant/Lactating Women and Adverse Pregnancy/Lactation Outcomes

Eight studies examined the relationship between digestible carbohydrate intake among pregnant and/or lactating women and adverse maternal outcomes in the same population.(1-8) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 3**.

Study Characteristics

All eight studies were prospective cohort study (PCS) designs.(1-8)

Population Characteristics

Two studies involved pregnant women with overweight or obesity(3, 7); none of the other studies noted special population characteristics.

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

Two studies focused on carbohydrate intake(6, 7) and six looked more broadly at intake of all macronutrients(1-5, 8).

Outcome Characteristics

Outcomes of interest included: hypertensive disorders of pregnancy/lactation (i.e., hypertension, pre-eclampsia, eclampsia); gestational diabetes (GDM); and lactation ketoacidosis. One study examined hypertensive disorders of pregnancy(7), eight examined GDM(1-8), and no studies examined lactation ketoacidosis.

Intake in Pregnant/Postpartum Women and Gestational/Postpartum Weight Change

Fourteen studies examined the relationship between digestible carbohydrate intake in pregnant and/or postpartum women and gestational/postpartum weight outcomes.(7, 9-21) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 4**.

Study Characteristics

All fourteen studies were PCS designs.(7, 9-21)

Population Characteristics

Three studies included pregnant women with overweight or obesity (7, 9, 19); none of the other studies noted special population characteristics.

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

Two studies focused on carbohydrate intake(7, 9), one on protein/carbohydrate intake(17), and 11 looked more broadly at intake of all macronutrients(10-16, 18-21)

Outcome Characteristics

Outcomes of interest included: weight change from baseline (before or during pregnancy) to later in pregnancy/before delivery; weight gain in relation to recommendations; weight change from baseline (postpartum) to a later point in the postpartum period; postpartum weight retention if gestational weight is controlled.

Twelve studies examined gestational weight change(9, 12-19, 21), eight examined gestational weight gain in relation to recommendations(9, 12, 15-20), and two examined postpartum weight change and retention(10, 11).

Intake in Pregnant Women and Adverse Birth Outcomes

Two studies examined the relationship between digestible carbohydrate intake among pregnant women and adverse birth outcomes.(7, 22). A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 5**.

Study Characteristics

Both studies were PCS designs.(7, 22)

Population Characteristics

One study involved pregnant women with overweight or obesity(7); neither of the other studies noted special population characteristics.

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

One study focused on carbohydrate intake(7) and one looked more broadly at intake of all macronutrients(22).

Outcome Characteristics

Outcomes of interest included: spontaneous abortion or stillbirth; preterm birth; and low APGAR score (clinical status at birth).

Both studies examined preterm birth(7, 22). No studies examined clinical status at birth.

Intake in Pregnant Women and Fetal/Newborn Growth Outcomes

Twenty-five studies examined the relationship between digestible carbohydrate intake during pregnancy and fetal/newborn growth parameters.(7, 9, 12, 14, 15, 18, 20-38) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 6**.

Study Characteristics

All twenty-five studies were PCS designs(7, 9, 12, 14, 15, 18, 20-38)

Population Characteristics

Three studies included pregnant women with overweight or obesity(7, 9, 34) and one included pregnant women who previously delivered an infant with fetal macrosomia (29).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

Three studies focused on carbohydrate intake(7, 9, 37), and 22 looked more broadly at intake of all macronutrients(12, 14, 15, 18, 20-36, 38).

Outcome Characteristics

Outcomes of interest included: fetal growth (e.g., intrauterine growth restriction, fetal growth retardation); low birth weight (LBW); small for gestational age (SGA); large for gestational age (LGA); head circumference (HC), birth weight; birth length; birth BMI/BMI z-score/birth weight for length (WFL); ponderal index; and birth body composition and distribution.

One study examined fetal growth(34), three studies examined LBW (7, 22, 36), five studies examined SGA (22, 31-33, 38), two studies examined LGA(7, 38), seven studies examined HC(15, 25-28, 30, 36), 23 studies examined birth weight(7, 9, 12, 14, 15, 18, 20-33, 35, 36, 38), 10 studies examined birth length(14, 15, 22, 24, 26, 28-30, 35, 36), one study examined birth BMI/BMI z-score/WFL(23), five studies examined the ponderal index(14, 22, 24-26), and 10 examined birth body composition and distribution(14, 22, 24-26, 29, 30, 35-37).

Intake in Pregnant/Breastfeeding Women and Developmental Outcomes in Offspring, Ages 0-18 Years

No studies were identified examining the relationship between digestible carbohydrate intake during pregnancy and/or lactation and developmental outcomes in offspring.

Intake in Pregnant/Breastfeeding Women and Growth, Size, and Body Composition (GSBC) in Offspring at Any Age

Nine studies examined the relationship between digestible carbohydrate intake during pregnancy and/or lactation and GSBC in offspring.(23, 35, 39-45) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 7**.

Study Characteristics

All nine studies were PCS designs.(23, 35, 39-45)

Population Characteristics

None of the studies noted special population characteristics. Seven of the studies followed the intake population through childhood(23, 35, 39, 40, 43-45) and two through young adulthood(41, 42).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

One study focused on carbohydrate intake(43) and eight studies looked more broadly at intake of all macronutrients(23, 35, 39-42, 44, 45).

Outcome Characteristics

Outcomes of interest included: incidence/prevalence of underweight, healthy weight, overweight/obesity, failure to thrive/stunting/wasting; weight/weight-for-age (wt/WFA); height/height-for-age/stature-for-age (ht/HFA/SFA); BMI/BMI z-score/weight for length (WFL); and body composition and distribution.

One study examined incidence/prevalence of healthy weight and overweight/obesity(44); seven studies examined wt/WFA(23, 35, 39, 42-45); four studies examined ht/HFA/SFA(35, 43-45); six studies examined BMI/BMI z-score/WFL(23, 40-44); and five studies examined body composition/distribution(35, 39, 40, 43, 45).

Intake in Pregnant/Breastfeeding Women and Cardiovascular Disease (CVD) in Offspring at Any Age

Nine studies examined the relationship between digestible carbohydrate intake during pregnancy and/or lactation and CVD in offspring.(40-42, 45-50) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 8**.

Study Characteristics

Eight studies were PCS designs(40-42, 45-48, 50), and one was a retrospective cohort design (RCS)(49).

Population Characteristics

None of the studies noted special population characteristics. Five of the studies followed the intake population through childhood(40, 45, 46, 48, 50); three through early adulthood(41, 42, 47); and one through middle adulthood(49).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

Eight studies looked broadly at intake of all macronutrients(40-42, 45-48, 50), one of which also focused on protein/carb ratio, n-6/n-3 FA ratio(46). One study estimated protein/carbohydrate intake from the maternal diet(49).

Outcome Characteristics

Outcomes of interest were categorized as endpoints (CVD incidence, stroke incidence, CVD mortality) or intermediate measures (total cholesterol [TC], low-density lipoprotein cholesterol [LDL], high-density lipoprotein cholesterol [HDL], triglycerides, blood pressure [BP]).

Six studies examined blood pressure(45-50); and three studies examined TC and TG/TAG(40-42), one of which also examined LDL and HDL(40). No studies examined the incidence of CVD or stroke, nor CVD mortality.

Intake in Pregnant/Breastfeeding Women and Type 2 Diabetes (T2D) in Offspring at Any Age

Four studies examined the relationship between digestible carbohydrate intake during pregnancy/lactation and T2D outcomes in offspring.(41-43, 51) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 9**.

Study Characteristics

Three of the studies were PCS designs(41-43) and one was an RCS(51).

Population Characteristics

None of the studies noted special population characteristics. One of the studies followed the intake population through childhood(43); two through early adulthood(41, 42); and one through middle adulthood(51).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns.

One study focused on carbohydrate intake(43) and three looked more broadly at intake of all macronutrients(41, 42, 51).

Outcome Characteristics

Outcomes of interest were categorized as endpoints (type 2 diabetes [T2D] incidence, gestational diabetes [GDM] incidence) or intermediate measures (glycated hemoglobin [HbA1c], glucose tolerance, insulin resistance/insulin sensitivity).

Two studies examined HbA1c(41, 42) and three studies examined glucose tolerance, insulin resistance/insulin sensitivity(41, 43, 51). No studies reported on incidence of T2D or GDM in offspring.

Intake in Ages 0-24 Months and Developmental Outcomes in the Same Population, Ages 0-18 Years

Five studies examined the relationship between digestible carbohydrate intake in ages 0-24 months and developmental outcomes at a later age.(52-56) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 10**.

Study Characteristics

Three of the studies were PCS designs(52, 53, 55) and two were RCSs(54, 56).

Population Characteristics

Four of the studies included infants born preterm or at LBW or very low birth weight (VLBW)(52, 54-56). Two studies followed the intake population through toddlerhood(52, 56), two through childhood(53,55), and one through adulthood(54).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns. Intake could be from human milk, formula, solid foods, or other beverages.

Four studies examined intake of macronutrients from enteral and parenteral feedings of fortified human milk or formula.(52, 54-56) and one study examined intake of macronutrients from the entire diet, including solid foods.(53).

Outcome Characteristics

Outcomes of interest included developmental domains: cognitive; language and communication; and movement/physical.

All five studies examined cognitive development(52-56); four examined language/communication development(52-55); and two examined movement/physical development(52, 53).

Intake in Ages 0-24 Months and GSBC in the Same Population, at Any Age

Twenty-eight studies examined the relationship between digestible carbohydrate intake in ages 0-24 months, and GSBC at a later age.(56-83) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 11**.

Study Characteristics

Four of the studies were RCTs(65, 68, 76, 78), one was a nonRCT(75), 21 were PCSs(57-64, 66, 67, 69-74, 77, 79, 80, 82, 83), and two were RCSs(56, 81).

Population Characteristics

Twelve of the studies included infants born preterm or with LBW/VLBW(56-60, 64, 68, 70, 75, 76, 78, 81) and one study included infants at increased genetic risk for T1D(59).

Thirteen studies followed the intake population through infancy(57, 58, 60, 63-65, 68, 70, 73, 75, 76, 78, 81); two through toddlerhood(56, 61); eight through childhood(59, 62, 67, 71, 72, 79, 80, 82), two through adolescence(66, 69); and two through early adulthood(74, 77).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns. Intake could be from human milk, formula, solid foods, or other beverages.

Thirteen studies examined intake from enteral, parenteral, or oral feedings of human milk and/or formula, fortified or unfortified. Of these early feeding studies, one study examined intake of fat/carbohydrate intake of enteral feedings with five formulas with varying levels of energy/macronutrients(68); one study examined fat/carbohydrate intake from a control formula or formula with three different nonprotein energy supplements(78); and 11 studies broadly examined intake of all macronutrients(56-58, 60, 63, 64, 70, 73, 75, 76, 81)

Fifteen studies examined intake from the entire diet, including solid foods. Of these, one study examined intake of carbohydrates from the entire diet(71); one examined intake of protein/fat from the entire diet(67); and 13 studies broadly examined intake of all macronutrients(59, 61, 62, 65, 66, 69, 72, 74, 77, 79, 80, 82, 83).

Outcome Characteristics

Outcomes of interest included: incidence/prevalence of underweight, healthy weight, overweight/obesity, failure to thrive/stunting/wasting; wt/WFA; ht/HFA/SFA; BMI/BMI z-score/WFL; and body composition and distribution.

Two studies examined incidence of overweight/obesity(59, 79); 25 studies examined wt/WFA(56-65, 67-76, 78, 80-83); 23 studies examined ht/HFA/SFA(56-65, 67-70, 72-74, 76, 78, 80-83); 16 studies examined BMI/BMI z-score/WFL(59, 62, 63, 65, 66, 69, 71-74, 76, 77, 79, 80, 82, 83); and 19 studies examined body composition and distribution(56-58, 60, 63-69, 71, 72, 74, 76-78, 81, 82).

Intake in Ages 0-24 Months and CVD in the Same Population, at Any Age

Four studies examined the relationship between digestible carbohydrate intake in ages 0-24 months and CVD at a later age.(61, 71, 82, 84) A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 12**.

Study Characteristics

All four studies were PCS designs.(61, 71, 82, 84)

Population Characteristics

None of the studies noted special population characteristics. All four studies followed the intake population through childhood.(61, 71, 82, 84)

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns. Intake could be from human milk, formula, solid foods, or other beverages.

One study focused on carbohydrate intake(71) and three looked more broadly at intake of all macronutrients(61, 82, 84). All studies examined intake from the entire diet, including solid foods.

Outcome Characteristics

CVD outcomes were categorized as endpoints (CVD incidence, stroke incidence, CVD mortality) or intermediate measures (TC, LDL, HDL, TG/TAG, BP).

Three studies examined TC, LDL, HDL, and TG/TAG(61, 71, 82) and two studies examined BP(82, 84). No studies examined the incidence of CVD or stroke, nor CVD mortality.

Intake in Ages 0-24 Months and T2D in the Same Population, at Any Age

Two studies examined the relationship between dietary digestible carbohydrate intake in ages 0-24 months and T2D in the same individuals a later age.(65, 71). A general summary of the studies follows. Full extraction data for each study, including PI/ECOTs criteria and other characteristics, are provided in **Table 13**.

Study Characteristics

One study was an RCT design (65) and one was a PCS(71).

Population Characteristics

Neither study noted special population characteristics. One study followed the intake population through infancy(65) and the other through childhood(71).

Intervention/Exposure Characteristics

All interventions/exposures studied focused on specific diet components including carbohydrates, fats, or both carbohydrate and fat intakes; a dietary pattern that is defined by its total fat and/or digestible carbohydrate content such as ketogenic diet; or a combination of intakes/dietary patterns. Intake could be from human milk, formula, solid foods, or other beverages.

One study focused on carbohydrate intake(71) and the other compared Nordic and conventional diets(65); both examined intake from the entire diet, including solid foods.

Outcome Characteristics

Diabetes outcomes were categorized as endpoints (type 2 diabetes [T2D] incidence, gestational diabetes [GDM] incidence) or intermediate measures (glycated hemoglobin [HbA1c], glucose tolerance, insulin resistance/insulin sensitivity).

One study examined HbA1c(65) and the other examined glucose tolerance, insulin resistance/insulin sensitivity(71). No studies examined incidence of T2D or GDM.

Table 3. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant/Lactating Women and Adverse Pregnancy/Lactation Outcomes

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Dong, 2021(1) PCS China	n = 1,455 pregnant women	Macronutrient intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnant women: f/u = 28 wk gestation	"The results showed that the multivariable-adjusted RR of GDM from the lowest to the highest quartiles of the overall LCD score were 1·00 (reference), 1·15 (95 % CI 0·92, 1·42), 1·30 (95 % CI 1·06, 1·60) and 1·24 (95 % CI 1·01, 1·52) (P = 0·026 for trend). Multivariable-adjusted RR (95 % CI) of GDM from the lowest to the highest quartiles of the animal LCD score were 1·00 (reference), 1·20 (95 % CI 0·96, 1·50), 1·41 (95 % CI 1·14, 1·73) and 1·29 (95 % CI 1·04, 1·59) (P = 0·002 for trend). After additional adjustment for gestational weight gain before GDM diagnosis, the association of the overall LCD score with GDM risk was non-significant, while the association of animal LCD score with GDM risk remained significant."
Feng, 2023(2) PCS China	n = 1,477 pregnant women	Macronutrient intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnant women: f/u = 28 wk gestation	"The results showed that total fat intake was positively associated with GDM risk (Q4 v. Q1: RR = 1.40; 95 % CI 1.11, 1.76; P(trend) = 0.001). This association was also observed for the intakes of animal fat and vegetable fat. After stratified by total fat intake (< 30 %E v. >/= 30 %E), the higher animal fat intake was associated with higher GDM risk in the high-fat group, but the moderate animal fat intake was associated with reduced risk of GDM (T2 v. T1: RR = 0.65; 95 % CI 0.45, 0.96) in the normal-fat group. Vegetable fat intake was positively associated with GDM risk in the high-fat group but not in the normal-fat group."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Pajunen, 2022(3) PCS Finland	n = 351 pregnant women With overweight/obesity	Macronutrient intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnant women: f/u = 24-24 wk gestation	"Higher adherence to 'healthier dietary pattern' characterized by consumptions of vegetables and rye bread associated with a reduced risk of GDM (adjusted OR 0.27, 95% CI 0.11-0.70). Higher E-DII score, indicating pro-inflammatory diet, was associated with a 27% higher risk of GDM (adjusted OR 1.27; 95% CI 1.08-1.49) for each E-DII point. In the evaluation of nutrient intakes, total fat, saturated fatty acids (SFAs), and trans fatty acids were higher and fiber lower in women developing GDM compared to women not developing GDM (all p < 0.05). Intakes of total fat, SFAs, and trans fatty acids were also significant predictors for GDM (all p < 0.05)."
Radesky, 2008(4) PCS UK Project Viva	n = 1,733 pregnant women	Macronutrient intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnant women: f/u = 26-28 wk gestation	"Pre-pregnancy body mass index (BMI) was a strong predictor for GDM risk (OR 3.44 [95% CI 1.88, 6.31] for pre-pregnancy BMI > or =30 vs. <25 kg/m(2)). After adjustment for confounders, the OR [95% CI] for risk of GDM for total dietary fat was 1.00 [0.96, 1.05], for saturated fat 0.98 [0.88, 1.08], for polyunsaturated fat 1.09 [0.94, 1.26], for trans fat 0.87 [0.51, 1.49], and for carbohydrates 1.00 [0.96, 1.03] per each 1% of total energy. The adjusted OR [95% CI] for risk of GDM for a one standard deviation increase in energy-adjusted glycaemic load (32 units, about two soft drinks) was 0.96 [0.76, 1.22] and for each daily serving of whole grains was 0.90 [0.73, 1.13]. Dietary patterns and intake of red and processed meats were not predictive of glucose tolerance outcome. Estimates for IGT [impaired glucose tolerance] were similar to those for GDM. Intake of n-3 fatty acids was associated with increased GDM risk (OR 1.11 [95% CI 1.02, 1.22] per each 300 mg/day), but not with IGT risk."
Saldana, 2004(5) PCS US Pregnancy, Infection, and Nutrition Study	n = 1,698 pregnant women	Macronutrient intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnant women: f/u = Later in pregnancy (timing not reported)	"The overall prevalences of IGT and GDM in the cohort were 2.6% and 5.2%, respectively. The addition model showed that adding 100 kcal from carbohydrates to the diet was associated with a 12% decrease in risk of IGT and a 9% decrease in risk of GDM. The substitution model showed that substituting fat for carbohydrates (per each 1% of total calories) resulted in a significant increase in risk of both IGT and GDM [relative risk = 1.1 (95% CI: 1.02, 1.12) and 1.1 (1.02, 1.10), respectively]. Predicted probabilities of IGT and GDM were reduced by one-half with a 10% decrease in dietary fat and a 10% increase in carbohydrate."
Tajima, 2017(6) PCS Japan	n = 325 pregnant women	Carbohydrate intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnancy individuals: f/u = 28 wk gestation	"Carbohydrate intake was negatively associated with a positive GCT result after adjusting for age, parity, bod mass index at first prenatal visit, family history of diabetes mellitus, rate of gestational weight gain, energy intake, and dietary fiber intake (odds ratio for top category: 0.46 [95% CI, 0.23-0.93])."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Tanner, 2021(7) PCS Australia Study of Probiotic IN Gestational diabetes (SPRING)	n = 382 pregnant women With overweight/obesity	Carbohydrate intake from diet	**Adverse Pregnancy/Lactation:** hypertensive disorders, GDM *Additional examined outcomes: Gestational/Postpartum Weight, Adverse Birth Outcomes, Fetal and Newborn Growth*	Pregnant women: f/u = 16-28 wk	"Mean gestation was increased in women whose absolute carbohydrate intake was in the lowest quintile at 16 and at both 16- and 28-weeks' gestation compared with all other women (16: 39.7 vs. 39.1 weeks, p = 0.008; 16 and 28: 39.8 vs. 39.1, p = 0.005). In linear regression analysis, a low absolute carbohydrate intake at 16 and at 28 weeks' gestation was associated with increased gestation at delivery (16: p = 0.04, adjusted R2 = 0.15, 28: p = 0.04, adjusted R2 = 0.17). The coefficient of beta at 16 weeks' gestation was 0.50 (95% CI 0.03–0.98) and at 28 weeks' gestation was 0.51 (95%CI 0.03–0.99) meaning that consumption of a low absolute carbohydrate diet accounted for an extra 3.5 days in gestational age. This finding was not seen in women whose percentage carbohydrate intake was in the lowest quintile."
Zhou, 2018(8) PCS China Tongji Maternal and Child Health Cohort (TMCHC)	n = 2,755 pregnant women	Macronutrient intake from diet	**Adverse Pregnancy/Lactation:** GDM	Pregnant women: f/u = 28 wk gestation	"The results showed that high fish-meat-eggs scores, which were positively related to protein intake and inversely related to carbohydrate intake, were associated with a higher risk of GDM (adjusted OR for quartile 4 v. quartile 1: 1·83; 95 % CI 1·21, 2·79; P trend=0·007) and higher plasma glucose levels. In contrast, high rice-wheat-fruits scores, which were positively related to carbohydrate intake and inversely related to protein intake, were associated with lower risk of GDM (adjusted OR for quartile 3 v. quartile 1: 0·54; 95 % CI 0·36, 0·83; P trend=0·010) and lower plasma glucose levels. In addition, dietary protein and carbohydrate intake significantly contributed to the associations between dietary patterns and GDM risk or glucose levels."

Table 4. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant/Postpartum Women and Gestational/Postpartum Weight

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Callahan, 2021(9) PCS US	n - 56 pregnant women With normal weight or obesity	Carbohydrate intake from diet Four groups: normal weight/low-carb, normal weight/high-carb, obese/low-carb, and obese/high-carb	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations *Additional examined outcomes: Fetal/Newborn Growth*	Pregnancy: f/u = last prenatal visit	"A significant interaction between weight status and CHO [carbohydrate] content of the diet was found (P < .05), such that, for women with obesity, those consuming a lowCHO diet had less GWG than those consuming a highCHO diet, whereas the pattern was opposite for women with NW [normal weight]." "Results imply that moderately low CHO intake among women with obesity may influence infant birth weight via differences in GWG."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Chen, 2021(10) PCS Singapore GUSTO (Growing Up in Singapore Toward healthy Outcomes)	n = 426 postpartum individuals	Macronutrient intake from diet Low-carb diets, organized into quartiles, and further categorized by preference of fat/protein from animal or plant sources	**Gestational/Postpartum Weight:** postpartum weight change, postpartum weight retention	Postpartum individuals: f/u = 1 yr postpartum	"After adjusting for potential confounding variables, women in higher quartiles of total and animal-based LCD scores had a significantly lower bod weight and weight retention at 1 year postpartum (P < 0.05). The multivariable-adjusted ORs of substantial PPWR (≥5 kg), comparing the highest with the lowest quartile, were 0.47 (95% confidence interval 0.23-0.96) for the total LCD score (P = 0.021 for trend) and 0.38 (95% confidence interval 0.19-0.77) for the animal-based LCD score (P = 0.019 for trend), while this association was significantly attenuated by rice, glycemic load, fish, poultry, animal fat and animal protein (P for trend <0.05). A high score for plant-based LCD was not significantly associated with the risk of PPWR (P > 0.05)."
Dias Duarte de Carvalho Souza, 2022(11) PCS Brazil	n = 260 postpartum individuals	Macronutrient intake from diet	**Gestational/Postpartum Weight:** postpartum weight change, postpartum weight retention	Postpartum: f/u = 6 mo postpartum	"There was decrease in weight (-4.45 kg), bod mass index (-4.43 kg/m(2)), WC (-4.70 cm), and AC (-4.70 cm) values from the baseline (n = 260) up to 6 months after childbirth (p < 0.001). The evolution of these measurements has indicated that high carbohydrate and low protein intake were associated with the highest AC values. Low protein and high lipid intake have led to lower WC values (p < 0.05)."
Diemert, 2016(12) PCS Germany	n = 200 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations *Additional examined outcomes: Fetal/Newborn Growth*	Pregnancy: f/u = 34-36 wk gestation	"One third of the women were characterized by an elevated pre-pregnancy BMI, 60 % did not comply with current weight gain recommendations. Particularly overweight and obese women gained more weight than recommended. In a multivariate analysis birth weight correlated significantly with maternal BMI (p = 0.020), total weight gain (p = 0.020) and gestational week (p < 0.001). Compared to guidelines mean percentage of energy derived from fat (p = 0.002) and protein (p < 0.001) was significantly higher, whereas carbohydrate (p = 0.033) intake was lower. Mean fiber intake was significantly lower (p < 0.001). Saturated fat and sugar contributed largely to energy consumption. Gestational weight gain correlated significantly with energy (p = 0.027), carbohydrates (p = 0.008), monosaccharides and saccharose (p = 0.006) intake. 98 % of the pregnant women were below the iodine recommendation, while none of the women reached the required folate, vitamin D, and iron intake."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Dubois, 2018(13) PCS Canada 3D Cohort Study (Design, Develop, Discover)	n = 861 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change	Pregnant women: f/u = 3 wk before delivery	"In all BMI categories, intakes considered suboptimal (by comparison with estimated average requirements) were noted for Fe, vitamin D, folate, vitamin B6, Mg, Zn, Ca and vitamin A. Total fat intakes were above the acceptable macronutrient distribution range (AMDR) for 36 % of the women. A higher proportion of obese women had carbohydrate intakes (as %E) below the AMDR (v. normal-weight and overweight women; 19 v. 9 %) and Na intakes above the tolerable upper intake level (v. other BMI categories; 90 v. 77-78 %). In all BMI categories, median intakes of K and fibre were below adequate intake. Intakes of several nutrients (adjusted for energy) were correlated with BMI. Correlations were detected between energy-adjusted nutrient intakes and total GWG and were, for the most part, specific to certain BMI categories."
Grandy, 2018(14) PCS US	n = 41 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change *Additional examined outcomes: Fetal/Newborn Growth*	Pregnant women: f/u = delivery	"Neither the third trimester maternal diet quality nor the macronutrient consumption was associated with GWG after adjusting for pre-pregnancy BMI, maternal age, and parity. A ten-point lower HEI-2010 [Healthy Eating Index-2010] score was associated with 200 g higher infant birth weight and a 1.0 cm longer length. However, maternal HEI-2010 and macronutrient composition were unrelated to infant percent bod fat, ponderal index, or abdominal circumference."
Lagiou, 2004(15) PCS US	n = 227 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations *Additional examined outcomes: Fetal/Newborn Growth*	Pregnant women: f/u = 3rd trimester	"Intake of neither energy nor any of the energy-generating nutrients was significantly associated with birth size. In contrast, maternal weight gain by the end of the second trimester of pregnancy was significantly associated with energy intake (+0.9 kg/s.d. of intake; P approximately 0.006) as well as energy-adjusted intake of protein (+3.1 kg/s.d. of intake; P<10(-4)), lipids of animal origin (+2.6 kg/s.d. of intake; P<10(-4)) and carbohydrates (-5.2 kg/s.d. of intake; P<10(-4))."
Lai, 2019(16) PCS Singapore GUSTO (Growing Up in Singapore Toward healthy Outcomes)	n = 960 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations	Pregnant women: f/u = 40 wk gestation	"Higher energy intake (per 500 kcal increment) was associated with 0.18 SD higher GWG. In isocaloric diets, higher-carbohydrate and lower-fat intakes (at 5% energy substitution) were associated with 0.07 SD higher GWG, and 14% higher likelihood of excessive GWG. Concordantly, the highest tertile of carbohydrate-rich foods intake was associated with 0.20 SD higher GWG, but the highest tertile of fruit and vegetable intake was independently associated with 60% lower likelihood of inadequate GWG. Additionally, the highest tertile of dairy intake was associated with 0.18 SD lower GWG; and the highest tertile of plant-based protein foods intake was associated with 60% and 34% lower likelihood of inadequate and excessive GWG."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Maslova, 2015(17) PCS Denmark Danish National Birth Cohort (DNBC)	n = 46,262 pregnant women	Protein/carbohydrate intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations	Pregnant women: f/u = 30 wk gestation	"Average GWG was 471(224) g/week. The adjusted weight gain was 16 g/week lower (95% CI 9 to 22, p for trend <0.001) in the highest (Q5) versus lowest (Q1) quintile of the P/C ratio (∼3% average reduction across the entire pregnancy). Weight gain for those with >20%E vs <12%E from protein was 36 g/week lower (95% CI 20 to 53, p for trend <0.0001; ∼8% average reduction). A high P/C ratio was inversely related to intake of added sugars. Added sugar consumption was strongly associated with GWG (Q5 vs Q1: 34, 95% CI 28 to 40 g/week, p for trend <0.0001)."
Mishra, 2020(18) PCS India	n = 418 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations *Additional examined outcomes: Fetal/Newborn Growth*	Pregnant women: f/u = 38.22 ± 1.52 wk (mean)	"Women characterized by under-weight prepregnancy body mass index (BMI) were 16.20%, and a total of 6.45% did not comply with current weight gain recommendations. Particularly, overweight and obese women gained more weight than recommended. In a multivariate analysis GWG correlated significantly with BMI (p = 0.03), total calorie intake (p < 0.001) and fat intake (p < 0.001), while BW of newborns correlated significantly with adequacy of weight gain and fat intake (p < 0.001)."
Pellonpera, 2019(19) PCS Finland	n = 110 pregnant women With overweight/obesity	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations	Pregnant women: f/u = late gestation	"Of the women, 77% gained more weight than recommended; this was related to greater dietary fat consumption (80 ± 21 g/day vs. 67 ± 11 g/day, p = 0.010) and greater increase in FM (2.7 ± 3.0 kg vs. -1.0 ± 2.4 kg, p < 0.001) compared to women with ideal GWG. Dietary protein intake (g) correlated positively with FFM at both time points (early pregnancy: r = 0.31, p < 0.002, late pregnancy: r = 0.39, p < 0.001). Women with higher dietary quality index score had more FFM, compared to women with lower dietary quality (early pregnancy FFM: 48.8 ± 5.8 kg vs. 45.8 ± 4.7 kg, p = 0.004, late pregnancy FFM: 56.1 ± 6.4 kg vs. 53.4 ± 5.6 kg, p = 0.025). No correlations were detected between total energy intake or physical activity and FM or FFM at early or late pregnancy."
Rugina, 2020(20) PCS Romania	n = 115 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change, gestational weight gain in relation to recommendations *Additional examined outcomes: Fetal/Newborn Growth*	Pregnant women: f/u = delivery	"Weight, body mass index, mid-upper arm circumference, and tricipital skin-fold thickness were significantly higher at the time of delivery in women with excessive GWG compared with those with adequate GWG. A lipid-based diet was a risk factor for excessive GWG (relative risk: 1.488, 95% confidence interval: 1.112-1.991), whereas a protein-based diet was a protective factor (relative risk: 0.6723, 95% confidence interval: 0.4431-1.020). We found no significant relationship between a carbohydrate-based diet and GWG. The total energy intake was significantly higher in the excessive GWG group than in the adequate GWG group."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Tanner, 2021(7) PCS Australia Study of Probiotic IN Gestational diabetes (SPRING)	n = 382 pregnant women With overweight/obesity	Carbohydrate intake from diet	**Gestational/Postpartum Weight:** gestational weight change *Additional examined outcomes: Adverse Pregnancy/Lactation, Adverse Birth Outcomes, Fetal/Newborn Growth*	Pregnant women: f/u = 16-28 wk	"Mean gestation was increased in women whose absolute carbohydrate intake was in the lowest quintile at 16 and at both 16- and 28-weeks' gestation compared with all other women (16: 39.7 vs. 39.1 weeks, p = 0.008; 16 and 28: 39.8 vs. 39.1, p = 0.005). In linear regression analysis, a low absolute carbohydrate intake at 16 and at 28 weeks' gestation was associated with increased gestation at delivery (16: p = 0.04, adjusted R2 = 0.15, 28: p = 0.04, adjusted R2 = 0.17). The coefficient of beta at 16 weeks' gestation was 0.50 (95% CI 0.03–0.98) and at 28 weeks' gestation was 0.51 (95%CI 0.03–0.99) meaning that consumption of a low absolute carbohydrate diet accounted for an extra 3.5 days in gestational age. This finding was not seen in women whose percentage carbohydrate intake was in the lowest quintile."
Zulfiqar, 2011(21) PCS Pakistan	n = 157 pregnant women	Macronutrient intake from diet	**Gestational/Postpartum Weight:** gestational weight change *Additional examined outcomes: Fetal/Newborn Growth*	Pregnant women: f/u = delivery	"Maternal energy intake more than the National Recommended Dietary Allowance (RDA) for Pakistan showed a highly significant (P = 0.007) increase in the birth weight of the neonates but no increase was seen (P = 0.93) in the maternal weekly weight gain. Maternal fat consumption had a significant positive relation with both the neonatal birth weight (P = 0.005) as well as maternal weekly weight gain (P = 0.03) but carbohydrate consumption was only significantly related to maternal weight gain (P = 0.01)."

Table 5. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant Women and Adverse Birth Outcomes

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Rai, 2011(22) PCS India	n = 265 pregnant women	Macronutrient intake from diet	**Adverse Birth Outcomes:** preterm birth *Additional outcomes examined: Fetal/Newborn Growth*	Newborns: f/u = birth	"The results of this study indicate that maximum number of women (99%) couldn't plan their pregnancies and 57% had their first visit to the Gynecologist between 8-11 weeks of gestation, while some (3%) had a visit in the 15th weeks of gestation. 68% pregnant women were within normal BMI range (19 to 26) while BMI of 32% were below normal. These subjects were 36 to 76% deficient in intake of food groups and 39 to 72% deficient in micronutrients/trace elements intake while intake of fat was 48% increased. The deficient women were in the category of malnourishment. In this study about 16% babies were born with low birth weight and height. Regression showed significant (p<0.05) correlation between maternal BMI and gestational age with neonates birth weight. The variables found significant predicator of neonates birth weight. The present study concludes that risk factor for IUGR/Low birth weight (LBW) of neonates is associated with low maternal BMI, unplanned pregnancy, and poor nutritional intake by middle class socio-economic women of urban area."
Tanner, 2021(7) PCS Australia Study of Probiotic IN Gestational diabetes (SPRING)	n = 382 pregnant women With overweight/obesity	Carbohydrate intake from diet	**Adverse Birth Outcomes:** preterm birth *Additional outcomes examined: Adverse Pregnancy/Lactation, Gestational/Postpartum Weight, Fetal and Newborn Growth*	Newborns: f/u = birth	"Mean gestation was increased in women whose absolute carbohydrate intake was in the lowest quintile at 16 and at both 16- and 28-weeks' gestation compared with all other women (16: 39.7 vs. 39.1 weeks, p = 0.008; 16 and 28: 39.8 vs. 39.1, p = 0.005). In linear regression analysis, a low absolute carbohydrate intake at 16 and at 28 weeks' gestation was associated with increased gestation at delivery (16: p = 0.04, adjusted R2 = 0.15, 28: p = 0.04, adjusted R2 = 0.17). The coefficient of beta at 16 weeks' gestation was 0.50 (95% CI 0.03–0.98) and at 28 weeks' gestation was 0.51 (95%CI 0.03–0.99) meaning that consumption of a low absolute carbohydrate diet accounted for an extra 3.5 days in gestational age. This finding was not seen in women whose percentage carbohydrate intake was in the lowest quintile."

Table 6. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant Women and Fetal/Newborn Growth Parameters

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Callahan, 2021(9) PCS US	n - 56 pregnant women With normal weight or obesity	Carbohydrate intake from diet Four groups: normal weight/low-carb, normal weight/high-carb, obese/low-carb, and obese/high-carb	**Fetal/Newborn Growth:** birth weight *Additional outcomes examined: Gestational/Postpartum Weight*	Infants: f/u = birth	"A significant interaction between weight status and CHO [carbohydrate] content of the diet was found (P < .05), such that, for women with obesity, those consuming a lowCHO diet had less GWG than those consuming a highCHO diet, whereas the pattern was opposite for women with NW [normal weight]." "Results imply that moderately low CHO intake among women with obesity may influence infant birth weight via differences in GWG."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Chen, 2017(23) PCS Singapore GUSTO (Growing Up in Singapore Toward healthy Outcomes)	n = 910 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight, birth BMI/BMI z-score/WFL *Additional outcomes examined: GSBC (offspring)*	Newborns: f/u = birth	"A 25-g (∼100-kcal) increase in maternal carbohydrate intake was associated with a 0.01/mo (95% CI: 0.0003, 0.01/mo) higher prepeak velocity and a 0.04 (95% CI: 0.01, 0.08) higher BMI(peak) These associations were mainly driven by sugar intake, whereby a 25-g increment of maternal sugar intake was associated with a 0.02/mo (95% CI: 0.01, 0.03/mo) higher infant prepeak velocity and a 0.07 (95% CI: 0.01, 0.13) higher BMI(peak) Higher maternal carbohydrate and sugar intakes were associated with a higher offspring BMI z score at ages 2-4 y. Maternal protein and fat intakes were not consistently associated with the studied outcomes."
Chong, 2015(24) PCS Singapore GUSTO (Growing Up in Singapore Toward healthy Outcomes)	n = 835 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight, birth length, ponderal index, birth body comp	Newborns: f/u = birth	"With the use of adjusted models, no associations were observed for maternal macronutrient intake and birth weight. In male offspring, higher carbohydrate or fat intake with lower protein intake was associated with longer birth length (β = 0.08 cm per percentage increment in carbohydrate; 95% CI: 0.04, 0.13; β = 0.08 cm per percentage increment in fat; 95% CI: 0.02, 0.13) and lower ponderal index (β = -0.12 kg/m(3) per percentage increment in carbohydrate; 95% CI: -0.19, -0.05; β = -0.08 kg/m(3) per percentage increment in fat; 95% CI: -0.16, -0.003), but this was not observed in female offspring (P-interaction < 0.01)."
Crume, 2016(25) PCS US Healthy Start Study	n = 1,040 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight, HC, ponderal index, birth body comp	Newborns: f/u = birth	"In the partition multivariate regression model, individual macronutrient intake values were not associated with birthweight or fat-free mass, but were associated with fat mass. Respectively, 418 kJ increases in total fat, saturated fat, unsaturated fat, and total carbohydrates were associated with 4.2-g (P = .03), 11.1-g (P = .003), 5.9-g (P = .04), and 2.9-g (P = .02) increases in neonatal fat mass, independent of prepregnancy bod mass index. In the nutrient density multivariate regression model, macronutrient balance was not associated with fat mass, fat-free mass, or birthweight after adjustment for prepregnancy bod mass index."
Damen, 2021(26) PCS US	n = 79 pregnant women	Macronutrient intake of diet	**Fetal/Newborn Growth:** birth weight, birth length, HC, ponderal index, birth body comp	Newborns: f/u = birth	"Average total grams of maternal total dietary fat and unsaturated fat intake during pregnancy correlated with infant percent bod fat after adjusting for potential confounding variables (r = 0.23, p = 0.045; r = 0.24, p = 0.037). Maternal average daily intake of total fat, saturated fat, and unsaturated fat during the second trimester of pregnancy were each associated with infant percent bod fat (r = 0.25, p = 0.029; r = 0.23, p = 0.046; r = 0.25, p = 0.031; respectively)."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Diemert, 2016(12) PCS Germany	n = 200 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight *Additional outcomes examined: Gestational/Postpartum Weight*	Newborns: f/u = birth	"One third of the women were characterized by an elevated pre-pregnancy BMI, 60 % did not comply with current weight gain recommendations. Particularly overweight and obese women gained more weight than recommended. In a multivariate analysis birth weight correlated significantly with maternal BMI (p = 0.020), total weight gain (p = 0.020) and gestational week (p < 0.001). Compared to guidelines mean percentage of energy derived from fat (p = 0.002) and protein (p < 0.001) was significantly higher, whereas carbohydrate (p = 0.033) intake was lower. Mean fiber intake was significantly lower (p < 0.001). Saturated fat and sugar contributed largely to energy consumption. Gestational weight gain correlated significantly with energy (p = 0.027), carbohydrates (p = 0.008), monosaccharides and saccharose (p = 0.006) intake. 98 % of the pregnant women were below the iodine recommendation, while none of the women reached the required folate, vitamin D, and iron intake."
Eshak, 2020(27) PCS Japan Japan Environment and Children's Study (JECS)	n = 78,793 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** HC, birth weight	Newborns: f/u = birth	"The mid-pregnancy intakes of total energy, macronutrients and vitamins were lower than the recommended intakes for pregnant Japanese women. Maternal total energy intake was positively associated with the offspring's birth weight; there was a 10-g mean difference in the offspring's birth weight of mothers in the lowest (3026 g) v. highest (3036 g) quartiles of energy intake. Carbohydrate intake was positively associated with the offspring's birth length (mean difference of 0·7 cm) and inversely associated with the ponderal index (mean difference of 0·8 g/cm3). Offspring of mothers in the highest v. lowest quartiles of total dietary fibre intake were on average 9 g heavier and had 0·3 cm longer birth length and 0·2 cm longer head circumference. The highest in reference to lowest intake quartile of vitamin C was associated with 13 g and 0·7 cm mean differences in the offspring's birth weight and length, respectively. Several other associations were evident for maternal intakes of vitamins and the offspring's birth size."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Fahey, 2019(28) PCS South Africa Venda Health Examination of Mothers, Babies and their Environment (VHEMBE)	n = 752 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** HC, birth weight, birth length	Newborns: f/u = birth	"Maternal ANC attendance, dietary composition, and infant birth size exhibited significant seasonal variation in both unadjusted and adjusted analyses. Adequate frequency of ANC attendance during pregnancy (≥ 4 visits) was highest among women delivering during the gardening season and lowest during the lean (rainy) season. High rainfall during the third trimester was also negatively associated with adequate ANC attendance (adjusted OR = 0.59, 95% CI: 0.40, 0.86). Carbohydrate intake declined during the harvest season and increased during the vegetable gardening and lean seasons, while fat intake followed the opposite trend. Infant birth weight, length, and head circumference z-scores peaked following the gardening season and were lowest after the harvest season. Maternal protein intake and ANC ≤ 12 weeks did not significantly vary by season or rainfall. "
Grandy, 2018(14) PCS US	n = 41 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight, birth length, ponderal index, birth body comp *Additional outcomes examined: Gestational/Postpartum Weight*	Newborns: f/u = birth	"Neither the third trimester maternal diet quality nor the macronutrient consumption was associated with GWG after adjusting for pre-pregnancy BMI, maternal age, and parity. A ten-point lower HEI-2010 [Healthy Eating Index-2010] score was associated with 200 g higher infant birth weight and a 1.0 cm longer length. However, maternal HEI-2010 and macronutrient composition were unrelated to infant percent bod fat, ponderal index, or abdominal circumference."
Horan, 2014(29) PCS Ireland ROLO study (Randomised cOntrol trial of LOw glycaemic index diet versus no dietary intervention to prevent recurrence of fetal macrosomia)	n = 542 pregnant women Who previously delivered an infant with fetal macrosomia	Macronutrient intake from diet, glycemic index/glycemia load *Two groups: Low glycemic index dietary advice vs Usual care	**Fetal/Newborn Growth:** birth weight, birth length, birth body comp	Newborns: f/u = birth	"The main maternal factor associated with increased birth weight was greater gestational weight gain while the main maternal factor associated with greater birth length was non-smoking status. Neonatal central adiposity, determined using waist:length ratio, was negatively associated with maternal age, and positively associated with maternal smoking status, pre-pregnancy mid-upper arm circumference, trimester 3 saturated fat intake, postprandial glucose at 28 weeks gestation and membership of the control group and showed a trend towards a positive association with trimester 2 glycaemic load."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Kanade, 2008(30) PCS India	n = 236 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** HC, birth weight, birth length, birth body comp	Newborns: f/u = birth	"Despite large differences in nutritional status of urban and rural mothers (pre-pregnant weight 55.9 9.2 Vs 41.5 5.2 kg, respectively) maternal fat intakes at 18 wk were associated with birth weight (p 0.05), length (p 0.01) and triceps skin fold thickness (p 0.05) of the newborn in urban and rural mothers. Consumption of fruits was associated with birth length (p 0.05) in urban (18wk) and with birth weight (p 0.01) and length (p 0.01) in rural (28wk) mothers, when their energy intakes were low. Maternal consumption of milk too, was associated with newborn's triceps (p 0.01) in urban (28wk) while with birth weight (p 0.05) and length (p 0.05) in rural (18wk) mothers. The findings mainly underscore the importance of consumption of micronutrient rich foods, when energy intakes are limiting during pregnancy, for improving birth size."
Lagiou, 2004(15) PCS US	n = 227 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** HC, birth weight, birth length *Additional outcomes examined: Gestational/Postpartum Weight*	Newborns: birth	"Intake of neither energy nor any of the energy-generating nutrients was significantly associated with birth size. In contrast, maternal weight gain by the end of the second trimester of pregnancy was significantly associated with energy intake (+0.9 kg/s.d. of intake; P approximately 0.006) as well as energy-adjusted intake of protein (+3.1 kg/s.d. of intake; P<10(-4)), lipids of animal origin (+2.6 kg/s.d. of intake; P<10(-4)) and carbohydrates (-5.2 kg/s.d. of intake; P<10(-4))."
Mani, 2016(31) PCS India St. John's birth cohort	n = 1,838 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** SGA, birth weight	Newborns: f/u = birth	"This is a population that traditionally consumes diets that are low in SFA and n-3 PUFA, but high in linoleic acid (LA, 18:2 n-6). The data show that consumption of low SFA was associated with decreased birthweight and an increased risk of SGA [adjusted odds ratio (AOR) 1.45; 95% confidence interval (CI): 1.1, 2.1). Similar results were seen with n-3 PUFA: low intakes of alpha linolenic acid (ALNA, 18:3 n-3) as well as low intakes of long-chain (LC) n-3 PUFA were associated with increased risk of SGA (AOR 1.70; 95% CI: 1.1, 2.6, and AOR 1.27; 95% CI: 1.1, 2.1, respectively). Increased intakes of SFA and ALNA were predominantly associated with lower intakes of cereals and higher intakes of milk and milk products."
Mishra, 2020(18) PCS India	n = 418 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight *Additional outcomes examined: Gestational/Postpartum Weight*	Newborns: f/u = birth	"Women characterized by under-weight prepregnancy body mass index (BMI) were 16.20%, and a total of 6.45% did not comply with current weight gain recommendations. Particularly, overweight and obese women gained more weight than recommended. In a multivariate analysis GWG correlated significantly with BMI (p = 0.03), total calorie intake (p < 0.001) and fat intake (p < 0.001), while BW of newborns correlated significantly with adequacy of weight gain and fat intake (p < 0.001)."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Morisaki, 2018(32) PCS Japan Japan Environment and Children's Study (JECS)	n = 91,637 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** SGA, birth weight	Newborns: f/u = birth	"The average birth weight was 3028 (SD 406) g, and 6350 infants (6·9 %) were small for gestational age (SGA). In both phases of the survey, birth weight was highest and the risk of SGA was lowest when the percentage energy from protein was 12 %, regardless of whether isoenergetic replacement was with fat or carbohydrates. Furthermore, when protein density in the maternal diet was held constant, birth weight was highest when 25 % of energy intake came from fat and 61 % came from carbohydrates during early pregnancy. We found maternal protein intake to have an inverse U-curve relationship with fetal growth."
Mukhopadhyay, 2018(33) PCS India St. John's birth cohort	n = 2,035 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** SGA, birth weight	Newborns: f/u = birth	"The prevalence of SGA was 28%. Trimester 1 macronutrient composition was high in carbohydrate and low in fat (means ± SDs-carbohydrate: 64.6% ± 5.1%; protein: 11.5% ± 1.1%; and fat: 23.9% ± 4.4% of energy). Higher carbohydrate and lower fat consumption were each associated with an increased risk of SGA [adjusted OR (AOR) per 5% of energy (95% CI): carbohydrate: 1.15 (1.01, 1.32); fat: 0.83 (0.71, 0.97)] specifically among male births (males: n = 1047; females: n = 988). Dietary intake of >70% of energy from carbohydrate was also associated with increased risk (AOR: 1.67; 95% CI: 1.00, 2.78), whereas >25% of energy from fat intake was associated with decreased risk (AOR: 0.61; 95% CI: 0.41, 0.90) of SGA in male births."
O'Brien, 2018(34) PCS Australia LIMIT Trial	n = 721 pregnant women With overweight/obesity	Macronutrient intake from diet	**Fetal/Newborn Growth:** fetal growth	Newborns: f/u = birth	"A 10 unit increase in the log total energy was associated with a reduction in mid-thigh lean mass by 4.94 mm at 28 weeks (95% CI −9.57 mm, −0.32 mm; p = 0.036) and 7.02 mm at 36 weeks (95% CI −13.69 mm, −0.35 mm; p = 0.039). A 10 unit increase in Healthy Eating Index score was associated with a reduced mean subscapular skin fold measure at 28 weeks by 0.17 mm (95% CI −0.32 mm, −0.03 mm; p = 0.021). We did not identify consistent associations between maternal diet and measures of fetal growth and adiposity in overweight and obese women."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Okubo, 2014(35) PCS UK Southampton Women's Survey	n = 906 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight, birth length, birth body comp *Additional outcomes examined: GSBC (offspring)*	Newborns: f/u = birth	"After control for potential confounders, both maternal dietary GI and GL in early pregnancy were positively associated with fat mass at 4 and 6 y of age [fat mass SDs per 10-unit GI increase: β = 0.43 (95% CI: 0.06, 0.80), P = 0.02 at 4 y of age; β = 0.40 (95% CI: 0.10, 0.70), P = 0.01 at 6 y of age; fat mass SDs per 50-unit GL increase: β = 0.43 (95% CI: 0.19, 0.67), P < 0.001 at 4 y of age; β = 0.27 (95% CI: 0.07, 0.47), P = 0.007 at 6 y of age]. In contrast, there were no associations between maternal dietary GI or GL in late pregnancy and offspring fat mass at these ages. Maternal dietary GI and GL were not associated with fat mass at birth or offspring lean mass at any of the ages studied."
Rai, 2011(22) PCS India	n = 265 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** LBW, SGA, birth weight, birth length, ponderal index, birth body comp *Additional outcomes examined: Adverse Birth Outcomes*	Newborns: f/u = birth	"The results of this study indicate that maximum number of women (99%) couldn't plan their pregnancies and 57% had their first visit to the Gynecologist between 8-11 weeks of gestation, while some (3%) had a visit in the 15th weeks of gestation. 68% pregnant women were within normal BMI range (19 to 26) while BMI of 32% were below normal. These subjects were 36 to 76% deficient in intake of food groups and 39 to 72% deficient in micronutrients/trace elements intake while intake of fat was 48% increased. The deficient women were in the category of malnourishment. In this study about 16% babies were born with low birth weight and height. Regression showed significant (p<0.05) correlation between maternal BMI and gestational age with neonates birth weight. The variables found significant predicator of neonates birth weight. The present study concludes that risk factor for IUGR/Low birth weight (LBW) of neonates is associated with low maternal BMI, unplanned pregnancy, and poor nutritional intake by middle class socio-economic women of urban area."
Rao, 2001(36) PCS India Pune Maternal Nutrition Study (PMNS)	n = 633 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** LBW, HC, birth weight, birth length, birth body comp	Newborns: f/u = birth	"Mothers were short (151.9 6 5.1 cm) and underweight (41.7 6 5.1 kg) and had low energy and protein intakes at 18 wk (7.4 6 2.1 MJ and 45.4 6 14.1 g) and 28 wk (7.0 6 2.0 MJ and 43.5 6 13.5 g) of gestation. Mean birth weight and length of term babies were also low (2665 6 358 g and 47.8 6 2.0 cm, respectively). Energy and protein intakes were not associated with birth size, but higher fat intake at wk 18 was associated with neonatal length (P , 0.001), birth weight (P , 0.05) and triceps skinfold thickness (P , 0.05) when adjusted for sex, parity and gestation. However, birth size was strongly associated with the consumption of milk at wk 18 (P , 0.05) and of green leafy vegetables (P , 0.001) and fruits (P , 0.01) at wk 28 of gestation even after adjustment for potentially confounding variables. Erythrocyte folate at 28 wk gestation was positively associated with birth weight (P , 0.001)."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Renault, 2015(37) PCS Denmark Treatment of Obese Pregnant Women (TOP)	n = 212 pregnant women	Carbohydrate intake from diet	**Fetal/Newborn Growth:** birth body comp	Newborns: f/u = birth	"Mean ± SD weight and absolute and relative fat mass in the offspring at birth were 3769 ± 542 g, 436 ± 214 g, and 11% ± 4%, respectively. Maternal intake of digestible carbohydrates was associated with the offspring's relative fat mass in late (P-trend = 0.006) but not early (P-trend = 0.15) pregnancy. A comparison of mothers in the highest (median: 238 g/d) compared with the lowest (median: 188 g/d) quartile of digestible carbohydrate intake showed a mean adjusted higher value in the offspring's relative fat mass of 2.1% (95% CI: 0.6%, 3.7%), which corresponded in absolute terms to a 103-g (95% CI: 27, 179-g) higher fat mass. Abdominal fat mass was also higher. In a strata of women with well-controlled glucose (2-h glucose values ≤6.6 mmol/L), no association between carbohydrate intake and offspring fat mass was observed, but the associations became significant and increased in strength with higher intolerance (strata with 2-h glucose values between 6.7-7.7 and ≥7.8 mmol/L)."
Rugina, 2020(20) PCS Romania	n = 115 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight *Additional outcomes examined: Gestational/Postpartum Weight*	Newborns: f/u = birth	"Weight, body mass index, mid-upper arm circumference, and tricipital skin-fold thickness were significantly higher at the time of delivery in women with excessive GWG compared with those with adequate GWG. A lipid-based diet was a risk factor for excessive GWG (relative risk: 1.488, 95% confidence interval: 1.112-1.991), whereas a protein-based diet was a protective factor (relative risk: 0.6723, 95% confidence interval: 0.4431-1.020). We found no significant relationship between a carbohydrate-based diet and GWG. The total energy intake was significantly higher in the excessive GWG group than in the adequate GWG group."
Sharma, 2018(38) PCS UK CAffeine and REproductive health (CARE)	1,196 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** SGA, LGA, birth weight	Newborns: f/u = birth	"Multiple linear regression models adjusted for alcohol and smoking in trimester 1, showed that each additional 10 g/d CHO consumption was associated with an increase of 4 g (95 % CI 1, 7; P=0·003) in birth weight. Conversely, an additional 10 g/d fat intake was associated with a lower birth weight of 8 g (95 % CI 0, 16; P=0·04) when we accounted for energy contributing macronutrients in each model, and maternal height, weight, parity, ethnicity, gestational age at delivery and sex of the baby. There was no evidence of an association between protein intake and birth weight. Maternal diet in trimester 2 suggested that higher intakes of glucose (10 g/d) and lactose (1 g/d) were both associated with higher birth weight of 52 g (95 % CI 4, 100; P=0·03) and 5 g (95 % CI 2, 7; P<0·001) respectively."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Relevant Outcomes	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Tanner, 2021(7) PCS Australia Study of Probiotic IN Gestational diabetes (SPRING)	n = 382 pregnant women With overweight/obesity	Carbohydrate intake from diet	**Fetal/Newborn Growth:** LBW, LGA, birth weight *Additional outcomes examined: Adverse Pregnancy/Lactation, Gestational/Postpartum Weight, Adverse Birth Outcomes*	Newborns: f/u = birth	"Mean gestation was increased in women whose absolute carbohydrate intake was in the lowest quintile at 16 and at both 16- and 28-weeks' gestation compared with all other women (16: 39.7 vs. 39.1 weeks, p = 0.008; 16 and 28: 39.8 vs. 39.1, p = 0.005). In linear regression analysis, a low absolute carbohydrate intake at 16 and at 28 weeks' gestation was associated with increased gestation at delivery (16: p = 0.04, adjusted R2 = 0.15, 28: p = 0.04, adjusted R2 = 0.17). The coefficient of beta at 16 weeks' gestation was 0.50 (95% CI 0.03–0.98) and at 28 weeks' gestation was 0.51 (95%CI 0.03–0.99) meaning that consumption of a low absolute carbohydrate diet accounted for an extra 3.5 days in gestational age. This finding was not seen in women whose percentage carbohydrate intake was in the lowest quintile."
Zulfiqar, 2011(21) PCS Pakistan	n = 157 pregnant women	Macronutrient intake from diet	**Fetal/Newborn Growth:** birth weight *Additional outcomes examined: Gestational/Postpartum Weight*	Newborns: f/u = birth	"Maternal energy intake more than the National Recommended Dietary Allowance (RDA) for Pakistan showed a highly significant (P = 0.007) increase in the birth weight of the neonates but no increase was seen (P = 0.93) in the maternal weekly weight gain. Maternal fat consumption had a significant positive relation with both the neonatal birth weight (P = 0.005) as well as maternal weekly weight gain (P = 0.03) but carbohydrate consumption was only significantly related to maternal weight gain (P = 0.01)."

Table 7. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant/Breastfeeding Women and GSBC in Offspring

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Brion, 2010(39) PCS UK Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC)	n = 5,593 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** wt/WFA, body comp	Children: f/u = 11 yr	"Associations of maternal prenatal-offspring intakes were stronger than those of maternal postnatal-offspring intakes for protein and fat. Greater child energy and macronutrient intakes were only associated with greater adiposity in children when adjusted for potential energy underreporting. Maternal diet during pregnancy was not associated with offspring adiposity or lean mass."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Chen, 2017(23) PCS Singapore GUSTO (Growing Up in Singapore Toward healthy Outcomes)	n = 910 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** wt/WFA, BMI/BMI z-score/WFL *Additional outcomes examined: Fetal/Newborn Growth*	Children: f/u = 48 mo of age	"A 25-g (∼100-kcal) increase in maternal carbohydrate intake was associated with a 0.01/mo (95% CI: 0.0003, 0.01/mo) higher prepeak velocity and a 0.04 (95% CI: 0.01, 0.08) higher BMI(peak) These associations were mainly driven by sugar intake, whereby a 25-g increment of maternal sugar intake was associated with a 0.02/mo (95% CI: 0.01, 0.03/mo) higher infant prepeak velocity and a 0.07 (95% CI: 0.01, 0.13) higher BMI(peak) Higher maternal carbohydrate and sugar intakes were associated with a higher offspring BMI z score at ages 2-4 y. Maternal protein and fat intakes were not consistently associated with the studied outcomes."
Khalil, 2017(40) PCS Ireland Lifeways Cross-Generation Cohort study	n = 72 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** BMI/BMI z-score/WFL, body comp *Additional outcomes examined: CVD*	Children: f/u = 9 yr of age	"There was a negative correlation between HDL cholesterol efflux capacity and waist circumference at age 5 (r = -0.3, p = 0.01) and age 9 (r = -0.24, p = 0.04) and BMI at age 5 (r = -0.45, p = 0.01) and age 9 (r = -0.19, p = 0.1). Multiple regression analysis showed that BMI at age 5 remained significantly associated with reduced HDL cholesterol efflux capacity (r = -0.45, p < 0.001). HDL-C was negatively correlated with energy-adjusted fat intake (r = -0.24, p = 0.04) and positively correlated with energy-adjusted protein (r = 0.24, p = 0.04) and starch (r = 0.29, p = 0.01) intakes during pregnancy. HDL-C was not significantly correlated with children dietary intake at age 5. There were no significant correlations between maternal or children dietary intake and HDL cholesterol efflux capacity. "
Maslova, 2014(41) PCS Denmark Aarhus Birth Cohort	n = 684 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** BMI/BMI z-score/WFL *Additional outcomes examined: CVD, T2D*	Adults (offspring): f/u = 19-21 yr of age	"Offspring mean (±SD) BMI was 22.1 ± 3.3 and 22.8 ± 2.9 for women and men, respectively. The prevalence of overweight (BMI ≥25) was 16.9% for women and 19.1% for men. We showed that a 1:1-g substitution of animal protein for carbohydrates increased risk of BMI ≥25 in female [quartile 4 compared with quartile 1: risk ratio (RR): 3.36; 95% CI: 1.52, 7.42] and male (quartile 4 compared with quartile 1: RR: 2.22; 95% CI: 0.92, 5.35) offspring. These results appeared to be accounted for by protein from meat sources. The results could not be explained by postnatal risk factors."
Maslova, 2016(42) PCS Denmark Danish National Birth Cohort (DNBC)	n = 684 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** wt/WFA, BMI/BMI z-score/WFL *Additional outcomes examined: CVD, T2D*	Adults (offspring): f/u = 19-21 yr of age	"The mean (standard deviation) BMI was 22.1 (3.3) and 22.8 (2.9) kg/m(2) in female and male offspring, respectively. The median (10th to 90th percentile) of maternal fat intake was 31% of energy [23,39]. We found no overall associations for maternal fat intake with female offspring anthropometry. However, for male offspring higher intake of MUFA during pregnancy was associated with higher insulin levels at 20 years (Q4 vs. Q1: %Δ: 37, 95% CI: 1, 86) accompanied by a non-significant 3.6 (95% CI: -1.1, 8.2) cm increase in WC. High maternal total fat intake (>=35% energy) was also associated with higher BMI (0.9, 95% CI: 0.2, 1.6) and WC (4.0, 95% CI: 1.6, 2.3) among male offspring."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Mulcahy, 2022(43) PCS Mexico Early Life Exposure in Mexico to Environmental Toxicants (ELEMENT)	n = 237 pregnant women	Carbohydrate intake from diet	**GSBC (offspring):** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp *Additional outcomes examined: T2D*	Children/adolescents: f/u = 8-14 yr of age	"We found non-linear associations of maternal CHO intake during pregnancy with offspring metabolic health during peripuberty. After adjusting for maternal age, and child age, sex and pubertal status, children whose mothers were in the fourth v. first quartile of total CHO intake during the third trimester had 0·42 (95 % CI -0·01, 0·08) ng/ml lower C-peptide and 0·10 (95 % CI -0·02, 0·22) units lower C-peptide insulin resistance (CP-IR). We found similar magnitude and direction of association with respect to net CHO intake during the first trimester and offspring C-peptide and CP-IR. Maternal CHO intake during pregnancy was not associated with offspring adiposity."
Murrin, 2013(44) PCS Ireland Lifeways Cross-Generation Cohort study	n = 381 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** healthy weight, overweight/obesity, wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL	Children: f/u = 5 yr of age	"Total mean (s.d.) EI was significantly higher during pregnancy (2548 ± 1239 kcal) than 5 years postpartum (2084 ± 718 kcal). Increased odds of overweight/obesity were found in mothers with higher intakes of sugar at T1 (Q4 odds ratio (OR): 4.57, 95% confidence interval (CI): 1.01-20.69) and high intakes of SFA at T2 (Q4 OR: 3.35, 95% CI: 0.97-11.57). Mothers with persistently high intakes of SFA and those who reduce their sugar intake between T1 and T2 were more likely to have overweight/obese children."
Normia, 2013(45) PCS Finland	n = 109 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** wt/WFA, ht/HFA/SFA, body comp *Additional outcomes examined: CVD*	Children: f/u = 4 yr of age	"In the final multivariate model, the predictor variables of childhood systolic blood pressure were maternal dietary carbohydrate and fat intake during pregnancy, as well as childhood weight and dietary fat intake at 4 years of age. Systolic blood pressure levels in the children were found to be positively associated with the maternal carbohydrate intake (P = 0.003), whereas blood pressure levels were lowest in children exposed to the middle tertile of maternal dietary fat intake during pregnancy (P = 0.003) and whose own dietary fat intake was in the middle tertile at the age of 4 years (P = 0.013). The model also showed that heavier children have a higher systolic blood pressure (P < 0.001). None of the maternal clinical characteristics fulfilled the criterion to be included in the model. The only determinant underlying childhood diastolic blood pressure was childhood weight at 4 years of age (r = 0.289, P = 0.026)."
Okubo, 2014(35) PCS UK Southampton Women's Survey	n = 906 pregnant women	Macronutrient intake from diet	**GSBC (offspring):** wt/WFA, ht/HFA/SFA, body comp *Additional outcomes examined: Fetal/Newborn Growth*	Children: f/u = 4-6 yr of age	"After control for potential confounders, both maternal dietary GI and GL in early pregnancy were positively associated with fat mass at 4 and 6 y of age [fat mass SDs per 10-unit GI increase: β = 0.43 (95% CI: 0.06, 0.80), P = 0.02 at 4 y of age; β = 0.40 (95% CI: 0.10, 0.70), P = 0.01 at 6 y of age; fat mass SDs per 50-unit GL increase: β = 0.43 (95% CI: 0.19, 0.67), P < 0.001 at 4 y of age; β = 0.27 (95% CI: 0.07, 0.47), P = 0.007 at 6 y of age]. In contrast, there were no associations between maternal dietary GI or GL in late pregnancy and offspring fat mass at these ages. Maternal dietary GI and GL were not associated with fat mass at birth or offspring lean mass at any of the ages studied."

Table 8. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant/Breastfeeding Women and CVD in Offspring

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Blumfield, 2015(46) PCS US Women and Their Children's Health (WATCH)	n = 129 pregnant women	Macronutrient content of diet, protein/carb ratio, n-6/n-3 FA ratio	**CVD (offspring):** BP	Children: f/u = 48 mo	"Using mixed-model regression analyses adjusted for childhood growth indices, pregnancy intakes of percentage of energy (E%) polyunsaturated fat (β coefficient 0.73; 95% CI 0.003, 1.45; p = 0.045), E% omega-6 fatty acids (β coefficient 0.89; 95% CI 0.09, 1.69; p = 0.03) and protein-to-carbohydrate (P:C) ratio (β coefficient -14.14; 95% CI -27.68, -0.60; p = 0.04) were associated with child systolic BP trajectory up to 4 years. Child systolic BP was greatest at low proportions of dietary protein (<16% of energy) and high carbohydrate (>40% of energy) intakes."
Hrolfsdottir, 2017(47) PCS Denmark Danish Fetal Origins 1988 (DaFO88) cohort	n = 434 pregnant women	Macronutrient intake from diet	**CVD (offspring):** BP	Adults (offspring): f/u = 20 yr	"The results showed that after adjustment, higher maternal protein intake was associated with slightly higher offspring diastolic blood pressure (highest compared with the lowest quintile of protein intake: ∆=2.4 mm Hg; 95% CI 0.4-4.4; P=0.03 for trend). Similar differences, although not significant, were found for systolic blood pressure (∆=2.6 mm Hg; 95% CI -0.0 to 5.3; P=0.08 for trend)."
Khalil, 2017(40) PCS Ireland Lifeways Cross-Generation Cohort study	n = 72 pregnant women	Macronutrient intake from diet	**CVD (offspring):** TC, LDL, HDL, TG/TAG *Additional outcomes examined: GSBC*	Children: f/u = 9 yr of age	"There was a negative correlation between HDL cholesterol efflux capacity and waist circumference at age 5 (r = -0.3, p = 0.01) and age 9 (r = -0.24, p = 0.04) and BMI at age 5 (r = -0.45, p = 0.01) and age 9 (r = -0.19, p = 0.1). Multiple regression analysis showed that BMI at age 5 remained significantly associated with reduced HDL cholesterol efflux capacity (r = -0.45, p < 0.001). HDL-C was negatively correlated with energy-adjusted fat intake (r = -0.24, p = 0.04) and positively correlated with energy-adjusted protein (r = 0.24, p = 0.04) and starch (r = 0.29, p = 0.01) intakes during pregnancy. HDL-C was not significantly correlated with children dietary intake at age 5. There were no significant correlations between maternal or children dietary intake and HDL cholesterol efflux capacity. "
Leary, 2005(48) PCS UK Avon Longitudinal Study of Parents and Children (ALSPAC)	n = 6,944 pregnant women	Macronutrient intake from diet	**CVD (offspring):** BP	Children: f/u = 7.5 yr of age	"There was a suggestion of an inverse association between maternal omega-3 fatty acids and offspring BP, but this was lost after full adjustment (table 1). Carbohydrate was directly associated with systolic BP, but only after full adjustment, and there were no other relations with systolic BP (table 1). There were no relations between maternal diet and offspring diastolic BP."
Maslova, 2014(41) PCS Denmark Aarhus Birth Cohort	n = 684 pregnant women	Macronutrient intake from diet	**CVD (offspring):** TC, TG/TAG *Additional outcomes examined: GSBC, T2D*	Adults (offspring): f/u = 19-21 yr of age	"Offspring mean (±SD) BMI was 22.1 ± 3.3 and 22.8 ± 2.9 for women and men, respectively. The prevalence of overweight (BMI ≥25) was 16.9% for women and 19.1% for men. We showed that a 1:1-g substitution of animal protein for carbohydrates increased risk of BMI ≥25 in female [quartile 4 compared with quartile 1: risk ratio (RR): 3.36; 95% CI: 1.52, 7.42] and male (quartile 4 compared with quartile 1: RR: 2.22; 95% CI: 0.92, 5.35) offspring. These results appeared to be accounted for by protein from meat sources. The results could not be explained by postnatal risk factors."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Maslova, 2016(42) PCS Denmark Danish National Birth Cohort (DNBC)	n = 684 pregnant women	Macronutrient intake from diet	**CVD (offspring):** TC, TG/TAG *Additional outcomes examined: GSBC, T2D*	Adults (offspring): f/u = 19-21 yr of age	"The mean (standard deviation) BMI was 22.1 (3.3) and 22.8 (2.9) kg/m(2) in female and male offspring, respectively. The median (10th to 90th percentile) of maternal fat intake was 31% of energy [23,39]. We found no overall associations for maternal fat intake with female offspring anthropometry. However, for male offspring higher intake of MUFA during pregnancy was associated with higher insulin levels at 20 years (Q4 vs. Q1: %Δ: 37, 95% CI: 1, 86) accompanied by a non-significant 3.6 (95% CI: -1.1, 8.2) cm increase in WC. High maternal total fat intake (>=35% energy) was also associated with higher BMI (0.9, 95% CI: 0.2, 1.6) and WC (4.0, 95% CI: 1.6, 2.3) among male offspring."
Normia, 2013(45) PCS Finland	n = 109 pregnant women	Macronutrient intake from diet	**CVD (offspring):** BP *Additional outcomes examined: GSBC*	Children: f/u = 4 yr of age	"In the final multivariate model, the predictor variables of childhood systolic blood pressure were maternal dietary carbohydrate and fat intake during pregnancy, as well as childhood weight and dietary fat intake at 4 years of age. Systolic blood pressure levels in the children were found to be positively associated with the maternal carbohydrate intake (P = 0.003), whereas blood pressure levels were lowest in children exposed to the middle tertile of maternal dietary fat intake during pregnancy (P = 0.003) and whose own dietary fat intake was in the middle tertile at the age of 4 years (P = 0.013). The model also showed that heavier children have a higher systolic blood pressure (P < 0.001). None of the maternal clinical characteristics fulfilled the criterion to be included in the model. The only determinant underlying childhood diastolic blood pressure was childhood weight at 4 years of age (r = 0.289, P = 0.026)."
Roseboom, 2001(49) RCS Netherlands Dutch Famine Birth Cohort	n = 739 pregnant women	Estimated protein/carbohydrate intake from diet	**CVD (offspring):** BP	Adults: FU=~ 50 yr of age	"Adult blood pressure was not associated with protein, carbohydrate or fat intake during any period of gestation. We found, however, after adjustment for sex that the systolic blood pressure decreased by 0.6 mmHg (0.1-1.1) for every 1% increase in protein/carbohydrate ratio in the third trimester. This association was present both in people who had been exposed to the famine during gestation as well as in those who had not been exposed. The association between protein/carbohydrate ratio in the third trimester and adult blood pressure was furthermore independent of maternal weight gain and final weight, and birth weight [increase for every 1% increase in protein/carbohydrate ratio 0.6 mmHg (0.0-1.2)]. Adjustment for adult characteristics such as body mass index, smoking and socio-economic status did not affect the observed association appreciably [adjusted increase 0.5 mmHg (0.0-1.0)]."
van den Hil, 2013(50) PCS Netherlands Generation R Study	n = 2,863 pregnant women	Macronutrient intake from diet	**CVD (offspring):** BP	Children: f/u = 6 yr of age	"First-trimester maternal daily intake of energy, fat, protein and carbohydrate was not associated with childhood blood pressure. Furthermore, maternal intake of micronutrients was not associated with childhood blood pressure. Also, higher maternal vitamin B_{12} concentrations were associated with a higher diastolic blood pressure (0·31 mmHg per standard deviation increase in vitamin B_{12} (95% CI 0·06, 0·56)). After taking into account multiple testing, none of the associations was statistically significant. Maternal first-trimester folate and homocysteine concentrations were not associated with childhood blood pressure."

Table 9. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Pregnant/Breastfeeding Women and T2D in Offspring

Reference **Study Design** **Country and Larger Cohort Study (if applicable)**	**Intake Population**	**Interventions/ Exposures (Comparison Type)**	**Outcomes of Interest**	**Outcome Population and Maximum Length of Followup (f/u)**	**Results from Abstract**
Maslova, 2014(41) PCS Denmark Aarhus Birth Cohort	n = 684 pregnant women	Macronutrient intake from diet	**T2D (offspring):** HbA1c *Additional outcomes examined: GSBC, CVD*	Adults (offspring): f/u = 19-21 yr of age	"Offspring mean (±SD) BMI was 22.1 ± 3.3 and 22.8 ± 2.9 for women and men, respectively. The prevalence of overweight (BMI ≥25) was 16.9% for women and 19.1% for men. We showed that a 1:1-g substitution of animal protein for carbohydrates increased risk of BMI ≥25 in female [quartile 4 compared with quartile 1: risk ratio (RR): 3.36; 95% CI: 1.52, 7.42] and male (quartile 4 compared with quartile 1: RR: 2.22; 95% CI: 0.92, 5.35) offspring. These results appeared to be accounted for by protein from meat sources. The results could not be explained by postnatal risk factors."
Maslova, 2016(42) PCS Denmark Danish National Birth Cohort (DNBC)	n = 684 pregnant women	Macronutrient intake from diet	**T2D (offspring):** HbA1c, glucose tolerance, insulin resistance/insulin sensitivity *Additional outcomes examined: GSBC, CVD*	Adults (offspring): f/u = 19-21 yr of age	"The mean (standard deviation) BMI was 22.1 (3.3) and 22.8 (2.9) kg/m(2) in female and male offspring, respectively. The median (10th to 90th percentile) of maternal fat intake was 31% of energy [23,39]. We found no overall associations for maternal fat intake with female offspring anthropometry. However, for male offspring higher intake of MUFA during pregnancy was associated with higher insulin levels at 20 years (Q4 vs. Q1: %Δ: 37, 95% CI: 1, 86) accompanied by a non-significant 3.6 (95% CI: -1.1, 8.2) cm increase in WC. High maternal total fat intake (>=35% energy) was also associated with higher BMI (0.9, 95% CI: 0.2, 1.6) and WC (4.0, 95% CI: 1.6, 2.3) among male offspring."
Mulcahy, 2022(43) PCS Mexico Early Life Exposure in Mexico to Environmental Toxicants (ELEMENT)	n = 237 pregnant women	Carbohydrate intake from diet	**T2D (offspring):** glucose tolerance, insulin resistance/insulin sensitivity *Additional outcomes examined: GSBC*	Children/adolescents: f/u = 8-14 yr of age	"We found non-linear associations of maternal CHO intake during pregnancy with offspring metabolic health during peripuberty. After adjusting for maternal age, and child age, sex and pubertal status, children whose mothers were in the fourth v. first quartile of total CHO intake during the third trimester had 0·42 (95 % CI -0·01, 0·08) ng/ml lower C-peptide and 0·10 (95 % CI -0·02, 0·22) units lower C-peptide insulin resistance (CP-IR). We found similar magnitude and direction of association with respect to net CHO intake during the first trimester and offspring C-peptide and CP-IR. Maternal CHO intake during pregnancy was not associated with offspring adiposity."
Shiell, 2000(51) RCS Scotland Aberdeen Maternity and Neonatal Databank	n = 168 pregnant women	Macronutrient intake from diet	**T2D (offspring):** glucose tolerance, insulin resistance/insulin sensitivity	Adults: f/u = 40 yr	"The offspring of women who had high intakes of fat and protein in late pregnancy had a reduced plasma insulin increment between fasting and 30 min with a 7.0% decrease in increment (P = 0.007) per 10 g increase in protein intake and a 4.9% decrease (P = 0.002) per 10 g increase in fat intake. This was independent of the mother's body mass index or weight gain in pregnancy. A low maternal body mass index in early or late pregnancy was associated with a raised fasting plasma insulin concentration with a decrease of 2.4% (P = 0.05) per 1 kg/m2 increase of maternal body mass."

Table 10. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Ages 0-24 Months and Developmental Outcomes in the Same Individuals

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Bishara, 2021(52) PCS Canada GTA-DoMINO (Greater Toronto Area Donor Milk for Improved Neurodevelopmental Outcomes)	n = 302 infants Born VLBW	Macronutrient content from parenteral and enteral feedings of fortified formula or fortified human milk	**Developmental Outcomes:** cognitive, language/communication, movement/physical	Toddlers: f/u = 18 mo corrected gestational age (CGA)	"Higher quartiles of energy, lipid, and carbohydrate intakes were positively associated with growth velocity (P = <0.0001-0.007); no association was observed for protein intake. Energy, protein-to-energy ratio and lipid intakes were associated with cognitive scores (P = 0.001-0.004); however, intakes within the second and third quartiles were generally associated with the highest cognitive scores. No nutrient intakes were associated with language or motor scores across the entire study period."
Marinho, 2023(53) PCS France EDEN mother-child cohort	n = 914 infants	Macronutrient intake from diet	**Developmental Outcomes:** cognitive, language/communication, movement/physical	Children: f/u = 5-6 yr of age	"Macronutrient intake in infancy was not associated with neurodevelopmental scores in preschool children. No association was found between PUFA intake and overall neurodevelopmental scores, after accounting for multiple testing."
Sammallahti, 2017(54) RCS Finland Helsinki Study of Very Low Birth Weight Adults	n = 79 infants Born preterm/VLBW	Macronutrient intake from parenteral and enteral feedings of human milk or formula	**Developmental Outcomes:** cognitive, language/communication	Adults: f/u = 25.1 yr of age	"10 kcal/kg/day higher total energy intake at 3 to 6 weeks of age was associated with 0.21 SD higher adult IQ (95% Confidence Interval [CI] 0.07-0.35). Higher carbohydrate and fat intake at 3-6 weeks, and higher energy intake from human milk at 3-6 and at 6-9 weeks were also associated with higher adult IQ: these effect sizes ranged from 0.09 SD (95% CI 0.01-0.18) to 0.34 SD (0.14-0.54) higher IQ, per one gram/kg/day more carbohydrate and fat, and per 10 kcal/kg/day more energy from human milk. Adjustment for neonatal complications attenuated the associations: intraventricular hemorrhage, in particular, was associated with both poorer nutrition and poorer IQ."
Sato, 2021(55) PCS Canada Optimizing Mothers' Milk for Preterm Infants (OptiMoM)	n = 41 infants Born preterm/LBW	Macronutrient intake from parenteral and enteral feedings of fortified human milk	**Developmental Outcomes:** cognitive, language/communication	Children: f/u = 5 yr of age	"Associations between white matter microstructure and cognitive outcomes were also examined. Compared to children who did not meet enteral feeding recommendations, those who achieved enteral protein, lipid and energy recommendations during the first postnatal month showed improved white matter maturation at 5 years. Among the macronutrients, greater protein intake contributed most to the beneficial effect of nutrition, showing widespread increases in fractional anisotropy and reductions in radial diffusivity. No significant associations were found between white matter metrics with breastmilk or carbohydrate intake."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Tottman, 2020(56) RCS New Zealand	n = 478 infants Born preterm/VLBW	Macronutrient content of parenteral and enteral feedings	**Developmental Outcomes:** cognitive *Additional outcomes examined: GSBC*	Toddlers: f/u = 2 yr corrected age	"More girls (215/478) survived without neurodevelopmental impairment at 2 years (82% vs. 72%, P = 0.02). Overall, survival without neurodevelopmental impairment was positively associated with more energy, fat, and enteral feeds in week 1, and more energy and enteral feeds in month 1 (P = 0.005-0.03), but all with sex interactions (P = 0.008-0.02). In girls but not boys, survival without neurodevelopmental impairment was positively associated with week 1 total intakes of fat (OR(95% CI) for highest vs. lowest intake quartile 62.6(6.6-1618.1), P < 0.001), energy (22.9(2.6-542.0), P = 0.03) and enteral feeds (1.9 × 10(9)(9.5-not estimable), P < 0.001)."

Table 11. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Ages 0-24 Months and GSBC in the Same Individuals

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Ahmed, 2021(57) PCS Bahrain	n = 19 infants Born preterm	Macronutrient content of human milk	**GSBC:** wt/WFA, ht/HFA, body comp	Infants: f/u = 15 d	"The protein to energy ratio was lower than the recommended ESPGHAN [European Society for Pediatric Gastroenterology, Hepatology and Nutrition] ratio. The energy content was positively correlated to total lipids. Total lipids were negatively correlated to gestational age and weight at birth. The protein content was significantly higher in milk samples from mothers who were vaginally delivered. The mean daily growth rates were found to be lower than the recommended growth rates. ESPGHAN recommended levels of protein and total carbohydrates combined with low total lipids levels yielded a better daily weight gain."
Belfort, 2020(58) PCS US	n = 37 infants Born preterm	Macronutrient content of human milk	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Infants: f/u = 112 d	"In median regression models adjusted for birth size and gestational age, and other covariates, greater intakes of fat and energy were associated with higher weight (0.61 z-scores per g/kg/day fat, 95% CI 0.21, 1.01; 0.69 z-scores per 10 kcal/kg/day, 95% CI 0.28, 1.10), whereas greater protein intake was associated with greater bod length (0.84 z-scores per g/kg/day protein, 95% CI 0.09, 1.58). Higher fat intake was also associated with higher fat mass and fat-free mass. Macronutrient intakes from human milk were highly variable and associated with growth outcomes despite routine fortification."

Reference Study Design Country and Larger Cohort Study (if applicable)	**Intake Population**	**Interventions/ Exposures (Comparison Type)**	**Outcomes of Interest**	**Outcome Population and Maximum Length of Followup (f/u)**	**Results from Abstract**
Beyerlein, 2017(59) PCS US and Europe The Environmental Determinants of Diabetes in the Young (TEDDY) study	n = 5,563 infants With increased genetic risk for type 1 diabetes	Macronutrient content/intake of formula, human milk, food	**GSBC:** overweight/obesity, wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL	Children: f/u = 5.5 yr of age	"Having overweight or obesity at the age of 5.5 years was positively associated with mean energy intake in previous age intervals (e.g., adjusted OR [95% CI] for overweight: 1.06 [1.04-1.09] per 100 kcal intake at the age of 4.5-5.0 years) and with protein intake after the age of 3.5 and 4.5 years, respectively (e.g., adjusted OR for overweight: 1.06 [1.03-1.09] per 1% of energy intake at the age of 4.5-5.0 years). The respective associations with carbohydrate and fat intake were less consistent."
Collins, 2008(60) PCS (using data collected during an RCT) Australia	n = 138 infants Born preterm	Macronutrient content of parenteral and enteral feedings	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Infants: f/u = discharge	"With total energy held constant, the contribution of carbohydrate to total energy had a positive relation to weight, length, and head circumference gains; protein had no relation and fat was negatively associated. For every 1% increase in energy from carbohydrate, there was a 2.3-g/d increase in weight (95% confidence interval 1.6-3.0, P < 0.0001), a 0.013-cm/d increase in length (95% confidence interval 0.003-0.022, P = 0.007), and a 0.015-cm/d increase in head circumference (95% confidence interval 0.009-0.022, P < 0.0001)."
Cowin, 2001(61) PCS UK Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC)	n = 389 infants	Macronutrient content from diet	**GSBC:** wt/WFA, ht/HFA/SFA *Additional outcomes examined: CVD*	Toddlers: f/u = 31 mo of age	"Among boys, total cholesterol concentrations were positively associated with the intake of total fat (r=0.209, P=0.002) and saturated fatty acids (r=0.211, P=0.002). Among girls, HDLC was positively associated with energy intake (r=0.204, P=0.018), and negatively associated with intakes of polyunsaturated fat, saturated fat and sugar in multivariate analysis. There were no associations between the intakes of non-starch polysaccharides (fibre) or dietary cholesterol and total or HDL cholesterol concentrations in either sex. Among boys, higher intakes of breakfast cereals were associated with lower total cholesterol (r=-0.187, P=0.008). Among girls, higher intakes of biscuits and meat and meat products were associated with higher HDLC concentrations."
Garden, 2012(62) PCS Australia Childhood Asthma Prevention Study (CAPS)	n = 370 infants (intake also captured in childhood)	Macronutrient content/intake of human milk, food	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL	Children: f/u = 11.5 yr of age	"We identified three BMI growth trajectories between birth and age 11.5 years, separately in boys and girls. Breastfeeding duration less than six months and the early introduction of solids did not adversely influence BMI trajectories in our sample but high intakes of meat, particularly high fat varieties, and high intakes of carbohydrate at age around 18 months were associated with a high BMI trajectory in boys. It is not clear whether these dietary factors confer a direct risk of higher BMI in childhood or are markers for other dietary patterns that are present early and/or develop through childhood and contribute to higher BMI."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Gridneva, 2021(63) PCS Australia	n = 20 infants	Macronutrient content of human milk	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp	Infants: f/u = 12 mo of age	"Maternal adiposity associated with infant SFA (negatively at 2, 5, 12, positively at 9 months, all overall p < 0.05). 24-h milk intake positively associated with infant SAD [Subcutaneous-abdominal depth] (p = 0.007) and VD (p = 0.013). CDI [calculated daily intake] of total protein (p = 0.013), total carbohydrates (p = 0.004) and lactose (p = 0.013) positively associated with SFA [small for gestational age]. Lactoferrin concentration associated with infant VD (negatively at 2, 12, positively at 5, 9 months, overall p = 0.003). CDI of HM [human milk] components and maternal adiposity have differential effects on development of infant visceral and subcutaneous abdominal adiposity."
Han, 2022(64) PCS China	n = 133 infants Born very preterm/VLBW	Macronutrient content of parenteral and enteral feedings	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Infants: f/u = 6 mo corrected age	"After adjusting for covariates, higher daily protein, lipid, and energy intake during the first 28 days was associated with higher weight at term age for every 1 g/kg/day increment of protein and lipid intake, and every 10 kcal/kg/day increment of energy intake was associated with 0.50 (95% CI 0.04, 0.96), 0.29 (95% CI 0.07, 0.51), and 0.27 (95% CI 0.10, 0.44) higher weight z-score, respectively. Higher protein intake was associated with lower z-score of fat mass (FM, β = -1.88, 95% CI -3.53, -0.23) and percentage of bod fat (PBF, β = -2.18, 95% CI -3.98, -0.39) at 6 months of CA, but higher lipid and carbohydrate intake was associated with higher FM and PBF z-scores at 6 months of CA."
Johansson, 2019(65) RCT Sweden	n = 232 infants	Nordic diet group (NG) vs conventional diet group (CG); NG = (4-6 mo of age) systematic taste portions schedule consisting of home-made purées of Nordic produce for 24 days; subsequently: NG supplied with baby food products and recipes of homemade baby foods based on Nordic ingredients but with reduced protein content compared to the CG. CG advised to follow current Swedish recommendations on complementary foods	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp *Additional outcomes examined: T2D*	Infants: f/u = 9 mo of age	"The NG had significantly higher intake of fruits and vegetables than the CG at 9 months of age; 225 ± 109 g/day vs. 156 ± 77 g/day (p < 0.001), respectively. Energy intake was similar, but protein intake was significantly lower in the NG (-26%, p < 0.001) compared to the CG. This lower protein intake was compensated for by higher intake of carbohydrate from fruits and vegetables. No significant group differences in growth or iron status were observed."
Jones, 2021(66) PCS UK Children in Focus (CIF) substudy of Avon Longitudinal Study of Parents and Children (ALSPAC)	n = 1,432 infants	Macronutrient intake from diet	**GSBC:** BMI/BMI z-score/WFL, body comp	Adolescents: f/u = 17 yr	"In replication analyses, in contrast to ELANCE, there was a positive association between fat intake (% energy) at 18 months and fat mass (FM) at 9 years (B coefficient 0.10 (95% CI 0.03, 0.20) kg, p = 0.005). There was no association with serum leptin. In extended analyses fat intake at 18 months was positively associated with FM in boys (0.2 (0.00, 0.30), p = 0.008) at 9 years but not in girls. Fat intake was positively associated with serum leptin concentration in boys (0.2 (0.1, 0.4) ng/mL, p = 0.011) but not in girls."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Karaolis-Danckert, 2007(67) PCS Germany Dortmund Nutritional and Anthropometric Longitudinally Designed (DONALD) Study	n = 249 infants	Protein/fat intake from diet	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Children: f/u = 5 yr of age	"Multilevel model analyses showed that, among rapid growers, those who had been fully breastfed for > or =4 mo had a lower BF% at 2 y of age than did those who had not been fully breastfed for > or =4 mo (beta +/- SE: -1.53 +/- 0.59%; P = 0.009). This difference persisted until 5 y. Furthermore, those rapid growers who had a consistently high fat intake at both 12 and 18-24 mo did not show the expected physiologic decrease in BF% between 2 and 5 y seen in those rapid growers with an inconsistent or consistently low fat intake at these time points (0.73 +/- 0.26%/y; P = 0.006)"
Kashyap, 2001(68) RCT US	n = 63 infants Born LBW	Fat/carbohydrate intake of enteral feedings with 5 formulas with varying levels of energy/macronutrients: groups 1, 2, and control received 130 kcal x kg(-1) x d(-1) with 35, 65, and 50% of the nonprotein energy as carbohydrate; groups 3 and 4 received energy intake of 155 kcal x kg(-1) x d(-1) with 35 and 65% of the nonprotein energy as carbohydrate; protein intake of all groups was 4 g x kg(-1) x d(-1)	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Infants: f/u = 37-54 d (varied by group)	"Greater rates of weight gain and nitrogen retention were observed at high-carbohydrate intake compared with high-fat intake at both gross energy intakes. Greater rates of energy storage and an increase in skinfold thickness were observed in group 4 (high-energy high-carbohydrate diet) despite higher rates of energy expenditure."
Magarey, 2001(69) PCS Australia Adelaide Nutrition Study (ANS)	n = 243 infants	Macronutrient intake from diet	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp	Children: f/u = 15 yr of age	"Across 2--15 y energy-adjusted fat and carbohydrate intakes were respectively directly and inversely related to SS skinfold measures but not to either BMI or TC skinfold. The best predictor of fatness was previous adiposity, with the effect strengthening as the age interval shortened. Parental BMI, maternal SS and paternal TC contributed to the variance of the corresponding measure in children at some but not all ages."
Martin, 2009(70) PCS US ELGAN (Extremely Low Gestational Age Newborns)	n = 1,187 infants Born preterm/ELGA (extremely low gestational age)	Macronutrient content of parenteral and enteral feedings	**GSBC:** wt/WFA, ht/HFA/SFA	Infants: f/u = 28 d	"Protein and fat delivery approximated current nutritional recommendations, whereas carbohydrate and total energy intake delivery did not. Despite this, GV of our study infants exceeded the current guideline of 15 g/kg per day. Nevertheless, we found extrauterine growth restriction (ie, weight for gestational age below the 10th centile) in 75% of the infants at 28 days, compared with only 18% at birth. A GV of 20 to 30 g/kg per day was associated with infants' maintaining or exceeding their birth weight z score, with rates in the upper range for the gestationally youngest infants. Early (day 7) nutritional practices were positively associated with GV measured between days 7 and 28."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Nguyen, 2020(71) PCS Netherlands Generation R Study	n = 3,629 infants	Carbohydrate intake from diet	**GSBC:** wt/WFA, BMI/BMI z-score/WFL, body comp *Additional outcomes examined: CVD, T2D*	Children: f/u = 10 yr	"In multivariable-adjusted linear mixed models, we found no associations of intake of carbohydrates or its subtypes with children's BMI or body composition. A higher intake of monosaccharides and disaccharides was associated with higher triglyceride concentrations (0.02 SDS per 10 g/d, 95% CI: 0.01, 0.04). Higher monosaccharide and disaccharide intake was also associated with lower HDL-cholesterol (-0.03 SDS, 95% CI: -0.04; -0.01), especially when it replaced polysaccharides."
Öhlund, 2010(72) PCS Sweden	n = 127 infants, children	Macronutrient intake from diet	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp	Children: f/u = 4 yr of age	": Fourteen percent of the girls and 13% of the boys were overweight (age-adjusted BMI> or =25) and 2% of the girls and 3% of the boys were obese (age-adjusted BMI> or =30). Thirty-four percent and 9% of the fathers and 19 and 7% of the mothers were overweight and obese, respectively. BMI at 6-18 months was a strong predictor of BMI at 4 years. Univariate regression analyses revealed that intake of protein in particular, and also of total energy and carbohydrates at 17/18 months and at 4 years, was positively associated with BMI at 4 years. Although BMI at 6-18 months was the strongest predictor of BMI at 4 years, in the final multivariate models of the child's BMI, protein intake at 17-18 months and at 4 years, energy intake at 4 years and the father's-but not the mother's-BMI were also independent contributing factors."
Olga, 2023(73) PCS UK Cambridge Baby Growth and Breastfeeding Study (CBGS-BF)	n = 70 infants	Macronutrient content of human milk	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL	Infants: f/u = 12 mo of age	"In the full cohort and among sixty infants who received EBF for 3+ months, higher BM intake at 6 weeks was associated with initial faster growth between 0 and 6 weeks (β + se 3·58 + 0·47 for weight and 4·53 + 0·6 for adiposity gains, both P < 0·0001) but subsequent slower growth between 3 and 12 months (β + se - 2·27 + 0·7 for weight and -2·65 + 0·69 for adiposity gains, both P < 0·005). BM carbohydrate and protein intakes at 4-6 weeks were positively associated with early (0-6 weeks) but tended to be negatively related with later (3-12 months) adiposity gains, while BM fat intake showed no association..."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Péneau, 2014(74) PCS France ELANCE (Etude Longitudinale Alimentation Nutrition Croissance des Enfants)	n = 73 infants (intake also captured during childhood and adolescence)	Macronutrient intake from diet and impact of breastfeeding	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp	Adults: f/u = 20 yr of age	"In this sample, 64% of the children had been breastfed. In linear regression models adjusted for mother's body mass index and father's profession, breastfeeding was not associated with any of the body fat measurements at 20 years (all P > .05). After adding nutritional intake variables (total energy and % energy from nutrients) to the models, breastfeeding became significantly associated with lower SF at 20 years. In particular, breastfed subjects had significantly lower % SF at 20 years after adjustment for energy and % fat intakes at 2 years of age, (β = -28.25% SF; 95% CI, -50.28% to -6.21%; P = .013) or when adjusting for energy and % carbohydrates at 2 years of age (β = -28.27% SF; 95% CI, -50.64% to -5.90%; P = .014)."
Rochow, 2013(75) NonRCT Canada	n = 10 infants Born preterm/VLBW	Macronutrient intake of fully fortified breast milk vs. routinely fortified breast milk	**GSBC:** wt/WFA	Infants: f/u = 3 wk	"All 650 pooled breast milk samples required at least 1 macronutrient adjusted. On average, 0.3 ± 0.4 g of fat, 0.7 ± 0.2 g of protein, and 1.2 ± 0.2 g of carbohydrate were added. Biochemistry was normal in the 10 target fortified infants (birth weight: 860 ± 309 g, 26.3 ± 1.6 weeks gestational age); weight gain was 19.9 ± 2.7 g/kg/d; and milk intake was 147 ± 5 mL/kg/d (131 ± 16 kcal/kg/d). Osmolality of fortified breast milk was 436 ± 13 mOsmol/kg. Matched pair analysis of infants indicated a higher milk intake (155 ± 5 mL/kg/d) but similar weight gain (19.7 ± 3.3 g/kg/d). No adverse event was observed. The linear relationship between milk intake and weight gain observed in study babies but not seen in matched controls may be related to the variable composition of breast milk. "
Rochow, 2021(76) RCT Canada	n = 103 infants Born preterm/VLBW	Macronutrient intake from target-fortified human milk vs. standard-fortified human milk	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp	Infants: f/u = 3 wk	"Baseline characteristics, morbidities, and total fluid intake were not different between groups (intervention n = 52, control n = 51). The intervention group infants had higher macronutrient intakes, weight gain (21.2 ± 2.5 vs 19.3 ± 2.4 g/kg/d, mean difference: 1.9 g/kg/d, 95% CI: 0.9 - 2.9), and body weight. Infants in the intervention group from mothers with below-average breast milk protein content showed greatest impact on weight at 36 weeks (2580 ± 280 g vs 2210 ± 300 g), length, head circumference, fat, and fat-free mass. Also, feeding intolerance was less frequent, blood urea was higher, and triglycerides were lower."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Rolland-Cachera, 2013(77) PCS France ELANCE (Etude Longitudinale Alimentation Nutrition Croissance des Enfants)	n = 73 infants	Macronutrient intake from diet	**GSBC:** BMI/BMI z-score/WFL, body comp	Adults: f/u = 20 yr of age	"In adjusted linear regression models, an increase by 100 kcal in energy intake at 2 years was associated with higher subscapular skinfold thickness (β=6.4% SF, 95% confidence interval 2.53-10.30, P=0.002) and higher FFM (0.50 kg, 0.06-0.95, P=0.03) at 20 years. An increase by 1% energy from fat at 2 years was associated with lower subscapular skinfold thickness (-2.3% SF, -4.41 to -0.18, P=0.03), lower FM (-0.31 kg, -0.60 to -0.01, P=0.04) and lower serum leptin concentration (-0.21 μg l(-1), -0.39 to -0.03, P=0.02) at 20 years."
Romera, 2004(78) RCT Spain	n = 30 infants Born preterm/VLBW	Fat/carbohydrate intake from control formula or control formula with three different nonprotein energy supplements	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Infants: f/u = 11 d	"The fat accretion (4.9, 5.9, 6.2, and 3.8 g/kg/day in groups A, B, C and D, respectively) correlated directly with fat intake. Infants receiving standard energy intake had a fat percentage of weight gain significantly lower (28%) than that of the high-energy intake groups (31%, 40%, and 38% in groups A, B, and C, respectively). This difference corresponded to the results obtained from skinfold thickness measurements."
Scaglioni, 2000(79) PCS Italy	n = 147 infants	Macronutrient intake from diet	**GSBC:** overweight/obesity, BMI/BMI z-score/WFL,	Children: f/u = 5 yr of age	"Parental overweight was observed for 51% children. The prevalence of overweight at the age of 5 y was higher in children with than without parental overweight (37.3% vs 8.3%, P<0.0001). Five-year old overweight children had a higher percentage intake of proteins at the age of 1 y than non overweight children (22% vs 20%, P=0.024) and lower intake of carbohydrates (44% vs 47%, P=0.031). Multiple logistic analysis confirmed that protein intake at 1 y of age was associated with overweight at 5 y (P=0.05). In children born from overweight mothers, prevalence of overweight at the age of 5 y tended to be higher in bottle-fed than in breast-fed ones (62.5% vs 23.3%, P=0.08)."
Skinner, 2004(80) PCS US	n = 70 infants	Macronutrient intake from diet	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL	Children: FU + 8 yr of age	"Children's BMI at 8 y was negatively predicted by age of adiposity rebound and positively predicted by their BMI at 2 y. Additionally, each model included one longitudinal dietary variable; mean protein and fat intakes recorded between 2 and 8 y were positive predictors of BMI at 8 y; mean carbohydrate intake over the same time period was negatively related to BMI at 8 y. R(2) values indicated that these three-variable models predicted 41-43% of the variability in BMI among children. BMI of 23% of the children exceeded the 85th CDC percentile."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Stiolz-Sjöström, 2013(81) RCS Sweden Extremely Preterm Infants in Sweden Study (EXPRESS)	n = 394 infants Born preterm/ELGA (extremely low gestational age)	Macronutrient intake from parenteral and enteral feedings	**GSBC:** wt/WFA, ht/HFA/SFA, body comp	Infants: f/u = 70 d	"Study infants (n = 531) had a mean ± SD gestational age of 25.3 ± 1.1 weeks and a birth weight of 765 ± 170 g. Between 0 and 70 days, average daily energy and protein intakes were 120 ± 11 kcal/kg and 3.2 ± 0.4 g/kg, respectively. During this period, standard deviation scores for weight, length and head circumference decreased by 1.4, 2.3 and 0.7, respectively. Taking gestational age, baseline anthropometrics and severity of illness into account, lower energy intake correlated with lower gain in weight (r = +0.315, p < 0.001), length (r = +0.215, p < 0.001) and head circumference (r = +0.218, p < 0.001). Protein intake predicted growth in all anthropometric outcomes, and fat intake was positively associated with head circumference growth."
Stroobant, 2017(82) PCS Netherlands Generation R Study	n = 2,967 infants	Macronutrient intake from diet	**CVD:** TC, LDL, HDL, TG/TAG, BP **GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL, body comp	Children: f/u = 6 yr of age	"In multivariable models, we observed no associations of a higher intake of total fat or SFAs, MUFAs, or PUFAs with growth, adiposity, or cardiometabolic health when fat was consumed at the expense of carbohydrates. In subsequent models, there were also no associations observed for higher MUFA or PUFA intakes at the expense of SFAs with any of the outcomes. Results did not differ by sex, ethnicity, age, or birth weight."
Tottman, 2020(56) RCS New Zealand	n = 478 infants Born preterm/VLBW	Macronutrient content of parenteral and enteral feedings	**GSBC:** wt/WFA, ht/HFA/SFA, body comp *Additional outcomes examined: Developmental Outcomes*	Toddlers: f/u = 2 yr corrected age	"More girls (215/478) survived without neurodevelopmental impairment at 2 years (82% vs. 72%, P = 0.02). Overall, survival without neurodevelopmental impairment was positively associated with more energy, fat, and enteral feeds in week 1, and more energy and enteral feeds in month 1 (P = 0.005-0.03), but all with sex interactions (P = 0.008-0.02). In girls but not boys, survival without neurodevelopmental impairment was positively associated with week 1 total intakes of fat (OR(95% CI) for highest vs. lowest intake quartile 62.6(6.6-1618.1), P < 0.001), energy (22.9(2.6-542.0), P = 0.03) and enteral feeds (1.9 × 10(9)(9.5-not estimable), P < 0.001)."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Zuccotti, 2020(83) PCS Italy Nutrintake 2 (NI2) study (re-evaluation of NI1 study)	n = 164 infants	Macronutrient intake from diet	**GSBC:** wt/WFA, ht/HFA/SFA, BMI/BMI z-score/WFL	Children: f/u = 54 mo (median) of age	"During the same period, there was no biologically relevant change in the intake of macronutrients expressed as percentage of energy while median increases of 757 mg/day, 0.7 mg/day and 3.1 g/1000 kcal per day were detected for sodium, iron and fibre, respectively. As compared to the Italian reference standards, the Nutrintake children continued to show at the 3-year follow-up an excessive intake of simple carbohydrates, proteins, sodium, and a low intake of iron and fibre." Note: anthropometry was measured, but the association between nutrient intake and anthropometry was not explored by the authors.

Table 12. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Ages 0-24 Months and CVD in the Same Individuals

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Cowin, 2001(61) PCS UK Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC)	n = 389 infants	Macronutrient content from diet	**CVD:** TC, LDL, HDL, TG/TAG *Additional outcomes examined: GSBC*	Children: f/u = 31 mo of age	"Among boys, total cholesterol concentrations were positively associated with the intake of total fat (r=0.209, P=0.002) and saturated fatty acids (r=0.211, P=0.002). Among girls, HDLC was positively associated with energy intake (r=0.204, P=0.018), and negatively associated with intakes of polyunsaturated fat, saturated fat and sugar in multivariate analysis. There were no associations between the intakes of non-starch polysaccharides (fibre) or dietary cholesterol and total or HDL cholesterol concentrations in either sex. Among boys, higher intakes of breakfast cereals were associated with lower total cholesterol (r=-0.187, P=0.008). Among girls, higher intakes of biscuits and meat and meat products were associated with higher HDLC concentrations."
Nguyen, 2020(71) PCS Netherlands Generation R Study	n = 3,629 infants	Carbohydrate intake from diet	**CVD:** TC, LDL, HDL, TG/TAG *Additional outcomes examined: GSBC, T2D*	Children: f/u = 10 yr	"In multivariable-adjusted linear mixed models, we found no associations of intake of carbohydrates or its subtypes with children's BMI or body composition. A higher intake of monosaccharides and disaccharides was associated with higher triglyceride concentrations (0.02 SDS per 10 g/d, 95% CI: 0.01, 0.04). Higher monosaccharide and disaccharide intake was also associated with lower HDL-cholesterol (-0.03 SDS, 95% CI: -0.04; -0.01), especially when it replaced polysaccharides."
Stroobant, 2017(82) PCS Netherlands Generation R Study	n = 2,967 infants	Macronutrient intake from diet	**CVD:** TC, LDL, HDL, TG/TAG, BP *Additional outcomes examined: GSBC*	Children: f/u = 6 yr of age	"In multivariable models, we observed no associations of a higher intake of total fat or SFAs, MUFAs, or PUFAs with growth, adiposity, or cardiometabolic health when fat was consumed at the expense of carbohydrates. In subsequent models, there were also no associations observed for higher MUFA or PUFA intakes at the expense of SFAs with any of the outcomes. Results did not differ by sex, ethnicity, age, or birth weight."

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
van den Hooven, 2013(84) PCS Netherlands Generation R Study	n = 2,882 infants	Macronutrient intake from diet	**CVD:** BP	Children: f/u = 6 yr of age	"Higher total fat intake was associated with higher carotid-femoral PWV (P-trend = 0.03), whereas higher intakes of total carbohydrate and mono- and disaccharides were associated with lower carotid-femoral PWV. No consistent associations were observed for macronutrient intake with systolic blood pressure, diastolic blood pressure, fractional shortening, and aortic root diameter. Higher intakes of total, saturated, monounsaturated, and polyunsaturated fat were associated with lower left atrial diameter (all P-trend ≤ 0.01), and higher total carbohydrate and mono- and disaccharide intakes were associated with higher left atrial diameter (P-trend < 0.01 and 0.02, respectively). Furthermore, the third tertile of mono- and disaccharide intake was associated with a higher left ventricular mass (difference: 1.01 g; 95% CI: 0.18, 1.85 g; P = 0.02)."

Table 13. Characteristics of Studies Examining the Relationship between Dietary Carbohydrate Intake in Ages 0-24 Months and T2D in the Same Individuals

Reference Study Design Country and Larger Cohort Study (if applicable)	Intake Population	Interventions/ Exposures (Comparison Type)	Outcomes of Interest	Outcome Population and Maximum Length of Followup (f/u)	Results from Abstract
Johansson, 2019(65) RCT Sweden	n = 232 infants	Nordic diet group (NG) vs conventional diet group (CG); NG = (4-6 mo of age) systematic taste portions schedule consisting of home-made purées of Nordic produce for 24 days; subsequently: NG supplied with baby food products and recipes of homemade baby foods based on Nordic ingredients but with reduced protein content compared to the CG. CG advised to follow current Swedish recommendations on complementary foods	**T2D:** HbA1c *Additional outcomes examined:: GSBC*	Infants: f/u = 9 mo of age	"The NG had significantly higher intake of fruits and vegetables than the CG at 9 months of age; 225 ± 109 g/day vs. 156 ± 77 g/day (p < 0.001), respectively. Energy intake was similar, but protein intake was significantly lower in the NG (-26%, p < 0.001) compared to the CG. This lower protein intake was compensated for by higher intake of carbohydrate from fruits and vegetables. No significant group differences in growth or iron status were observed."
Nguyen, 2020(71) PCS Netherlands Generation R Study	n = 3,629 infants	Carbohydrate intake from diet	**T2D:** glucose tolerance, insulin resistance, insulin sensitivity *Additional outcomes examined: GSBC, CVD*	Children: f/u = 10 yr	"In multivariable-adjusted linear mixed models, we found no associations of intake of carbohydrates or its subtypes with children's BMI or body composition. A higher intake of monosaccharides and disaccharides was associated with higher triglyceride concentrations (0.02 SDS per 10 g/d, 95% CI: 0.01, 0.04). Higher monosaccharide and disaccharide intake was also associated with lower HDL-cholesterol (-0.03 SDS, 95% CI: -0.04; -0.01), especially when it replaced polysaccharides."

Summary and Limitations

- The largest bodies of evidence identified for this evidence scan investigated dietary digestible carbohydrate intake and physical growth and/or body composition; specifically intake in pregnant women and fetal/newborn growth parameters, and intake in ages 0-24 months and GSBC in the same individuals at a later time point. Several studies investigating intake in ages 0-24 months and GSBC outcomes, focused on body composition/distribution in relation to risk of obesity.

- A considerable amount of evidence was also identified for intake by pregnant/lactating individuals or 0-24 months and development of other chronic diseases (i.e., CVD, T2D) in offspring or in the same individuals. Outcomes of interest were mostly measured during childhood. A few studies measured outcomes in adulthood. All measured only intermediate outcomes (rather than incidence).
- A number of studies were identified investigating intake in pregnant/lactating individuals and outcomes in the same population, especially development of gestational diabetes and weight gain/retention.
- No studies were identified investigating intake during pregnancy/lactation and developmental outcomes in offspring.
- A handful of studies explored the association between intake in ages 0-24 months and developmental outcomes. Most of these involved populations of preterm and/or LBW/VLBW infants. These studies involve controlled intake environments and outcomes that are impacted by numerous factors in this vulnerable population; findings may not be applicable to the general population.
- Almost half (12/28) of the studies examining the relationship between intake in ages 0-24 months and GSBC outcomes were in preterm and/or/LBW/VLBW infants.
- This evidence scan did not include a risk of bias assessment; inclusion of a study is not an indication of its quality. Inclusion criteria did limit eligible designs to RCTs, nonRCTs, cohort studies, and nested case-control studies.
- All studies examining intake in pregnant/postpartum populations were cohort studies. Most studies examining intake in ages 0-24 months were cohort studies; a handful were trials examining GSBC outcomes.
- No studies specifically examining intake in lactating women and outcomes in the same individuals (e.g., adverse outcomes, weight gain/change) were identified. No studies examining dietary intake in breastfeeding individuals (i.e., via 24-hour recalls, food-frequency questionnaires, etc.) were identified. However, a number of studies examining intake of human milk (analyzed for macronutrient content) were identified. One study assessed the overall impact of breastfeeding (not macronutrient content, specifically) on offspring GSBC in adulthood.
- Authors of studies use inconsistent terminology to describe dietary carbohydrate intake; many report “carbohydrates” generally and may describe exclusion of fiber from their calculations while other authors are unclear; few authors refer to “available” or “digestible carbohydrate”; it is sometimes uncertain whether the digestible portion of carbohydrate was truly isolated; all of this makes comparisons and generalizability challenging.

Included References for the Evidence Scan

1. Dong H, Sun H, Cai C, Pang X, Bai D, Lan X, et al. A low-carbohydrate dietary pattern characterised by high animal fat and protein during the first trimester is associated with an increased risk of gestational diabetes mellitus in Chinese women: a prospective cohort study. *Br J Nutr*. 2021;126(12):1872-80. doi: 10.1017/s0007114521000611
2. Feng Q, Yang M, Dong H, Sun H, Chen S, Chen C, et al. Dietary fat quantity and quality in early pregnancy and risk of gestational diabetes mellitus in Chinese women: a prospective cohort study. *Br J Nutr*. 2023;129(9):1481-90. doi: 10.1017/S0007114522002422
3. Pajunen L, Korkalo L, Koivuniemi E, Houttu N, Pellonperä O, Mokkala K, et al. A healthy dietary pattern with a low inflammatory potential reduces the risk of gestational diabetes mellitus. *Eur J Nutr*. 2022;61(3):1477-90. doi: 10.1007/s00394-021-02749-z
4. Radesky JS, Oken E, Rifas-Shiman SL, Kleinman KP, Rich-Edwards JW, Gillman MW. Diet during early pregnancy and development of gestational diabetes. *Paediatr Perinat Epidemiol*. 2008;22(1):47-59. doi: 10.1111/j.1365-3016.2007.00899.x
5. Saldana TM, Siega-Riz AM, Adair LS. Effect of macronutrient intake on the development of glucose intolerance during pregnancy. *Am J Clin Nutr*. 2004;79(3):479-86. doi: 10.1093/ajcn/79.3.479
6. Tajima R, Yachi Y, Tanaka Y, Kawasaki YA, Nishibata I, Hirose AS, et al. Carbohydrate intake during early pregnancy is inversely associated with abnormal glucose challenge test results in Japanese pregnant women. *Diabetes Metab Res Rev*. 2017;33(6). doi: 10.1002/dmrr.2898
7. Tanner H, Barrett HL, Callaway LK, Wilkinson SA, Dekker Nitert M. Consumption of a low carbohydrate diet in overweight or obese pregnant women is associated with longer gestation of pregnancy. *Nutrients*. 2021;13(10). doi: 10.3390/nu13103511
8. Zhou X, Chen R, Zhong C, Wu J, Li X, Li Q, et al. Maternal dietary pattern characterised by high protein and low carbohydrate intake in pregnancy is associated with a higher risk of gestational diabetes mellitus in Chinese women: a prospective cohort study. *Br J Nutr*. 2018;120(9):1045-55. doi: 10.1017/s0007114518002453
9. Callahan ML, Schneider-Worthington CR, Martin SL, Gower BA, Catalano PM, Chandler-Laney P. Association of weight status and carbohydrate intake with gestational weight gain. *Clin Obes*. 2021;11(4):e12455. doi: 10.1111/cob.12455
10. Chen Y, Qin Y, Zhang Z, Huang S, Jiao C, Zhang Z, et al. Association of the low-carbohydrate dietary pattern with postpartum weight retention in women. *Food Funct*. 2021;12(21):10764-72. doi: 10.1039/d1fo00935d
11. Dias Duarte de Carvalho Souza M, Mary Ribeiro M, Bueno Ferreira L, Silva do Carmo A, Dos Santos LC. Weight reduction and changes in body circumferences in lactating women as a function of differences in dietary macronutrient content. *Breastfeed Med*. 2022;17(6):511-8. doi: 10.1089/bfm.2021.0354
12. Diemert A, Lezius S, Pagenkemper M, Hansen G, Drozdowska A, Hecher K, et al. Maternal nutrition, inadequate gestational weight gain and birth weight: results from a prospective birth cohort. *BMC Pregnancy Childbirth*. 2016;16:224. doi: 10.1186/s12884-016-1012-y
13. Dubois L, Diasparra M, Bédard B, Colapinto CK, Fontaine-Bisson B, Tremblay RE, et al. Adequacy of nutritional intake during pregnancy in relation to prepregnancy BMI: results from the 3D Cohort Study. *Br J Nutr*. 2018;120(3):335-44. doi: 10.1017/s0007114518001393
14. Grandy M, Snowden JM, Boone-Heinonen J, Purnell JQ, Thornburg KL, Marshall NE. Poorer maternal diet quality and increased birth weight. *J Matern Fetal Neonatal Med*. 2018;31(12):1613-9. doi: 10.1080/14767058.2017.1322949
15. Lagiou P, Tamimi RM, Mucci LA, Adami HO, Hsieh CC, Trichopoulos D. Diet during pregnancy in relation to maternal weight gain and birth size. *Eur J Clin Nutr*. 2004;58(2):231-7. doi: 10.1038/sj.ejcn.1601771
16. Lai JS, Soh SE, Loy SL, Colega M, Kramer MS, Chan JKY, et al. Macronutrient composition and food groups associated with gestational weight gain: the GUSTO study. *Eur J Nutr*. 2019;58(3):1081-94. doi: 10.1007/s00394-018-1623-3

17. Maslova E, Halldorsson TI, Astrup A, Olsen SF. Dietary protein-to-carbohydrate ratio and added sugar as determinants of excessive gestational weight gain: a prospective cohort study. *BMJ Open*. 2015;5(2):e005839. doi: 10.1136/bmjopen-2014-005839

18. Mishra KG, Bhatia V, Nayak R. Maternal nutrition and inadequate gestational weight gain in relation to birth weight: results from a prospective cohort study in India. *Clin Nutr Res*. 2020;9(3):213-22. doi: 10.7762/cnr.2020.9.3.213

19. Pellonperä O, Koivuniemi E, Vahlberg T, Mokkala K, Tertti K, Rönnemaa T, et al. Dietary quality influences body composition in overweight and obese pregnant women. *Clin Nutr*. 2019;38(4):1613-9. doi: 10.1016/j.clnu.2018.08.029

20. Rugină C, Mărginean CO, Meliţ LE, Giga DV, Modi V, Mărginean C. Relationships between excessive gestational weight gain and energy and macronutrient intake in pregnant women. *J Int Med Res*. 2020;48(8):300060520933808. doi: 10.1177/0300060520933808

21. Zulfiqar T, Rizvi F, Jalali S, Shami SA, Tasnim N, Jahan S. Effects of maternal macronutrient intake in 3rd trimester of normal pregnancy on the maternal weight gain and neonatal birth weight of full term neonates. *Rawal Med J*. 2011;36(2).

22. Rai D, Singh KP. Pre and periconceptional nutritional status of urban women; and its impact on their neonates. *Natl Acad Science Letters - India*. 2011;34(3-4):147-59.

23. Chen LW, Aris IM, Bernard JY, Tint MT, Colega M, Gluckman PD, et al. Associations of maternal macronutrient intake during pregnancy with infant BMI peak characteristics and childhood BMI. *Am J Clin Nutr*. 2017;105(3):705-13. doi: 10.3945/ajcn.116.148270

24. Chong MF, Chia AR, Colega M, Tint MT, Aris IM, Chong YS, et al. Maternal protein intake during pregnancy is not associated with offspring birth weight in a multiethnic Asian population. *J Nutr*. 2015;145(6):1303-10. doi: 10.3945/jn.114.205948

25. Crume TL, Brinton JT, Shapiro A, Kaar J, Glueck DH, Siega-Riz AM, et al. Maternal dietary intake during pregnancy and offspring body composition: The Healthy Start Study. *Am J Obstet Gynecol*. 2016;215(5):609.e1-.e8. doi: 10.1016/j.ajog.2016.06.035

26. Damen NA, Gillingham M, Hansen JG, Thornburg KL, Purnell JQ, Marshall NE. Maternal dietary fat intake during pregnancy and newborn body composition. *J Perinatol*. 2021;41(5):1007-13. doi: 10.1038/s41372-021-00922-0

27. Eshak ES, Okada C, Baba S, Kimura T, Ikehara S, Sato T, et al. Maternal total energy, macronutrient and vitamin intakes during pregnancy associated with the offspring's birth size in the Japan Environment and Children's Study. *Br J Nutr*. 2020;124(6):558-66. doi: 10.1017/s0007114520001397

28. Fahey CA, Chevrier J, Crause M, Obida M, Bornman R, Eskenazi B. Seasonality of antenatal care attendance, maternal dietary intake, and fetal growth in the VHEMBE birth cohort, South Africa. *PLoS One*. 2019;14(9):e0222888. doi: 10.1371/journal.pone.0222888

29. Horan MK, McGowan CA, Gibney ER, Donnelly JM, McAuliffe FM. Maternal low glycaemic index diet, fat intake and postprandial glucose influences neonatal adiposity--secondary analysis from the ROLO study. *Nutr J*. 2014;13:78. doi: 10.1186/1475-2891-13-78

30. Kanade AN, Rao S, Kelkar RS, Gupte S. Maternal nutrition and birth size among urban affluent and rural women in India. *J Am Coll Nutr*. 2008;27(1):137-45. doi: 10.1080/07315724.2008.10719685

31. Mani I, Dwarkanath P, Thomas T, Thomas A, Kurpad AV. Maternal fat and fatty acid intake and birth outcomes in a South Indian population. *Int J Epidemiol*. 2016;45(2):523-31. doi: 10.1093/ije/dyw010

32. Morisaki N, Nagata C, Yasuo S, Morokuma S, Kato K, Sanefuji M, et al. Optimal protein intake during pregnancy for reducing the risk of fetal growth restriction: the Japan Environment and Children's Study. *Br J Nutr*. 2018;120(12):1432-40. doi: 10.1017/s000711451800291x

33. Mukhopadhyay A, Thomas T, Bosch RJ, Dwarkanath P, Thomas A, Duggan CP, et al. Fetal sex modifies the effect of maternal macronutrient intake on the incidence of small-for-gestational-age births: a prospective observational cohort study. *Am J Clin Nutr*. 2018;108(4):814-20. doi: 10.1093/ajcn/nqy161

34. O'Brien CM, Louise J, Deussen A, Dodd JM. In overweight or obese pregnant women, maternal dietary factors are not associated with fetal growth and adiposity. *Nutrients*. 2018;10(7). doi: 10.3390/nu10070870

35. Okubo H, Crozier SR, Harvey NC, Godfrey KM, Inskip HM, Cooper C, et al. Maternal dietary glycemic index and glycemic load in early pregnancy are associated with offspring adiposity in childhood: the Southampton Women's Survey. *Am J Clin Nutr*. 2014;100(2):676-83. doi: 10.3945/ajcn.114.084905

36. Rao S, Yajnik CS, Kanade A, Fall CH, Margetts BM, Jackson AA, et al. Intake of micronutrient-rich foods in rural Indian mothers is associated with the size of their babies at birth: Pune Maternal Nutrition Study. *J Nutr*. 2001;131(4):1217-24. doi: 10.1093/jn/131.4.1217

37. Renault KM, Carlsen EM, Nørgaard K, Nilas L, Pryds O, Secher NJ, et al. Intake of carbohydrates during pregnancy in obese women is associated with fat mass in the newborn offspring. *Am J Clin Nutr*. 2015;102(6):1475-81. doi: 10.3945/ajcn.115.110551

38. Sharma SS, Greenwood DC, Simpson NAB, Cade JE. Is dietary macronutrient composition during pregnancy associated with offspring birth weight? An observational study. *Br J Nutr*. 2018;119(3):330-9. doi: 10.1017/s0007114517003609

39. Brion MJ, Ness AR, Rogers I, Emmett P, Cribb V, Davey Smith G, et al. Maternal macronutrient and energy intakes in pregnancy and offspring intake at 10 y: exploring parental comparisons and prenatal effects. *Am J Clin Nutr*. 2010;91(3):748-56. doi: 10.3945/ajcn.2009.28623

40. Khalil H, Murrin C, O'Reilly M, Viljoen K, Segurado R, O'Brien J, et al. Total HDL cholesterol efflux capacity in healthy children - Associations with adiposity and dietary intakes of mother and child. *Nutr Metab Cardiovasc Dis*. 2017;27(1):70-7. doi: 10.1016/j.numecd.2016.10.002

41. Maslova E, Rytter D, Bech BH, Henriksen TB, Rasmussen MA, Olsen SF, et al. Maternal protein intake during pregnancy and offspring overweight 20 y later. *Am J Clin Nutr*. 2014;100(4):1139-48. doi: 10.3945/ajcn.113.082222

42. Maslova E, Rytter D, Bech BH, Henriksen TB, Olsen SF, Halldorsson TI. Maternal intake of fat in pregnancy and offspring metabolic health - A prospective study with 20 years of follow-up. *Clin Nutr*. 2016;35(2):475-83. doi: 10.1016/j.clnu.2015.03.018

43. Mulcahy MC, Tellez-Rojo MM, Cantoral A, Solano-González M, Baylin A, Bridges D, et al. Maternal carbohydrate intake during pregnancy is associated with child peripubertal markers of metabolic health but not adiposity. *Public Health Nutr*. 2022;25(9):2541-53. doi: 10.1017/s1368980021004614

44. Murrin C, Shrivastava A, Kelleher CC. Maternal macronutrient intake during pregnancy and 5 years postpartum and associations with child weight status aged five. *Eur J Clin Nutr*. 2013;67(6):670-9. doi: 10.1038/ejcn.2013.76

45. Normia J, Laitinen K, Isolauri E, Poussa T, Jaakkola J, Ojala T. Impact of intrauterine and post-natal nutritional determinants on blood pressure at 4 years of age. *J Hum Nutr Diet*. 2013;26(6):544-52. doi: 10.1111/jhn.12115

46. Blumfield ML, Nowson C, Hure AJ, Smith R, Simpson SJ, Raubenheimer D, et al. Lower protein-to-carbohydrate ratio in maternal diet is associated with higher childhood systolic blood pressure up to age four years. *Nutrients*. 2015;7(5):3078-93. doi: 10.3390/nu7053078

47. Hrolfsdottir L, Halldorsson TI, Rytter D, Bech BH, Birgisdottir BE, Gunnarsdottir I, et al. Maternal macronutrient intake and offspring blood pressure 20 years later. *J Am Heart Assoc*. 2017;6(4). doi: 10.1161/jaha.117.005808

48. Leary SD, Ness AR, Emmett PM, Davey Smith G, Headley JE. Maternal diet in pregnancy and offspring blood pressure. *Arch Dis Child*. 2005;90(5):492-3. doi: 10.1136/adc.2004.070698

49. Roseboom TJ, van der Meulen JH, van Montfrans GA, Ravelli AC, Osmond C, Barker DJ, et al. Maternal nutrition during gestation and blood pressure in later life. *J Hypertens*. 2001;19(1):29-34. doi: 10.1097/00004872-200101000-00004

50. van den Hil LC, Rob Taal H, de Jonge LL, Heppe DH, Steegers EA, Hofman A, et al. Maternal first-trimester dietary intake and childhood blood pressure: the Generation R Study. *Br J Nutr*. 2013;110(8):1454-64. doi: 10.1017/s0007114513000676

51. Shiell AW, Campbell DM, Hall MH, Barker DJ. Diet in late pregnancy and glucose-insulin metabolism of the offspring 40 years later. *Bjog*. 2000;107(7):890-5. doi: 10.1111/j.1471-0528.2000.tb11088.x

52. Bishara R, Asbury MR, Ng DVY, Bando N, Ng E, Unger S, et al. Higher energy, lipid, and carbohydrate provision to very low-birth-weight infants is differentially associated with neurodevelopment at 18 months, despite consistent improvements in weight gain. *JPEN J Parenter Enteral Nutr*. 2021;45(8):1762-73. doi: 10.1002/jpen.2072

53. Marinho AR, Correia D, Bernard JY, Heude B, Lopes C, de Lauzon-Guillain B. Macronutrient intake during infancy and neurodevelopment in preschool children from the EDEN mother-child cohort. *Eur J Clin Nutr*. 2023;77(6):668-76. doi: 10.1038/s41430-023-01273-z

54. Sammallahti S, Kajantie E, Matinolli HM, Pyhälä R, Lahti J, Heinonen K, et al. Nutrition after preterm birth and adult neurocognitive outcomes. *PLoS One*. 2017;12(9):e0185632. doi: 10.1371/journal.pone.0185632

55. Sato J, Vandewouw MM, Bando N, Ng DVY, Branson HM, O'Connor DL, et al. Early nutrition and white matter microstructure in children born very low birth weight. *Brain Commun*. 2021;3(2):fcab066. doi: 10.1093/braincomms/fcab066

56. Tottman AC, Bloomfield FH, Cormack BE, Harding JE, Taylor J, Alsweiler JM. Sex-specific relationships between early nutrition and neurodevelopment in preterm infants. *Pediatr Res*. 2020;87(5):872-8. doi: 10.1038/s41390-019-0695-y

57. Ahmed B, Freije A, Alhakim F, Alhaddad F, Elbehery A, Perna S. The effects of energy and macronutrient content of human milk on the growth of preterm infants: A prospective cohort pilot study. *Bahrain Med Bull*. 2021;43(3):560-6.

58. Belfort M, Cherkerzian S, Bell K, Soldateli B, Cordova Ramos E, Palmer C, et al. Macronutrient intake from human milk, infant growth, and body composition at term equivalent age: a longitudinal study of hospitalized very preterm infants. *Nutrients*. 2020;12(8). doi: 10.3390/nu12082249

59. Beyerlein A, Uusitalo UM, Virtanen SM, Vehik K, Yang J, Winkler C, et al. Intake of energy and protein is associated with overweight risk at age 5.5 years: results from the prospective TEDDY study. *Obesity (Silver Spring)*. 2017;25(8):1435-41. doi: 10.1002/oby.21897

60. Collins CT, Gibson RA, Miller J, McPhee AJ, Willson K, Smithers LG, et al. Carbohydrate intake is the main determinant of growth in infants born <33 weeks' gestation when protein intake is adequate. *Nutrition*. 2008;24(5):451-7. doi: 10.1016/j.nut.2008.01.014

61. Cowin IS, Emmett PM. Associations between dietary intakes and blood cholesterol concentrations at 31 months. *Eur J Clin Nutr*. 2001;55(1):39-49. doi: 10.1038/sj.ejcn.1601120

62. Garden FL, Marks GB, Simpson JM, Webb KL. Body mass index (BMI) trajectories from birth to 11.5 years: relation to early life food intake. *Nutrients*. 2012;4(10):1382-98. doi: 10.3390/nu4101382

63. Gridneva Z, Rea A, Lai CT, Tie WJ, Kugananthan S, Murray K, et al. Development of visceral and subcutaneous-abdominal adipose tissue in breastfed infants during first year of lactation. *Nutrients*. 2021;13(9). doi: 10.3390/nu13093294

64. Han J, Zhang L, Li S, Zhang Y, Jiang Y, Chen X, et al. Associations of early nutrition with growth and body composition in very preterm infants: a prospective cohort study. *Eur J Clin Nutr*. 2022;76(1):103-10. doi: 10.1038/s41430-021-00901-w

65. Johansson U, Öhlund I, Hernell O, Lönnerdal B, Lindberg L, Lind T. Protein-reduced complementary foods based on nordic ingredients combined with systematic introduction of taste portions increase intake of fruits and vegetables in 9 month old infants: a randomised controlled trial. *Nutrients*. 2019;11(6). doi: 10.3390/nu11061255

66. Jones LR, Emmett PM, Hays NP, Shahkhalili Y, Taylor CM. Association of Nutrition in Early Childhood with Body Composition and Leptin in Later Childhood and Early Adulthood. *Nutrients*. 2021;13(9). doi: 10.3390/nu13093264

67. Karaolis-Danckert N, Günther AL, Kroke A, Hornberg C, Buyken AE. How early dietary factors modify the effect of rapid weight gain in infancy on subsequent body-composition development in term children whose birth weight was appropriate for gestational age. *Am J Clin Nutr*. 2007;86(6):1700-8. doi: 10.1093/ajcn/86.5.1700

68. Kashyap S, Ohira-Kist K, Abildskov K, Towers HM, Sahni R, Ramakrishnan R, et al. Effects of quality of energy intake on growth and metabolic response of enterally fed low-birth-weight infants. *Pediatr Res*. 2001;50(3):390-7. doi: 10.1203/00006450-200109000-00015

69. Magarey AM, Daniels LA, Boulton TJ, Cockington RA. Does fat intake predict adiposity in healthy children and adolescents aged 2--15 y? A longitudinal analysis. *Eur J Clin Nutr*. 2001;55(6):471-81. doi: 10.1038/sj.ejcn.1601207

70. Martin CR, Brown YF, Ehrenkranz RA, O'Shea TM, Allred EN, Belfort MB, et al. Nutritional practices and growth velocity in the first month of life in extremely premature infants. *Pediatrics*. 2009;124(2):649-57. doi: 10.1542/peds.2008-3258

71. Nguyen AN, Santos S, Braun KVE, Voortman T. Carbohydrate intake in early childhood and body composition and metabolic health: results from the Generation R Study. *Nutrients*. 2020;12(7). doi: 10.3390/nu12071940

72. Ohlund I, Hernell O, Hörnell A, Stenlund H, Lind T. BMI at 4 years of age is associated with previous and current protein intake and with paternal BMI. *Eur J Clin Nutr*. 2010;64(2):138-45. doi: 10.1038/ejcn.2009.132

73. Olga L, Vervoort J, van Diepen JA, Gross G, Petry CJ, Prentice PM, et al. Associations between breast milk intake volume, macronutrient intake and infant growth in a longitudinal birth cohort: the Cambridge Baby Growth and Breastfeeding Study (CBGS-BF). *Br J Nutr*. 2023;130(1):56-64. doi: 10.1017/s0007114522003178

74. Péneau S, Hercberg S, Rolland-Cachera MF. Breastfeeding, early nutrition, and adult body fat. *J Pediatr*. 2014;164(6):1363-8. doi: 10.1016/j.jpeds.2014.02.020

75. Rochow N, Fusch G, Choi A, Chessell L, Elliott L, McDonald K, et al. Target fortification of breast milk with fat, protein, and carbohydrates for preterm infants. *J Pediatr*. 2013;163(4):1001-7. doi: 10.1016/j.jpeds.2013.04.052

76. Rochow N, Fusch G, Ali A, Bhatia A, So HY, Iskander R, et al. Individualized target fortification of breast milk with protein, carbohydrates, and fat for preterm infants: A double-blind randomized controlled trial. *Clin Nutr*. 2021;40(1):54-63. doi: 10.1016/j.clnu.2020.04.031

77. Rolland-Cachera MF, Maillot M, Deheeger M, Souberbielle JC, Péneau S, Hercberg S. Association of nutrition in early life with body fat and serum leptin at adult age. *Int J Obes (Lond)*. 2013;37(8):1116-22. doi: 10.1038/ijo.2012.185

78. Romera G, Figueras J, Rodríguez-Miguélez JM, Ortega J, Jiménez R. Energy intake, metabolic balance and growth in preterm infants fed formulas with different nonprotein energy supplements. *J Pediatr Gastroenterol Nutr*. 2004;38(4):407-13. doi: 10.1097/00005176-200404000-00008

79. Scaglioni S, Agostoni C, Notaris RD, Radaelli G, Radice N, Valenti M, et al. Early macronutrient intake and overweight at five years of age. *Int J Obes Relat Metab Disord*. 2000;24(6):777-81. doi: 10.1038/sj.ijo.0801225

80. Skinner JD, Bounds W, Carruth BR, Morris M, Ziegler P. Predictors of children's body mass index: a longitudinal study of diet and growth in children aged 2-8 y. *Int J Obes Relat Metab Disord*. 2004;28(4):476-82. doi: 10.1038/sj.ijo.0802405

81. Stoltz Sjöström E, Öhlund I, Ahlsson F, Engström E, Fellman V, Hellström A, et al. Nutrient intakes independently affect growth in extremely preterm infants: results from a population-based study. *Acta Paediatr*. 2013;102(11):1067-74. doi: 10.1111/apa.12359

82. Stroobant W, Braun KV, Kiefte-de Jong JC, Moll HA, Jaddoe VW, Brouwer IA, et al. Intake of different types of fatty acids in infancy is not associated with growth, adiposity, or cardiometabolic health up to 6 years of age. *J Nutr*. 2017;147(3):413-20. doi: 10.3945/jn.116.241018

83. Zuccotti GV, Cassatella C, Morelli A, Cucugliato MC, Mameli C, Troiano E, et al. Nutrient intake in aging infants and toddlers: 3-year follow-up of the Nutrintake study. *Int J Food Sci Nutr*. 2020;71(4):464-72. doi: 10.1080/09637486.2019.1663798

84. van den Hooven EH, de Jonge LL, Kiefte-de Jong JC, Raat H, Villamor E, Hofman A, et al. Infant macronutrient composition is associated with differences in cardiovascular structures and function in childhood. *J Nutr*. 2013;143(12):1989-98. doi: 10.3945/jn.113.179440

Acknowledgments and Funding

Joint U.S.-Canada Dietary Reference Intakes Working Group members:

Samantha Adas, MS, RDN (National Institutes of Health [NIH]); David Baer, PhD (U.S. Department of Agriculture [USDA] – Agricultural Research Service [ARS]); Andrew Bremer, MD, PhD, MAS (NIH); Cindy Davis, PhD (USDA-ARS); Janet de Jesus, MS, RD (U.S. Department of Health and Human Services – Office of Disease Prevention and Health Promotion); Veronique Dorais, MSc (Health Canada); Krista Esslinger, MSc, RD (Health Canada); Karl Friedl, PhD (Department of Defense); Jaime Gahche, PhD, MPH (NIH); Sarah Gebauer, PhD (U.S. Food and Drug Administration); Donna Johnson-Bailey, MPH, RD (USDA – Food and Nutrition Service); Amanda MacFarlane, PhD (Health Canada); Julie Obbagy, PhD, RD (USDA - Center for Nutrition Policy and Promotion [CNPP]); Matthew Parrott, PhD (Health Canada); Jennifer Seymour, PhD (U.S. Centers for Disease Control and Prevention); and Eve Stoody, PhD (USDA – CNPP)

NAL evidence team members were involved in: establishing all aspects of the protocol, which presented the plan for how they would examine the scientific evidence, including the inclusion and exclusion criteria; reviewing all studies that met the criteria they set; and describing the body of evidence for each question. The NAL evidence team facilitated, executed, and documented the work necessary to ensure the evidence scan was completed in accordance with NAL methodology.

The NAL evidence team was supported by the Joint U.S.-Canada Dietary Reference Intakes Working Group, who developed the evidence scan questions and provided input on the protocol.

The NAL evidence team thanks Molly Higgins (Systematic Review Librarian, NESR, CNPP) for peer-review of the literature search strategies and Jesse Sigman (Librarian – Evidence Synthesis Specialist, NAL, USDA) for deduplication of database search results. The team also thanks Mario Ferruzzi (formerly Director, Arkansas Children's Nutrition Center [ACNC]; currently Dean, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University), Lisa T. Jansen (Assistant Professor, Department of Dietetics and Nutrition in the College of Health Professions, University of Arkansas for Medical Sciences [UAMS] at ACNC), and Colin Kay (Director, ACNC; Professor, Department of Pediatrics, UAMS at ACNC) for assistance with literature screening. Finally, the team thanks Elisabet Borsheim (Professor of Pediatrics and Department of Geriatrics; Director of Research Faculty Development, Arkansas Children's Research Institute) and Veronique Dorais (Senior Epidemiologist, Health Canada) for assistance with conflict resolution.

Funding: U.S. Department of Agriculture, Agricultural Research Service, Washington, DC

Purpose: the purpose of this project was to conduct a series of evidence scans on macronutrients (e.g., carbohydrate, fat, protein, fiber, sugar) and health outcomes to support the Joint US-Canada Dietary Reference Intakes Working Group. These evidence scans describe the volume and characteristics of available research and help inform decision-making related to the review and revision of macronutrient DRI values. More information about the review of macronutrients can be found at: https://odphp.health.gov/our-work/nutrition-physical-activity/dietary-guidelines/dietary-reference-intakes/review-macronutrients-and-energy

Appendices

Appendix A - Abbreviations

Table App-A. Abbreviations Used in this Report

Abbreviation	Full Name
AI	Adequate Intake
AMDR	Acceptable Macronutrient Distribution Range
ARS	Agricultural Research Service
BMI	Body mass index
BP	Blood pressure
CC	Case-control
CNPP	Center for Nutrition Policy and Promotion
CVD	Cardiovascular disease
DGAC	Dietary Guidelines Advisory Committee
DRI	Dietary Reference Intakes
DRI Working Group	Joint U.S.-Canada Dietary Reference Intakes Working Group
d	Day(s)
EAR	Estimated Average Requirement
f/u	Followup
FNIC	Food and Nutrition Information Center
FNS	Food and Nutrition Service
FSNP	Food Safety and Nutrition Program
GDM	Gestational diabetes
GSBC	Growth, size, and body composition
HbA1c	Hemoglobin A1c
HC	Head circumference
ht/HFA/SFA	Height/height-for-age/stature-for-age
IOM	Institute of Medicine
LBW	Low birth weight
LGA	Large for gestational age
MA	Meta-analysis

Abbreviation	Full Name
mo	Month(s)
N/A	Not applicable
N/R	Not reported
NAFLD	Nonalcoholic fatty liver disease
NAL	National Agricultural Library
NASEM	National Academies of Sciences, Engineering, and Medicine
NESR	Nutrition Evidence Systematic Review
NIH	National Institutes of Health
NonRCT	Nonrandomized controlled trial
PCS	Prospective cohort study
PI/ECOTS	Population, intervention/exposure, comparator, outcome, timing, setting
RCS	Retrospective cohort study
RDA	Recommended Dietary Allowance
RCT	Randomized controlled trial
ScR	Scoping review
SGA	Small for gestational age
SR	Systematic review
T2D	Type 2 diabetes
TC	Total cholesterol
TG/TAG	Triglyceride/triacylglycerol
UL	Tolerable Upper Intake Level
UR	Umbrella review
USDA	U.S. Department of Agriculture
VLBW	Very low birth weight
wk	Week(s)
wt/WFA	Weight/weight-for-age
WFL	Weight for length
yr	Year(s)

Appendix B - Literature Search Strategy

Database Searches

The following databases were searched for this evidence scan:

- **PubMed** (U.S. National Library of Medicine) – retrieved 2,522 references on April 13, 2023
- **Web of Science - Core Collection** (Clarivate) – retrieved 2,356 references on April 13, 2023
- **Scopus** (Elsevier) – retrieved 2,714 references on April 13, 2023
- **Food Science and Technology Abstracts** (FSTA, EBSCO) – retrieved 683 references on April 13, 2023

A model search strategy (see **Table App-B**) was developed by the NAL librarian, reviewed, and then translated into syntax for the remaining databases.

Table App-B: Model Database Strategy in PubMed Syntax for Dietary Digestible Carbohydrate Intake and Maternal-Infant Daily Requirements and Chronic Disease Risk

Set #	Description	Search String
#1	Interventions/ exposures: digestible carbohydrate	("dietary carbohydrates"[mh:noexp] OR "diet, carbohydrate-restricted"[mh] OR "diet, fat-restricted"[mh] OR "diet, high fat"[mh] OR "ketogenic diet*"[tiab] OR "keto diet*"[tiab] OR "ketogenic diets"[tiab:~5] OR "keto diets"[tiab:~5] OR "ketogenic dietary"[tiab:~5] OR "keto dietary"[tiab:~5] OR "ketogenic ratio"[tiab] OR "ketogenic ratios"[tiab] OR "carbohydrate intake"[tiab:~2] OR "carbohydrate intakes"[tiab:~2] OR "carbohydrates intakes"[tiab:~2] OR "carbohydrates intake"[tiab:~2] OR "carbohydrate consumption"[tiab:~2] OR "carbohydrates consumption"[tiab:~2] OR "fat intake"[tiab:~2] OR "fat intakes"[tiab:~2] OR "total fat"[tiab:~2] OR ("carbohydrate*"[tiab] AND ("macronutrient"[tiab] OR "macro-nutrient"[tiab])) OR (("carbohydrate diet*"[tiab] OR "carb diet*"[tiab] OR "CHO diet*"[tiab] OR "fat diet*"[tiab] OR "protein diet*"[tiab]) AND ("low"[tiab] OR "lower"[tiab] OR "high*"[tiab] OR "balance*"[tiab] OR "restrict*"[tiab] OR "reduc*"[tiab] OR "moderat*"[tiab])) OR "carbohydrate reduc*"[tiab] OR "carb reduc*"[tiab] OR "CHO reduc*"[tiab] OR "carbohydrate restrict*"[tiab] OR "carb restrict*"[tiab] OR "CHO restrict*"[tiab] OR "carbohydrate rich diet*"[tiab] OR "CHO rich diet*"[tiab] OR "low fat diet*"[tiab] OR "lower fat diet*"[tiab] OR "atkins diet"[tiab:~3] OR "zone diet"[tiab:~3] OR "Ornish diet"[tiab:~3] OR "digestible carb*"[tiab] OR "Diet, High Protein"[mh])
#2	*Populations: pregnant, breastfeeding, postpartum, fetus, neonate* *Note: the MeSH term, "pregnant women"[mh], was used at the time this search was executed; but has since been updated to, "pregnant people"[mh], which should be searched going forward*	("maternal nutritional physiological phenomena"[mh] OR "pregnant women"[mh] OR "pregnancy"[mh] OR "pregnancy trimesters"[mh] OR "Fetus"[mh] OR "maternal-child"[tiab:~1] OR "maternal-offspring"[tiab:~1] OR "mother-child"[tiab:~1] OR "mother-offspring"[tiab:~1] OR "gravid*"[tiab] OR "natal"[tiab] OR "antenatal"[tiab] OR "prenatal"[tiab] OR "perinatal"[tiab] OR "postnatal"[tiab] OR "partal"[tiab] OR "antepartal"[tiab] OR "prepartal"[tiab] OR "peripartal"[tiab] OR "postpartal"[tiab] OR "partum"[tiab] OR "antepartum"[tiab] OR "prepartum"[tiab] OR "peripartum"[tiab] OR "postpartum"[tiab] OR "pregnan*"[tiab] OR "peripregnan*"[tiab] OR "postpregnan*"[tiab] OR "postconcept*"[tiab] OR "gestation*"[tiab] OR "perigestation*"[tiab] OR "postgestation*"[tiab] OR "parturition*"[tiab] OR "postparturition*"[tiab] OR puerper*[tiab] OR "maternal diet*"[tiab] OR "maternal diet"[tiab:~3] OR "maternal intake"[tiab:~3] OR "maternal nutrition"[tiab] OR "mother diet*"[tiab] OR "mother diet"[tiab:~3] OR "mother intake"[tiab:~3] OR "mother nutrition"[tiab:~3] OR "mothers diet*"[tiab] OR "mothers diet"[tiab:~3] OR "mothers intake"[tiab] OR "mothers nutrition"[tiab] OR "Breast Feeding"[mh] OR "breast fe*"[tiab] OR "breastfe*"[tiab] OR "Lactation"[mh] OR "lactati*"[tiab] OR "nursing women"[tiab] OR "nursing mother*"[tiab] OR "wet nurs*"[tiab] OR "birth cohort*"[tiab] OR "developmental programming"[tiab] OR "epigenetic programming"[tiab] OR "fetal programming"[tiab] OR "foetal programming"[tiab] OR "intrauterine programming"[tiab] OR "nutritional programming"[tiab] OR "transgenerational programming"[tiab] OR "metabolic programming"[tiab] OR ("programing"[tiab] AND ("developmental"[tiab] OR "epigenetic"[tiab] OR "fetal"[tiab] OR "foetal"[tiab] OR "intrauterine"[tiab] OR "intra-uterine"[tiab] OR "nutritional"[tiab] OR "transgenerational"[tiab] OR "metabolic"[tiab])) OR "nursing newborn*"[tiab] OR ("nursing"[tiab] AND ("newborn*"[tiab] OR "neonate*"[tiab] OR "baby"[tiab] OR "babies"[tiab] OR "infants"[tiab] OR "child"[tiab])))

#3	Outcomes: adverse events, growth/ development parameters, chronic diseases	("Brain/Growth and Development"[mh] OR "Infant/Growth and Development"[mh] OR "Psychomotor Performance"[mh] OR "Child Development"[mh] OR "Adolescent Development"[mh] OR "Bayley scales"[tiab] OR "Bayley-I*"[tiab] OR "Bayley-3"[tiab] OR "Bayley-4"[tiab] OR "Ages and Stages Questionnaire*"[tiab] OR "ASQ-3"[tiab] OR "Vineland"[tiab] OR ("Wechsler"[tiab] AND ("WPPSI"[tiab] OR "WISC"[tiab] OR "preschool"[tiab] OR "children"[tiab])) OR "NEPSY"[tiab] OR "Beery-Buktenica"[tiab] OR "Beery test"[tiab:~3] OR "Beery tests"[tiab:~3] OR "developmental index*"[tiab] OR "developmental indices"[tiab] OR "developmental quotient*"[tiab] OR "neurodevelopment*"[tiab] OR ("early childhood"[tiab] AND "develop*"[tiab]) OR "cognitive development"[tiab] OR "motor skill"[tiab] OR "psychomotor"[tiab] OR "psycho-motor"[tiab] OR "language development"[tiab:~2] OR "language acquisition"[tiab:~2] OR "Language Development"[mh] OR "metacognit*"[tiab] OR "neurocogniti*"[tiab] OR "neurodevelop*"[tiab] OR "neuro develop*"[tiab] OR "Aptitude Tests"[mh] OR "Abortion, Spontaneous"[mh] OR "spontaneous abortion*"[tiab] OR "Stillbirth"[mh] OR "stillbirth*"[tiab] OR "stillborn"[tiab] OR "miscarri*"[tiab] OR "early pregnancy loss"[tiab] OR "fetal demise"[tiab] OR "foetal demise"[tiab] OR "fetus demise"[tiab:~2] OR "Premature Birth"[mh] OR "Infant, Premature"[mh] OR "premature birth*"[tiab] OR "premature born"[tiab:~1] OR "premature infant*"[tiab] OR "preterm birth*"[tiab] OR "preterm born"[tiab:~1] OR "preterm infant*"[tiab] OR "pre-term birth*"[tiab] OR "pre-term born"[tiab:~1] OR "pre-term infant*"[tiab] OR "APGAR"[tiab] OR "newborn status"[tiab:~2] OR ("clinical status*"[tiab] AND ("newborn"[tiab] OR "neonat*"[tiab] OR "birth*"[tiab])) OR "Fetal Growth Retardation"[mh] OR "Fetal Development"[mh] OR "intrauterine growth restriction"[tiab] OR "intra uterine growth restriction"[tiab] OR "placental growth"[tiab] OR "fetal growth"[tiab] OR "foetal growth"[tiab] OR "birth weight"[mh] OR "birth weight"[tiab] OR "weight at birth"[tiab] OR "infant, large for gestational age"[mh] OR "Infant, Low Birth Weight"[mh] OR "LBW infant*"[tiab] OR "large for gestational age"[tiab] OR "LGA infant*"[tiab] OR "small for gestational age"[tiab] OR "smallness for gestational age"[tiab] OR "SGA infant*"[tiab] OR "weight for gestational age"[tiab] OR "newborn adiposity"[tiab] OR "neonatal adiposity"[tiab] OR "neonate adiposity"[tiab:~3] OR "neonates adiposity"[tiab:~3] OR "neonatal growth assessment score*"[tiab] OR "Fetal Macrosomia"[mh] OR "fetal macrosomia"[tiab] OR "foetal macrosomia"[tiab] OR "ponderal index"[tiab] OR "Cephalometry"[mh] OR "head circumference"[tiab:~2] OR "head circumferences"[tiab:~2] OR "maternal morbidit*"[tiab] OR "pregnancy morbidit*"[tiab] OR "pregnancy complications"[tiab:~2] OR "pregnancies complications"[tiab:~3] OR "Hypertension, Pregnancy-Induced"[mh] OR "preeclamp*"[tiab] OR "eclamp*"[tiab] OR "hypertensive disorders of pregnancy"[tiab] OR "hypertensive disorders in pregnancy"[tiab] OR "ophthalmic doppler"[tiab:~3] OR Diabetes, Gestational[mh] OR "gestational diabetes"[tiab] OR "diabetic pregnan*"[tiab] OR "pregnancy diabetes"[tiab:~3] OR ("Maternal Nutritional Physiological Phenomena"[mh] AND "diabet*"[tiab]) OR (ketoacidosis[tiab] AND (lactati*[tiab] OR "breast feeding"[tiab] OR "breastfeeding"[tiab])) OR "Gestational Weight Gain"[mh] OR (("weight gain*"[tiab] OR "gaining weight"[tiab] OR "weight change*"[tiab] OR "weight change"[tiab:~2] OR "weight loss"[tiab] OR "lose weight"[tiab] OR "weight management"[tiab] OR "managing weight"[tiab] OR "weight retention"[tiab] OR "retain weight"[tiab:~2] OR "BMI"[tiab] OR "BMIs"[tiab]) AND (gestation*[tiab] OR pregnan*[tiab] OR postpartum[tiab] OR "post partum"[tiab])) OR "Adipose Tissue"[mh] OR "Body Composition"[mh] OR "Body Weights and Measures"[mh:noexp] OR "Body Fat Distribution"[mh] OR "Body Mass Index"[mh] OR "Body Size"[mh] OR "Skinfold Thickness"[mh] OR "Waist-Hip Ratio"[mh] OR "Overnutrition"[mh] OR "Growth"[mh:noexp] OR "anthropometr*"[tiab] OR "body fat"[tiab] OR "fat mass"[tiab] OR "fat free mass"[tiab] OR "lean mass"[tiab] OR "obese"[tiab] OR "obesity"[tiab] OR "underweight"[tiab] OR "overweight"[tiab] OR "weight status"[tiab] OR "head circumference*"[tiab] OR "arm circumference*"[tiab] OR "calf circumference*"[tiab] OR "neck circumference*"[tiab] OR "thigh circumference*"[tiab] OR "waist circumference*"[tiab] OR "waist to hip ratio*"[tiab] OR "waist hip ratio*"[tiab] OR "body mass index*"[tiab] OR "BMI"[tiab] OR "BMIs"[tiab] OR "adipos*"[tiab] OR "body weight"[tiab] OR "body height"[tiab] OR "body size"[tiab] OR "body composition"[tiab] OR "overnutrition"[tiab] OR "wasting"[tiab] OR "healthy weight"[tiab] OR "skin fold"[tiab] OR "skin folds"[tiab] OR "skinfold"[tiab] OR "skinfolds"[tiab] OR "Weight Reduction Programs"[mh] OR "Body-Weight Trajectory"[mh] OR "Weight Gain"[mh] OR "Weight Loss"[mh:noexp] OR "Diet, Reducing"[mh] OR "weight gain"[tiab] OR "diet reduc*"[tiab] OR "weight cycling"[tiab] OR "weight decreas*"[tiab] OR "weight watch*"[tiab] OR "weight control*"[tiab] OR "weight retention"[tiab] OR "weight management"[tiab] OR "growth charts"[mh] OR "growth chart*"[tiab]OR "stunting"[tiab] OR "stunted"[tiab] OR "weight for height"[tiab] OR "stature for age"[tiab] OR "weight for age"[tiab] OR "height for age"[tiab] OR "length for age"[tiab] OR "weight for length"[tiab] OR "failure to thrive"[tiab] OR "Cardiovascular Diseases"[mh:noexp] OR "cardiovascular disease*"[tiab] OR "coronary artery disease*"[tiab] OR "heart disease*"[tiab] OR "Heart Failure"[mh] OR "heart failure"[tiab] OR "myocardial infarction*"[tiab] OR "Myocardial Ischemia"[mh] OR "myocardial ischemia*"[tiab] OR "heart attack*"[tiab] OR "Stroke"[mh] OR ("stroke*"[tiab] AND ("cerebral"[tiab] OR "cerebrovascular*"[tiab] OR "cerebro vascular"[tiab] OR "vascular"[tiab] OR "hemorrhag*"[tiab] OR "haemorrhag*"[tiab] OR "cryptogenic*"[tiab] OR "ischemic"[tiab] OR "ischaemic"[tiab] OR "wake-up"[tiab] OR "embolic"[tiab] OR "cardioembolic"[tiab] OR "thrombolic"[tiab] OR "thrombotic"[tiab])) OR "cerebrovascular accident"[tiab] OR "CVA stroke"[tiab:~10] OR "angina"[tiab] OR "heart attack*"[tiab] OR "hypertension"[tiab] OR "Blood Pressure"[mh:noexp] OR "high blood pressure"[tiab] OR "Lipids/blood"[mh] OR "Cholesterol, HDL"[mh] OR "HDL cholesterol"[tiab] OR "Cholesterol, LDL"[mh] OR "LDL cholesterol"[tiab] OR "density lipoprotein*"[tiab] OR "total cholesterol"[tiab] OR "blood cholesterol"[tiab] OR "Triglycerides"[mh] OR "triglyceride*"[tiab] OR "triacylglyceride*"[tiab] OR "triacylglycerol*"[tiab] OR "Hypertension"[mh:noexp] OR "hypertensi*"[tiab] OR "cardioprotect*"[tiab] OR "metabolic syndrome*"[tiab] OR "Diabetes Mellitus"[mh:noexp] OR "Diabetes Mellitus, Type 2"[mh] OR "type 2 diabet*"[tiab] OR "T2D"[tiab] OR "adult onset diabetes"[tiab] OR MODY[tiab] OR NIDDM[tiab] OR "Prediabetic State"[mh] OR "prediabet*"[tiab] OR "pre diabet*"[tiab] OR "Insulin Resistance"[mh] OR "insulin resistan*"[tiab] OR "glucose intoleran*"[tiab] OR "glucose toleran*"[tiab] OR "Glycated Hemoglobin"[mh] OR "hemoglobin A1c"[tiab] OR "hba1c"[tiab] OR "hba 1c"[tiab] OR "haemoglobin A1c"[tiab] OR "Hyperglycemia"[mh] OR "hyperglycemia"[tiab] OR "hyperglycaemia"[tiab] OR "Hypoglycemia"[mh] OR

Set #	Description	Search String
		"hypoglycemia"[tiab] OR "hypoglycaemia"[tiab] OR "Blood Glucose"[mh] OR "blood glucose"[tiab] OR "plasma glucose"[tiab] OR "serum glucose"[tiab] OR "glycemi*"[tiab] OR "glycaemi*"[tiab] OR "blood sugar"[tiab] OR "dysglycemi*"[tiab] OR "dysglycaemi*"[tiab] OR "hyperinsulinism"[mh] OR "hyperinsulin*"[tiab])
#4	Population-outcome pairing	#2 AND #3
#5	Populations: ages 0-24 months	("Infant Nutritional Physiological Phenomena"[mh] OR "birth to 24"[tiab:~1] OR "children under 2"[tiab] OR ((diet*[tiab] OR "feeding"[tiab] OR "food consumption"[tiab:~2] OR "food intake"[tiab:~2] OR nutri*[tiab]) AND ("Infant"[mh] OR infant*[tiab] OR "infancy"[tiab] OR toddler*[tiab] OR "1 month old*"[tiab] OR "2 month old*"[tiab] OR "3 month old*"[tiab] OR "4 month old*"[tiab] OR "5 month old*"[tiab] OR "6 month old*"[tiab] OR "7 month old*"[tiab] OR "8 month old*"[tiab] OR "9 month old*"[tiab] OR "10 month old*"[tiab] OR "11 month old*"[tiab] OR "12 month old*"[tiab] OR "13 month old*"[tiab] OR "14 month old*"[tiab] OR "15 month old*"[tiab] OR "16 month old*"[tiab] OR "17 month old*"[tiab] OR "18 month old*"[tiab] OR "19 month old*"[tiab] or "20 month old*"[tiab] OR "21 month old*"[tiab] OR "22 month old*"[tiab] OR "23 month old*"[tiab] OR "24 month old*"[tiab])))
#6	Outcomes: growth parameters, chronic diseases	("Adipose Tissue"[mh] OR "Body Composition"[mh] OR "Body Weights and Measures"[mh:noexp] OR "Body Fat Distribution"[mh] OR "Body Mass Index"[mh] OR "Body Size"[mh] OR "Skinfold Thickness"[mh] OR "Waist-Hip Ratio"[mh] OR "Overnutrition"[mh] OR "Growth"[mh:noexp] OR "anthropometr*"[tiab] OR "body fat"[tiab] OR "fat mass"[tiab] OR "fat free mass"[tiab] OR "lean mass"[tiab] OR "obese"[tiab] OR "obesity"[tiab] OR "underweight"[tiab] OR "overweight"[tiab] OR "weight status"[tiab] OR "arm circumference*"[tiab] OR "calf circumference*"[tiab] OR "neck circumference*"[tiab] OR "thigh circumference*"[tiab] OR "waist circumference*"[tiab] OR "waist to hip ratio*"[tiab] OR "waist hip ratio*"[tiab] OR "body mass index*"[tiab] OR "BMI"[tiab] OR "BMIs"[tiab] OR "adipos*"[tiab] OR "body weight"[tiab] OR "body height"[tiab] OR "body size"[tiab] OR "body composition"[tiab] OR "overnutrition"[tiab] OR "wasting"[tiab] OR "healthy weight"[tiab] OR "skin fold"[tiab] OR "skin folds"[tiab] OR "skinfold"[tiab] OR "skinfolds"[tiab] OR "Weight Reduction Programs"[mh] OR "Body-Weight Trajectory"[mh] OR "Weight Gain"[mh] OR "Weight Loss"[mh:noexp] OR "Diet, Reducing"[mh] OR "weight gain"[tiab] OR "diet reduc*"[tiab] OR "weight cycling"[tiab] OR "weight decreas*"[tiab] OR "weight watch*"[tiab] OR "weight control*"[tiab] OR "weight retention"[tiab] OR "weight management"[tiab] OR "Growth Charts"[mh] OR "growth chart*"[tiab]OR "stunting"[tiab] OR "stunted"[tiab] OR "weight for height"[tiab] OR "stature for age"[tiab] OR "weight for age"[tiab] OR "height for age"[tiab] OR "length for age"[tiab] OR "weight for length"[tiab] OR "failure to thrive"[tiab] OR "Cardiovascular Diseases"[mh:noexp] OR "cardiovascular disease*"[tiab] OR "coronary artery disease*"[tiab] OR "heart disease*"[tiab] OR "Heart Failure"[mh] OR "heart failure"[tiab] OR "myocardial infarction*"[tiab] OR "Myocardial Ischemia"[mh] OR "myocardial ischemia*"[tiab] OR "heart attack*"[tiab] OR "Stroke"[mh] OR ("stroke*"[tiab] ("cerebral"[tiab] OR "cerebrovascular*"[tiab] OR "cerebro vascular"[tiab] OR "vascular"[tiab] OR "hemorrhag*"[tiab] OR "haemorrhag*"[tiab] OR "cryptogenic*"[tiab] OR "ischemic"[tiab] OR "ischaemic"[tiab] OR "wake-up"[tiab] OR "embolic"[tiab] OR "cardioembolic"[tiab] OR "thrombolic"[tiab] OR "thrombotic"[tiab])) OR "cerebrovascular accident"[tiab] OR "CVA stroke"[tiab:~10] OR "angina"[tiab] OR "heart attack*"[tiab] OR "hypertension"[tiab] OR "Blood Pressure"[mh:noexp] OR "high blood pressure"[tiab] OR "Lipids/blood"[mh] OR "Cholesterol, HDL"[mh] OR "HDL cholesterol"[tiab] OR "Cholesterol, LDL"[mh] OR "LDL cholesterol"[tiab] OR "density lipoprotein*"[tiab] OR "total cholesterol"[tiab] OR "blood cholesterol"[tiab] OR "Triglycerides"[mh] OR "triglyceride*"[tiab] OR "triacylglyceride*"[tiab] OR "triacylglycerol*"[tiab] OR "Hypertension"[mh:noexp] OR "hypertensi*"[tiab] OR "cardioprotect*"[tiab] OR "cardio-protect*"[tiab] OR "metabolic syndrome*"[tiab] OR "Diabetes Mellitus"[mh:noexp] OR "Diabetes Mellitus, Type 2"[mh] OR "type 2 diabet*"[tiab] OR "T2D"[tiab] OR "adult onset diabetes"[tiab] OR MODY[tiab] OR NIDDM[tiab] OR "Prediabetic State"[mh] OR "prediabet*"[tiab] OR "pre diabet*"[tiab] OR "Insulin Resistance"[mh] OR "insulin resistan*"[tiab] OR "glucose intoleran*"[tiab] OR "glucose toleran*"[tiab] OR "Glycated Hemoglobin"[mh] OR "hemoglobin A1c"[tiab] OR "hba1c"[tiab] OR "hba 1c"[tiab] OR "haemoglobin A1c"[tiab] OR "Hyperglycemia"[mh] OR "hyperglycemia"[tiab] OR "hyperglycaemia"[tiab] OR "Hypoglycemia"[mh] OR "hypoglycemia"[tiab] OR "hypoglycaemia"[tiab] OR "Blood Glucose"[mh] OR "blood glucose"[tiab] OR "plasma glucose"[tiab] OR "serum glucose"[tiab] OR "glycemi*"[tiab] OR "glycaemi*"[tiab] OR "blood sugar"[tiab] OR "dysglycemi*"[tiab] OR "dysglycaemi*"[tiab] OR "hyperinsulinism"[mh] OR "hyperinsulin*"[tiab]))
#7	Population-outcome pairing	#5 AND #6
#8	Populations: ages 0-18 years	("Infant Nutritional Physiological Phenomena"[mh] OR "Child Nutritional Physiological Phenomena"[mh] OR (("Infant"[mh] OR "Child"[mh] OR "Adolescent"[mh] OR infant*[tiab] OR toddler*[tiab] OR child*[tiab] OR adolescen*[tiab] OR teen*[tiab] OR "infancy"[tiab] OR "preschool*"[tiab] OR "pre school*"[tiab] OR "preteen"[tiab] OR "pre teen"[tiab] OR "youth*"[tiab] OR "1 month old*"[tiab] OR "2 month old*"[tiab] OR "3 month old*"[tiab] OR "4 month old*"[tiab] OR "5 month old*"[tiab] OR "6 month old*"[tiab] OR "7 month old*"[tiab] OR "8 month old*"[tiab] OR "9 month old*"[tiab] OR "10 month old*"[tiab] OR "11 month old*"[tiab] OR "12 month old*"[tiab] OR "13 month old*"[tiab] OR "14 month old*"[tiab] OR "15 month old*"[tiab] OR "16 month old*"[tiab] OR "17 month old*"[tiab] OR "18 month old*"[tiab] OR "19 month old*"[tiab] or "20 month old*"[tiab] OR "21 month old*"[tiab] OR "22 month old*"[tiab] OR "23 month old*"[tiab] OR "24 month old*"[tiab]) AND (diet*[tiab] OR nutri*[tiab])))

Set #	Description	Search String
#9	Outcomes: developmental parameters	("Brain/Growth and Development"[mh] OR "Infant/Growth and Development"[mh] OR "Psychomotor Performance"[mh] OR "Child Development"[mh] OR "Adolescent Development"[mh] OR "Bayley scales"[tiab] OR "Bayley-I*"[tiab] OR "Bayley-3"[tiab] OR "Bayley-4"[tiab] OR "Ages and Stages Questionnaire*"[tiab] OR "ASQ-3"[tiab] OR "Vineland"[tiab] OR ("Wechsler"[tiab] AND ("WPPSI"[tiab] OR "WISC"[tiab] OR "preschool"[tiab] OR "children"[tiab])) OR "NEPSY"[tiab] OR "Beery-Buktenica"[tiab] OR "Beery test"[tiab:~3] OR "developmental index*"[tiab] OR "developmental indices"[tiab] OR "developmental quotient*"[tiab] OR "neurodevelopment*"[tiab] OR ("early childhood"[tiab] AND "develop*"[tiab]) OR "cognitive development"[tiab] OR "motor skill"[tiab] OR "psychomotor"[tiab] OR "psycho-motor"[tiab] OR "language development"[tiab:~2] OR "language acquisition"[tiab:~2] OR "Language Development"[mh] OR "neurodevelopment*"[tiab] OR ("early childhood"[tiab] AND "develop*"[tiab]) OR "cognitive development"[tiab] OR "language development"[tiab:~2] OR "language acquisition"[tiab:~2] OR "Language Development"[mh] OR "metacognit*"[tiab] OR "neurocogniti*"[tiab] OR "neurodevelop*"[tiab] OR "neuro develop*"[tiab] OR "Aptitude Tests"[mh])))
#10	Population-outcome pairing	#8 AND #9
#11	Combine interventions/ exposures and population-outcome pairings	#1 AND (#4 OR #7 OR #10)
#12	Language	(english[Filter])
#13	Publication dates	(2000:3000[pdat])
#14	Limit to included languages and publication dates	#11 AND #12 AND #13
#15	Animals	(("animals"[MESH] OR "animal experimentation"[MESH] OR "models, animal"[MESH] OR "vertebrates"[MESH]) NOT ("humans"[MESH] OR "human experimentation"[MESH]))
#16	Excluded study designs	("systematic review"[pt] OR "meta-analysis"[pt] OR "review"[pt] OR "case reports"[pt] OR "comment"[pt] OR "editorial"[pt] OR "lecture"[pt] OR "letter"[pt] OR "news"[pt])
#17	Exclude animals and excluded study designs	#14 NOT (#15 OR #16)

***Syntax key:** [mh] = search for this term (and any narrower terms) in the MeSH field (controlled vocabulary); [mh:noexp] = search for this MeSH term only and do not include any narrower MeSH terms (which may be N/A); [nm] = search for this term in the supplementary concept field; [sh] = search for this term in the subheading field (a tag applied to MeSH terms for disease); [ti] = search for this term in the title field (useful for commonly occurring terms); [tiab] = search for this term in the title and abstract fields; [la] = language field; [pd] = publication date field; [edat] = entry date field (in anticipation of update searches, if needed); * = search for varying word endings; single term = retrieve this term and any compound words containing the term (e.g., "sugar" retrieves "added sugar", "dietary sugar", "sugar sweetened", etc; "diabetes" retrieves "pre-diabetes", etc.); hyphens and spaces are treated similarly = "attention-deficit" retrieves "attention deficit" and vice versa

Grey Literature Searches

Some evidence scans required additional searches for grey literature (i.e., evidence published outside of peer-reviewed journals). Grey literature was not searched for this evidence scan.

Appendix C – Excluded References

Table App-C lists the reason/s for each of the 220 references excluded at full-text screening. Team members reviewed the full-text article for each reference to make a final decision about its relevance to the specific criteria in the evidence framework. Team members selected a reason for any reference excluded at this level (e.g., review/study type, PI/ECOTS element), typically selecting *only the first reason encountered for the exclusion (i.e., references may be out of scope for more reasons than are indicated in this table)*.

Table App-C: Excluded References for Dietary Digestible Carbohydrate Intake and Maternal-Infant Daily Requirements and Chronic Disease Risk

Reference	Exclusion Reason/s
Aaltonen, J, Ojala, et al. Impact of maternal diet during pregnancy and breastfeeding on infant metabolic programming: a prospective randomized controlled study. Eur J Clin Nutr. 2011;65(1):10-9. https://doi.org/10.1038/ejcn.2010.225	Excluded intervention/exposure Macronutrient distribution not described
Abdelhamid, ER, Kamhawy, et al. Breast milk macronutrients in relation to infants' anthropometric measures. *Open Access Macedonian J Medical Sciences*. 2020;8:845-850. https://doi.org/10.3889/oamjms.2020.4980	Excluded intervention/exposure
Abdelhamid, ER, Kamhawy, et al. Association between maternal nutrition and fetal developmental profile: Do leptin and adiponectin have a significant role?. *Current Pediatric Research*. 2021;25(9):862-874.	Nonisocaloric comparison Macronutrient distribution not described
Abreu de Almeida, T, Abreu Soares, et al. Nutritional and anthropometric profile of adolescent volleyball athletes. *Revista Brasileira de Medicina do Esporte*. 2003;9(4):198-203. https://doi.org/10.1590/s1517-86922003000400002	Excluded comparator Excluded outcome
Aguilà, Q, Ramón, et al. Assessment study of the nutritional status, eating habits and physical activity of the schooled population of Centelles, Hostalets de Balenyà and Sant Martí de Centelles (ALIN 2014 Study). *Endocrinologia, Diabetes y Nutricion*. 2017;64(3):138-145. https://doi.org/10.1016/j.endinu.2017.01.007	Excluded intervention/exposure Excluded comparator Nonisocaloric comparison Macronutrient distribution not described
Ahmadi, A, Mosallaei, et al. Nutrient intake and growth indices for children at Kindergartens in Shiraz, Iran. *J Pak Med Assoc*. 2014;64(3):316-321.	Excluded study design Nonisocaloric comparison
Aji, AS, Lipoeto, et al. Impact of maternal dietary carbohydrate intake and vitamin D-related genetic risk score on birth length: the Vitamin D Pregnant Mother (VDPM) cohort study. *BMC Pregnancy Childbirth*. 2022;22(1):. https://doi.org/10.1186/s12884-022-05020-3	Excluded outcome
Åkeson, PK, Axelsson, et al. Fat intake and metabolism in Swedish and Italian infants. *Acta Paediatrica, International J Paediatrics*. 2000;89(1):28-33. https://doi.org/10.1111/j.1651-2227.2000.tb01182.x	Excluded comparator Nonisocaloric comparison Excluded outcome
Alick, CL, Maguire, et al. Periconceptional maternal diet characterized by high glycemic loading is associated with offspring behavior in NEST. *Nutrients*. 2021;13(9):. https://doi.org/10.3390/nu13093180	Excluded intervention/exposure Excluded comparator Macronutrient distribution not described
Allehdan, S, Basha, et al. Effectiveness of carbohydrate counting and Dietary Approach to Stop Hypertension dietary intervention on managing Gestational Diabetes Mellitus among pregnant women who used metformin: a randomized controlled clinical trial. *Clinical Nutrition*. 2022;41(2):384-395. https://doi.org/10.1016/j.clnu.2021.11.039	Excluded population
Althuizen, E, Van Poppel, et al. Postpartum behaviour as predictor of weight change from before pregnancy to one year postpartum. *BMC Public Health*. 2011;11:. https://doi.org/10.1186/1471-2458-11-165	Excluded population Macronutrient distribution not described
Alves-Santos, NH, Cocate, et al. Dietary patterns and their association with adiponectin and leptin concentrations throughout pregnancy: a prospective cohort. *Br J Nutr*. 2018;119(3):320-329. https://doi.org/10.1017/S0007114517003580	Nonisocaloric comparison Macronutrient distribution not described
Anderson, EL, Howe, et al. Childhood energy intake is associated with nonalcoholic fatty liver disease in adolescents. *J Nutr*. 2015;145(5):983-989. https://doi.org/10.3945/jn.114.208397	Excluded population Excluded outcome
Andrade, MLSdeS, Oliveira, et al. Associations between biological and behavioral factors in early life and food consumption in Brazilian adolescents: results from the ERICA study. *PLoS One*. 2022;17(3):e0264714-e0264714. https://doi.org/10.1371/journal.pone.0264714	Excluded study design Excluded intervention/exposure
Angali, KA, Shahri, et al. Maternal dietary pattern in early pregnancy is associated with gestational weight gain and hyperglycemia: A cohort study in South West of Iran. *Diabetes and Metabolic Syndrome: Clin Res and Revs*. 2020;14(6):1711-1717. https://doi.org/10.1016/j.dsx.2020.08.008	Macronutrient distribution not described
Appannah, G, Pot, et al. Identification of a dietary pattern associated with greater cardiometabolic risk in adolescence. *Nutrition, Metabolism and Cardiovascular Diseases*. 2015;25(7):643-650. https://doi.org/10.1016/j.numecd.2015.04.007	Excluded population Excluded outcome Macronutrient distribution not described

Reference	Exclusion Reason/s
Arenaza, L, Medrano, et al. Dietary determinants of hepatic fat content and insulin resistance in overweight/obese children: a cross-sectional analysis of the Prevention of Diabetes in Kids (PREDIKID) study. *Br J Nutr*. 2019;121(10):1158-1165. https://doi.org/10.1017/S0007114519000436	Excluded population
Armeno, M, Verini, et al. Long-term effectiveness and adverse effects of ketogenic diet therapy in infants with drug-resistant epilepsy treated at a single center in Argentina. *Epilepsy Res*. 2021;178:. https://doi.org/10.1016/j.eplepsyres.2021.106793	Excluded outcome Macronutrient study design Macronutrient distribution not described
Arslanian, KJ, Fidow, et al. Effect of maternal nutrient intake during 31–37 weeks gestation on offspring body composition in Samoa. *Ann Hum Biol*. 2020;47(7-8):587-596. https://doi.org/10.1080/03014460.2020.1820078	Macronutrient distribution not described
Asemi, Z, Tabassi, et al. Favourable effects of the Dietary Approaches to Stop Hypertension diet on glucose tolerance and lipid profiles in gestational diabetes: a randomised clinical trial (Publication with Expression of Concern. See vol. 127, pg. 151, 2022). *Br J Nutr*. 2013;109(11):2024-2030. https://doi.org/10.1017/S0007114512004242	Excluded population
Assaf-Balut, C, Torre, et al. A Mediterranean diet with additional extra virgin olive oil and pistachios reduces the incidence of gestational diabetes mellitus (GDM): a randomized controlled trial: the St. Carlos GDM prevention study. *PLoS One*. 2017;12(10):e0185873-e0185873. https://doi.org/10.1371/journal.pone.0185873	Excluded intervention/exposure Excluded comparator Macronutrient distribution not described
Atchley, CB, Cloud, et al. Enhanced Protein Diet for Preterm Infants: A Prospective, Randomized, Double-blind, Controlled Trial. *J Pediatr Gastroenterol Nutr*. 2019;69(2):218-223. https://doi.org/10.1097/MPG.0000000000002376	Excluded intervention/exposure Excluded comparator Macronutrient distribution not described
Atkinson, SA, Maran, et al. Be healthy in pregnancy (BHIP): a randomized controlled trial of nutrition and exercise intervention from early pregnancy to achieve recommended gestational weight gain. *Nutrients*. 2022;14(4):810-810. https://doi.org/10.3390/nu14040810	Excluded intervention/exposure Macronutrient distribution not described
Azcorra, H, Dickinson, et al. The relationship between pre-pregnancy BMI and energy and macronutrients intakes during pregnancy in women from Yucatan, Mexico. *J Obstet Gynaecol (Lahore)*. 2022. https://doi.org/10.1080/01443615.2022.2143259	Excluded outcome
Bahreynian, M, Feizi, et al. Interaction between maternal dietary fat intake, breast milk omega-3 fatty acids and infant growth during the first year of life. *Child Care Health Dev*. 2023;49(1):137-144. https://doi.org/10.1111/cch.13026	Nonisocaloric comparison Macronutrient distribution not described
Bao, W, Bowers, et al. Prepregnancy Dietary Protein Intake, Major Dietary Protein Sources, and the Risk of Gestational Diabetes Mellitus A prospective cohort study. *Diabetes Care*. 2013;36(7):2001-2008. https://doi.org/10.2337/dc12-2018	Other out of scope
Bao, W, Li, et al. Low Carbohydrate-Diet Scores and Long-term Risk of Type 2 Diabetes Among Women With a History of Gestational Diabetes Mellitus: A Prospective Cohort Study. *Diabetes Care*. 2016;39(1):43-49. https://doi.org/10.2337/dc15-1642	Excluded study design Excluded population
Barreto, JRPDS, Assis, et al. Influence of sugar consumption from foods with different degrees of processing on anthropometric indicators of children and adolescents after 18 months of follow-up. *Br J Nutr*. 2022;128(11):2267-2277. https://doi.org/10.1017/S0007114522000411	Nonisocaloric comparison Excluded outcome Macronutrient distribution not described
Bell, LK, Golley, et al. Dietary risk scores of toddlers are associated with nutrient intakes and socio-demographic factors, but not weight status. *Nutrition & Dietetics*. 2016;73(1):73-80. https://doi.org/10.1111/1747-0080.12208	Excluded study design
Bergqvist, ACC, Schall, et al. Predictive power of first morning glucose and the ketogenic diet. *NeuroPediatrics*. 2007;38(4):193-196. https://doi.org/10.1055/s-2007-992816	Excluded intervention/exposure Excluded comparator Nonisocaloric comparison Excluded outcome Macronutrient distribution not described
Bernal, MJ, Periago, et al. Effects of infant cereals with different carbohydrate profiles on colonic function - Randomised and double-blind clinical trial in infants aged between 6 and 12 months - Pilot study. *Eur J Pediatr*. 2013;172(11):1535-1542. https://doi.org/10.1007/s00431-013-2079-3	Excluded intervention/exposure Macronutrient distribution not described
Boonstra, VH, Arends, et al. Food intake of children with short stature born small for gestational age before and during a randomized GH trial. *Horm Res*. 2006;65(1):23-30. https://doi.org/10.1159/000090376	Excluded intervention/exposure Excluded comparator Excluded outcome

Reference	Exclusion Reason/s
Brekke, HK, van Odijk, et al. Predictors and dietary consequences of frequent intake of high-sugar, low-nutrient foods in 1-year-old children participating in the ABIS study. *Br J Nutr*. 2007;97(1):176-181. https://doi.org/10.1017/S0007114507244460	Excluded intervention/exposure Macronutrient distribution not described
Brennan, A, Mullaney, et al. Nutritional and Social Correlates of Gestational Diabetes. *Proc Nutr Soc*. 2015;74(OCE4):E247-E247. https://doi.org/10.1017/S002966511500289X	Other out of scope
Brinkis, R, Albertsson-Wikland, et al. Impact of Early Nutrient Intake and First Year Growth on Neurodevelopment of Very Low Birth Weight Newborns. *Nutrients.* 2022;14(18):. https://doi.org/10.3390/nu14183682	Excluded intervention/exposure Nonisocaloric comparison
Brinkis, R, Albertsson-Wikland, et al. Nutrient intake with early progressive enteral feeding and growth of very low-birth-weight newborns. *Nutrients.* 2022;14(6):1181-1181. https://doi.org/10.3390/nu14061181	Excluded population Excluded intervention/exposure
Broek, van den M, Leermakers, et al. Maternal dietary patterns during pregnancy and body composition of the child at age 6 y: the Generation R Study. *Am J Clin Nutr*. 2015;102(4):873-880. https://doi.org/10.3945/ajcn.114.102905	Excluded intervention/exposure Macronutrient distribution not described
Bueno, AA, Ghebremeskel, et al. Dimethyl acetals, an indirect marker of the endogenous antioxidant plasmalogen level, are reduced in blood lipids of Sudanese pre-eclamptic subjects whose background diet is high in carbohydrate. *J Obstet Gynaecol (Lahore)*. 2012;32(3):241-246. https://doi.org/10.3109/01443615.2011.641622	Excluded outcome Macronutrient distribution not described
Callanan, S, Yelverton, et al. The association of a low glycaemic index diet in pregnancy with child body composition at 5 years of age: a secondary analysis of the ROLO study. *Pediatr Obes*. 2021;16(12):e12820-e12820. https://doi.org/10.1111/ijpo.12820	Excluded intervention/exposure Excluded comparator Nonisocaloric comparison Macronutrient distribution not described
Caraballo, R, Noli, et al. Epilepsy of infancy with migrating focal seizures: Three patients treated with the ketogenic diet. *Epileptic Disorders*. 2015;17(2):194-197. https://doi.org/10.1684/epd.2015.0741	Excluded study design Nonisocaloric comparison Excluded outcome Macronutrient distribution not described
Cardoso, M, Virella, et al. Individualized Fortification Based on Measured Macronutrient Content of Human Milk Improves Growth and Body Composition in Infants Born Less than 33 Weeks: A Mixed-Cohort Study. *Nutrients.* 2023;15(6):. https://doi.org/10.3390/nu15061533	Excluded comparator
Castro, MBT, Cunha, et al. High protein diet promotes body weight loss among Brazilian postpartum women. *Matern Child Nutr*. 2019;15(3):e12746-e12746. https://doi.org/10.1111/mcn.12746	Excluded population Excluded intervention/exposure Excluded outcome Macronutrient study design
Castro, de MBT, Kac, et al. High-protein diet promotes a moderate postpartum weight loss in a prospective cohort of Brazilian women. *Nutrition.* 2009;25(11--12):1120-1128. https://doi.org/10.1016/j.nut.2009.02.006	Macronutrient distribution not described
Castro, TG, Baraldi, et al. Dietary practices and nutritional status of 0–24-month-old children from Brazilian Amazonia. *Public Health Nutr*. 2009;12(12):2335-2342. https://doi.org/10.1017/S1368980009004923	Excluded study design Nonisocaloric comparison Macronutrient distribution not described
Ceasrine, AM, Devlin, et al. Maternal diet disrupts the placenta–brain axis in a sex-specific manner. *Nature Metabolism*. 2022;4(12):1732-1745. https://doi.org/10.1038/s42255-022-00693-8	Excluded intervention/exposure Animal study
Changamire, FT, Mwiru, et al. Macronutrient and sociodemographic determinants of gestational weight gain among HIV-negative women in Tanzania. *Food Nutr Bull*. 2014;35(1):43-50. https://doi.org/10.1177/156482651403500106	Excluded comparator Nonisocaloric comparison Macronutrient distribution not described
Chen, H, Wang, et al. Evaluation of dietary intake of lactating women in China and its potential impact on the health of mothers and infants. *BMC Womens Health*. 2012;12:18. https://doi.org/10.1186/1472-6874-12-18	Excluded outcome
Chen, X, Scholl, et al. Differences in maternal circulating fatty acid composition and dietary fat intake in women with gestational diabetes mellitus or mild gestational hyperglycemia. *Diabetes Care*. 2010;33(9):2049-2054. https://doi.org/10.2337/dc10-0693	Excluded outcome Macronutrient distribution not described
Chmielewska, A, Farooqi, et al. Lean Tissue Deficit in Preterm Infants Persists up to 4 Months of Age: Results from a Swedish Longitudinal Study. *Neonatology*. 2020;117(1):80-87. https://doi.org/10.1159/000503292	Nonisocaloric comparison
Clapp, JF, III. Maternal carbohydrate intake and pregnancy outcome. Proc Nutr Soc. 2002;61(1):45-50.	Excluded study design

Reference	Exclusion Reason/s
Cooke, RJ, Griffin, et al. Adiposity is not altered in preterm infants fed with a nutrient-enriched formula after hospital discharge. *Pediatr Res*. 2010;67(6):660-664. https://doi.org/10.1203/PDR.0b013e3181da8d01	Nonisocaloric comparison Macronutrient distribution not described
Costa-Orvay, JA, Figueras-Aloy, et al. The effects of varying protein and energy intakes on the growth and body composition of very low birth weight infants. *Nutr J*. 2011;10(Dec.):. https://doi.org/10.1186/1475-2891-10-140	Nonisocaloric comparison
Coviello, C, Keunen, et al. Effects of early nutrition and growth on brain volumes, white matter microstructure, and neurodevelopmental outcome in preterm newborns. *Pediatr Res*. 2018;83(1):102-110. https://doi.org/10.1038/pr.2017.227	Excluded intervention/exposure Macronutrient distribution not described
Cristina, P, Laurentiu-Marius, et al. Development of children aged 1.5-3 years in relation with nourishment in a children's nursery in Romania. *WSEAS Transactions on Environment and Development*. 2009;5(11):716-725.	Nonisocaloric comparison
Daniels, TE, Sadovnikoff, et al. Associations of maternal diet and placenta leptin methylation. *Mol Cell Endocrinol*. 2020;505:. https://doi.org/10.1016/j.mce.2020.110739	Excluded outcome
de Castro, MBT, Kac, et al. Assessment of protein intake during pregnancy using a food frequency questionnaire and the effect on postpartum body weight variation. *Cad Saude Publica*. 2010;26(11):2112-2120. https://doi.org/10.1590/S0102-311X2010001100012	Excluded intervention/exposure Macronutrient distribution not described
Denguezli, W, Faleh, et al. Risk factors of fetal macrosomia: Role of maternal nutrition. *Tunis Med*. 2009;87(9):564-568.	Nonisocaloric comparison
Dodd, JM, Cramp, et al. The effects of antenatal dietary and lifestyle advice for women who are overweight or obese on maternal diet and physical activity: The LIMIT randomised trial. *BMC Med*. 2014;12(1):. https://doi.org/10.1186/s12916-014-0161-y	Excluded intervention/exposure
Doksöz, O, Çeleɫen, et al. The short-term effects of ketogenic diet on cardiac ventricular functions in epileptic children. *Pediatr Neurol*. 2015;53(3):233-237.e1. https://doi.org/10.1016/j.pediatrneurol.2015.06.009	Excluded study design Excluded intervention/exposure Macronutrient distribution not described
Doornweerd, S, Ijzerman, et al. Lower birth weight is associated with alterations in dietary intake in adolescents independent of genetic factors: a twin study. *Clinical Nutrition.* 2017;36(1):179-185. https://doi.org/10.1016/j.clnu.2015.10.012	Nonisocaloric comparison Excluded outcome
Duerden, EG, Thompson, et al. Early protein intake predicts functional connectivity and neurocognition in preterm born children. *Sci Rep*. 2021;11(1):. https://doi.org/10.1038/s41598-021-83125-z	Nonisocaloric comparison
Dujmović, M, Krešić, et al. Changes in dietary intake and body weight in lactating and non-lactating women: Prospective study in northern coastal Croatia. *Coll Antropol*. 2014;38(1):179-187.	Excluded intervention/exposure
Englund-Ogge, L, Birgisdottir, et al. Meal frequency patterns and glycemic properties of maternal diet in relation to preterm delivery: results from a large prospective cohort study. *PLoS One*. 2017;12(3):18. https://doi.org/10.1371/journal.pone.0172896	Excluded intervention/exposure Macronutrient distribution not described
Evans, S, Daly, et al. Growth, protein and energy intake in children with PKU taking a weaning protein substitute in the first two years of life: A case-control study. *Nutrients.* 2019;11(3):. https://doi.org/10.3390/nu11030552	Excluded population
Fadzil, F, Shamsuddin, et al. Predictors of postpartum weight retention among urban Malaysian mothers: A prospective cohort study. *Obes Res Clin Pract*. 2018;12(6):493-499. https://doi.org/10.1016/j.orcp.2018.06.003	Excluded comparator Nonisocaloric comparison Macronutrient distribution not described
Flax, VL, Siega-Riz, et al. Provision of lipid-based nutrient supplements to Honduran children increases their dietary macro- and micronutrient intake without displacing other foods. *Maternal and Child Nutrition*. 2015;11:203-213. https://doi.org/10.1111/mcn.12182	Excluded intervention/exposure Excluded outcome
Forchielli, ML, Diani, et al. Gluten deprivation: What nutritional changes are found during the first year in newly diagnosed coeliac children?. *Nutrients.* 2020;12(1):. https://doi.org/10.3390/nu12010060	Excluded population Excluded outcome
Fossee, E, Zamora, et al. Prenatal dietary patterns in relation to adolescent offspring adiposity and adipokines in a Mexico City cohort. *J Dev Orig Health Dis*. https://doi.org/10.1017/S2040174422000678	Nonisocaloric comparison Macronutrient distribution not described
Fox, NS, Gerber, et al. Glycemic control in twin pregnancies with gestational diabetes: Are we improving or worsening outcomes?. *J Maternal-Fetal and Neonatal Medicine*. 2016;29(7):1041-1045. https://doi.org/10.3109/14767058.2015.1038517	Excluded population
Fraser, DD, Whiting, et al. Elevated polyunsaturated fatty acids in blood serum obtained from children on the ketogenic diet. *Neurology.* 2003;60(6):1026-9. https://doi.org/10.1212/01.wnl.0000049974.74242.c6	Excluded outcome Macronutrient distribution not described

Reference	Exclusion Reason/s
Gennaro, S, Fehder, et al. Health behaviors in postpartum women. *Fam Community Health*. 2000;22(4):16-26. https://doi.org/10.1097/00003727-200001000-00004	Nonisocaloric comparison
Geukers, VG, Li, et al. High-carbohydrate/low-protein-induced hyperinsulinemia does not improve protein balance in children after cardiac surgery. *Nutrition.* 2012;28(6):644-650. https://doi.org/10.1016/j.nut.2011.09.018	Excluded intervention/exposure Excluded outcome
Goodarzi-Khoigani, M, Mahmoodabad, et al. Prevention of insulin resistance by dietary intervention among pregnant mothers: A randomized controlled trial. *Int J Prev Med*. 2017;8:. https://doi.org/10.4103/ijpvm.IJPVM_405_16	Excluded intervention/exposure Excluded comparator
Gridneva, Z, Rea, et al. Human Milk Macronutrients and Bioactive Molecules and Development of Regional Fat Depots in Western Australian Infants during the First 12 Months of Lactation. *Life*. 2022;12(4). https://doi.org/10.3390/life12040493	Excluded outcome
Guelinckx, I, Devlieger, et al. Effect of lifestyle intervention on dietary habits, physical activity, and gestational weight gain in obese pregnant women: a randomized controlled trial. *Am J Clin Nutr*. 2010;91(2):373-380. https://doi.org/10.3945/ajcn.2009.28166	Excluded intervention/exposure
Hakola, L, Vuorinen, et al. Dietary fatty acid intake in childhood and the risk of islet autoimmunity and type 1 diabetes: the DIPP birth cohort study. *Eur J Nutr*. 2023;62(2):847-856. https://doi.org/10.1007/s00394-022-03035-2	Macronutrient distribution not described
Halldorsson TI, Birgisdottir BE, Brantsæter AL, Meltzer HM, Haugen M, Thorsdottir I, et al. Old question revisited: are high-protein diets safe in pregnancy? Nutrients. 2021;13(2). doi: 10.3390/nu13020440	Excluded interverntion/exposure
Harreiter, J, Simmons, et al. Nutritional lifestyle intervention in obese pregnant women, including lower carbohydrate intake, is associated with increased maternal free fatty acids, 3-b-hydroxybutyrate, and fasting glucose concentrations: A secondary factorial analysis of the European multicenter, randomized controlled DALI lifestyle intervention trial. *Diabetes Care*. 2019;42(8):1380-1389. https://doi.org/10.2337/dc19-0418	Excluded comparator Nonisocaloric comparison Excluded outcome Macronutrient distribution not described
Hellmuth, C, Uhl, et al. The impact of human breast milk components on the infant metabolism. *PLoS One*. 2018;13(6):e0197713-e0197713. https://doi.org/10.1371/journal.pone.0197713	Nonisocaloric comparison
Herrick, K, Phillips, et al. Maternal consumption of a high-meat, low-carbohydrate diet in late pregnancy: Relation to adult cortisol concentrations in the offspring. *J Clin Endocrinol Metab*. 2003;88(8):3554-3560. https://doi.org/10.1210/jc.2003-030287	Macronutrient distribution not described
Horan, MK, Donnelly, et al. The association between maternal nutrition and lifestyle during pregnancy and 2-year-old offspring adiposity: analysis from the ROLO study. *J Public Health (Germany)*. 2016;24(5):427-436. https://doi.org/10.1007/s10389-016-0740-9	Macronutrient distribution not described
Horan, MK, McGowan, et al. Maternal diet and weight at 3 months postpartum following a pregnancy intervention with a low glycaemic index diet: Results from the ROLO randomised control trial. *Nutrients.* 2014;6(7):2946-2955. https://doi.org/10.3390/nu6072946	Macronutrient distribution not described
Hui, A, Back, et al. Lifestyle intervention on diet and exercise reduced excessive gestational weight gain in pregnant women under a randomised controlled trial. *BJOG: An International J Obstetrics and Gynaecology*. 2012;119(1):70-77. https://doi.org/10.1111/j.1471-0528.2011.03184.x	Excluded intervention/exposure
Iacovou, M, Mulcahy, et al. Reducing the maternal dietary intake of indigestible and slowly absorbed short-chain carbohydrates is associated with improved infantile colic: a proof-of-concept study. *J Hum Nutr Diet*. 2018;31(2):256-265. https://doi.org/10.1111/jhn.12488	Excluded outcome Macronutrient distribution not described
Immeli, L, Sankilampi, et al. Length of nutritional transition associates negatively with postnatal growth in very low birthweight infants. *Nutrients.* 2021;13(11):3961-3961. https://doi.org/10.3390/nu13113961	Excluded intervention/exposure
Irawan, R, Widjaja, et al. Breastmilk macronutrient levels and infant growth during the first three months: A cohort study. *Siriraj Medical J*. 2020;72(1):10-17. https://doi.org/10.33192/Smj.2020.02	Macronutrient distribution not described
Islam, MM, Sanin, et al. Risk factors of stunting among children living in an urban slum of Bangladesh: Findings of a prospective cohort study. *BMC Public Health*. 2018;18(1):. https://doi.org/10.1186/s12889-018-5101-x	Nonisocaloric comparison
Jen, V, Karagounis, et al. Dietary protein intake in school-age children and detailed measures of body composition: the Generation R Study. *Int J Obes*. 2018;42(10):1715-1723. https://doi.org/10.1038/s41366-018-0098-x	Excluded comparator
Jiang, W, Liu, et al. Safety and benefit of pre-operative oral carbohydrate in infants: A multi-center study in China. *Asia Pac J Clin Nutr*. 2018;27(5):975-979. https://doi.org/10.6133/apjcn.052018.08	Excluded intervention/exposure

Reference	Exclusion Reason/s
Kaneko, K, Ito, et al. High Maternal Total Cholesterol Is Associated With No-Catch-up Growth in Full-Term SGA Infants: The Japan Environment and Children's Study. *Front Endocrinol (Lausanne)*. 2022;13:. https://doi.org/10.3389/fendo.2022.939366	Macronutrient distribution not described
Karamanos, B, Thanopoulou, et al. Relation of the Mediterranean diet with the incidence of gestational diabetes. *Eur J Clin Nutr*. 2014;68(1):8-13. https://doi.org/10.1038/ejcn.2013.177	Excluded population Excluded comparator
Kennedy, RAK, Mullaney, et al. The relationship between early pregnancy dietary intakes and subsequent birthweight and neonatal adiposity. *J Public Health (Bangkok)*. 2018;40(4):747-755. https://doi.org/10.1093/pubmed/fdx131	Nonisocaloric comparison
Khan, NA, Raine, et al. The relation of saturated fats and dietary cholesterol to childhood cognitive flexibility. *Appetite*. 2015;93:51-6. https://doi.org/10.1016/j.appet.2015.04.012	Excluded comparator
Khoigani, MG, Paknahad, et al. The relationship between nutrients intake and preeclampsia in pregnant women in Isfahan, Iran. *J Research In Medical Sciences*. 2012;17:S211-S218.	Nonisocaloric comparison Macronutrient distribution not described
Kim, JT, Kang, et al. Catch-up growth after long-term implementation and weaning from ketogenic diet in pediatric epileptic patients. *Clinical Nutrition*. 2013;32(1):98-103. https://doi.org/10.1016/j.clnu.2012.05.019	Excluded intervention/exposure Nonisocaloric comparison Macronutrient distribution not described
Komatsu Y, Wada Y, et al. Associations between maternal diet, human milk macronutrients, and breast-fed infant growth during the first month of life in the SMILE Iwamizawa in Japan. *Nutrients*. 2023 Jan 28;15(3):654. doi: 10.3390/nu15030654	Excluded study design
Kossoff, EH, Pyzik, et al. Efficacy of the ketogenic diet for infantile spasms. *Pediatrics*. 2002;109(5):780-783. https://doi.org/10.1542/peds.109.5.780	Excluded comparator Excluded outcome
Kuzawa, CW, Adair, et al. Lipid profiles in adolescent Filipinos: relation to birth weight and maternal energy status during pregnancy. *Am J Clin Nutr*. 2003;77(4):960-966. https://doi.org/10.1093/ajcn/77.4.960	Excluded comparator Nonisocaloric comparison Macronutrient distribution not described
Lauer, RM, Obarzanek, et al. Efficacy and safety of lowering dietary intake of total fat, saturated fat, and cholesterol in children with elevated LDL cholesterol: the Dietary Intervention Study in Children. *Am J Clin Nutr*. 2000;72(5):1332S-1342S.	Excluded population Excluded outcome
Lestari, CR, Salimo, et al. The relationship between energy intake and fat intake with fine motor skill in infants aged 6-11 months. *Malaysian J Medicine and Health Sciences*. 2021;17:115-118.	Excluded study design Macronutrient distribution not described
Leung, SSF, Chan, et al. Growth and nutrition of Hong Kong children aged 0-7 years. *J Paediatr Child Health*. 2000;36(1):56-65. https://doi.org/10.1046/j.1440-1754.2000.00441.x	Macronutrient distribution not described
Libuda, L, Alexy, et al. Time trends in dietary fat intake in a sample of German children and adolescents between 2000 and 2010: not quantity, but quality is the issue. *Br J Nutr*. 2014;111(1):141-150. https://doi.org/10.1017/S0007114513002031	Excluded outcome
Ling-Wei, Chen, Mya-Thway, et al. Maternal macronutrient intake during pregnancy is associated with neonatal abdominal adiposity: the Growing Up in Singapore Towards healthy Outcomes (GUSTO) study. *J Nutr*. 2016;146(8):1571-1579. https://doi.org/10.3945/jn.116.230730	Nonisocaloric comparison
Liu, F, Peng, et al. Efficacy of the ketogenic diet in Chinese children with Dravet syndrome: A focus on neuropsychological development. *Epilepsy and Behavior*. 2019;92:98-102. https://doi.org/10.1016/j.yebeh.2018.12.016	Excluded population Nonisocaloric comparison Macronutrient distribution not described
Ludwig-Auser, H, Sherar, et al. Influence of nutrition provision during the first two weeks of life in premature infants on adolescent body composition and blood pressure. Chinese J Contemporary *Pediatrics*. 2013;15(3):161-170. https://doi.org/10.7499/j.issn.1008-8830.2013.03.001	Excluded intervention/exposure Nonisocaloric comparison Macronutrient distribution not described
Luoto R, Kinnunen TI, et al. Primary prevention of gestational diabetes mellitus and large-for-gestational-age newborns by lifestyle counseling: a cluster-randomized controlled trial. *PLoS Med*. 2011 May;8(5):e1001036. https://doi.org/10.1371/journal.pmed.1001036	Excluded intervention/exposure
Makhani, SS, Davies, et al. Carbohydrate-to-Fiber Ratio, a Marker of Dietary Intake, as an Indicator of Depressive Symptoms. *Cureus*. 2021;13(9):e17996. https://doi.org/10.7759/cureus.17996	Excluded study design Excluded population

Reference	Exclusion Reason/s
Martins, AP, Benicio, et al. Influence of dietary intake during gestation on postpartum weight retention. *Rev Saude Publica*. 2011;45(5):870-7. https://doi.org/10.1590/s0034-89102011005000056	Macronutrient distribution not described
Maslova, E, Hansen, et al. Maternal protein intake in pregnancy and offspring metabolic health at age 9-16 y: results from a Danish cohort of gestational diabetes mellitus pregnancies and controls. *Am J Clin Nutr*. 2017;106(2):623-636. https://doi.org/10.3945/ajcn.115.128637	Excluded population
Matinolli, HM, Hovi, et al. Neonatal nutrition predicts energy balance in young adults born preterm at very low birth weight. *Nutrients.* 2017;9(12):1282-1282. https://doi.org/10.3390/nu9121282	Nonisocaloric comparison Macronutrient distribution not described
Matinolli, HM, Hovi, et al. Early protein intake is associated with body composition and resting energy expenditure in young adults born with very low birth weight. *J Nutr*. 2015;145(9):2084-2091. https://doi.org/10.3945/jn.115.212415	Nonisocaloric comparison
McGee, M, Unger, et al. Associations between diet quality and body composition in young children born with very low body weight. *J Nutr*. 2020;150(11):2961-2968. https://doi.org/10.1093/jn/nxaa281	Macronutrient distribution not described
McGee, M, Unger, et al. Adiposity and fat-free mass of children born with very low birth weight do not differ in children fed supplemental donor milk compared with those fed preterm formula. *J Nutr*. 2020;150(2):331-339. https://doi.org/10.1093/jn/nxz234	Macronutrient distribution not described
McGowan, CA, Walsh, et al. The influence of a low glycemic index dietary intervention on maternal dietary intake, glycemic index and gestational weight gain during pregnancy: A randomized controlled trial. *Nutr J*. 2013;12(1):. https://doi.org/10.1186/1475-2891-12-140	Excluded intervention/exposure Nonisocaloric comparison Macronutrient distribution not described
McLeod, G, Simmer, et al. Feasibility study: Assessing the influence of macronutrient intakes on preterm body composition, using air displacement plethysmography. *J Paediatr Child Health*. 2015;51(9):862-869. https://doi.org/10.1111/jpc.12893	Nonisocaloric comparison
Meinila, J, Klemetti, et al. Macronutrient intake during pregnancy in women with a history of obesity or gestational diabetes and offspring adiposity at 5 years of age. *Int J Obes*. 2021;45(5):1030-1043. https://doi.org/10.1038/s41366-021-00762-0	Excluded population
Meinila, J, Koivusalo, et al. Nutrient intake of pregnant women at high risk of gestational diabetes. *Food Nutr Res*. 2015;59:8. https://doi.org/10.3402/fnr.v59.26676	Excluded outcome
Mizgier, M, Jarzabek-Bielecka, et al. Maternal diet and gestational diabetes mellitus development. *J Maternal-Fetal and Neonatal Medicine*. 2021;34(1):77-86. https://doi.org/10.1080/14767058.2019.1598364	Excluded population
Mohammad, MA, Sunehag, et al. Effect of dietary macronutrient composition under moderate hypocaloric intake on maternal adaptation during lactation. *Am J Clin Nutr*. 2009;89(6):1821-1827. https://doi.org/10.3945/ajcn.2008.26877	Excluded intervention/exposure
Morgan, JB, Williams, et al. Do mothers understand healthy eating principles for low-birth-weight infants?. *Public Health Nutr*. 2006;9(6):700-6. https://doi.org/10.1079/phn2005890	Macronutrient distribution not described
Morlacchi, L, Mallardi, et al. Is targeted fortification of human breast milk an optimal nutrition strategy for preterm infants? An interventional study. *J Transl Med*. 2016;14(1):. https://doi.org/10.1186/s12967-016-0957-y	Nonisocaloric comparison
Muhsen, K, Na'amnih, et al. Associations of feeding practices in early life and dietary intake at school age with obesity in 10- to 12-year-old Arab children. *Nutrients*. 2021;13(6):2106-2106. https://doi.org/10.3390/nu13062106	Nonisocaloric comparison
Murakami, K, Sasaki, et al. A low–glycemic index and –glycemic load diet is associated with not only higher intakes of micronutrients but also higher intakes of saturated fat and sodium in Japanese children and adolescents: the National Health and Nutrition Survey. *Nutr Res*. 2018;49:37-47. https://doi.org/10.1016/j.nutres.2017.10.015	Excluded study design Excluded intervention/exposure Excluded outcome
Na, Wang, Zequn, et al. Relationships between maternal dietary patterns and blood lipid levels during pregnancy: a prospective cohort study in Shanghai, China. *Int J Environ Res Public Health*. 2021;18(7):3701-3701. https://doi.org/10.3390/ijerph18073701	Macronutrient distribution not described
Nagel, EM, Jacobs, et al. Maternal dietary intake of total fat, saturated fat, and added sugar is associated with infant adiposity and weight status at 6 mo of age. *J Nutr*. 2021;151(8):2353-2360. https://doi.org/10.1093/jn/nxab101	Nonisocaloric comparison Macronutrient distribution not described
Najpaverova, S, Kovarik, et al. The relationship of nutritional energy and macronutrient intake with pregnancy outcomes in Czech pregnant women. *Nutrients*. 2020;12(4):. https://doi.org/10.3390/nu12041152	Nonisocaloric comparison

Reference	Exclusion Reason/s
Nascimento, GG, Peres, et al. Diet-induced overweight and obesity and periodontitis risk: an application of the parametric g-formula in the 1982 Pelotas Birth Cohort. *Am J Epidemiol*. 2017;185(6):442-451. https://doi.org/10.1093/aje/kww187	Excluded intervention/exposure
Natale, RA, Lopez-Mitnik, et al. Effect of a Child Care Center-Based Obesity Prevention Program on Body Mass Index and Nutrition Practices Among Preschool-Aged Children. *Health Promot Prac*t. 2014;15(5):695-705. https://doi.org/10.1177/1524839914523429	Excluded comparator Excluded outcome
Newby, PK, Peterson, et al. Dietary composition and weight change among low-income preschool children. *Arch Pediatr Adolesc Med*. 2003;157(8):759-764. https://doi.org/10.1001/archpedi.157.8.759	Nonisocaloric comparison Macronutrient distribution not described
Ng, DVY, Brennan-Donnan, et al. How close are we to achieving energy and nutrient goals for very low birth weight infants in the first week?. *J Parenteral and Enteral Nutrition*. 2017;41(3):500-506. https://doi.org/10.1177/0148607115594674	Nonisocaloric comparison
Niinikoski, H, Jula, et al. Blood pressure is lower in children and adolescents with a low-saturated-fat diet since infancy the special turku coronary risk factor intervention project. *Hypertension*. 2009;53(6):918-924. https://doi.org/10.1161/HYPERTENSIONAHA.109.130146	Excluded intervention/exposure Macronutrient distribution not described
Nizamuddin, J, Turner, et al. Management and risk factors for dyslipidemia with the ketogenic diet. *J Child Neurol*. 2008;23(7):758-761. https://doi.org/10.1177/0883073808318061	Macronutrient distribution not described
Nyankovskyy, S, Dobryanskyy, et al. Dietary habits and nutritional status of children from Ukraine during the first 3 years of life. *Pediatr Pol*. 2014;89(6):395-405. https://doi.org/10.1016/j.pepo.2014.08.003	Excluded study design
Omoto, T, Kyozuka, et al. Influence of preconception carbohydrate intake on hypertensive disorders of pregnancy: The Japan Environment and Children's Study. *J Obstetrics and Gynaecology Research*. 2023;49(2):577-586. https://doi.org/10.1111/jog.15501	Excluded population
Paknahad, Z, Fallah, et al. Maternal Dietary Patterns and Their Association with Pregnancy Outcomes. Clin *Nutr Res*. 2019;8(1):64-73. https://doi.org/10.7762/cnr.2019.8.1.64	Nonisocaloric comparison Macronutrient distribution not described
Papadopoulou, E, Vafeiadi, et al. Maternal diet, prenatal exposure to dioxins and other persistent organic pollutants and anogenital distance in children. *Sci Total Environ*. 2013;461-462:222-9. https://doi.org/10.1016/j.scitotenv.2013.05.005	Excluded intervention/exposure Macronutrient distribution not described
Patel, N, Godfrey, et al. Infant adiposity following a randomised controlled trial of a behavioural intervention in obese pregnancy. *Int J Obes*. 2017;41(7):1018-1026. https://doi.org/10.1038/ijo.2017.44	Excluded population Excluded intervention/exposure
Pathirathna, ML, Sekijima, et al. Impact of second trimester maternal dietary intake on gestational weight gain and neonatal birth weight. *Nutrients.* 2017;9(6):627-627. https://doi.org/10.3390/nu9060627	Excluded study design Excluded comparator Nonisocaloric comparison
Peacock, L, Seed, et al. The UK Pregnancies Better Eating and Activity Trial (UPBEAT); pregnancy outcomes and health behaviours by obesity class. *Int J Environ Res Public Health*. 2020;17(13):4712-4712. https://doi.org/10.3390/ijerph17134712	Excluded population Excluded intervention/exposure
Pereira-Da-Silva, L, Rodrigues, et al. Resting energy expenditure, macronutrient utilization, and body composition in term infants after corrective surgery of major congenital anomalies: A case-study. *J Neonatal Perinatal Med*. 2016;8(4):403-412. https://doi.org/10.3233/NPM-15915019	Excluded study design Excluded population
Perez-Ferre, N, Valle, et al. Diabetes mellitus and abnormal glucose tolerance development after gestational diabetes: a three-year, prospective, randomized, clinical-based, Mediterranean lifestyle interventional study with parallel groups. *Clinical Nutrition.* 2015;34(4):579-585. https://doi.org/10.1016/j.clnu.2014.09.005	Excluded intervention/exposure Macronutrient distribution not described
Pittaluga, E, Vernal, et al. Benefits of supplemented preterm formulas on insulin sensitivity and body composition after discharge from the neonatal intensive care unit. *J Pediatr*. 2011;159(6):926-932.e2. https://doi.org/10.1016/j.jpeds.2011.06.002	Nonisocaloric comparison
Plancoulaine, S, Charles, et al. Infant-feeding patterns are related to blood cholesterol concentration in prepubertal children aged 5-11 y: The Fleurbaix-Laventie Ville Sante study. *Eur J Clin Nutr*. 2000;54(2):114-119. https://doi.org/10.1038/sj.ejcn.1600904	Macronutrient distribution not described
Power, VA, Spittle, et al. Nutrition, Growth, Brain Volume, and Neurodevelopment in Very Preterm Children. *J Pediatr*. 2019;215:50-55.e3. https://doi.org/10.1016/j.jpeds.2019.08.031	Nonisocaloric comparison
Prentice, P, Ong, et al. Breast milk nutrient content and infancy growth. *Acta Paediatrica, International J Paediatrics*. 2016;105(6):641-647. https://doi.org/10.1111/apa.13362	Nonisocaloric comparison Macronutrient distribution not described

Reference	Exclusion Reason/s
Raitakari, OT, Rönnemaa, et al. Endothelial function in healthy 11-year-old children after dietary intervention with onset in infancy: The Special Turku Coronary Risk Factor Intervention Project for children (STRIP). *Circulation*. 2005;112(24):3786-3794. https://doi.org/10.1161/CIRCULATIONAHA.105.583195	Macronutrient distribution not described
Rask-Nissilä, L, Jokinen, et al. Prospective, randomized, infancy-onset trial of the effects of a low-saturated-fat, low-cholesterol diet on serum lipids and lipoproteins before school age: The Special Turku coronary Risk factor Intervention Project (STRIP). *Circulation*. 2000;102(13):1477-1483. https://doi.org/10.1161/01.CIR.102.13.1477	Macronutrient distribution not described
Rask-Nissilä, L, Jokinen, et al. Effects of diet on the neurologic development of children at 5 years of age: The STRIP project. *J Pediatr*. 2002;140(3):328-333. https://doi.org/10.1067/mpd.2002.122393	Macronutrient distribution not described
Rauber, F, Hoffman, et al. Diet quality from pre-school to school age in Brazilian children: A 4-year follow-up in a randomised control study. *Br J Nutr*. 2014;111(3):499-505. https://doi.org/10.1017/S0007114513002857	Macronutrient distribution not described
Ribas, SA, Paravidino, et al. The Cardiovascular Health Integrated Lifestyle Diet (CHILD) Lowers LDL-Cholesterol Levels in Brazilian Dyslipidemic Pediatric Patients. *J Am Nutr Assoc*. 2022;41(4):352-359. https://doi.org/10.1080/07315724.2021.1887006	Excluded outcome
Rising, R, Lifshitz, et al. Relationship between maternal obesity and infant feeding-interactions. *Nutr J*. 2005;4:. https://doi.org/10.1186/1475-2891-4-17	Excluded outcome
Rodriguez-Lopez, M, Osorio, et al. Influence of breastfeeding and postnatal nutrition on cardiovascular remodeling induced by fetal growth restriction. *Pediatr Res*. 2016;79(1):100-106. https://doi.org/10.1038/pr.2015.182	Excluded comparator Excluded outcome
Rogers, I, Emmett, et al. Fat content of the diet among pre-school children in Britain; relationship with food and nutrient intakes. *Eur J Clin Nutr*. 2002;56(3):252-263. https://doi.org/10.1038/sj.ejcn.1601335	Excluded outcome
Rogers, IS, Emmett, et al. Fat content of the diet among preschool children in southwest Britain: II. relationship with growth, blood lipids, and iron status. *Pediatrics.* 2001;108(3):E49. https://doi.org/10.1542/peds.108.3.e49	Macronutrient distribution not described
Rosenberg, EA, Seely, et al. Relationship between carbohydrate intake and oral glucose tolerance test results among pregnant women. *Diabetes Res Clin Pract*. 2021;176:. https://doi.org/10.1016/j.diabres.2021.108869	Macronutrient distribution not described
Ruebel, ML, Gilley, et al. Associations between maternal diet, body composition and gut microbial ecology in pregnancy. *Nutrients.* 2021;13(9):3295-3295. https://doi.org/10.3390/nu13093295	Excluded outcome
Ruottinen, S, Lagström, et al. Dietary fiber does not displace energy but is associated with decreased serum cholesterol concentrations in healthy children. *Am J Clin Nutr*. 2010;91(3):651-661. https://doi.org/10.3945/ajcn.2009.28461	Excluded intervention/exposure Nonisocaloric comparison
Ruottinen, S, Niinikoski, et al. High sucrose intake is associated with poor quality of diet and growth between 13 months and 9 years of age: The special turku coronary risk factor intervention project. *Pediatrics.* 2008;121(6):e1676-e1685. https://doi.org/10.1542/peds.2007-1642	Excluded intervention/exposure
Sahni, R, Saluja, et al. Quality of diet, body position, and time after feeding influence behavioral states in low birth weight infants. *Pediatr Res*. 2002;52(3):399-404. https://doi.org/10.1203/00006450-200209000-00016	Excluded outcome
Sánchez-García, AM, Zaragoza-Martí, et al. Adequacy of parenteral nutrition in preterm infants according to current recommendations: A study in a Spanish hospital. *Int J Environ Res Public Health*. 2020;17(6):. https://doi.org/10.3390/ijerph17062131	Excluded intervention/exposure
Sangalli, CN, Leffa, et al. Impact of promoting healthy infant feeding practices on energy intake and anthropometric measures of children up to 6 years of age: a randomised controlled trial. *J Hum Nutr Diet*. 2021;34(5):771-783. https://doi.org/10.1111/jhn.12881	Excluded intervention/exposure Nonisocaloric comparison
Santiworakul C, Chomtho K, et al. Growth and nutritional status of pediatric patients treated with the ketogenic diet. Asia Pac J Clin Nutr. 2021 Jun;30(2):231-237. doi: 10.6133/apjcn.202106_30(2).0007	Excluded study design
Saunders, CM, Rehbinder, et al. Food and nutrient intake and adherence to dietary recommendations during pregnancy: a Nordic mother-child population-based cohort. *Food Nutr Res*. 2019;63:. https://doi.org/10.29219/fnr.v63.3676	Excluded outcome
Schmidt, AB, Lund, et al. Dietary glycemic index and glycemic load during pregnancy and offspring risk of congenital heart defects: a prospective cohort study. *Am J Clin Nutr*. 2020;111(3):526-535. https://doi.org/10.1093/ajcn/nqz342	Excluded intervention/exposure Excluded outcome Macronutrient distribution not described
Scholl, TO, Chen, et al. Maternal diet, C-reactive protein, and the outcome of pregnancy. *J Am Coll Nutr*. 2011;30(4):233-40. https://doi.org/10.1080/07315724.2011.10719965	Excluded outcome

Reference	Exclusion Reason/s
Scholl, TO, Chen, et al. The Dietary Glycemic Index during Pregnancy: Influence on Infant Birth Weight, Fetal Growth, and Biomarkers of Carbohydrate Metabolism. *Am J Epidemiol*. 2004;159(5):467-474. https://doi.org/10.1093/aje/kwh068	Excluded intervention/exposure
Sekiyama, M, Roosita, et al. Physical growth and diets of school children: Trends from 2001 to 2015 in rural West Java, Indonesia. *Am J Hum Biol*. 2018;30(2):. https://doi.org/10.1002/ajhb.23089	Macronutrient distribution not described
Seymour, de JV, Chia, et al. Maternal dietary patterns and gestational diabetes mellitus in a multi-ethnic Asian cohort. *J Dev Orig Health Dis*. 2015;6(Suppl. 2):S98-S99. https://doi.org/10.1017/S2040174415007801	Other out of scope
Shapiro, ALB, Ringham, et al. Infant Adiposity is Independently Associated with a Maternal High Fat Diet but not Related to Niacin Intake: The Healthy Start Study. *Matern Child Health J*. 2017;21(8):1662-1668. https://doi.org/10.1007/s10995-016-2258-8	Macronutrient distribution not described
Shariff, ZM, Lin, et al. Higher Dietary Energy Density is Associated with Stunting but not Overweight and Obesity in a Sample of Urban Malaysian Children. *Ecol Food Nutr*. 2016;55(4):378-389. https://doi.org/10.1080/03670244.2016.1181065	Nonisocaloric comparison
Sharma, SS, Greenwood, et al. The differential impact of maternal dietary macronutrient composition on offspring birthweight - results from the Danish National Birth Cohort. *Proc Nutr Soc*. 2018;77(OCE4):E183-E183. https://doi.org/10.1017/S0029665118001891	Excluded study design
Shenhav, S, Gemer, et al. Severe hyperlipidemia-associated pregnancy: prevention in subsequent pregnancy by diet. *Acta Obstet Gynecol Scand*. 2002;81(8):788-90. https://doi.org/10.1034/j.1600-0412.2002.810819.x	Excluded study design
Shiell, AW, Campbell-Brown, et al. High-meat, low-carbohydrate diet in pregnancy relation to adult blood pressure in the offspring. *Hypertension*. 2001;38(6):1282-1288. https://doi.org/10.1161/hy1101.095332	Excluded study design
Shull, S, Diaz-Medina, et al. Early efficacy of the ketogenic diet is not affected by initial body mass index percentile. *Pediatr Neurol*. 2014;50(5):469-473. https://doi.org/10.1016/j.pediatrneurol.2014.01.014	Excluded study design Excluded intervention/exposure Macronutrient distribution not described
Simões, VMF, Barbieri, et al. Perinatal and early adulthood factors associated with adiposity. *Cad Saude Publica*. 2012;28(7):1381-1393. https://doi.org/10.1590/S0102-311X2012000700016	Macronutrient distribution not described
Sørensen, LB, Søe, et al. Effects of increased dietary protein-to-carbohydrate ratios in women with polycystic ovary syndrome. *Am J Clin Nutr*. 2012;95(1):39-48. https://doi.org/10.3945/ajcn.111.020693	Excluded population
Spruijt-Metz, D, Lindquist, et al. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*. 2002;75(3):581-586. https://doi.org/10.1093/ajcn/75.3.581	Macronutrient distribution not described
Staffler A, Klemme M, et al. Very low birth weight preterm infants are at risk for hypoglycemia once on total enteral nutrition. *J Matern Fetal Neonatal Med*. 2013;26(13):1337-41. https://doi.org/10.3109/14767058.2013.784250	Excluded outcome
Stutte, S, Gohlke, et al. Impact of early nutrition on body composition in children aged 9.5 years born with extremely low birth weight. *Nutrients.* 2017;9(2):12. https://doi.org/10.3390/nu9020124	Macronutrient distribution not described
Sumesh, Parat, Praneeta, et al. Targeted breast milk fortification for very low birth weight (VLBW) infants: nutritional intake, growth outcome and body composition. *Nutrients.* 2020;12(4):1156-1156. https://doi.org/10.3390/nu12041156	Excluded intervention/exposure
Svensson V, Sobko T, et al. Obesogenic dietary intake in families with 1-year-old infants at high and low obesity risk based on parental weight status: baseline data from a longitudinal intervention (Early STOPP). *Eur J Nutr*. 2016 Mar;55(2):781-792. https://doi.org/10.1007/s00394-015-0899-9	Excluded study design
Tahir, MJ, Ejima, et al. Associations of breastfeeding or formula feeding with infant anthropometry and body composition at 6 months. *Matern Child Nutr*. 2021;17(2):e13105-e13105. https://doi.org/10.1111/mcn.13105	Macronutrient distribution not described
Taillie, LS, Afeiche, et al. The contribution of at-home and away-from-home food to dietary intake among 2-13-year-old Mexican children. *Public Health Nutr*. 2017;20(14):2559-2568. https://doi.org/10.1017/S1368980016002196	Excluded outcome
Takizawa, M, Kaneko, et al. The relationship between carbohydrate intake and glucose tolerance in pregnant women. *Acta Obstet Gynecol Scand*. 2003;82(12):1080-1085. https://doi.org/10.1046/j.1600-0412.2003.00187.x	Excluded intervention/exposure
Talai Rad, N, Ritterath, et al. Longitudinal analysis of changes in energy intake and macronutrient composition during pregnancy and 6 weeks post-partum. *Arch Gynecol Obstet*. 2011;283(2):185-190. https://doi.org/10.1007/s00404-009-1328-1	Excluded outcome

Reference	Exclusion Reason/s
Thakali, KM, Zhong, et al. Associations between maternal body mass index and diet composition with placental DNA methylation at term. *Placenta*. 2020;93:74-82. https://doi.org/10.1016/j.placenta.2020.02.018	Excluded outcome
Thiess, T, Lauer, et al. Correlation of Early Nutritional Supply and Development of Bronchopulmonary Dysplasia in Preterm Infants <1,000 g. *Frontiers in Pediatrics.* 2021;9:. https://doi.org/10.3389/fped.2021.741365	Excluded outcome
Tian, Qiao, Yue, et al. Beyond protein intake: does dietary fat intake in the year preceding pregnancy and during pregnancy have an impact on gestational diabetes mellitus?. *Eur J Nutr*. 2021;60(6):3461-3472. https://doi.org/10.1007/s00394-021-02525-z	Excluded study design Excluded population Excluded intervention/exposure
Ting Ting, Fu, Schroder, et al. Macronutrient analysis of target-pooled donor breast milk and corresponding growth in very low birth weight infants. *Nutrients.* 2019;11(8):1884-1884. https://doi.org/10.3390/nu11081884	Excluded intervention/exposure
Toppe, F, Rasche, et al. Relationship between early nutrition and deep gray matter and lateral ventricular volumes of preterm infants at term-equivalent age. *World J Pediatrics.* 2023. https://doi.org/10.1007/s12519-022-00657-8	Excluded population
Tottman, AC, Bloomfield, et al. Relationships between Early Nutrition and Blood Glucose Concentrations in Very Preterm Infants. *J Pediatr Gastroenterol Nutr*. 2018;66(6):960-966. https://doi.org/10.1097/MPG.0000000000001929	Excluded intervention/exposure
Totzauer, M, Luque, et al. Effect of Lower Versus Higher Protein Content in Infant Formula Through the First Year on Body Composition from 1 to 6 Years: Follow-Up of a Randomized Clinical Trial. *Obesity.* 2018;26(7):1203-1210. https://doi.org/10.1002/oby.22203	Excluded intervention/exposure Macronutrient distribution not described
Uauy, R, Mize, et al. Fat intake during childhood: metabolic responses and effects on growth. *Am J Clin Nutr*. 2000;72(5):1354S-1360S.	Macronutrient distribution not described
Uusitalo, U, Arkkola, et al. Unhealthy dietary patterns are associated with weight gain during pregnancy among Finnish women. *Public Health Nutr*. 2009;12(12):2392-2399. https://doi.org/10.1017/S136898000900528X	Excluded comparator Macronutrient distribution not described
Van Goudoever, JB, Sulkers, et al. Short-term growth and substrate use in very-low-birth-weight infants fed formulas with different energy contents. *Am J Clin Nutr*. 2000;71(3):816-821. https://doi.org/10.1093/ajcn/71.3.816	Excluded population
Vasu, V, Durighel, et al. Preterm nutritional intake and MRI phenotype at term age: A prospective observational study. *BMJ Open*. 2014;4(5):. https://doi.org/10.1136/bmjopen-2014-005390	Macronutrient distribution not described
Verduci, E, Radaelli, et al. Dietary macronutrient intake during the first 10 years of life in a cohort of Italian children. *J Pediatr Gastroenterol Nutr*. 2007;45(1):90-95. https://doi.org/10.1097/MPG.0b013e318058ca4e	Excluded outcome
Vilela, S, Oliveira, et al. Chrono-Nutrition: The Relationship between Time-of-Day Energy and Macronutrient Intake and Children's Body Weight Status. *J Biol Rhythms*. 2019;34(3):332-342. https://doi.org/10.1177/0748730419838908	Excluded outcome
Vining, EPG, Pyzik, et al. Growth of children on the ketogenic diet. *Dev Med Child Neurol*. 2002;44(12):796-802. https://doi.org/10.1017/S0012162201002961	Excluded outcome Macronutrient distribution not described
Walker, JL, Bell, et al. Relationships between dietary intake and body composition according to gross motor functional ability in preschool-aged children with cerebral palsy. *Ann Nutr Metab*. 2012;61(4):349-357. https://doi.org/10.1159/000342557	Nonisocaloric comparison Macronutrient distribution not described
Walsh, JM, Mahony, et al. Impact of a low glycemic index diet in pregnancy on markers of maternal and fetal metabolism and inflammation. *Reproductive Sciences*. 2014;21(11):1378-1381. https://doi.org/10.1177/1933719114525275	Excluded intervention/exposure Macronutrient distribution not described
Wang, H, Zhou, et al. Association of maternal depression with dietary intake, growth, and development of preterm infants: a cohort study in Beijing, China. *Front Med*. 2018;12(5):533-541. https://doi.org/10.1007/s11684-017-0591-y	Excluded population
Weder, S, Hoffmann, et al. Energy, macronutrient intake, and anthropometrics of vegetarian, vegan, and omnivorous children (1-3 years) in Germany (VeChi diet study). *Nutrients.* 2019;11(4):. https://doi.org/10.3390/nu11040832	Excluded study design
Whisner CM, Young BE, et al. Maternal diet but not gestational weight gain predicts central adiposity accretion in utero among pregnant adolescents. *Int J Obes (Lond)*. 2015;39(4):565-70. https://doi.org/10.1038/ijo.2014.202	Excluded outcome
Williams, S, Basualdo-Hammond, et al. Growth retardation in children with epilepsy on the ketogenic diet: a retrospective chart review. *J Am Diet Assoc*. 2002;102(3):405-7. https://doi.org/10.1016/s0002-8223(02)90093-3	Macronutrient distribution not described

Reference	Exclusion Reason/s
Wilson, CA, Seed, et al. Is there an association between diet, physical activity and depressive symptoms in the perinatal period? An analysis of the UPBEAT cohort of obese pregnant women. *Matern Child Health J*. 2020;24(12):1482-1493. https://doi.org/10.1007/s10995-020-02933-3	Excluded outcome Macronutrient distribution not described
Wolde, M, Berhan, et al. Determinants of underweight, stunting and wasting among schoolchildren. *BMC Public Health*. 2015;15(1):. https://doi.org/10.1186/s12889-014-1337-2	Excluded outcome Excluded study design
Woo, JG, Reynolds, et al. Longitudinal diet quality trajectories suggest targets for diet improvement in early childhood. *J Acad Nutr Diet*. 2021;121(7):1273-1283. https://doi.org/10.1016/j.jand.2020.08.084	Excluded outcome
Worden, LT, Abend, et al. Ketogenic diet treatment of children in the intensive care unit: Safety, tolerability, and effectiveness. *Seizure*. 2020;80:242-248. https://doi.org/10.1016/j.seizure.2020.07.003	Excluded outcome Macronutrient distribution not described
Xu, Q, Gao, et al. The Association of Maternal Body Composition and Dietary Intake with the Risk of Gestational Diabetes Mellitus during the Second Trimester in a Cohort of Chinese Pregnant Women. *Biomed Environ Sci*. 2016;29(1):1-11. https://doi.org/10.3967/bes2016.001	Nonisocaloric comparison
Yongfang, Liu, Juan, et al. Ketogenic diet and growth in Chinese infants with refractory epilepsy. *Asia Pac J Clin Nutr*. 2021;30(1):113-121. https://doi.org/10.6133/apjcn.202103_30(1).0014	Nonisocaloric comparison
Yongjian, Zhu, Yanhua, et al. Associations of dietary patterns and pre-eclampsia: a matched case-control study. *Br J Nutr*. 2023;129(2):247-254. https://doi.org/10.1017/S0007114522001210	Excluded study design Macronutrient distribution not described
Young, B. Variation in infant formula macronutrient ingredients is associated with infant anthropometrics. *Nutrients*. 2020;12(11):3465-3465. https://doi.org/10.3390/nu12113465	Excluded study design Excluded intervention/exposure
Yu, MX, Zhuang, et al. Effects of a nutrient-dense formula compared with a post-discharge formula on post-discharge growth of preterm very low birth weight infants with extrauterine growth retardation: a multicentre randomised study in China. *J Hum Nutr Diet*. 2020;33(4):557-565. https://doi.org/10.1111/jhn.12733	Nonisocaloric comparison
Yusuf, H, Subih, et al. Associations of macro and micronutrients and antioxidants intakes with preeclampsia: a case-control study in Jordanian pregnant women. *Nutrition, Metabolism and Cardiovascular Diseases*. 2019;29(5):458-466. https://doi.org/10.1016/j.numecd.2019.01.008	Excluded study design
Zamir, I, Stoltz Sjöström, et al. Postnatal nutritional intakes and hyperglycemia as determinants of blood pressure at 6.5 years of age in children born extremely preterm. *Pediatr Res*. 2019;86(1):115-121. https://doi.org/10.1038/s41390-019-0341-8	Excluded population
Zamora, AN, Peterson, et al. Third-Trimester Maternal Dietary Patterns Are Associated with Sleep Health among Adolescent Offspring in a Mexico City Cohort. *J Nutr*. 2022;152(6):1487-1495. https://doi.org/10.1093/jn/nxac045	Excluded outcome Macronutrient distribution not described
Zhang, H, Xia, et al. Carbohydrate intake quality and gestational diabetes mellitus, and the modifying effect of air pollution. *Frontiers in Nutrition*. 2023;9:. https://doi.org/10.3389/fnut.2022.992472	Excluded intervention/exposure
Zhi, Huang, Neng, et al. Dietary patterns and their effects on postpartum weight retention of lactating women in south central China. *Nutrition*. 2019;67-68:110555-110555. https://doi.org/10.1016/j.nut.2019.110555	Excluded study design
Zhu, D, Wang, et al. Ketogenic diet effects on neurobehavioral development of children with intractable epilepsy: A prospective study. *Epilepsy and Behavior*. 2016;55:87-91. https://doi.org/10.1016/j.yebeh.2015.12.011	Excluded comparator Macronutrient distribution not described