



Ultra-processed Food and Drink Products in Latin America:

Sales, Sources, Nutrient Profiles
and Policy Implications.



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE
Americas

Ultra-processed Food and Drink Products in Latin America:

Sales, Sources, Nutrient Profiles
and Policy Implications.



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE
Americas

Washington, DC, 2019

Ultra-processed Food and Drink Products in Latin America: Sale, Sources, Nutrient Profiles
and Policy Implications
ISBN: 978-92-75-12032-3

© Pan American Health Organization 2019

All rights reserved. Publications of the Pan American Health Organization (PAHO) are available at www.paho.org. Requests for permission to reproduce or translate PAHO Publications should be addressed to the Publications Program through the website (www.paho.org/permissions).

Suggested citation. Pan American Health Organization. *Ultra-processed food and drink products in Latin America: Sales, sources, nutrient profiles, and policy implications*. Washington, D.C.: PAHO; 2019.

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://iris.paho.org>.

Publications of the Pan American Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of PAHO concerning the status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by PAHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by PAHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall PAHO be liable for damages arising from its use.

Cover photo credit: ©Shutterstock

ACKNOWLEDGMENTS

PAHO gratefully acknowledges the following: Dr. Jean-Claude Moubarac (Department of Nutrition, Université de Montréal, Canada); Dr. Carlos Augusto Monteiro (Department of Nutrition, University of São Paulo, Brazil); Dr. Enrique Jacoby (Centre for Epidemiological Studies in Health and Nutrition (NUPENS), University of São Paulo, Brazil); and Geoffrey Cannon (NUPENS, University of São Paulo, Brazil).



©Shutterstock

Key findings

Key findings from this report on seven Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela), that together make up 80% of the population of the Latin American and the Caribbean region, are consistent with and support findings and recommendations made in previous PAHO documents, as follows:

- *Ultra-processed Food and Drink Products in Latin America: Trends, Impact on Obesity, Policy Implications (1)*, which finds that sales of these products increased from 2000 to 2013 in all countries and are associated with weight gain and obesity.
- *PAHO's Nutrient Profile Model (2)*, which recommends protection and promotion of unprocessed and minimally processed foods, and freshly prepared dishes and meals made from these foods, and identifies the types of ultra-processed products whose sales should be restricted by regulatory measures.
- *PAHO Plan of Action for the Prevention of Obesity in Children and Adolescents (3)*, which states the unanimous commitments of PAHO Member States to implement a set of effective policies, laws, regulations, and interventions to transform the current obesogenic environment and halt the rise of the rapidly growing obesity epidemic in the Americas.

Specifically, this report shows that:

- Between 2009 and 2014 (the most recent year for

which figures were available at the time this report was compiled)

- Sales per capita of packaged food and drinks included in this analysis were essentially unchanged, increasing by 0.3%, while sales of the portion of ultra-processed food and drink products grew by 8.3%.
- These trends are projected to continue during the period 2015 to 2019.
- In 2014:
 - Ultra-processed drinks contributed one-third of total energy from all ultra-processed products.
 - Free sugars contributed 43% of the total energy resulting from ultra-processed product sales.
 - All 89 ultra-processed products included in this analysis exceeded the recommended levels in free sugars, total fats, saturated fats or sodium. Two-thirds were excessive in two or three of these critical nutrients.
 - Most ultra-processed product sales came from carbonated soft drinks (22%), cookies or “biscuits” (18%), and sugar-sweetened juices and drinks, confectionery, and industrial breads considered together (22%).
 - Half of the free sugars in ultra-processed products came from carbonated soft drinks. Almost a fifth came from other sugar-sweetened juices and drinks.
 - Over half of total fat and saturated fat in ultra-processed products came from cookies (biscuits), margarine and other spreadable oils and fats, sweet and savory snacks, and confectionery.
- One half of sodium in ultra-processed products came from instant sauces and dressings. Over a quarter came from cookies (biscuits), industrial bread, margarine and other spreadable oils and fats, and sweet and savory snacks, considered together.
- Sales of all ultra-processed products were two to three times higher in Chile and Mexico compared with Colombia and Peru.

Policy implications

The findings presented in this report point to the need for:

- Strengthening of food systems that protect public health in Latin America and that are rational, appropriate, and sustainable. This requires commitment and investment as top priorities for national governments.
- Reduction of the health risks posed by ultra-processed products by reducing their overall consumption. This requires implementation of fiscal policies as well as regulation of ultra-processed product labeling, promotion, advertising and sales, especially in schools.
- Development of new market opportunities to protect and increase the production, availability, affordability and consumption of unprocessed and minimally processed foods, and fresh hand-made meals.

Contents

Introduction	1
Ultra-processing	1
The problem with ultra-processing	2
Scope of this report	3
1. Methods	5
1.1 Defining ultra-processed products.....	5
1.2 Trends and analysis	6
2. Sales	9
2.1 Sales of ultra-processed food products	9
2.2 Growth of sales of ultra-processed and packaged food and drink products.....	11
2.3 Sales of ultra-processed food and drink products	12
2.4 Sales of specific ultra-processed products.....	14
3. Nutrient profiles	17
3.1 Free sugars	17
3.2 Total fat	18
3.3 Saturated fat	18
3.4 Sodium	22
3.5 Summary	22
4. Sources of dietary energy and critical nutrients	27
4.1 Macronutrients	27
4.2 Energy.....	27
4.3 Free sugars	30
4.4 Total fat	34
4.5 Saturated fat.....	34
4.6 Sodium	37
4.7 Summary	37
5. Conclusions and recommendations	41
5.1 Findings	41
5.2 Limitations	42
5.3 Discussion	43
5.4 Recommendations.....	45
Annex A	
The NOVA food classification system	46
Annex B	
Ultra-processed food and drink products grouped in 21 categories and 89 sub-categories sold in seven Latin American countries, 2014, as used in this report	50

Figures and tables

Figure 1	Average daily retail sales per capita of ultra-processed products in seven Latin American countries, 2009-2014, and projections for 2015 to 2019 (measured in kcal).....	9
Figure 2	Average daily retail sales per capita of ultra-processed products in seven Latin American countries, 2009-2014 and projections for 2015 to 2019 per country (measured in kcal)	10
Figure 3	Average daily retail per capita sales of ultra-processed food and drink products in seven Latin American countries, 2009-2014 and projections for 2015 to 2019 (measured in kcal).....	12
Figure 4	Contribution of food and drinks to energy from sales of all ultra-processed products in seven Latin American countries, 2014	13
Figure 5	Growth of average retail per capita sales of ultra-processed food and drink products per country, 2009-2014	14
Figure 6	Average retail per capita sales growth of ultra-processed food and drink products in seven Latin American countries by product, 2009-2014 and projected to 2015 to 2019	15
Figure 7	Energy as free sugars in ultra-processed products sold in seven Latin American countries in 2014 (products listed contain at least 1% of total energy as free sugars).....	19
Figure 8	Energy from total fat in ultra-processed products sold in seven Latin American countries in 2014 (products listed contain at least 5% of total energy as total fat).....	20
Figure 9	Energy as saturated fat in ultra-processed products sold in seven Latin America countries in 2014 (products here contain at least 1% of total energy as saturated fat)	21
Figure 10	Sodium density in ultra-processed products sold in seven Latin American countries in 2014.....	23
Figure 11	Ultra-processed products sold in seven Latin American countries in 2014, with excessive amounts of free sugars, total fat, saturated fat, and/or sodium.....	24
Figure 12	Contribution of macronutrients to total dietary energy from ultra-processed products sold in seven Latin American countries, 2014	28

Figure 13	Distribution of dietary energy from ultra-processed products sold in seven Latin American countries, 2014	29
Figure 14	Distribution of free sugars resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014	33
Figure 15	Distribution of total fat resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014	35
Figure 16	Distribution of saturated fat resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014	36
Figure 17	Distribution of sodium resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014	38
Table 1	Average daily retail per capita sales and growth of ultra-processed and packaged food and drink products in seven Latin American countries, 2009-2014 and projections for 2015 to 2019 (measured in kcal)	11
Table 2	Criteria for excessive free sugars, total fat, saturated fat, and sodium as defined by the PAHO <i>Nutrient Profile Model</i>	17
Table 3	Proportion of the 89 ultra-processed product sub-categories with excessive free sugars, total fat, saturated fat, and/or sodium	22
Table 4	Ultra-processed products contributing most to dietary energy sold in seven Latin American countries, 2014	31
Table 5	Main sources of dietary energy and critical nutrients from ultra-processed products as sold in seven Latin American countries in 2014	39



©PAHO

Introduction

The rapid increase in the prevalence of overweight and obesity, diabetes, and associated chronic non-communicable diseases (NCDs) in recent decades, threatens the health and well-being and also the economic prospects of all Latin American and the Caribbean countries, now and in the future (4-6).

To address one crucial aspect of this crisis, in October 2014, the Member States of the Pan American Health Organization (PAHO) approved a five-year *Plan of Action* whose purpose is to halt a further increase in obesity in children and adolescents in the Americas (3).

The plan calls for the implementation of fiscal policies, such as taxes on sugar-sweetened beverages and energy-dense nutrient-poor products, regulation of food marketing and labeling, improvement of school nutrition and physical activity environments, and promotion of breastfeeding and healthy eating. Its goal is to halt the rise of the epidemic so that there is no increase in current country prevalence rates of obesity.

As the plan's title indicates, and two other PAHO documents (1, 2) state, this report identifies food and drink products of special concern, including sugar-sweetened drinks and energy-dense nutrient-poor snack products, more precisely as "ultra-processed products."

Ultra-processing

Many studies that have examined the impact of different types of food on dietary quality and health, now identify ultra-processed food and drink products as particularly obesogenic and generally unhealthy. Studies published by PAHO (1, 2) address countries in the Region of the Americas, while several other studies have taken a global perspective (7-9), many focus-

ing on Brazil (10-18) and Chile (19), with many from the United States and Canada (20-24), and a number from Europe and elsewhere (25-30). The official national Brazilian dietary guidelines recommend avoidance of ultra-processed food products (31, 32).

Ultra-processed products typically contain little or no whole foods. They are industrial formulations made mostly from substances extracted or derived from foods, plus additives (20, 23). They include soft drinks and other sugar-sweetened juices and drinks, sweet and savory snacks, candies (confectionery), industrial breads, cakes, and cookies (biscuits), sweetened breakfast cereals, reconstituted meat products, and pre-prepared dishes. As well as sugars, oils, fats and salt, ultra-processed products include substances also derived from foods but not used in home cooking, such as hydrogenated oils, modified starches, protein isolates, and additives such as colors, flavors and flavor enhancers. Additives are used to imitate and enhance the sensory qualities of natural foods or to disguise unattractive qualities of the final product (20, 23).

The ingredients, and the succession of manufacturing methods and processing techniques used (hence "ultra-processed"), create durable, accessible, convenient, extremely palatable, highly profitable ready-to-drink, ready-to-eat, or ready-to-heat products (33, 34). These displace established, appropriate and sustainable national and local food systems, dietary patterns based on hand-made freshly prepared dishes, and meals prepared from unprocessed and minimally processed foods together with processed culinary ingredients and processed foods (12, 22, 26).

For full definitions and lists of unprocessed and minimally processed foods, processed culinary ingredients, processed foods and ultra-processed products, see Annex A.

The problem with ultra-processing

Analyses of nationally representative dietary surveys conducted in several countries in the Americas consistently show that ultra-processed food and drink products are nutritionally imbalanced. They are high in free sugar, total fat, saturated fat and sodium, and low in protein, dietary fiber, minerals and vitamins, compared with unprocessed or minimally processed foods, dishes and meals; together with culinary ingredients and processed foods (10, 14-16, 19-21, 23-25, 29). Ultra-processed products are together less satiating and more hyperglycemic compared with minimally processed foods (33, 35), and they are often designed to induce overconsumption (36). For these and other reasons, the dietary share of ultra-processed products has been proposed as an index of overall diet quality (37).

The previous PAHO report on ultra-processed products shows that sales per capita of these products have been rising rapidly in Latin America (1). Between 2000 and 2013, they grew by 26.7% in the 13 Latin American countries studied (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Peru, Uruguay and Venezuela). The increase in sales (and related consumption) was associated with increases in body weight, indicating that these products are a major driver of growing rates of overweight and obesity in the region. This is supported by evidence from a prospective cohort in which consumption of ultra-processed foods predicted risk of overweight and obesity (27) and also of hypertension (28). In cross-sectional studies, high consumption of ultra-processed products has been shown to be associated with obesity in all age groups (13, 17), metabolic syndrome in adolescents (11), and dyslipidemias in children (18).

A number of studies report that consumption of ultra-processed products is higher in younger adults (14, 23, 25), and children and adolescents (17, 18, 38). A survey in southern Brazil reported that ultra-processed products account for 20% of dietary energy in infants aged less than 2 years old, and that these products account for 36% of dietary energy in children aged between 2 and 6 years old (38). This no doubt explains the policy of manufacturers to target their marketing of various types of ultra-processed products at children and also adolescents (39, 40).

In 2016, as part of the implementation of the Plan of Action for the Prevention of Obesity in Children and Adolescents, PAHO developed its *Nutrient Profile Model* (2). This model uses evidence-based criteria to enable governments to identify ultra-processed food and drink products with excess critical nutrients (free sugars, sweeteners, saturated fat, total fat, trans fat and sodium), as based on the WHO population nutrient intake goals to prevent obesity and related NCDs (41). The model is designed to support regulatory measures for the protection of children and also the general population, such as:

- Restriction in the marketing of unhealthy food and drinks to children
- Regulation of school feeding programs and food and drinks sold in schools
- Use of front-of-package warning labels
- Definition of taxation policies to limit consumption of unhealthy food and drinks
- Assessment of agricultural subsidies
- Identification of foods to be provided to vulnerable groups.

The *PAHO Nutrient Profile Model* has been pilot tested using a limited sample of products, in Brazil, Chile, Jamaica and Trinidad and Tobago (2). The products were selected based on volume of sales or household purchases in these countries, and analyzed using information provided by nutrition fact panels and ingredient lists on packages.

The *PAHO Nutrient Profile Model* has not yet been applied systematically in the region. Furthermore, no systematic study has estimated the relative importance of the leading categories of ultra-processed food and drink products such as soft drinks, confectionery) sold in the region. One purpose of this report is to address these information gaps in order to provide the rationale for regulatory measures aiming at restricting the sales of ultra-processed products. The data presented here are from the seven Latin American countries listed above and correspond to sales in 2014, unless otherwise stated. Specifically, the report:

- Estimates trends in sales of ultra-processed products from 2009 to 2014, and projects sales for 2015 to 2019.
- Identifies ultra-processed food and drink products with excess free sugars, total fat, saturated fat and sodium.

- Identifies the specific products that contribute the most to energy and critical nutrients (free sugars, total fat, saturated fat and sodium) from sales of all ultra-processed products in 2014.

Scope of this report

Chapter 1 presents the methodology used to develop this report, including data sources and analysis.

Chapter 2 analyzes the trends in average daily retail sales per capita of ultra-processed foods and drink in seven countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela), for 2009 to 2014, and projected to 2015 to 2019. Average daily per capita sales (2009 to 2014) and projected sales (2015 to 2019) of ultra-processed products are compared with those of non-ultra-processed packaged foods (packaged food minus ultra-processed products). Sales growth of ultra-processed food is compared with that of ultra-processed drinks for each country, and for all the countries reviewed. Sales of specific ultra-processed product categories from 2009 to 2014 and projected to 2019 are shown, to identify products whose sales are increasing or declining.

Chapter 3 presents the average content of free sugars, saturated fat, total fat, and sodium in 89 categories of ultra-processed products sold in 2014 in the seven countries. Products with excessive amounts of these critical nutrients, were identified using the PAHO *Nutrient Profile Model* (2).

Chapter 4 estimates the contribution of free sugar, other carbohydrates, total fats, other fats and protein, to total energy derived from sales of ultra-processed products in the seven countries in 2014. It also identifies the categories of ultra-processed products that contribute most to energy, free sugars, total fat, saturated fat and sodium.



Chapter 5 concludes the report with a summary and discussion of the main findings, as well as the limitations of the report. This chapter also includes recommendations for public policies and actions. It also indicates that ultra-processed products with an excess of critical nutrients should be targeted by policies and programs recommended by the PAHO *Plan of Action for the Prevention of Obesity in Children and Adolescents* (3) to improve the food environment in the Region.



©PAHO

Chapter 1

Methods

This report describes observed and projected trends of sales per capita of ultra-processed food and drink productsⁱ from 2009 to 2019 in the following seven countries of Latin America: Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. These represented 80% of the Latin American and Caribbean population in 2014 (42).

The report assesses the nutrient profile of ultra-processed products sold in these countries in 2014 and identifies those in excess of four critical nutrients (free sugar, total fat, saturated fat and sodium) indicated in the PAHO *Nutrient Profile Model* (2). It estimates the contribution of macronutrients to total energy from sales of ultra-processed products in 2014, and identifies which categories of products contribute the most to total energy and to critical nutrients.

This report applies the concept of ultra-processed food and drink products as defined by the NOVA food classification (20, 23, 31, 34, 43, 44), used in the previous PAHO report on *Ultra-processed Food Products in Latin America* (1) and in the PAHO *Nutrient Profile Model* report (2), to retail sales data from the 2016 Euromonitor database (45). (In this report, “Euromonitor” refers to the Euromonitor *Passport Nutrition Database*.)

The Euromonitor 2016 *Passport Nutrition Database* is a service that provides volume and per capita amount of calories, salt and six nutrients (protein, total carbohydrate, total sugar, total fat, saturated fat, dietary fiber) purchased through packaged foods and drinks sold in retail outlets in 54 countries. This database was constituted in 2014 and the most recent estimates at the time of compilation of this report were for sales from retail outlets from 2009 to 2014, with projections for 2015 to 2019. Euromonitor projections used in this report are based on analyses of industry past and current performance, economic conditions, and industry validation using trade interviews (45). For this report, we used sales data expressed in kcal.

1.1 Defining ultra-processed products

Ultra-processed food and drink products are defined and identified in this report according to the NOVA food classification system (20, 23, 31, 34, 43, 44). NOVA classifies all foods and drinks according to the nature, extent and purpose of the processing they undergo before being purchased or acquired.

NOVA classifies all food and drinks into four groups. These are unprocessed or minimally processed foods; processed culinary ingredients; processed foods; and ultra-processed food and drink products. (See Annex A for definitions and examples of these groups.)

ⁱ **Non-sugar sweetened drinks**, infant formulas and **non-sugar sweetened gum** are not included in this report.

This report is concerned in particular with ultra-processed products. These are industrial formulations manufactured mostly or entirely from substances derived from constituents of foods, together with additives used to imitate and intensify the sensory qualities of unprocessed or minimally processed foods, and dishes and meals made from them together with processed culinary ingredients.

Various industrial processes with no domestic equivalents are used in the manufacturing of ultra-processed products, such as hydrogenation, extrusion and moulding, and pre-processing for frying. The main purpose of ultra-processing is to create products that are ready-to-eat, ready-to-drink, or ready-to-heat, mostly as snacks, which are liable to displace unprocessed or minimally processed foods and freshly prepared dishes and meals. Ultra-processed products typically have minimal content of whole foods and use additives to obtain food-like color, texture, flavor and hyper-palatability, plus complex combinations of salt, sugar and salt, and sophisticated and attractive branding, packaging, multimedia and other intensive marketing to children and adolescents. Many make health claims. They are highly profitable, and leading products are owned by transnational corporations (7, 36, 46).

For this report, a total of 250 products included in Euromonitor were identified as ultra-processed food and drink products. These were grouped into 21 categories according to product similarity and created for the purpose of this report as follows (45):

- Carbonated soft drinks
- Sweet and savory snacks
- Snack and “energy” bars
- Ice cream
- Candies (confectionery)
- Industrial breads
- Cakes, pastries, desserts
- Cookies (biscuits)
- Sweetened breakfast cereals
- Margarine and spreadable oils and fats
- Spreads (such as jams and peanut butter)

- Processed cheese
- “Sports” and “energy” drinks
- Sweetened flavored yogurt
- Sweetened flavored milk and powdered milk drinks
- Juice concentrates, sweetened juices and “fruit” drinks
- Solid baby foods
- Ready-to-heat dishes and meals
- Instant soups
- Instant noodles
- Sauces and dressings

In Chapter 3, the 21 categories were further subdivided into 89 sub-categories, taking nutrient profile similarity into account. For example, types of cookie (biscuit) were grouped together.

Infant formulas are not included in this report despite being ultra-processed products. Regulation of infant formulas is covered by the *International Code of Marketing of Breast-milk Substitutes* (47) and subsequent World Health Assembly Resolutions.

1.2 Trends and analysis

In Chapter 2, the average daily retail sales of ultra-processed products measured in kcal were calculated per capita. Sales trends from 2009 to 2014 and projections for 2015 to 2019 are presented as an average for the seven countries, as well as for each country separately.

These data were compared with the same data calculated for non-ultra-processed packaged food (packaged foods minus ultra-processed products). Additionally, sales of ultra-processed food products and of drink products were compared.

In Chapter 3, using volume sales measured in kcal in 2014, the following average values were calculated for the 89 sub-categories: percentage of energy from free sugars, total fat and saturated fat, and sodium density (as milligrams/kilocalories).

Data for total fat and saturated fat were taken directly from Euromonitor. Sodium density was calculated by multiplying the salt density by 0.4. Free sugars were identified by using the WHO definition, which is “all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices” (41). Euromonitor only provides data on total sugars without distinction between naturally occurring and free sugars, therefore free sugars were estimated from total sugars using a Canadian database that specifies the proportion of free sugars from total sugars in over 4,000 packaged food and drink products (48).

The nutrient content of each of the 89 ultra-processed food and drink product sub-categories were compared with the PAHO *Nutrient Profile Model* criteria (2) so as to identify ultra-processed products in excess of free sugars (10% or more of total dietary energy from free sugars), total fat (30% or more of total energy from total fat), saturated fat (10% or more of total energy from saturated fat), and sodium (1 mg or more of sodium per kilocalorie).

In Chapter 4, the contribution of macronutrients (protein, free sugars, other carbohydrates, fat and saturated fat) to total energy resulting from sales of ultra-processed food and drink products in the seven countries in 2014, was calculated.

The distribution of total energy and of critical nutrients (free sugars, total fat, saturated fat, sodium) resulting from sales of ultra-processed products according to 21 categories of products in the seven countries in 2014, were also measured.

The following applies to all figures presented in this report, unless otherwise noted:

1. Countries included are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Which are the countries from Latin America with nutrient content data available within the analyzed time-frame.
2. Dotted lines are expected sales projected by Euromonitor (45).
3. Ultra-processed products included here correspond to the following categories: carbonated soft drinks; sweet and savory snacks; snack and “energy” bars; ice cream; candies (confectionery); industrial breads; cakes, pastries, desserts; cookies (biscuits); sweetened breakfast cereals; margarine and spreadable oils and fats; spreads (jams, peanut butter etc.); processed cheese; “sports” and “energy” drinks; sweetened flavored yogurt; sweetened flavored milk and powdered milk drinks; juice concentrates, sweetened juices and “fruit” drinks; solid baby foods; ready-to-heat dishes and meals; instant soups; instant noodles; sauces and dressings. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).
4. Sweetened juices and drinks include juice concentrates and “fruit” drinks. Sweetened milk drinks include flavored and powdered drinks. Spreads include jams and preserves, chocolate spread and nut-and-seed spreads. Margarine also includes spreadable oils and fats. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).



Chapter 2

Sales

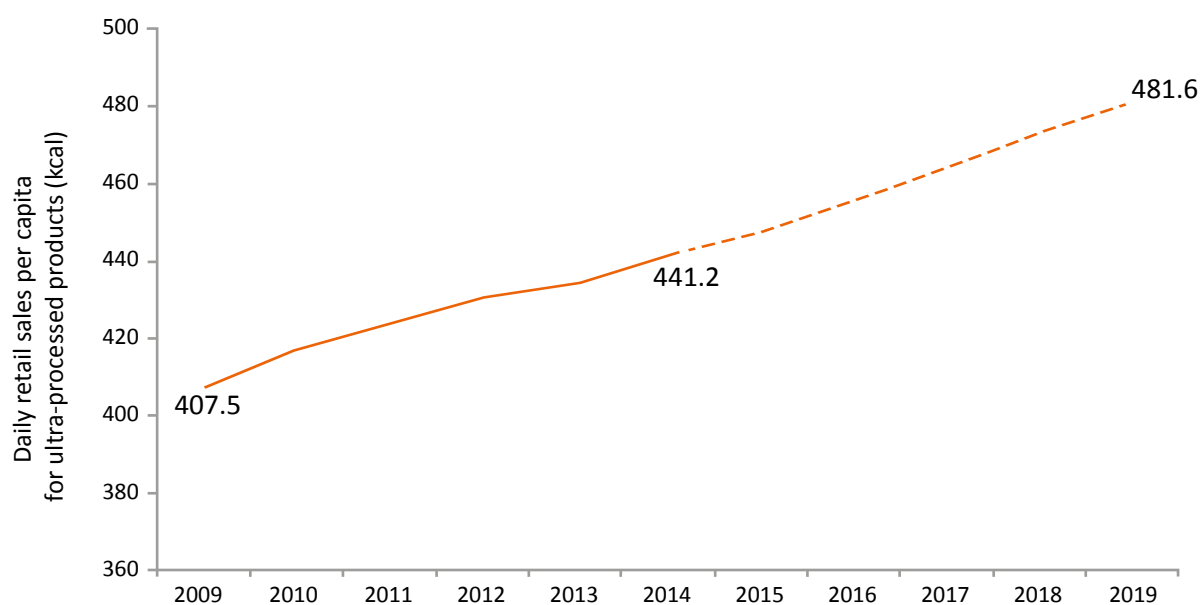
This chapter presents trends in average retail sales per capita of ultra-processed food and drink products from 2009 to 2014 and projections for 2015 to 2019 in Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Sales growth of ultra-processed food products is also shown separately from ultra-processed drink products, and ultra-processed products are compared with non-ultra-processed packaged foods.

2.1 Sales of ultra-processed food products

Figure 1 presents trends in daily per capita sales of ultra-processed food products from retail outlets in the seven Latin America countries examined, from 2009 to 2014, and projections for 2015 to 2019. Sales increased by 8.3% from 408 kcal per capita/day in 2009 to 441 kcal per capita/day in 2014. Sales are projected to grow by another 9.2% up to 482 kcal per capita/day in 2019.ⁱⁱ

Figure 1

Average daily retail sales per capita of ultra-processed products in seven Latin American countries, 2009-2014, and projections for 2015 to 2019 (measured in kcal)



Data are presented as kilocalories per capita.

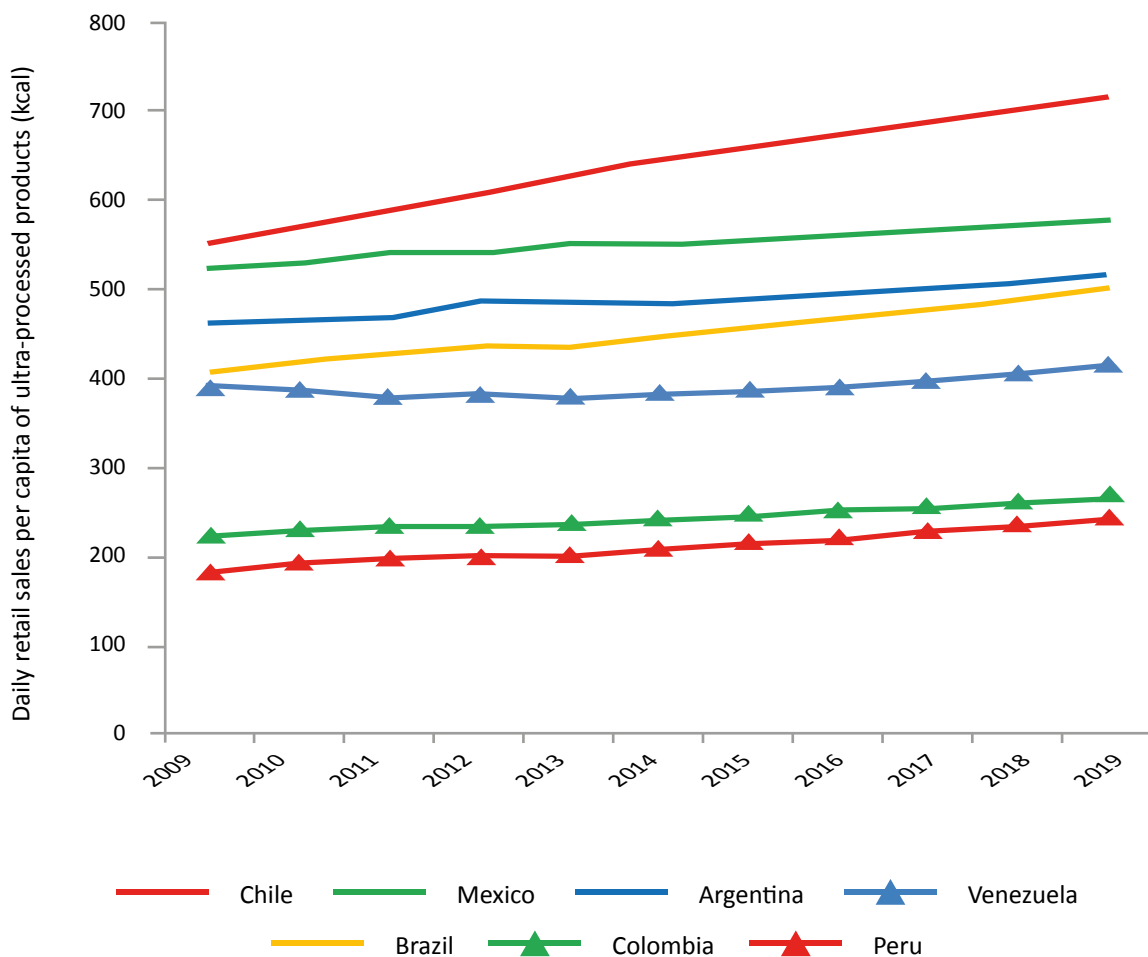
ii Infant formula sales rose from an average of 50.1 kcal per capita/day in 2009 to 68.4 kcal per capita/day in 2014 and are projected to rise further to 86.7 kcal per capita/day in 2019 (45).

Sales vary considerably between the seven countries. Figure 2 shows trends in sales from 2009 to 2014 and projections for 2015 to 2019. In 2009, sales were highest in Chile (552 kcal/person/day), Mexico (522 kcal) and Argentina (461 kcal), followed by Brazil (405 kcal) and Venezuela (388 kcal). In the same year, sales were two to three times lower in Colombia (224 kcal/person/day) and Peru (179 kcal).

Between 2009 and 2014, sales per capita grew unevenly in different countries. The largest growth occurred in Peru (where sales were the lowest in 2009) and in Chile (where sales were the highest in 2009). In Peru, sales grew by 15.6% from 179 to 207 kcal per capita/day. In Chile, they grew by 16.9% from 552 to 646 kcal per capita/day. In the same period, sales per capita/day grew by 10.4% in Brazil, followed by Co-

Figure 2

Average daily retail sales per capita of ultra-processed products in seven Latin American countries, 2009-2014 and projections for 2015 to 2019 per country (measured in kcal)



Data are presented as kilocalories per capita.

Colombia (7.7%), Mexico (5.3%) and Argentina (5.0%). In Venezuela, sales decreased during the same time period (by -1.6%).

These differences reflect the finding that sales of these products grow as available money increases (1). In Peru and Chile, gross domestic product (GDP) per capita increased by 35% and 42% respectively, between 2009 and 2014 (49), whereas it increased less in Brazil (22%) and in Mexico (23%), during the same period (49). In Venezuela, GDP per capita increased by only 7% and sales of ultra-processed products actually decreased during this period (49).

2.2 Growth of sales of ultra-processed and packaged food and drink products

From 2009 to 2014, the overall sales of packaged food and drinks was essentially unchanged, at 1,283 and 1,286 kcal per capita/day, respectively, while sales of ultra-processed products increased by 8.3%, from 408 to 441 kcal per capita/day during this period. During the period 2015 to 2019, sales of ultra-processed products are projected to grow by another 7.8% per capita/day. Year-to-year growth suggests that ul-

Table 1

Average daily retail per capita sales and growth of packaged packaged products (including ultra-processed food and drink products) in seven Latin American countries, 2009-2014 and projections for 2015 to 2019 (measured in kcal)

Year	Packaged food and drink products (kcal)	Ultra-processed food and drink products (kcal)	Share of packaged food and drink products that are ultra-processed (%)
2009	1282.7	407.5	31.8
2010	1284.5	416.8	32.4
2011	1285.2	423.7	33.0
2012	1277.4	430.2	33.7
2013	1278.3	434.5	34.0
2014	1286.0	441.2	34.3
Growth in study period (%)	0.3	8.3	-
Year-to-year growth (%)	0.05	1.6	-
2015	1292.0	446.9	34.6
2016	1300.8	455.3	35.0
2017	1307.8	463.8	35.5
2018	1314.7	473.1	36.0
2019	1322.5	481.6	36.4
Projected growth 2015-2019 (%)	2.4	7.8	-
Projected year-to-year growth (%)	0.6	1.9	-

Data are presented as kilocalories per capita.

tra-processed products are expected to grow at a relatively similar rate in 2015 to 2019 compared to 2009 to 2014.

2.3 Sales of ultra-processed food and drink products

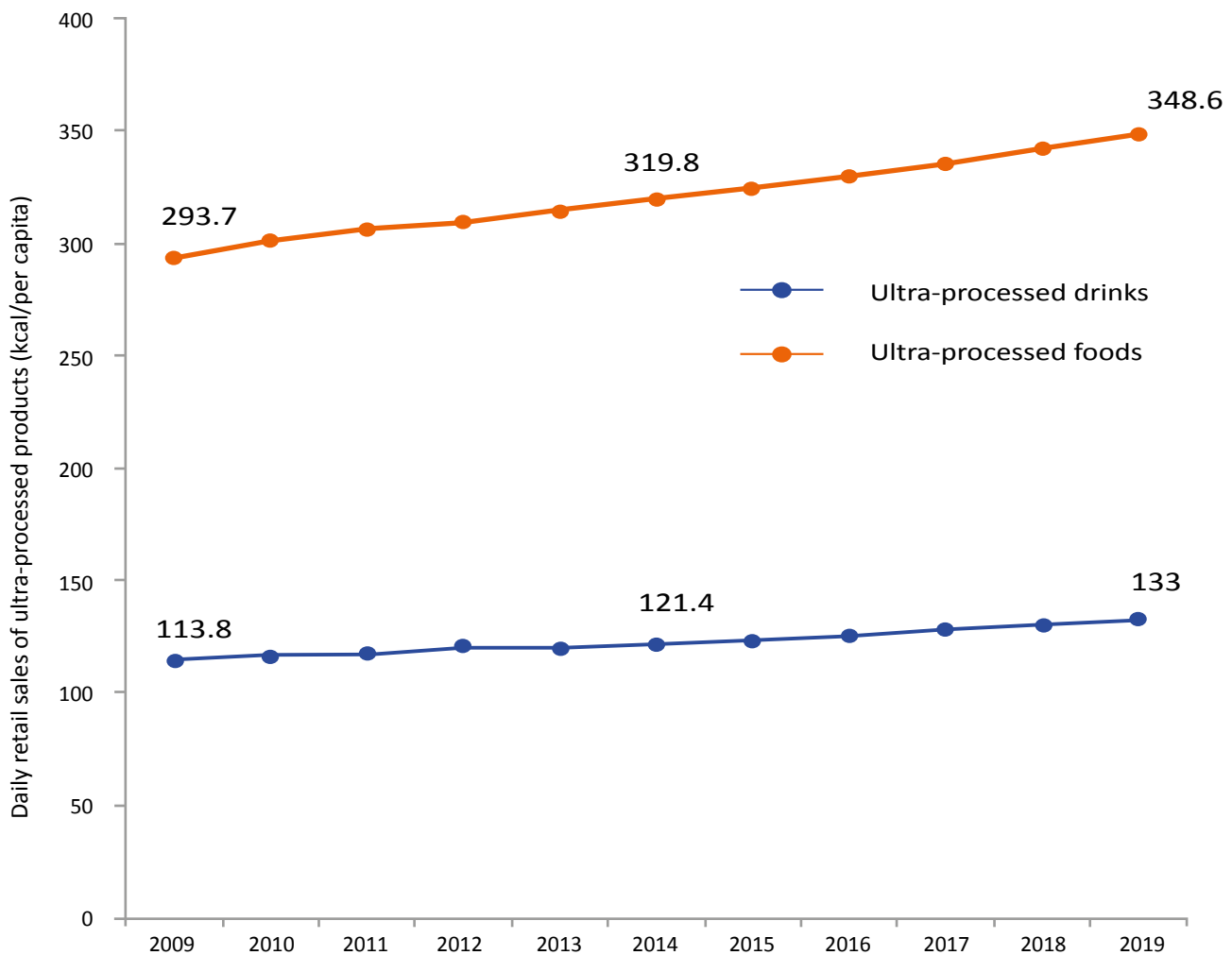
Sales of ultra-processed food and ultra-processed drinks grew at different rates between 2009 and 2014, and are projected to do so until 2019. As seen in Figure 3, from 2009 to 2014, sales of ultra-pro-

cessed foods increased by 8.9% from 294 to 320 kcal per capita/day, while sales of ultra-processed drinks increased by 6.7% from 114 to 121 kcal per capita/day. Sales of ultra-processed food are projected to grow by another 9% between 2014 and 2019, from 320 to 349 kcal per capita/day, while drinks are expected to grow by another 9.6%, from 121 to 133 kcal per capita/day.

In 2014, ultra-processed drink products accounted for almost a third of all calories (28%) while ultra-processed food products accounted for 72% of all calories from ultra-processed food sales (Figure 4).

Figure 3

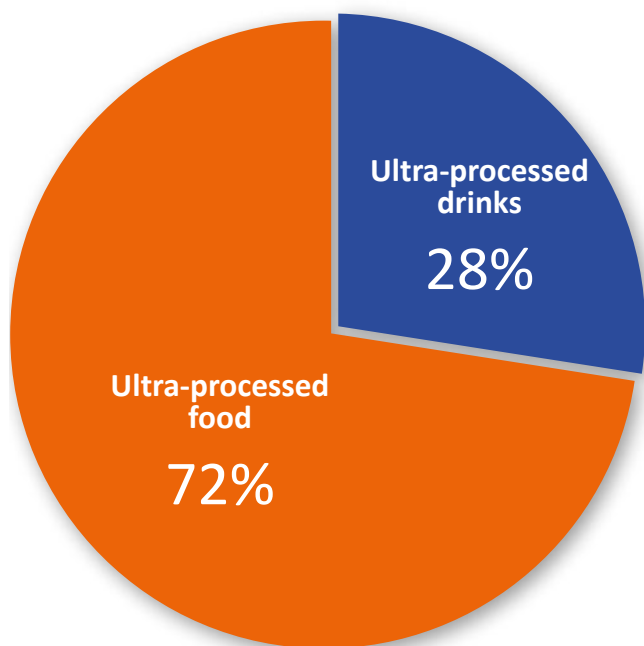
Average daily retail per capita sales of ultra-processed food and drink products in seven Latin American countries, 2009-2014 and projections for 2015 to 2019 (measured in kcal)



Data are presented as kilocalories per capita.

Figure 4

Contribution of food and drinks to energy from sales of all ultra-processed products in seven Latin American countries, 2014

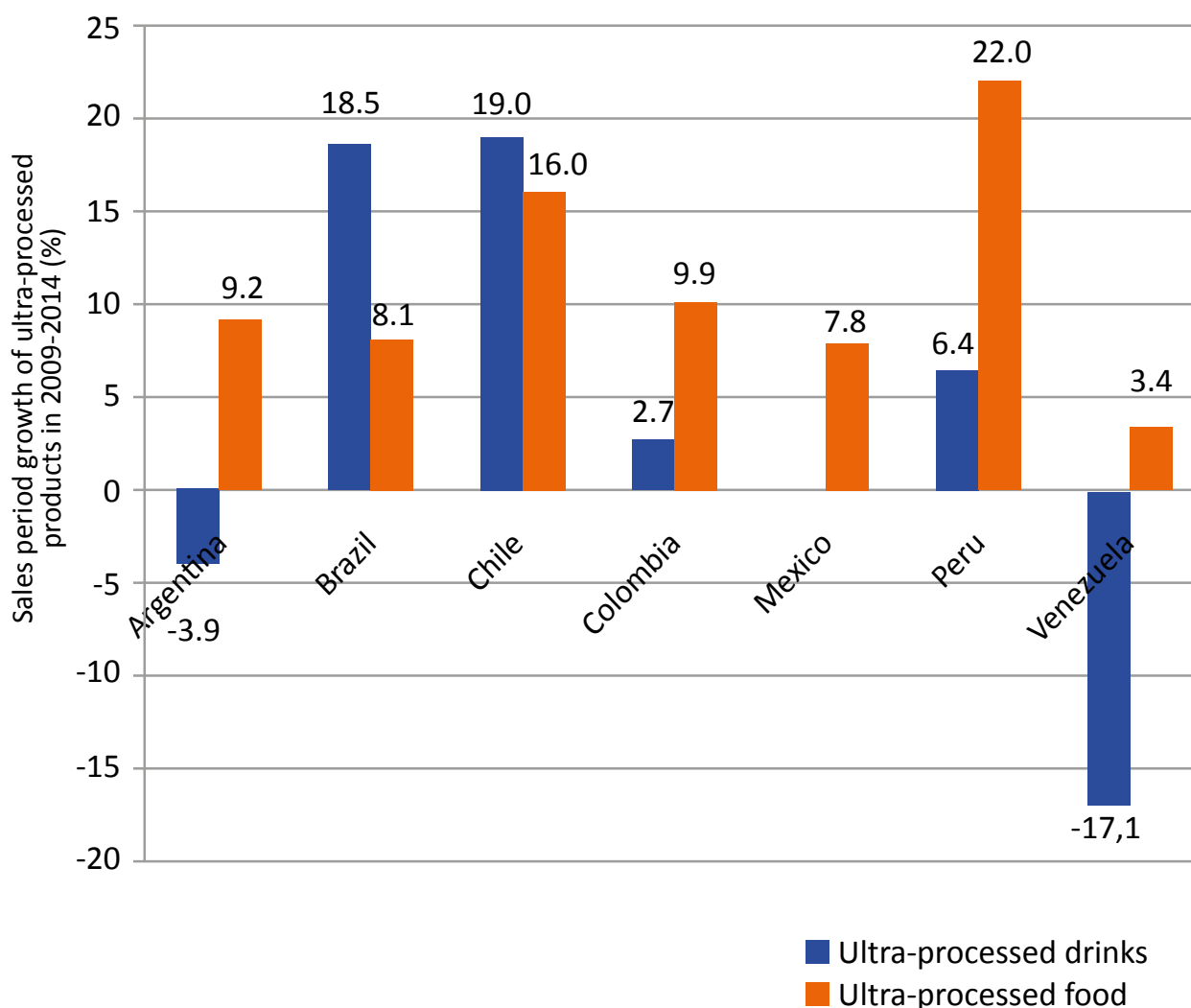


Per capita sales of ultra-processed food and drink products grew unevenly in the seven countries. Figure 5 compares variation of per capita sales of ultra-processed food products with those of ultra-processed drink products, between 2009-2014. The variation of per capita sales of ultra-processed food products during this period ranged from 3.4% in Venezuela to 22% in Peru, while for ultra-processed drink products it ranged from -17.1% in Venezuela to 19% in Chile. Between 2009 and 2014, per capita sales of ultra-processed drink products grew more than of food products in Brazil and Chile. Elsewhere, per capita sales of ultra-processed food products grew much more than ultra-processed drink products in Colombia (9.9% vs. 2.7%), Peru (22% vs. 6.4%) and Mexico (7.8% vs. 0.1%). Notably, per capita sales of ultra-processed drink products declined by 3.9% in Argentina and by 17.1% in Venezuela.



Figure 5

Growth of average retail per capita sales of ultra-processed food and drink products per country, 2009-2014



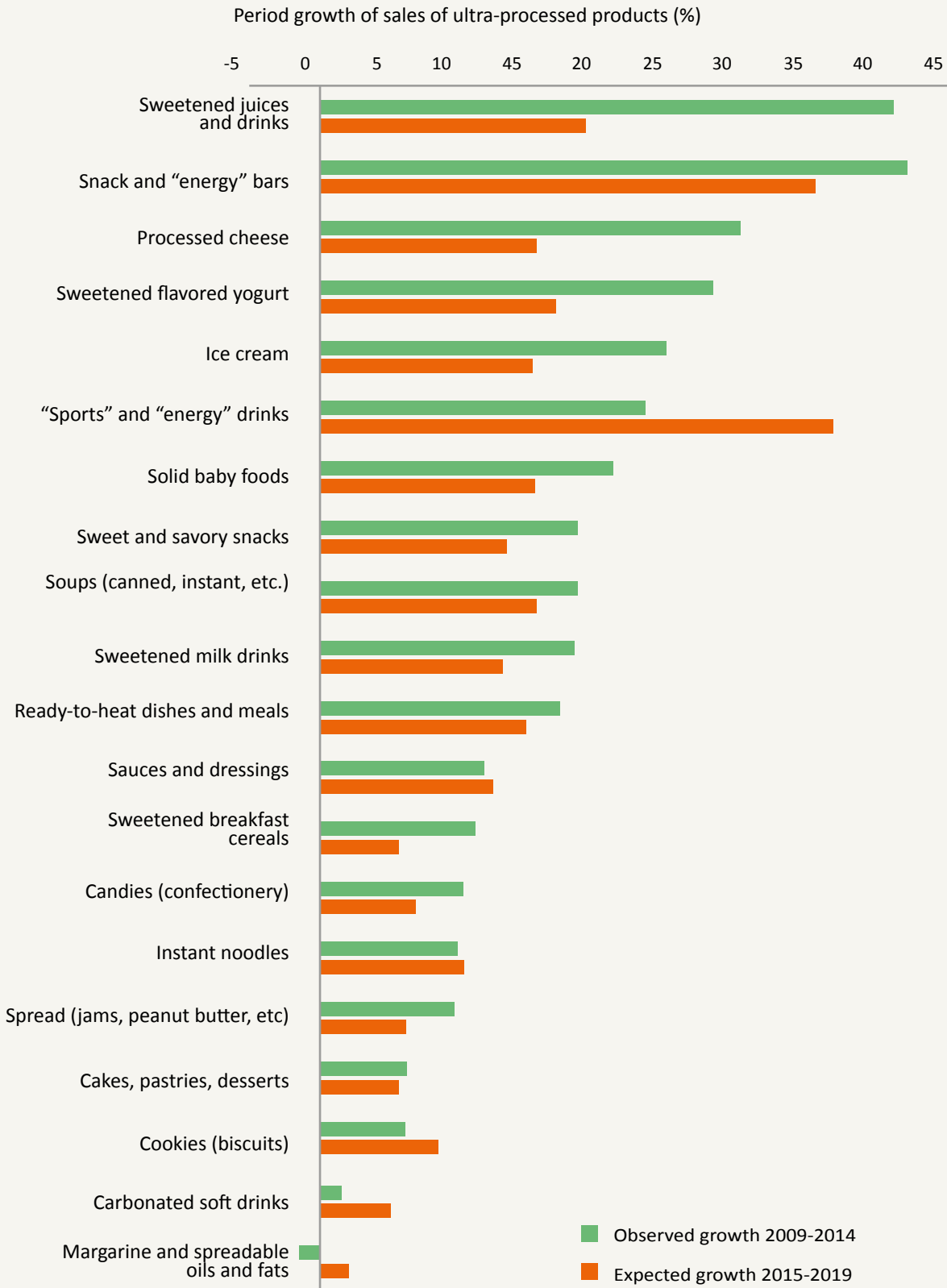
2.4 Sales of specific ultra-processed products

As presented in Figure 6, from 2009 to 2014, specific ultra-processed products whose per capita sales grew fastest were sweetened juices and drinks (40.9%) and snack and “energy” bars (41.7%), followed by processed cheese (30%), sweetened flavored yogurt (27.9%) and ice cream (24.7%), sport and energy drinks (23.1%), and solid baby foods (20.9%). Carbonated soft drink sales grew only marginally

(1.6%) as did sales of cookies (biscuits) (4.5%). The one product category whose sales dropped marginally was margarine and spreadable oils and fats (-1.5%). From 2015 to 2019, projected sales of sweetened juices and drinks, snack and “energy” bars, processed cheese, sweetened flavored yogurt, ice cream, especially sports and “energy” drinks are projected to grow rapidly, and solid baby foods, sweet and savory snacks, instant soups, ready-to-heat dishes and meals, sauces and dressings, instant noodles and cakes, pastries and desserts are also projected to show steady growth.

Figure 6

Average retail per capita sales growth of ultra-processed food and drink products in seven Latin American countries by product, 2009-2014 and projected through 2015 to 2019





Chapter 3

Nutrient profiles

This chapter combines Euromonitor sales data on ultra-processed products for 2014 with the PAHO *Nutrient Profile* model (2) criteria to identify ultra-processed food and drink products containing excess free sugars, total fat, saturated fat and sodium. Here, all 250 ultra-processed items available in Euromonitor were grouped into 89 sub-categories and compared across all selected critical nutrients. The average content of free sugars, total fat, saturated fat and sodium in each ultra-processed food and drink product was calculated, and products with excessive amounts of those nutrients were identified using the criteria summarized in Table 2.

In the following sections, ultra-processed products with excess free sugars, total fat, saturated fat and sodium are identified separately. Then, the results are presented for the critical nutrients grouped together.

3.1 Free sugars

Figure 7 shows the percentage of energy from free sugars in ultra-processed product items sold in seven countries of Latin America in 2014. A total of 67 products with at least 1% of total energy from free sugars are included in the figure. To the right of the orange vertical line are the products with excess free sugars (10% or more of total energy). Overall, 83% of all ultra-processed products contained free sugars (74 out of 89) and 55% contained excessive amounts (49 out of 89).

Products with excessive free sugars include: carbonated soft drinks, granola and muesli bars; water or dairy-based ice cream; jams and preserves; chocolate and sugar confectionery, chewing gum; sweet cookies; packaged/industrial pastries and cakes; children's and family breakfast cereals, breakfast bars; "sports" and "energy" drinks; flavored condensed milk; fruited or flavored spoonable yogurts, drinking yogurt, drink

Table 2

Criteria for excessive free sugars, total fat, saturated fat, and sodium as defined by the PAHO *Nutrient Profile Model*

Free sugars	Total fat	Saturated fat	Sodium
10% or more of total energy from free sugars	30% or more of total energy from total fat	10% or more of total energy from saturated fat	1 mg or more of sodium per 1 kcal

Criteria are taken from the PAHO *Nutrient Profile* model (2).

concentrates, sweetened fruit juices and fruit drinks, powder drinks; chocolate spreads; various sauces (ketchup, Worcester/steak, barbecue); solid prepared baby foods; dessert mixes and long shelf-life desserts.

Products without excessive free sugars include: salty snacks (tortilla/corn chips, pretzels, extrudedⁱⁱⁱ snacks); “energy” and “nutrition” bars; industrial breads; nut- and seed-based spreads; processed cheese; savory biscuits and crackers; pizzas; ready-meals; soups; various sauces (pasta, mustard, spicy chili/pepper sauces) and salad dressings.

3.2 Total fat

Figure 8 shows the percentage of total energy from total fat in ultra-processed product items sold in seven countries of Latin America in 2014. A total of 77 products with at least 5% of calories from total fat are included in the figure. To the right of the orange vertical line are the products with excess total fat (30% or more of total energy from total fat).

Overall, 98% of all ultra-processed products contained total fat (87 out of 89) and 40% contained excessive amounts (36 out of 89).

Products with excessive total fat include: savory snacks (extruded, tortilla/corn, chips/crisps); water- or dairy-based ice cream; chocolate confectionery; industrial pastries and cakes, frozen bakery; breakfast bars; margarine and spreadable oils and fats; processed cheese; chocolate and nut-based spreads; sweet cookies; coffee whiteners; frozen pizza, frozen or canned/preserved ready meals; various dressings, sauces and condiments (salad dressings, dips, mayonnaise, vinaigrettes, soy-based, spicy chili, stock cubes and powder, dry sauces and powder mixes); instant noodles; frozen desserts.

Products without excessive total fat content include:

iii Processed/reconstituted/shaped potato or cereal (e.g. wheat, maize, rice) based snacks, which can be flavored (e.g. cheese, prawn) or unflavored. Rice cracker snacks, with origins in Asia, are also included, such as Jacob’s Thai Bites, Want Want, etc. Rice cakes are included while tortilla chips and corn chips are not. Leading global brands include Pringles (Kellogg Co), Cheetos (PepsiCo Inc) and Chex (General Mills).

sugar confectionery, gum; industrial breads; children’s and family breakfast cereals; “energy” and “nutrition” bars; drinking yogurt; dried or prepared baby foods; dried ready meals, potato products (such as oven-ready French fries); soups; some sauces (pasta, ketchup, spicy/pepper, Worcester/steak); and dessert mixes.

3.3 Saturated fat

Figure 9 shows the percentage of total energy from saturated fat in ultra-processed product items sold in seven countries of Latin America in 2014. A total of 77 products with at least 1% of calories from saturated fat are included in the figure. To the right of the orange vertical line are the products with excess total saturated fat (10% or more of total energy from saturated fat).

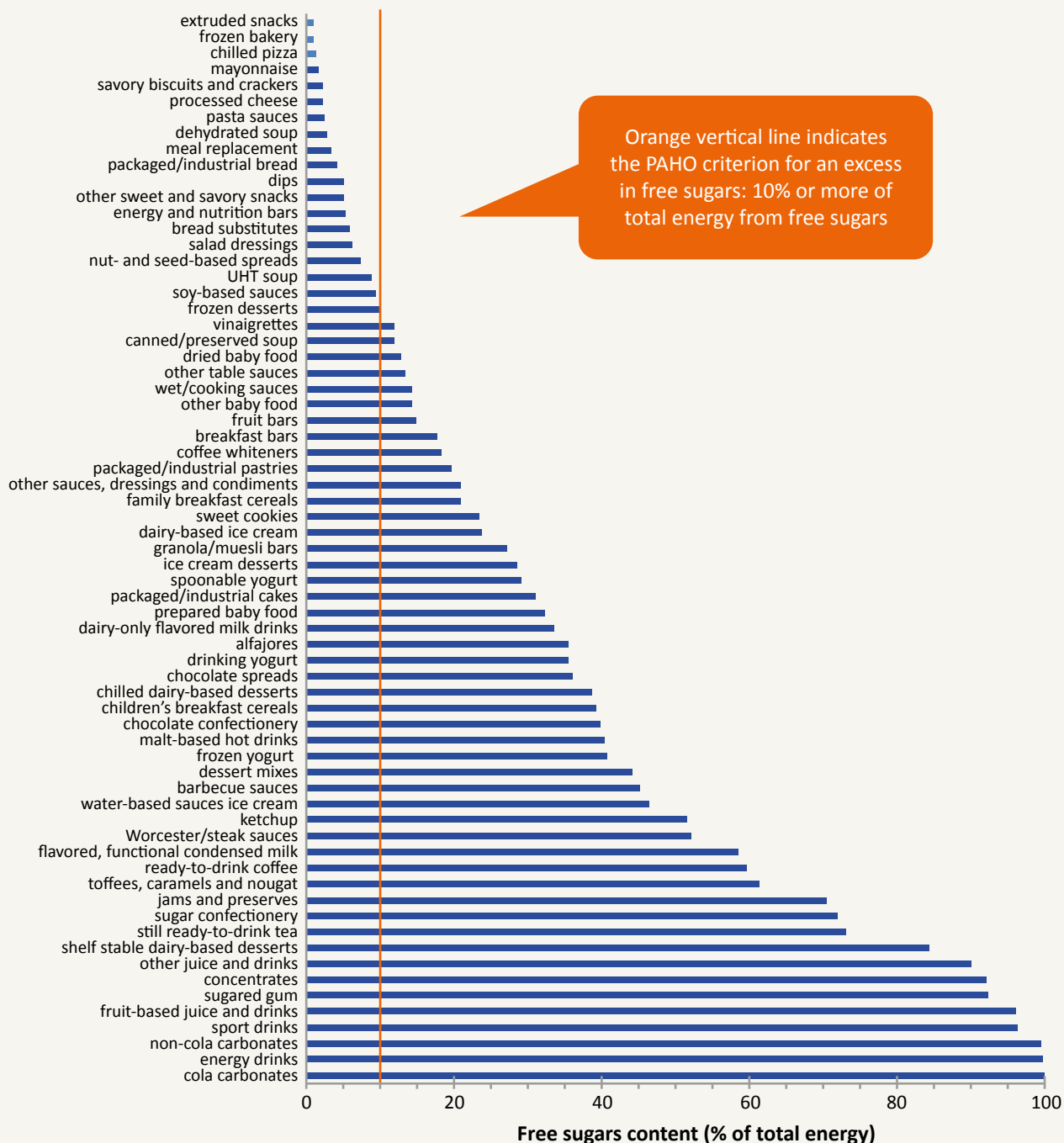
Overall, 93% of all ultra-processed products contained saturated fat (83 out of 89) and 55% of all products contained excessive amounts (49 out of 89).

Products with excessive saturated fat include: tortilla and corn chips, chips (crisps), extruded snacks, other sweet and savory snacks; chocolate confectionery; dairy-based or water-based ice cream; industrial pastries and cakes; breakfast bars; various snack bars (“energy,” “nutrition,” granola and muesli, fruit, breakfast); savory and sweet cookies; margarine, spreadable oils and fats; spreads; processed cheese; flavored condensed milk; frozen and spoonable yogurts; coffee whiteners; some condiments and sauces (salad dressings, stock cubes, dry sauces, dips, mustard, mayonnaise); prepared baby foods; pizzas; frozen or canned ready meals, dinner mixes; instant and dehydrated soups, instant noodles; frozen desserts, dairy-based desserts, and ice cream desserts.

Products without excessive saturated fat include: sugar confectionery, sugared gum; industrial bread; children’s and family breakfast cereals; drinking yogurt; some condiments and sauces (pasta, soy-based, ketchup, barbecue, spicy/pepper, Worcester/steak); dried baby foods; ultra-high-temperature and canned soups; potato products (such as oven-ready French fries), dried ready meals; and dessert mixes.

Figure 7

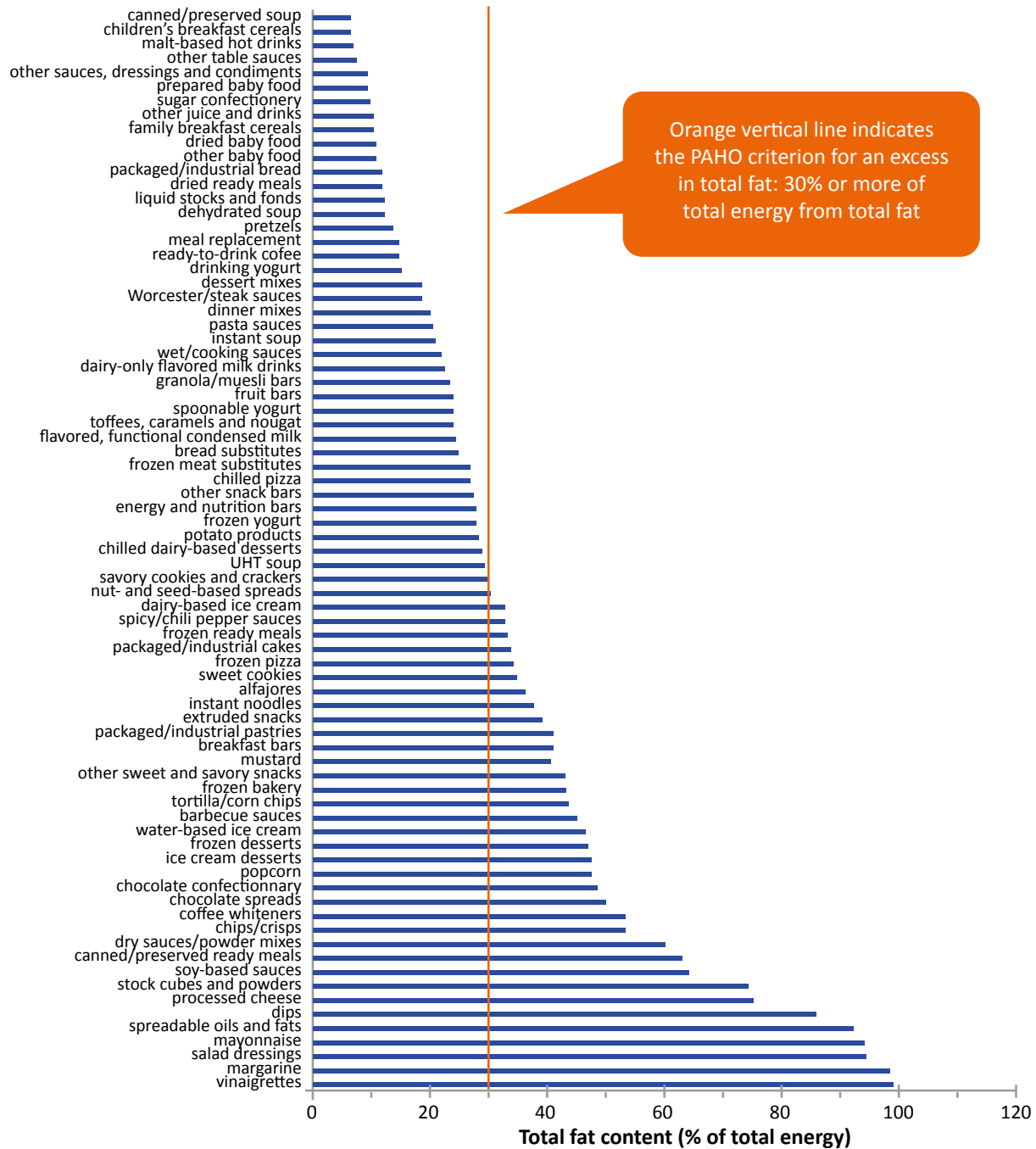
Energy as free sugars in ultra-processed products sold in seven Latin American countries in 2014 (products listed contain at least 1% of total energy as free sugars).



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. The orange vertical line corresponds to the PAHO nutrient profile model criterion for excessive content of free sugars, set at 10% or more of total energy. The following ultra-processed products contain less than 1% of kcal from free sugars or no free sugars at all, and are excluded from the figure: chips/ crisps, tortilla/corn chips, pretzels, popcorn; margarine, spreadable oils and fats; frozen pizza, frozen/canned/preserved/dried ready meals, dinner mixes, frozen potato products (such as oven-ready French fries), frozen meat substitutes; stock cubes and powders, liquid stocks; various sauces and condiments (mustard, spicy chili/pepper sauces; instant soups, instant noodles. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

Figure 8

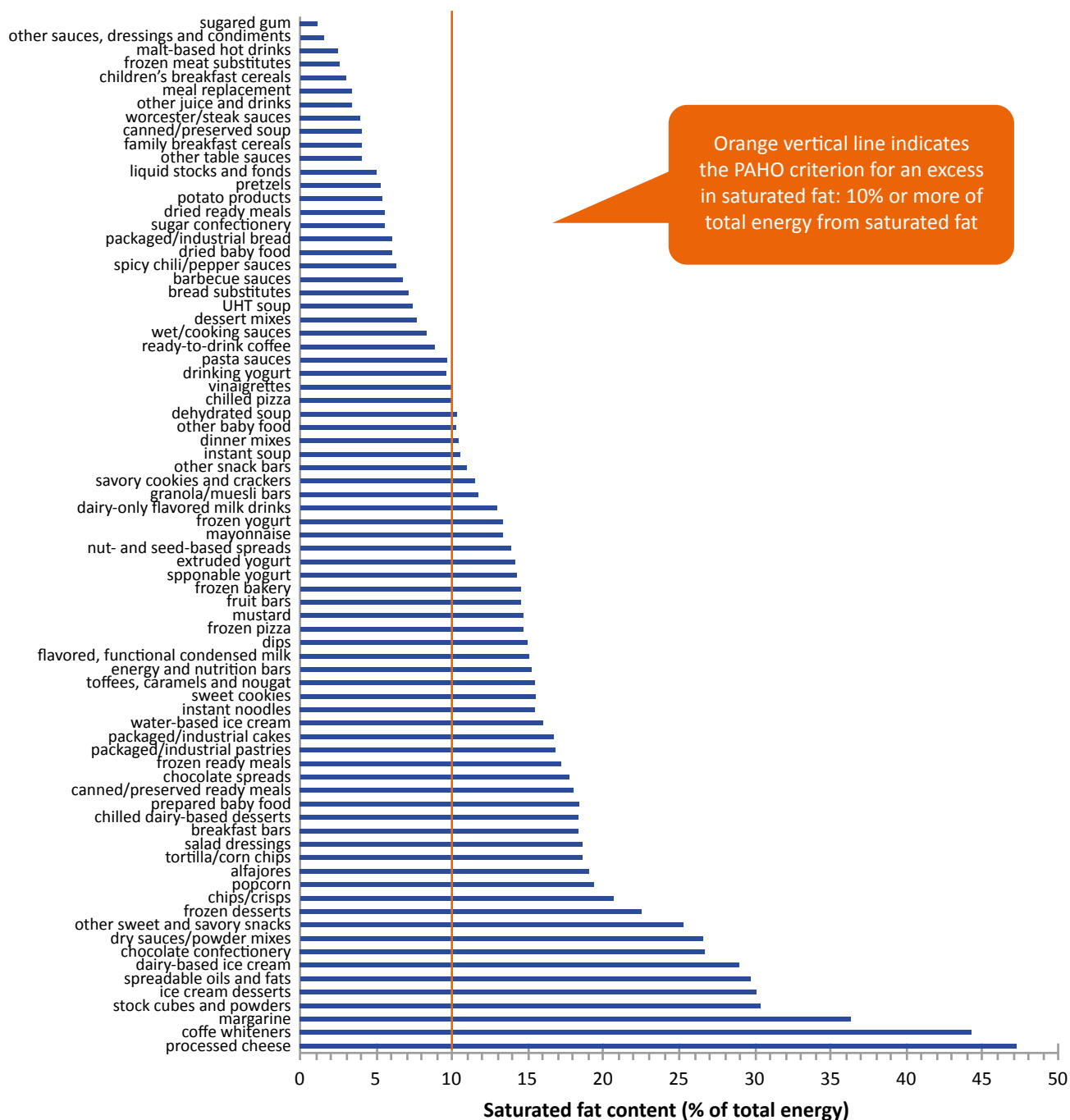
Energy from total fat in ultra-processed products sold in seven Latin American countries in 2014 (products listed contain at least 5% of total energy as total fat)



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. The orange vertical line corresponds to the PAHO nutrient profile model criterion for excessive content in total fat, which is set at 30% or more of total energy. The following ultra-processed products contains less than 5% of calories from total fat or no total fat at all, and are excluded in the figure: carbonated drinks; gum; jams and preserves; "sports" and "energy" drinks, drink concentrates; ready-to-drink tea; ketchup; shelf-stable dairy-based desserts. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

Figure 9

Energy as saturated fat in ultra-processed products sold in seven Latin America countries in 2014 (products here contain at least 1% of total energy as saturated fat)



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. The orange vertical line corresponds to the PAHO nutrient profile model criterion for excessive saturated fat, which is set at 10% or more of dietary energy. Only products with 1% or more dietary energy from saturated fat are included. The following products contain less than 1% of dietary energy from saturated fat or no saturated fat at all, and are excluded in the figure: carbonated drinks; sugar-free gum; jams and preserves; drink concentrates; fruit-based juices and drinks; sport and energy drinks; ready-to-drink tea; ketchup, soy-based sauces; shelf stable dairy-based deserts. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

3.4 Sodium

Figure 10 shows the sodium density in ultra-processed product items sold in seven countries of Latin America in 2014. To the right of the orange vertical line are the products with excess sodium (more than 1 mg per kcal).

Overall, 99% of all ultra-processed products contained sodium (88 out of 89) and 63% of all products contained excessive amounts (56 out of 89). A total of 8 sauces, condiments and dressings items were not included in the figure. These all contain excessive sodium, with an average of 107.8 mg/kcal.

Products with excessive sodium include: sweet and savory snacks, tortilla and corn chips, extruded snacks; industrial breads, bread substitutes, industrial pastries and cakes; savory and sweet cookies; margarine; several sauces (barbecue, pasta, table, wet/cooking, Worcester), salad dressings, condiments (mayonnaise, mustard, ketchup), spreadable oils and fats; processed cheese; children's and family breakfast cereals; breakfast bars; drink concentrates; prepared baby foods; meal replacements; the 8 dressings, sauces and condiments; pizzas, dinner mixes, frozen, dried and canned ready meals; soups (dehydrated, canned/preserved, instant, UHT); instant noodles and potato products (such as oven-ready French fries).

Products without excessive sodium include: carbonated soft drinks; confectionery, sugared gum; jams and preserves; ice cream; chocolate and nut-and-seed spreads; spoonable, drinking and frozen yogurt; dried baby food; fruit-based juices and drinks; dessert mixes, fruit bars, granola/muesli bars, and energy and nutrition bars.

3.5 Summary

Table 3 and Figure 11 summarize the key findings of this chapter. Most ultra-processed food and drink products sold in Latin America in 2014 contained excessive free sugars (55%), saturated fat (55%) or sodium (63%). For total fat, the figure was lower (40%).

Overall, all ultra-processed products contained excessive free sugars or total fat, or saturated fat, or sodium. A third (34%, or 30 products out of 89) contained excessive amounts of three critical nutrients, and over a third (36%, or 32 products out of 89) were excessive in two nutrients. It follows that 70% contained either two or three nutrients that were excessive. Four products were excessive in all four critical nutrients (these were breakfast bars, packaged cakes, packaged pastries and sweet cookies).

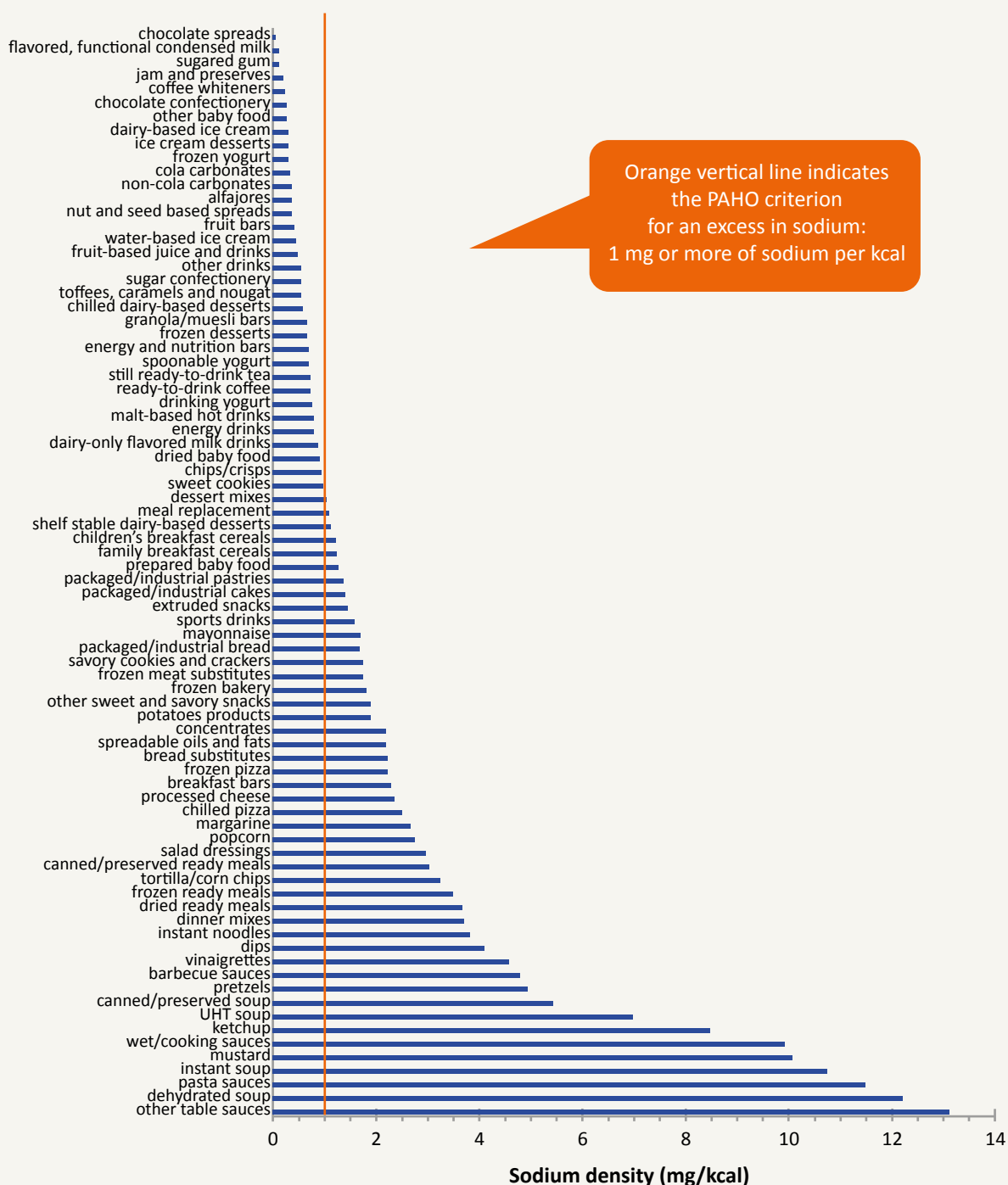
Table 3

Proportion of the 89 ultra-processed product sub-categories with excessive free sugars, total fat, saturated fat, and/or sodium

Excess	Percentage
Free sugars (10% or more of total energy)	55
Total fat (30% or more of total energy)	40
Saturated fat (10% or more of total energy)	55
Sodium (1 mg or more per kilocalorie)	63
1 of the above	100
2 of the above	36
3 of the above	34
2 or 3 of the above	70
All 4 of the above	4

Figure 10

Sodium density in ultra-processed products sold in seven Latin American countries in 2014



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. The orange vertical line corresponds to the PAHO *Nutrient Profile Model* criterion for excessive sodium, which is set at 1 or more mg/kcal. Sauces, dressings and condiments are not included in the figure: these all contain excessive sodium. Data are from the 2016 Euromonitor Passport Nutrition database (45).

Figure 11

Ultra-processed products sold in seven Latin American countries in 2014, with excessive amounts of free sugars, total fat, saturated fat, and/or sodium

Excessive in 4 critical nutrients	breakfast bars	excessive free sugars	excessive total fat	excessive saturated fat	excessive sodium
	packaged/industrial cakes packaged/industrial pastries sweet cookies				
Excessive in 3 critical nutrients	canned/preserved ready meals		excessive total fat	excessive saturated fat	excessive sodium
	chips/ crisps				
	dips				
	dry sauces/powder mixes				
	extruded snacks				
	frozen bakery				
	frozen pizza				
	frozen ready meals				
	instant noodles				
	margarine				
	mayonnaise				
	mustard				
	other sweet and savory snacks				
	popcorn				
	processed cheese				
salad dressings					
spreadable oils and fats					
stock cubes and powders					
tortilla/corn chips					
	prepared baby food	excessive free sugars		excessive saturated fat	excessive sodium
	barbecue sauces	excessive free sugars	excessive total fat		excessive sodium
	vinaigrettes				
	alfajores	excessive free sugars	excessive total fat	excessive saturated fat	
	chocolate confectionery				
	chocolate spreads				
	coffee whiteners				
	dairy-based ice cream				
	frozen desserts				
	ice cream desserts				
	water-based ice cream				
Excessive in 2 critical nutrients	chilled pizza			excessive saturated fat	excessive sodium
	dehydrated soup				
	dinner mixes				
	instant soup				
	savory biscuits and crackers				
	soy-based sauces		excessive total fat		excessive sodium
	spicy chili/pepper sauces				

(Continued on next page)

Figure 11 (Continued)

Excessive in 2 critical nutrients	canned/preserved soup children’s breakfast cereals concentrates dessert mixes family breakfast cereals ketchup other sauces, dressings and condiments other table sauces shelf stable dairy-based desserts sports drinks wet/cooking sauces worcester/steak sauces	excessive free sugars	excessive sodium
	nut- and seed-based spreads	excessive total fat	excessive saturated fat
	chilled dairy-based desserts dairy-only flavored milk drinks flavored, functional condensed milk frozen yogurt fruit bars granola/muesli bars other baby food spoonable yogurt toffees, caramels and nougat	excessive free sugars	excessive saturated fat
Excessive in 1 critical nutrient	bread substitutes dried ready meals frozen meat substitutes liquid stocks meal replacement monosodium glutamate packaged/industrial bread pasta sauces potato products pretzels ready-to-eat or ready-to-heat (UHT) soups		excessive sodium
	energy and nutrition bars other sanck bars		excessive saturated fat
	cola carbonates dried baby food drinking yogurt energy drinks fruit-based juice and drinks jams and preserves malt-based hot drinks non-cola carbonates other juice and drinks ready-to-drink coffee still ready-to-drink tea sugar confectionery sugared gum	excessive free sugars	



Chapter 4

Sources of dietary energy and critical nutrients

This chapter first discusses the contribution of specific macronutrients to total dietary energy from 21 categories of ultra-processed food and drink products sold in seven countries of Latin America in 2014. It then assesses the contribution of these product categories to total energy, free sugars, total fat, saturated fat and sodium from sales of ultra-processed products.

The 21 product categories have been listed in previous chapters and are: carbonated soft drinks; sweet and savory snacks; snack and “energy” bars; ice cream; candies (confectionery); industrial breads; cakes, pastries, desserts; cookies (biscuits); sweetened breakfast cereals; margarine and spreadable oils and fats; spreads (such as jams and peanut butter); processed cheese; “sports” and “energy” drinks; sweetened flavored yogurt; sweetened flavored milk and powdered milk drinks; juice concentrates, sweetened juices and “fruit” drinks; solid baby foods; ready-to-heat dishes and meals; instant soups; instant noodles; and sauces and dressings.

4.1 Macronutrients

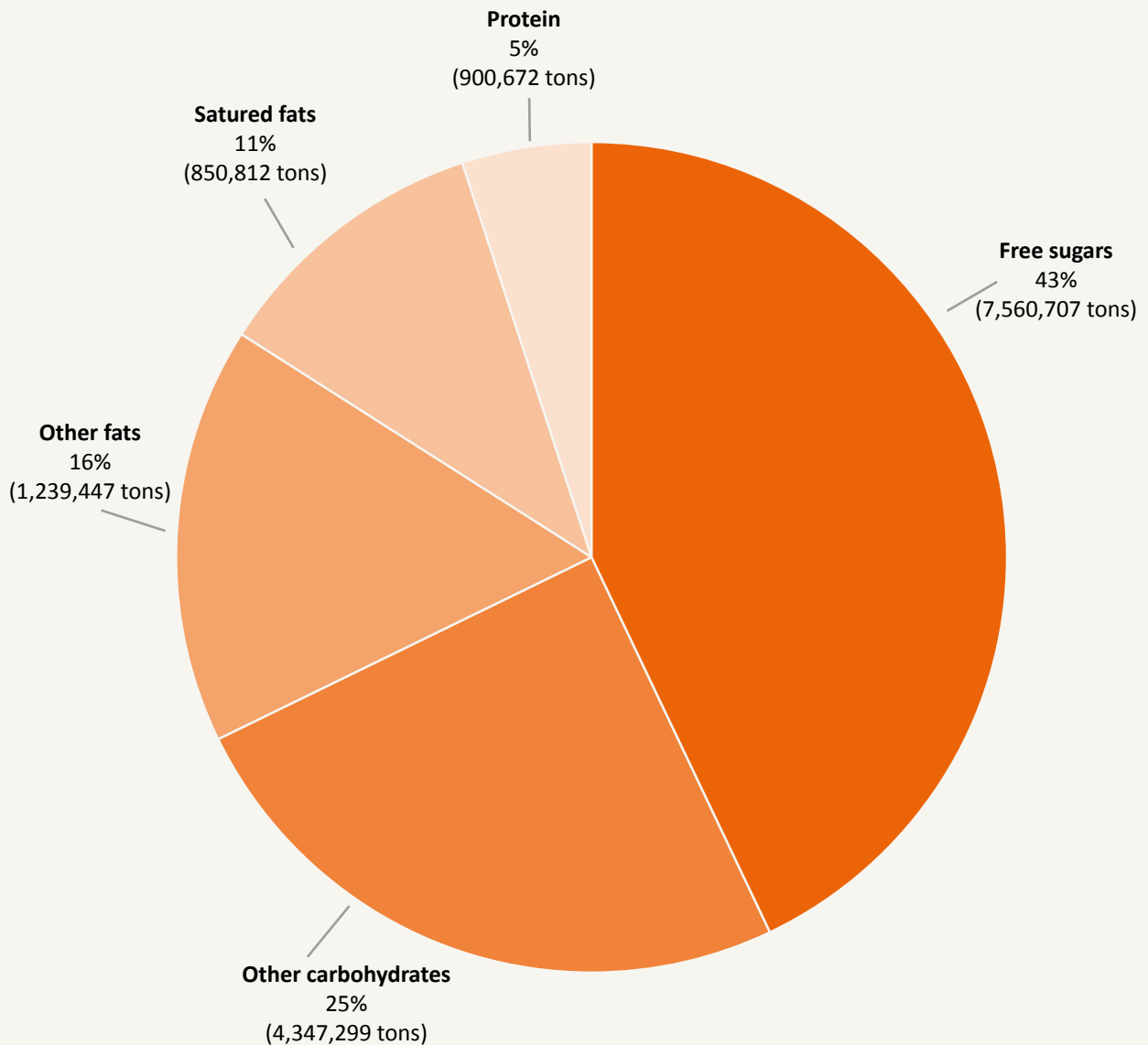
Figure 12 shows the contribution of macronutrients to total energy from ultra-processed products sold per capita in 2014 in the seven Latin American countries. Over two-fifths of total energy supplied by ultra-processed products came from free sugars (43%), representing more than 7 million tons of free sugars. Other carbohydrates (i.e. naturally occurring mono- and disaccharides, and oligo- and polysaccharides) supplied a quarter (25%) of total energy or more than 4 million tons. Saturated fat supplied just over a tenth (11%) or more than 850 000 tons, and other fats supplied close to one-sixth (16%) or more than 1 million tons. The limited protein supplied by ultra-processed products is notable. Only one-twentieth (5%) of dietary energy came from protein, representing around 900,000 tons.

4.2 Energy

Figure 13 shows the distribution of total energy supplied by ultra-processed products sold in seven Latin American countries in 2014 according to categories of products. Carbonated soft drinks alone accounted for over a fifth (22%) of total energy from ultra-processed products while another fifth (18%) came from cookies (biscuits). Sweetened juices and drinks, and confectionery, contributed just 7% and 8% of total energy, respectively.

Figure 12

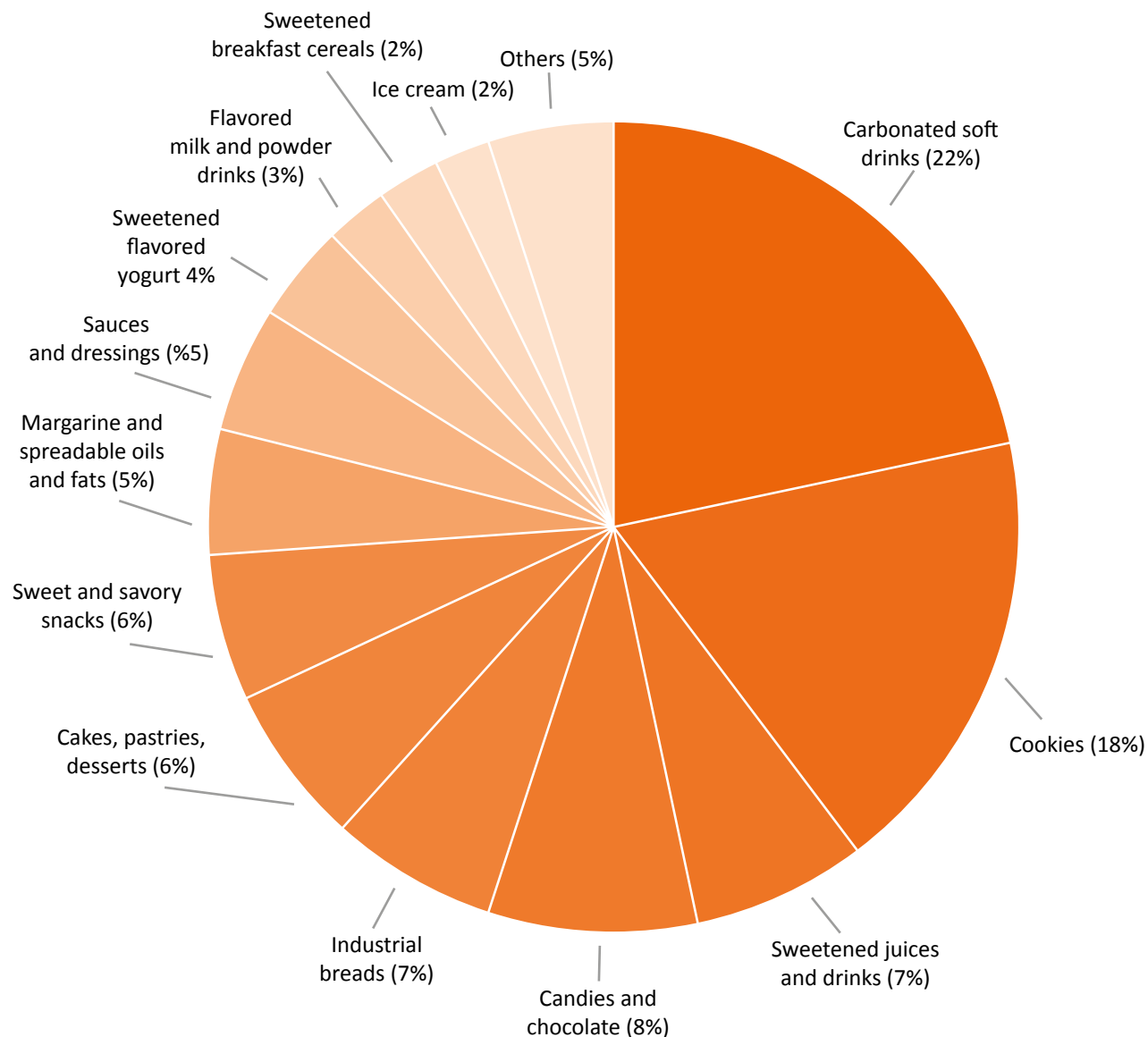
Contribution of macronutrients to total dietary energy from ultra-processed products sold in seven Latin American countries, 2014



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. Ultra-processed products included here correspond to the following categories: carbonated soft drinks; sweet and savory snacks; snack and “energy” bars; ice cream; candies (confectionery); industrial breads; cakes, pastries, desserts; cookies (biscuits); sweetened breakfast cereals; margarine and spreadable oils and fats; spreads (jams, peanut butter, etc); processed cheese; “sports” and “energy” drinks; sweetened flavored yogurt; sweetened flavored milk and powdered milk drinks; juice concentrates, sweetened juices and “fruit” drinks; solid baby foods; ready-to-heat dishes and meals; instant soups; instant noodles; sauces and dressings. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

Figure 13

Distribution of dietary energy from ultra-processed products sold in seven Latin American countries, 2014



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. "Others" include in descending order of contribution: instant noodles, solid baby foods; ready-to-heat dishes and meals; spreads (jams and peanut butter, etc.), processed cheese; snack and "energy" bars, instant soups. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).



Sweet and savory snacks, industrial breads, cakes and pastries and desserts, margarine and spreadable oils and fats, and sauces and dressings, contributed between 5 and 7%. Sweetened flavored yogurt, flavored milk and power drinks, sweetened breakfast cereals and ice cream, contributed between 2 and 4% of total energy.

Other products including snack and “energy” bars, spreads (such as jams and peanut butter), processed cheese, solid baby foods, ready-to-heat dishes and meals, instant soups and noodles, contributed 5%.

Table 4 shows the categories of products that contribute most to dietary energy from sales of all ultra-processed products sold in each of the seven Latin American countries in 2014.

Carbonated soft drinks contributed a fifth or more of dietary energy in all countries, and were in terms of dietary energy the first or second product most consumed: 25% in Argentina and in Peru, 23.5% in Chile, 21.7% in Mexico, 20.4% in Colombia, 20.2% in Venezuela and 20.1% in Brazil.

Cookies (biscuits) varied more but overall were also very high or high in all countries, and in terms of dietary energy were also the first or second product most consumed: 31.4% in Argentina, 26.9% in Peru, 20.7% in Brazil, 17.2% in Venezuela, 15.6% in Colombia, 12.0% in Mexico and 10.7% in Chile.

Candies (confectionery) appeared in the ten product categories in terms of dietary energy most consumed

in six countries: 10.8% in Brazil, 8.9% in Argentina, 8.4% in Chile, 6.1% in Mexico and in Colombia and 4.3% in Venezuela.

Other product categories which were among the 10 in terms of dietary energy consumed in most or all countries, were sweetened juices and drinks (all countries), sweetened flavored yogurt or milk drinks (five countries), industrial bread (all countries) sweet and savory snacks (six countries), cakes, pastries and desserts (five countries), and margarine and spreadable fats (five countries).

4.3 Free sugars

Figure 14 indicates that half of free sugars supplied by ultra-processed products (51% of total energy, which represents close to 4 million tons of free sugars) came from carbonated soft drinks and 13% of total energy (a little more than 1 million tons of free sugars) came from other sweetened juices and drinks, and flavored milk drinks. Confectionery (11% of dietary energy; 800,000 tons of free sugars), followed by cookies (biscuits) (7% of total energy; half a million tons of free sugars), cakes, pastries and desserts (4%), sweetened flavored yogurt (3%), sweetened breakfast cereals (2%), and ice cream (1%) were the other main contributors of free sugars. Other products accounted together for 4% of free sugars, and in descending order, these were spreads, sauces and dressings, industrial breads, solid baby foods, snack and “energy” bars, sweet and savory snacks, ready-to-heat dishes and meals and soups.

Table 4

Leading ultra-processed products contributing to dietary energy, sold in seven Latin American countries, 2014

Country	Rank	Category	Contribution to dietary energy from all sales of ultra-processed products (%)	kcal per capita per day
Argentina	1	Cookies (biscuits)	31.4	152.2
	2	Carbonated soft drinks	25.0	120.9
	3	Candies (confectionery)	8.9	43.1
	4	Sweetened flavored yogurt	6.0	28.9
	5	Cakes, pastries, desserts	5.6	27.1
	6	Industrial breads	5.3	25.6
	7	Sauces and dressings	3.9	19.1
	8	Sweetened juices and drinks	3.9	18.8
	9	Sweet and savory snacks	1.9	9.2
	10	Flavored milk drinks	1.7	8.1
Brazil	1	Cookies (biscuits)	20.7	92.7
	2	Carbonated soft drinks	20.1	90.1
	3	Candies (confectionery)	10.8	48.3
	4	Margarine and spreadable fats and oils	8.7	39.0
	5	Industrial breads	4.7	21.1
	6	Cakes, pastries, desserts	4.6	20.6
	7	Sweetened flavored yogurt	4.5	20.0
	8	Sweet and savory snacks	4.3	19.2
	9	Sweetened juices and drinks	4.0	18.0
	10	Flavored milk drinks	3.9	17.3
Chile	1	Carbonated soft drinks	23.5	151.5
	2	Cookies (biscuits)	10.7	69.1
	3	Sweetened juices and drinks	9.3	59.9
	4	Candies (confectionery)	8.4	54.0
	5	Sweetened flavored yogurt	8.0	51.8
	6	Sweet and savory snacks	5.9	38.3
	7	Ice cream	5.7	36.9
	8	Margarine and spreadable fats and oils	5.5	35.7
	9	Sauces and dressings	5.3	34.0
	10	Industrial breads	5.0	32.0

(Continue on next page)

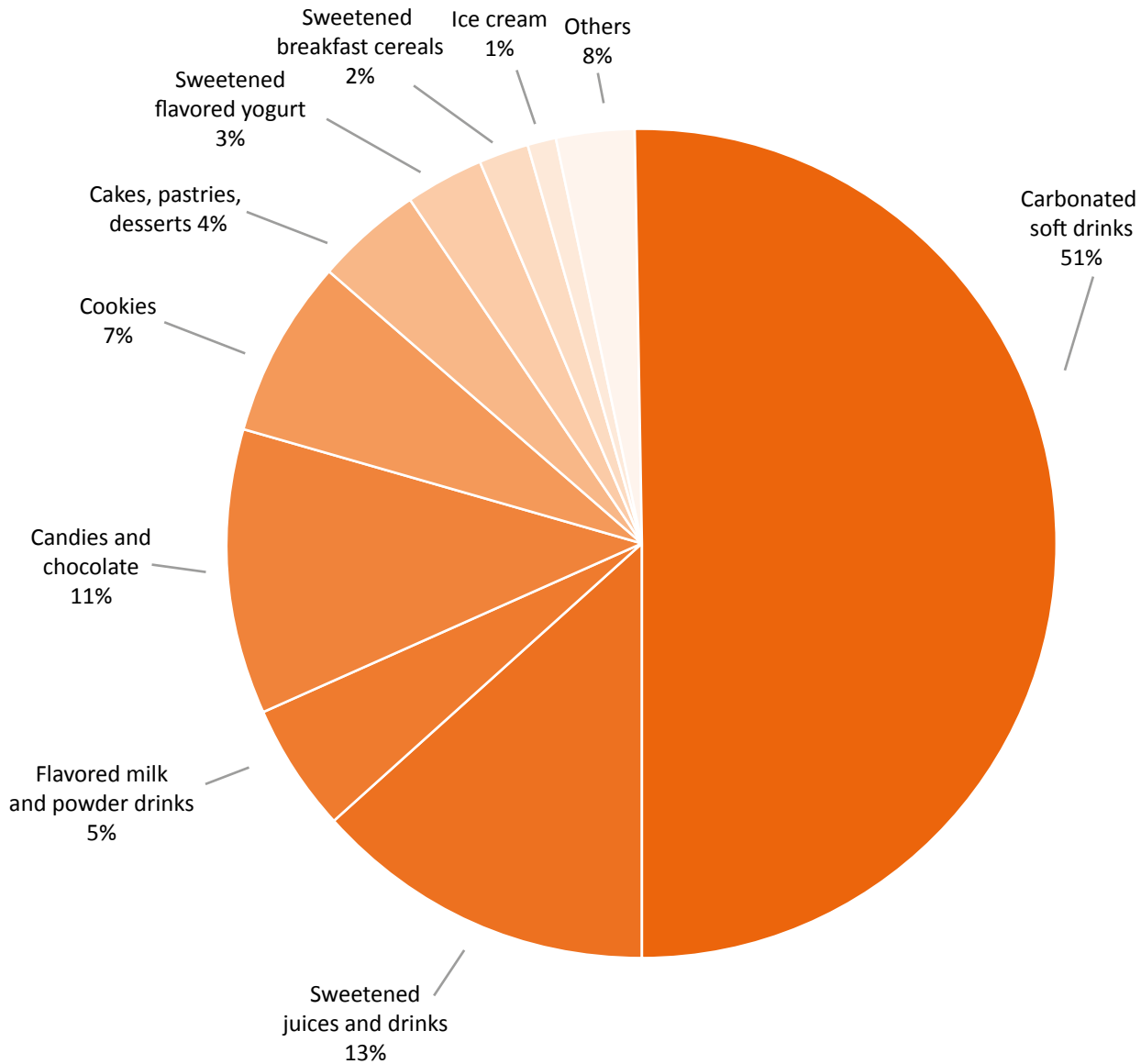
Table 4 (Continued)

Country	Rank	Category	Contribution to dietary energy from all sales of ultra-processed products (%)	kcal per capita per day
Colombia	1	Carbonated soft drinks	20.4	49.3
	2	Cookies (biscuits)	15.6	37.8
	3	Industrial breads	11.4	27.5
	4	Sweet and savory snacks	10.7	25.9
	5	Sweetened juices and drinks	6.4	15.4
	6	Candies (confectionery)	6.1	14.7
	7	Cakes, pastries, desserts	4.9	11.8
	8	Ice cream	4.7	11.4
	9	Margarine and spreadable fats and oils	3.8	9.3
	10	Flavored milk drinks	3.4	8.3
Mexico	1	Carbonated soft drinks	21.7	119.4
	2	Cookies (biscuits)	12.0	66.2
	3	Cakes, pastries, desserts	10.4	57.2
	4	Industrial breads	9.4	51.6
	5	Sweet and savory snacks	8.4	46.3
	6	Sweetened juices and drinks	8.4	46.0
	7	Sauces and dressings	7.6	41.6
	8	Candies (confectionery)	6.1	33.7
	9	Sweetened breakfast cereals	4.9	27.2
	10	Sweetened flavored yogurt	2.4	13.5
Peru	1	Cookies (biscuits)	26.9	55.5
	2	Carbonated soft drinks	25.0	51.6
	3	Sweetened juices and drinks	8.7	17.9
	4	Candies (confectionery)	8.0	16.5
	5	Sweetened flavored yogurt	5.5	11.3
	6	Margarine and spreadable fats and oils	4.2	8.6
	7	Cakes, pastries, desserts	4.0	8.3
	8	Ice cream	3.7	7.7
	9	Flavored milk drinks	2.7	5.8
	10	Industrial breads	2.7	5.8
Venezuela	1	Carbonated soft drinks	20.6	78.7
	2	Cookies (biscuits)	17.5	66.8
	3	Margarine and spreadable fats and oils	16.1	61.5
	4	Sauces and dressings	9.3	35.5
	5	Sweetened juices and drinks	7.5	28.8
	6	Sweet and savoury snacks	5.4	20.8
	7	Industrial breads	4.5	17.2
	8	Candies (confectionery)	4.4	16.6
	9	Sweetened breakfast cereals	2.8	10.6
	10	Solid baby foods	2.6	9.8

Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

Figure 14

Distribution of free sugars resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. "Others" include in descending order of importance: spreads (jams, peanut butter, etc.), sauces and dressings, industrial breads; solid baby foods; snack and "energy" bars, sweet and savory snacks, ready-to-heat dishes and meals; and instant soups. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

4.4 Total fat

Figure 15 shows that over a fifth of total fat supplied by ultra-processed products came from cookies (biscuits) (23% of total energy, which represent nearly 500,000 tons of total fat). Another fifth came from margarine and other spreadable fats and oils (18% of total energy; close to 400,000 tons). Over an eighth came from sauces and dressings (13% of total energy; close to 300,000 tons), a tenth from sweet and savory snacks (10% of total energy; 200,000 tons, and just under a tenth from confectionery (9% of total energy; 190,000 tons). Cakes, pastries and desserts (8%), ice cream (4%), industrial breads (3%), sweetened flavored yogurt (3%), processed cheese (2%), instant noodles (2%) and flavored milk and powder drinks (1%) were the other main contributors of total fat. Other ultra-processed product categories together accounted for 4% of total fat, including solid baby foods, ready-to-heat dishes and meals, sweetened breakfast cereals, snack and “energy” bars, spreads, and soups.

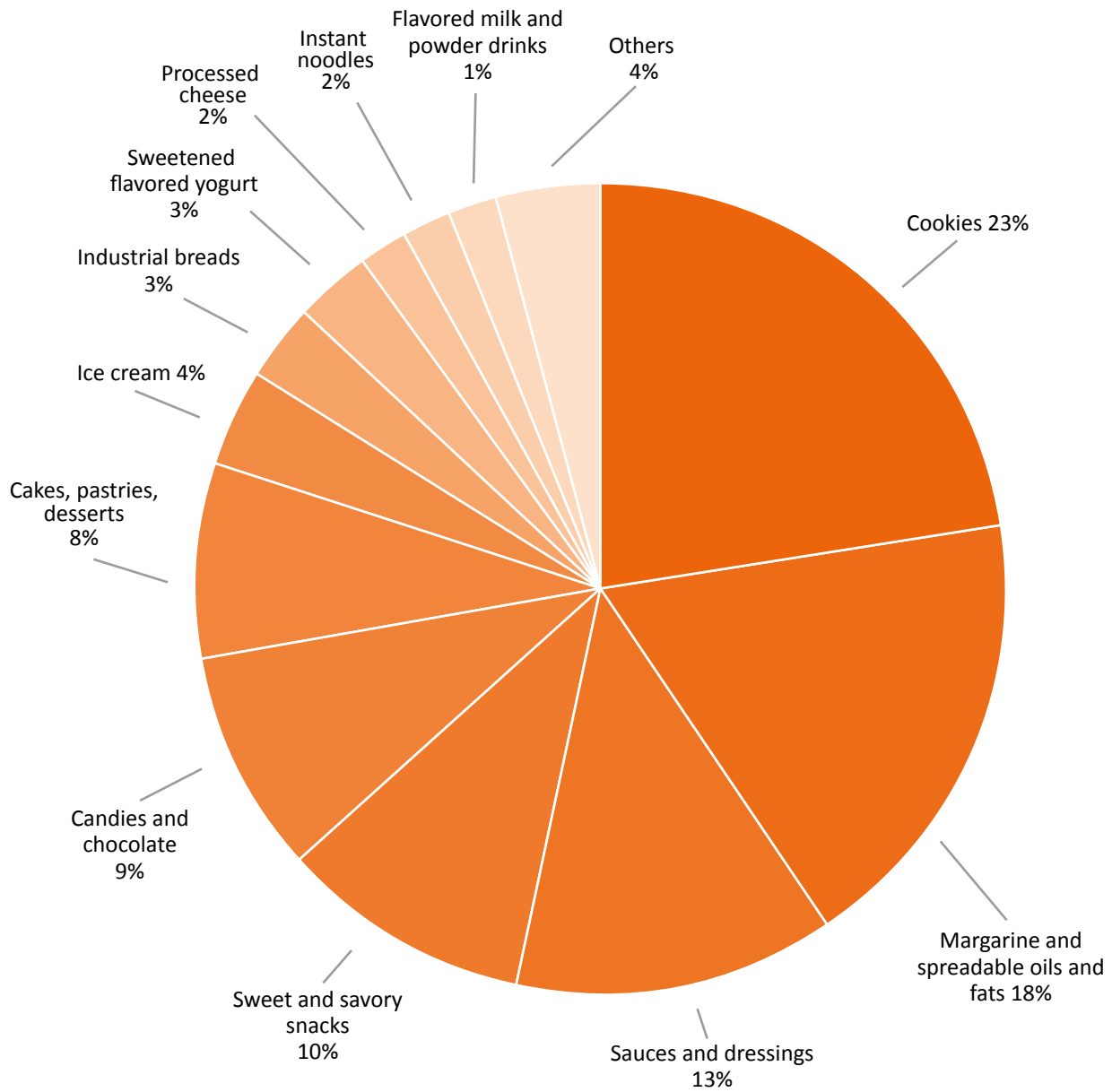
4.5 Saturated fat

According to Figure 16, almost a quarter of total saturated fat supplied by ultra-processed products came from cookies (biscuits) (24% of total energy, representing 200,000 tons of saturated fat). Almost a seventh came from margarine and other spreadable fats and oils (14% of total energy; 120,000 tons), almost an eighth from confectionery (13% of total energy; 110,000 tons) and a tenth from sweet and savory snacks (9% of total energy; 80,000 tons). Cakes and pastries (9%), sauces and dressings (6%), ice cream (5%), sweetened flavored yogurt (5%), industrial breads (4%), processed cheese (3%), flavored milk and powder drinks (2%) and instant noodles (2%) were the other main contributors of saturated fat. Other ultra-processed product categories accounted together for 4% of saturated fat, including solid baby foods, ready-meals, sweetened breakfast cereals, spreads (such as jam and peanut butter) and instant soups.



Figure 15

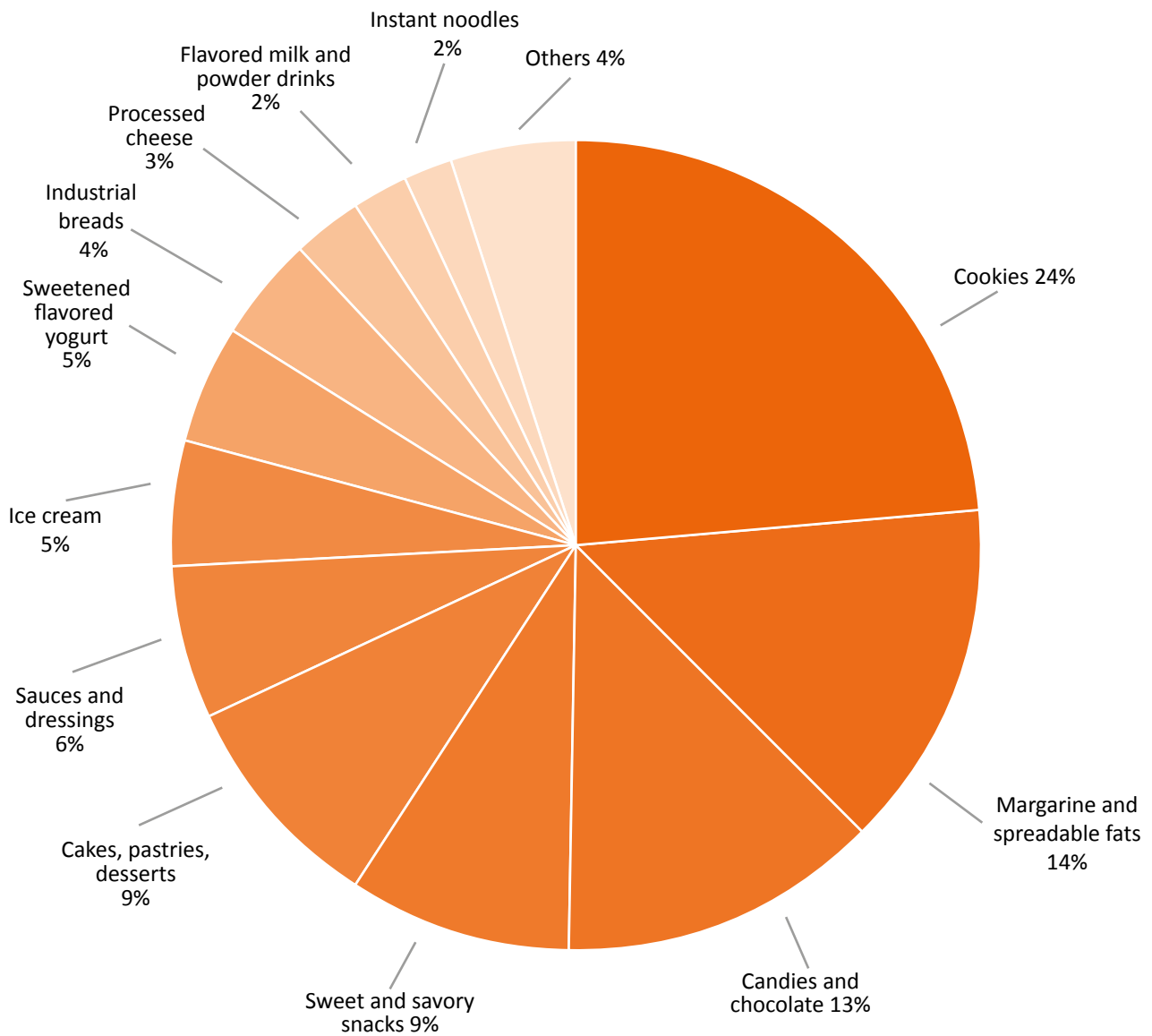
Distribution of total fat resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. "Others" include in descending order of importance: solid baby foods, ready-to-heat dishes and meals; sweetened breakfast cereals; snack and "energy" bars; spreads (jam, peanut butter, etc.), and instant soups. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

Figure 16

Distribution of saturated fat resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014



Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. "Others" include in descending order of importance: instant noodles; solid baby foods; ready-to-heat dishes and meals; sweetened breakfast cereals; spreads (jam, peanut butter, etc.), and instant soups. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

4.6 Sodium

Ultra-processed food and drink products provided an average of 600 mg of sodium per capita per day in the seven Latin America countries in 2014. Figure 17 shows that half of the sodium (49%) supplied by ultra-processed products came from sauces and dressings (representing 70,000 tons of sodium). Over a tenth (11% of total sodium) came from cookies (biscuits) (16,000 tonnes of sodium). Industrial breads (6%), margarine and other spreadable oils and fats (5%), sweet and savory snacks (5%), sweetened juices and drinks (5%), cakes, pastries and desserts (4%), carbonated soft drinks (3%), instant noodles (3%), and instant soups (2%) were the other main contributors of sodium. Other ultra-processed product categories accounted together for 8% of sodium, including sweetened breakfast cereals, sweetened flavored yogurt, ready-to-heat dishes and meals, processed cheese, solid baby foods, ice cream, snack and “energy” bars, candies (confectionery), flavored milk and powder drinks and spreads (such as jams and peanut butter).

4.7 Summary

Table 5 summarizes the key findings of this chapter. A small number of product categories accounted for most of dietary energy, free sugars, total fat, saturated fat, and sodium, resulting from per capita sales of ultra-processed products in the seven Latin American countries in 2014.

Sugar sweetened drinks (carbonated soft drinks, and other juices and drinks), cookies (biscuits), and confectionery were the main contributors to total dietary energy and to free sugars. Juices and drinks of all types



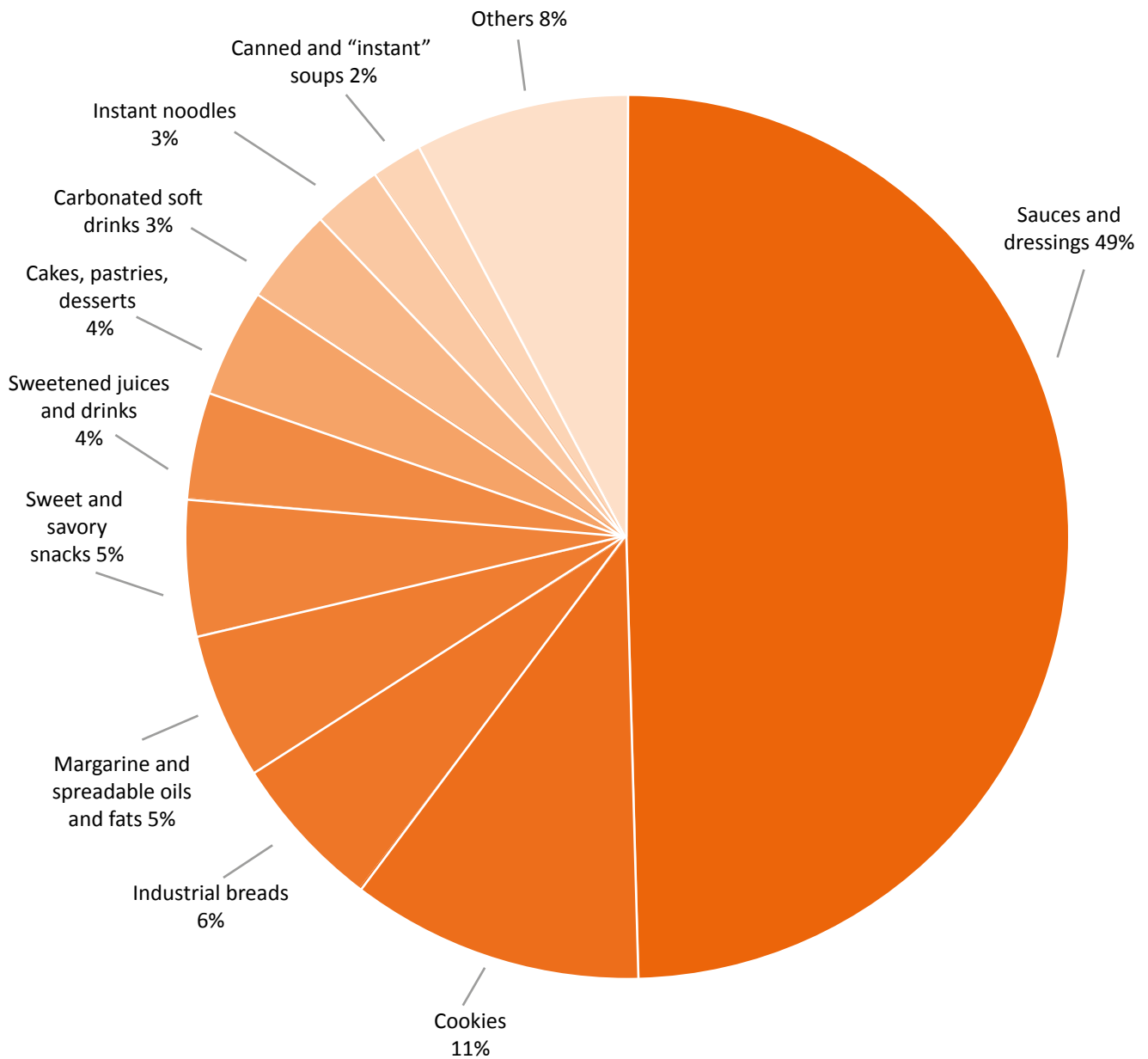
alone accounted for nearly seven-tenths (68%) of all free sugars from sales of ultra-processed products.

Cookies (biscuits), margarine and spreadable oils and fats, sweet and savory snacks, and confectionery, contributed three-fifths (59% and 60%, respectively) of all fat and saturated fat. Sauces and dressings contributed almost a seventh (13%) of total fat, and cakes, pastries and desserts almost a tenth (9%) of saturated fat. Cookies (biscuits) alone contributed almost a quarter of all total fat (22%) and saturated fat (24%).

Sauces and dressings alone contributed half (49%) of all sodium. The other main contributors were cookies (biscuits), industrial breads, sweet and savory snacks, and margarine and spreadable oils and fats.

Figure 17

Distribution of sodium resulting from sales of ultra-processed products according to categories of products in seven Latin American countries, 2014



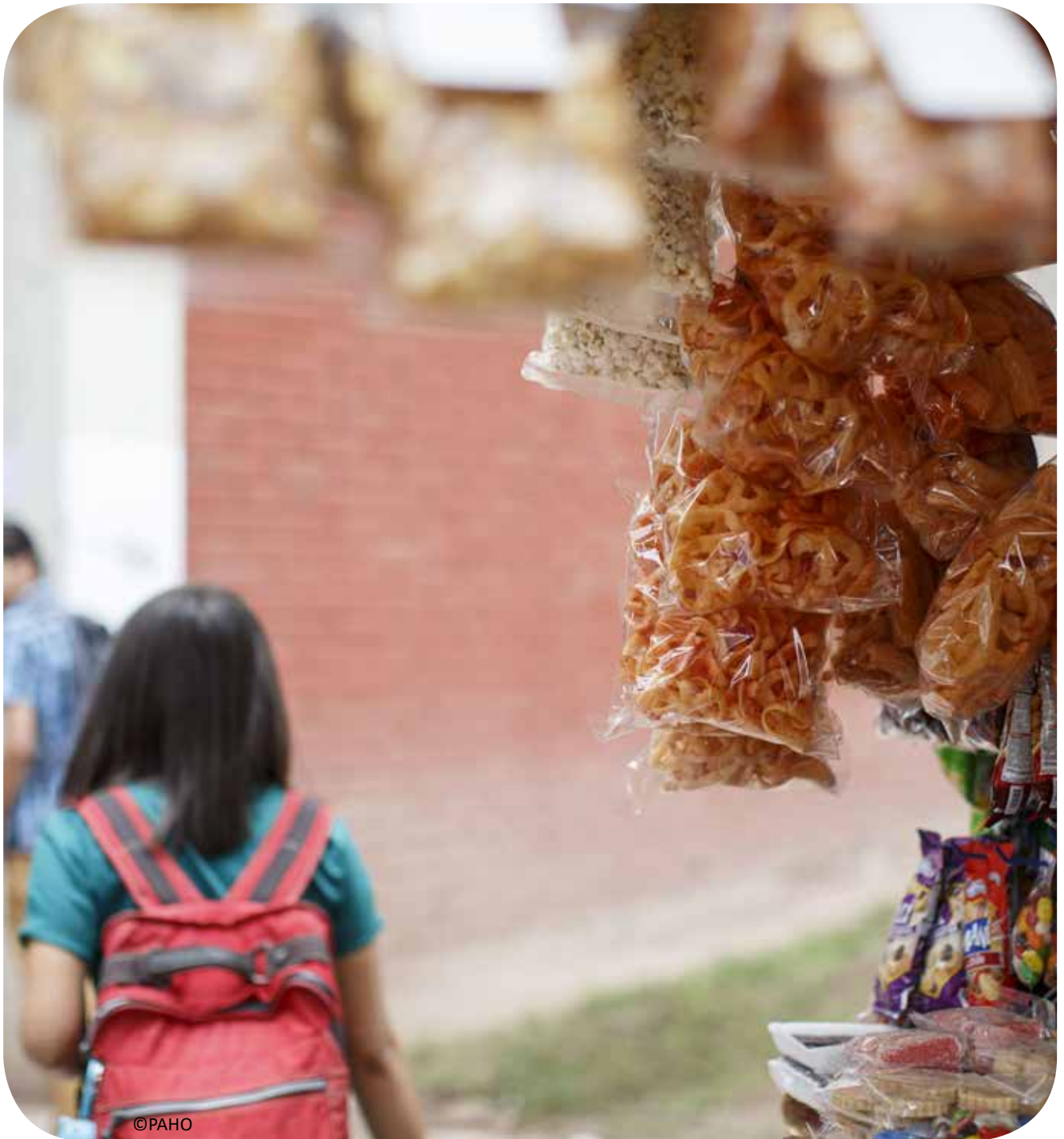
Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. "Others" include in descending order of importance: candies and chocolate (confectionery); sweetened breakfast cereals, sweetened flavored yogurt, flavored milk and powder drinks; ready-to-heat dishes and meals; processed cheese, solid baby foods, ice cream, snack and "energy" bars, and spreads (such as jam and peanut butter, etc.). Data are from the 2016 Euromonitor *Passport Nutrition* database (45).

Table 5

Main sources of dietary energy and critical nutrients from ultra-processed products as sold in seven Latin American countries in 2014

Calories	Free sugars	Total fat	Saturated fat	Sodium
Carbonated soft drinks (22%)	Carbonated soft drinks (50%)	Cookies (biscuits) (22%)	Cookies (biscuits) (24%)	Sauces, dressings (50%)
Cookies (biscuits) (18%)	Sweetened juices, drinks (18%)	Margarine, other spreadable fats, oils (18%)	Margarine, other spreadable fats, oils (14%)	Cookies (biscuits) (11%)
Sweetened juices, drinks (9%)	Confectionery (11%)	Sauces, dressings (13%)	Confectionery (12%)	Industrial breads (6%)
Confectionery (8%)	Cookies (biscuits) (7%)	Sweet, savory snacks (10%)	Sweet, savory snacks (10%)	Margarine, other spreadable fats, oils (5%)
Industrial breads (7%)	Cakes, pastries, desserts (4%)	Confectionery (9%)	Cakes, pastries, desserts (9%)	Sweet, savory snacks (5%)

Countries represented are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. The percentage contribution of each product to dietary energy and nutrients is given in parenthesis. For example, carbonated soft drinks accounted for 22% of dietary energy from sales of all ultra-processed products in the seven Latin American countries in 2014. Data are from the 2016 Euromonitor *Passport Nutrition* database (45).



Chapter 5

Conclusions and recommendations

This report provides further evidence that supports the findings of PAHO's previous report *Ultra-processed food and drink products in Latin America: trends, impact on obesity, policy implications* (1). The current and projected increasing sales of ultra-processed food and drink products throughout Latin America indicates the need for actions that can effectively reduce the demand for and offer of these products to improve diets and health.

5.1 Findings

The per capita sales of ultra-processed products in the countries surveyed grew by 8.3%, from 408 kcal/day in 2009 to 441 kcal/day in 2014, and are projected to increase by 9.2% to 482 kcal/day by 2019. As of 2014, ultra-processed products represented a fifth of the daily recommended amount of calories (2000 kcal/day), and almost two-fifths of daily energy from these products came from free sugars alone (190 kcal), which would exceed the WHO daily recommended maximum amount of 10% (50) by 7 percentage points (17.3%).^{iv}

Also, 11% of daily energy from ultra-processed products came from saturated fats (49 kcal), which would exceed the WHO daily recommended maximum amount of 10% (50), 0.2 percentage points.^v

The amount of sodium per capita per day supplied by ultra-processed products (600 mg) sold in the selected countries, also implies that the maximum daily intake recommended by WHO for sodium for adults (2000 mg/day or 1 mg/kcal) would be exceeded (51).^{vi}

Chapter 2 presents data that shows that sales of ultra-processed products have increased at the expense

of non-ultra-processed packaged products, and this trend is expected to continue. This confirms previous trends observed in Brazil and Canada, where ultra-processed food and drink products were found to replace fresh or minimally processed foods and freshly made meals (12, 22). Furthermore, ultra-processed drinks accounted for about a third of all calories from ultra-processed products in Latin America in 2014. These findings are a cause for concern, considering the benefits of fresh or minimally processed foods (52), and the detrimental effects of sugar-sweetened drinks on human metabolism (53-54).

Trends in sales of specific ultra-processed products from 2009 to 2014 and projections for 2015 to 2019 show that sweetened juices and sports and "energy" bars both increased by over 40% from 2009 to 2014, and continued rapid growth is projected for these products. Processed cheese, sweetened flavored yogurt, ice cream, sport and "energy" drinks, solid baby foods, sweet and savory snacks, instant soups, flavored milk drinks and milk powders, ready-to-heat dishes and meals, sauces and dressings, and instant

iv Taking as a reference a 2000 kcal diet, and assuming that the remaining 1559 kcal coming from non-ultra-processed products would provide less than 10% of kcal coming from free sugars (155 kcal) as recommended by WHO. Hence, out of the 2000 kcal, 345 kcal (155 kcal + 190 kcal) would come from free sugars, which equals 17.3%.

v Taking as a reference a 2000 kcal diet, and assuming that the remaining 1559 kcal coming from non ultra-processed products would provide less than 10% of kcal coming from saturated fat (155 kcal) as recommended by WHO. Hence, out of the 2000 kcal, 204 kcal (155 kcal + 49 kcal) would come from saturated fat, which equals 10.2%.

vi Taking as a reference a 2000 kcal diet, and assuming that the remaining 1559 kcal coming from non-ultra-processed products would provide less than 1mg of sodium/kcal (1559 mg), as recommended by WHO. Hence, out of the 2000 kcal, 2159 mg (1559 mg + 600 mg) of sodium would be consumed.

noodles, have also grown relatively quickly and are projected to continue to do so.

There was also substantial variation in sales volume and growth among countries. In 2014, per capita sales of ultra-processed products were twice as high in Argentina, Brazil, Chile and Mexico compared to Colombia and Peru. These differences may be partly explained by the relative availability of money. Between 2009 and 2014, sales increased by 15.6% in Peru and 16.9% in Chile, where gross national products increased by 35% and 41% respectively (49). In contrast, sales in Venezuela decreased by 1.6% in this period where the gross national product increased by only 7% (49).

Chapter 3 presents analyses of 89 ultra-processed product categories and the proportion containing excess free sugars was 55%, total fat 40%, saturated fat 55% and excess sodium, was 63%. All contained excess amounts of at least one of these critical nutrients according to the criteria specified in the PAHO *Nutrient Profile Model* (2). More than two-thirds (70%) contained excess amounts of two or three nutrients. These findings support a previous assessment which found that almost all (95-100%) of processed and ultra-processed products sold in Brazil, Chile, Jamaica, and Trinidad and Tobago contained excess amounts of at least one of the critical nutrients (2).

Chapter 4 highlighted that a relatively small number of products contributed to most of the dietary energy as well as critical nutrients contained in ultra-processed products. Sugar-sweetened drinks (carbonated soft drinks and other sweetened juices and drinks), cookies (biscuits), and confectionery, contributed the majority of dietary energy and also to free sugars. Carbonated soft drinks alone contributed a half (50%), and all juices and drinks together contributed over two-thirds (68%).

Cookies (biscuits), margarine and spreadable oils and fats, sweet and savory snacks, confectionery, and cakes, pastries and desserts, were the main contributors of total fat (59%) and saturated fat (60%). Cookies alone contributed almost a quarter of all total fat (22%) and saturated fat (24%). Half of all sodium (50%) came from sauces and dressings. Other main contributors were cookies (biscuits), industrial breads, sweet and savory snacks, and margarine and spreadable oils and fats.

Overall, the products that contributed most to free sugars, total fat, saturated fat or sodium from sales of ultra-processed products included carbonated and other sweetened soft drinks, biscuits (cookies), sweet and savory snacks, confectionery, cakes and pastries, margarine and other spreadable fats and oils, and sauces and dressings.

5.2 Limitations

When this report was prepared, actual sales data from Euromonitor were available only from 2009 to 2014. The data projections from 2015 to 2019 were based on past trends and also utilized information from manufacturers, and so are likely to be reliable. The report includes data from just seven Latin American countries, which, however, make up 80% of the region's population (42).

Average consumption presented in this report disguises differences in terms of individual consumption patterns. It is likely that the reported percentages are higher or even much higher in children and adolescents (17, 18, 38), young adults (14, 23, 25), and in those who are overweight or obese (13, 17, 27).

The report covers only retail sales and does not include purchases from restaurants, fast food outlets^{vii} and bars. *Euromonitor* sales data are based on a market study of the nutrient composition of packaged foods in the year 2014 (45), and so do not take into account variation in nutrient composition due to reformulation of food. Information from manufacturers indicates that such changes are usually gradual and are unlikely to make a substantial difference to the general analyses (55).

Free sugar content was estimated using a Canadian database with information on over 4,000 packaged products (48). This does not take into account variations in the free sugar composition of products in different countries.

Identification of ultra-processed products with excessive free sugars, sodium, total fat and saturated fat was done with 89 aggregated categories. This did

vii Defined as offering limited menus prepared quickly where customers order, pay and pick up from a counter (45).

not allow the analysis to account for variations in the composition of sub-categories. However, in general terms, the composition of products within any category was found to be similar. For example, all types of “sweet cookie” contained an excess of free sugars, including the chocolate coated, plain, and sandwich filled varieties.

Lastly, this report is not designed to give a complete picture of diets within Latin America. Its focus is on ultra-processed food products. Thus, there is only brief reference to other packaged foods and products, and to unpackaged unprocessed and minimally processed foods.

5.3 Discussion

This report contains new information which can further guide the development of policies and programs designed to halt or reverse the rates of obesity, diabetes and co-morbidities throughout Latin America. It can also provide a tool for people to make choices for themselves, their families and their communities. It is one more source of information pointing to the relationship between ultra-processed products, unhealthy diets, and poor health, in Latin America and in other parts of the world (1, 7-30, 35).

Estimates presented in this report suggest that consumption of ultra-processed products in many Latin American countries are eventually likely to reach the levels found in countries such as the United States (20), Canada (23), and the UK (56), where they account for approximately half of daily dietary energy. The projections indicate that this is likely to happen before the end of the 2016-2025 UN Decade of Action on Nutrition (57) and the 2016-2030 timeline of the UN Sustainable Development Goals (58), if measures are not taken into effect to reverse this current trend. It has already happened in Chile, where rates of consumption of ultra-processed products, and rates of obesity and diabetes, are now among the highest in the world (1).

As previously stated, ultra processed foods are mainly formulations of unhealthy fats, refined starches, free sugars, and salt, plus additives often intended to intensify sensory impact (20, 23).



Based on information presented in chapters 2-4, all ultra-processed products categories currently sold in Latin America are excessive in free sugars, total fat, saturated fat or sodium. Furthermore, two-fifths of the total energy provided by ultra-processed product sales comes from free sugars. Other studies have shown that ultra-processed products tend to be relatively low in dietary fibre, protein, and various micronutrients and other bioactive compounds (10, 14-16, 19-21, 23-25, 29). They also typically have high glycaemic loads and a low satiety index (35).

Other unhealthy and obesogenic characteristics of ultra-processed products have been discussed elsewhere, and include the fact that they are highly advertised and promoted, designed to be easily available and accessible for consumption as snacks (36, 59). Additionally, they are deliberately formulated to be habit-forming and even quasi-addictive, and therefore likely to cause overconsumption (60-62). The evidence also consistently indicates that the production, advertising and promotion of ultra-processed products are powerful drivers of the pandemics of obesity and NCDs (1, 11, 13, 17, 18, 27, 28).

Progress has already been made in several countries consistent with the recommendations of the Plan of Action for the Prevention of Obesity in Children and Adolescents (3). For example, Andean traditional food systems are being vigorously promoted by the Peruvian Association for Gastronomy and the Peruvian



Ministry of Health, with support from the UN Food and Agriculture Organization, with the purpose of improving the quality of home and street food, adding value to the country's food supply, and creating more demand for traditional foods, ingredients, herbs and freshly cooked meals (63-65).

In January 2014, the Mexican government imposed an 8% tax on energy-dense products such as salty snacks, chips, cakes, pastries, and frozen desserts and a 10% tax on sugar-sweetened drinks. These have reduced purchases during the same year by an average of 5% and at least 6%, respectively, with higher reduction among low-income families, compared with what was expected (66-67). In the following year, the fall in purchases of taxed beverages intensified reaching a 9.7% average reduction, with a 14.3% average reduction among families at the lowest socioeconomic level (68).

In June 2016, a law was enacted in Chile requiring food products that are energy-dense, or are high in sugar, saturated fat or sodium, to have a front-of-package label with a related warning. Any such products cannot be sold in schools, and cannot be advertised or promoted to children under 14 years of age (69).

In November 2014, the Brazilian government issued comprehensive official national dietary guidelines that specify avoidance of ultra-processed products.

Its main four recommendations, addressed to people as consumers and as citizens, are as follows (31, 32):

- Make natural or minimally processed foods, in great variety, mainly of plant origin, and preferably produced with agro-ecological methods, the basis of your diet.
- Use oils, fats, salt and sugar in small amounts for seasoning and cooking foods and to create culinary preparations.
- Limit the use of processed foods, consuming them in small amounts as ingredients in culinary preparations or as part of meals based on natural or minimally processed foods.
- Avoid ultra-processed products.

In December 2016, the Uruguay government issued food-based dietary guidelines using an approach similar to the Brazilian guidelines, with recommendations aimed at promoting healthy, shared and pleasurable ways of eating. Key recommendations include preference for fresh or minimally processed food and avoiding the daily consumption of ultra-processed food products (70).

Such initiatives are most effective when combined with other multisectoral actions within countries, and by countries working together to achieve agreed goals.

5.4 Recommendations

The initiatives to promote healthy eating and healthy nutrition environments already implemented in some Latin American countries are supported by the analyses, findings and conclusions of this report. Concerted actions led by governments, specific to national circumstances, are needed in all Latin American countries.

To counteract displacement of hand-made dishes made from fresh or minimally processed food by ultra-processed products, established food systems need to be preserved, family farmers supported, and healthy food preparation and cooking promoted, including in schools.

Public health policies and market incentives are needed, in order to make unprocessed and minimally processed food, and freshly prepared dishes and meals, more valued, and more available and affordable. Fresh and minimally processed foods that are staples in long-established diets, such as grains, roots, tubers, legumes and other plant foods should have generally affordable and stable prices.

Unhealthy products need to be the subject of statutory regulatory measures (2). Some ultra-processed products are shown in this report to be especially problematic. These include carbonated soft drinks, sweet and savory snacks, biscuits (cookies), confectionery, and cakes, pastries and desserts.

The previous PAHO report on ultra-processed products (1) concluded the following:

There is an urgent need to reduce the health risk posed by ultra-processed products by reducing their overall consumption. This requires implementation of various fiscal policies as well as statutory and other regulation of ultra-processed product labeling, promotion, and advertising, as proposed in PAHO's Plan of Action (3) and already established or planned in Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, and Peru.

Fiscal policies should aim to raise taxes on ultra-processed products and restrict their availability in non-food outlets. Statutory regulation should be used to prohibit all types of marketing of ultra-processed products to children and adolescents (including on packages), and to restrict marketing in all public spaces, including places where food is sold. Regulations need to be monitored, reviewed, and strengthened, as commonly done for tobacco products and alcoholic drinks.

Statutory and other forms of regulation on pricing, incentives, agriculture, and trade, along with information and education campaigns, are needed to protect and promote family farming; establish limits of land concentration; promote and strengthen the use of traditional and neglected crops; improve availability of locally sourced fresh food in school lunch programs; and protect, promote, and strengthen domestic food preparation and cooking skills.

The findings of this report endorse these recommendations.

Annex A

The *NOVA* food classification system*

Group 1

Unprocessed or minimally processed foods

Unprocessed foods are edible parts of plants (seeds, fruits, leaves, stems, roots) or of animals (muscle, offal, eggs, milk), and also fungi, algae and water, after separation from nature. Minimally processed foods are unprocessed foods altered by processes such as removal of inedible or unwanted parts, drying, crushing, grinding, fractioning, filtering, roasting, boiling, pasteurisation, refrigeration, freezing, placing in containers, vacuum packaging, or non-alcoholic fermentation. None of these processes adds substances such as salt, sugar, oils or fats to the original food.

The main purpose of the processes used in the production of group 1 foods is to extend the life of unprocessed foods, allowing their storage for longer use, facilitating or diversifying food preparation.

Group 1 foods include fresh, squeezed, chilled, frozen, or dried fruits and leafy and root vegetables; grains such as rice, corn, and wheat; legumes of all types; starchy roots and tubers such as potatoes; meat, poul-

try, fish and seafood, whole or in the form of steaks, fillets and other cuts, or chilled or frozen; eggs; milk, pasteurised or powdered; fresh fruits or vegetables blended without added sugar, other sweeteners or flavors; grits, flakes or flour made from corn, wheat, oats, or cassava; pasta, couscous made with flours, flakes or grits and water; tree and ground nuts and other oil seeds without added salt or sugar; spices and herbs; plain yogurt with no added sugar or artificial sweeteners added; tea, coffee, and drinking water. Group 1 also includes foods made up from two or more items in this group, such as dried mixed fruits or granola made from cereals, nuts and dried fruits with no added sugar, honey or oil, and foods with vitamins and minerals added generally to replace nutrients lost during processing, such as wheat or corn flour fortified with iron or folic acid. Group 1 items may infrequently contain additives used to preserve the properties of the original food. Examples are vacuum-packed vegetables with added anti-oxidants, and ultra-pasteurised milk with added stabilisers.

Group 2

Processed culinary ingredients

These are substances obtained directly from group 1 foods or from nature by processes such as pressing, refining, grinding, milling, and spray drying. They are normally not consumed by themselves but mainly used as ingredients to prepare, season and cook group 1 foods, and to make culinary preparations, such as hand-made dishes, soups, breads, salads, drinks, and desserts, palatable, diverse, nourishing and enjoyable.

Examples are salt mined or from seawater; sugar and molasses obtained from cane or beet; honey extracted from combs and syrup from maple trees; vegetable oils crushed from olives or seeds; butter and lard

obtained from milk and pork; and starches extracted from corn and other plants. Products consisting of two group 2 items, such as salted butter, group 2 items with added vitamins or minerals, such as iodized salt, and vinegar made by acetic fermentation of wine or other alcoholic drinks, remain in this group remain in this group. Group 2 items may contain additives used to preserve the product's original properties.

Examples are vegetable oils with added anti-oxidants, cooking salt with added anti-humectants, and vinegar with added preservatives that prevent microorganism proliferation.

Group 3

Processed foods

Products relatively simple made by adding sugar, oil, salt or other group 2 substances to group 1 foods. Most processed foods have two or three ingredients. Processes include various preservation or cooking methods, and, in the case of breads and cheese, non-alcoholic fermentation.

The main purpose of the manufacture of processed foods is to increase the durability of group 1 foods, or to modify or enhance their sensory qualities.

Examples are canned or bottled vegetables, fruits and legumes; salted or sugared nuts and seeds; salted, cured, or smoked meats; canned fish; fruits in syrup; as well as artisanal breads and cheeses. Processed foods may contain additives used to preserve their original properties or to resist microbial contamination. Examples are fruits in syrup with added anti-oxidants, and dried salted meats with added preservatives.

Group 4

Ultra-processed food and drink products

Industrial formulations typically with five or more ingredients. Besides salt, sugar, oils, and fats, ingredients of ultra-processed foods include food substances not commonly used in culinary preparations, such as hydrolyzed protein, modified starches and hydrogenated or interesterified oils, and additives whose purpose is to imitate sensory qualities of unprocessed or minimally processed foods and their culinary preparations or to disguise undesirable qualities of the final product, such as colorants, flavorings, non-sugar sweeteners, emulsifiers, humectants, sequestrants, and firming, bulking, de-foaming, anti-caking and glazing agents. Unprocessed or minimally processed foods represent a small proportion of or are even absent from the list of ingredients of ultra-processed products. Several industrial processes with no domestic equivalents are used in the manufacture of ultra-processed products, such as extrusion and moulding, and pre-processing for frying.

The main purpose of industrial ultra-processing is to create products that are ready-to-eat, ready-to-drink or ready-to-heat, liable to replace unprocessed or minimally processed foods as well as freshly prepared dishes. Common attributes of ultra-processed products are hyper-palatability, sophisticated and at-

tractive packaging, multi-media and other aggressive marketing to children and adolescents, health claims, high profitability, and branding and ownership by transnational corporations.

Examples of ultra-processed food are carbonated drinks; sweet or savory packaged snacks; ice cream, chocolate, candies (confectionery); mass-produced packaged breads and buns; margarines and spreads; processed cheese; cookies (biscuits), pastries, cakes, and cake mixes; breakfast “cereals”, “cereal” and “energy” bars; “energy” drinks; milk drinks, “fruit” yogurts and “fruit” drinks; cocoa drinks; meat and chicken extracts and “instant” sauces; infant formulas, follow-on milks, other baby products; “health” and “slimming” products such as powdered or “fortified” meal and dish substitutes; and many ready-to-heat products including pre-prepared pies and pasta and pizza dishes; poultry and fish “nuggets” and “sticks”, sausages, burgers, hot dogs, and other reconstituted meat products, and powdered and packaged “instant” soups, noodles and desserts. When products made solely of group 1 or group 3 foods also contain cosmetic or sensory intensifying additives, such as plain yogurt with added artificial sweeteners, and breads with added emulsifiers, they are classified here in group 4.

*Adapted from (23, 31, 32).

Annex B

Ultra-processed food and drink products grouped in 21 categories and 89 sub-categories sold in seven Latin American countries, 2014, as used in this report

1. Carbonated soft drinks

- Cola carbonates
- Non-cola carbonates

2. Sweet and savory snacks

- Chips (crisps)
- Popcorn
- Tortilla/corn chips
- Extruded snacks
- Pretzels
- Savory cookies and crackers
- Other sweet and savory snacks

3. Snack and “energy” bars

- Breakfast bars
- Energy and nutrition bars
- Fruit bars
- Granola/muesli bars
- Other snack bars

4. Ice cream

- Ice cream desserts
- Water-based ice cream
- Dairy-based ice cream

5. Candies (confectionery)

- Chocolate
- Sugar confectionery
- Toffees, caramels and nougat
- Sugared gum

6. Industrial breads

- Industrial breads
- Bread substitutes

7. Cakes, pastries, desserts

- Packaged cakes
- Packaged pastries
- Frozen bakery
- Frozen desserts
- Chilled dairy-based desserts
- Shelf stable dairy-based desserts
- Dessert, mixes

8. Cookies (biscuits)

- Sweet cookies
- *Alfajores*

9. Sweetened breakfast cereals

- Family breakfast cereals
- Child breakfast cereals

10. Margarine and spreadable oils and fats

- Margarine
- Spreadable oils and fats

11. Spreads

- Chocolate spreads
- Jams and preserves
- Nut- and seed-based spreads

12. Processed cheese

- Processed cheese

13. “Sports” and “energy” drinks

- Sports drinks
- Energy drinks

14. Sweetened flavored yogurt

- Drinking yogurt
- Spoonable yogurt
- Frozen yogurt

15. Sweetened flavored milk and powdered milk drinks

- Dairy-only flavored milk drinks
- Flavored condensed milk

16. Juice concentrates, sweetened juices and “fruit” drinks

- Fruit-based juice and drinks
- Ready-to-drink tea
- Ready-to-drink coffee
- Juice concentrates
- Malt-based hot drinks
- Coffee whiteners
- Other juice and drinks

17. Solid baby foods

- Dried baby food
- Prepared baby food
- Other baby food

18. Ready-to-heat dishes and meals

- Canned/preserved ready meals
- Frozen ready meals
- Dried ready meals
- Frozen pizza
- Chilled pizza
- Dinner mixes
- Potato products
- Meal replacements
- Frozen meat substitutes

19. Canned and “instant” soups

- Instant soups
- Canned/preserved soups
- Dehydrated soups
- UHT soups

20. “Instant” noodles

- Instant noodles

21. Sauces and dressings

- Vinaigrettes
- Salad dressings
- Dips
- Soy-based sauces
- Stock cubes and powders
- Dry sauces/powder mixes
- Barbecue sauces
- Mayonnaise
- Mustard
- Ketchup
- Spicy chili/pepper sauces
- Pasta sauces
- Wet/cooking sauces
- Worcester/steak sauces
- Liquid stocks
- Monosodium glutamate
- Other table sauces
- Other sauces, dressings and condiments

References

- 1 Pan American Health Organization. Ultra-processed food and drink products in Latin America: trends, impact on obesity, policy implications. Washington, DC: PAHO; 2015.
- 2 Pan American Health Organization. Nutrient profile model. Washington, DC: PAHO; 2016.
- 3 Pan American Health Organization. Plan of action for the prevention of obesity in children and adolescents. Washington, DC: PAHO; 2014.
- 4 NCD Risk Factor Collaboration. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *Lancet* 2016;387(10026):1377-1396. doi:10.1016/S0140-6736(16)30054-X
- 5 NCD Risk Factor Collaboration. Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4.4 million participants. *Lancet* 2016;387(10027):1513-1530. doi:10.1016/S0140-6736(16)00618-8
- 6 Rivera JA, de Cossio TG, Pedraza LS, Aburto TC, Sanchez TG, Martorell R. Childhood and adolescent overweight and obesity in Latin America: a systematic review. *Lancet Diabetes Endocrinol.* 2014;2(4):321-332. doi:10.1016/S2213-8587(13)70173-6
- 7 Moodie R, Stuckler D, Monteiro CA, Sheron N, Neal B, Thamarangsi T, et al. The Lancet NCD Action Group. Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *Lancet* 2013;381(9867):670-679. doi:10.1016/S0140-6736(12)62089-3
- 8 Monteiro CA, Moubarac J-C, Cannon G, Ng SW, Popkin B. Ultra-processed products are becoming dominant in the global food system. *Obes Rev.* 2013;14(Suppl 2):21-28. doi:10.1111/obr.12107
- 9 International Food Policy Research Institute. Global nutrition report 2016. From promise to impact: ending malnutrition by 2030. Washington, DC: IFPRI; 2016.
- 10 Monteiro CA, Levy RB, Claro RM, de Castro IR, Cannon G. Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutr.* 2011;14(1):5-13. doi:10.1017/S1368980010003241
- 11 Tavares LF, Fonseca SC, Garcia Rosa ML, Yokoo EM. Relationship between ultra-processed foods and metabolic syndrome in adolescents from a Brazilian family doctor program. *Public Health Nutr.* 2012;15(1):82-87. doi:10.1017/S1368980011001571
- 12 Martins AP, Levy RB, Claro RM, Moubarac J-C, Monteiro CA. Increased contribution of ultra-processed food products in the Brazilian diet (1987-2009). *Rev Saude Publica* 2013;47(4):656-665. doi:10.1590/S0034-8910.2013047004968
- 13 Canella DS, Levy RB, Martins AP, Claro RM, Moubarac J-C, Baraldi LG, Monteiro CA. Ultra-processed food products and obesity in Brazilian households (2008-2009). *PLoS One* 2014;9(3):e92752. doi:10.1371/journal.pone.0092752
- 14 Bielemann RM, Motta JV, Minten GC, Horta BL, Gigante DP. Consumption of ultra-processed foods and their impact on the diet of young adults. *Rev Saude Publica* 2015;49:28. <http://www.ncbi.nlm.nih.gov/pubmed/26018785>

- 15 Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, Monteiro CA. Ultra-processed foods and the nutritional dietary profile in Brazil. *Rev Saude Publica* 2015;49:38. doi:10.1590/S0034-8910.2015049006132
- 16 Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, Monteiro CA. Impact of ultra-processed foods on micronutrient content in the Brazilian diet. *Rev Saude Publica* 2015;49:45. doi:10.1590/S0034-8910.2015049006211
- 17 Louzada ML, Baraldi LG, Steele EM, Martins AP, Canella DS, Moubarac J-C, Monteiro CA. Consumption of ultra-processed foods and obesity in Brazilian adolescents and adults. *Prev Med.* 2015;81:9-15. doi:10.1016/j.ypmed.2015.07.018
- 18 Rauber F, Campagnolo PD, Hoffman DJ, Vitolo MR. Consumption of ultra-processed food products and its effects on children's lipid profiles: a longitudinal study. *Nutr Metab Cardiovasc Dis.* 2015;25(1):116-122. doi:10.1016/j.numecd.2014.08.001
- 19 Crovetto MM, Uauy R, Martins AP, Moubarac J-C, Monteiro CA. Household availability of ready-to-consume food and drink products in Chile: impact on nutritional quality of the diet. *Rev Med Chil.* 2014;142(7):850-858. doi:10.4067/S0034-98872014000700005
- 20 Martinez Steele E, Baraldi LG, Louzada ML, Moubarac J-C, Mozaffarian D, Monteiro CA. Ultra-processed foods and added sugars in the US diet: evidence from a nationally representative cross-sectional study. *BMJ Open* 2016;6(3):e009892. doi:10.1136/bmjopen-2015-009892
- 21 Moubarac J-C, Martins AP, Claro RM, Levy RB, Cannon G, Monteiro CA. Consumption of ultra-processed foods and likely impact on human health. Evidence from Canada. *Public Health Nutr.* 2013;16(12):2240-2248. doi:10.1017/S1368980012005009
- 22 Moubarac J-C, Batal M, Martins AP, Claro RM, Levy RB, Cannon G, Monteiro CA. Processed and ultra-processed food products: consumption trends in Canada from 1938 to 2011. *Can J Diet Pract Res.* 2014;75(1):15-21. doi:10.3148/75.1.2014.15
- 23 Moubarac J-C, Batal M, Louzada ML, Martinez SE, Monteiro CA, et al. Consumption of ultra-processed foods predicts diet quality in Canada. *Appetite* 2016 Nov 4;108:512-520. doi:10.1016/j.appet.2016.11.006
- 24 Poti JM, Mendez MA, Ng SW, Popkin B. Is the degree of food processing and convenience linked with the nutritional quality of foods purchased by US households? *Am J Clin Nutr.* 2015;101(6):1251-1262. doi:10.3945/ajcn.114.100925
- 25 Adams J, White M. Characterisation of UK diets according to degree of food processing and associations with socio-demographics and obesity: cross-sectional analysis of UK National Diet and Nutrition Survey (2008-12). *Int J Behav Nutr Phys Act.* 2015;12:160. doi:10.1186/s12966-015-0317-y
- 26 Juul F, Hemmingsson E. Trends in consumption of ultra-processed foods and obesity in Sweden between 1960 and 2010. *Public Health Nutr.* 2015;18(17):3096-3107. doi:10.1017/S1368980015000506
- 27 Mendonça RD, Pimenta AM, Gea A, Arrillaga CF, Martinez-Gonzalez MA, Lopes ACS, Bes-Rastrollo M. Ultra-processed foods consumption and risk of overweight/obesity: the SUN cohort study. *AJCN* 2016;104(5):1433-1440.
- 28 Mendonça RD, Lopes ACS, Pimenta AM, Gea A, Martinez-Gonzalez MA, Bes-Rastrollo M. Ultra-processed food consumption and the incidence of hypertension in a Mediterranean cohort: the Seguimiento Universidad de Navarra project. *AJH* 2016;30(4):358-366.
- 29 Luiten CM, Steenhuis IH, Eyles H, Ni Mhurchu C, Waterlander WE. Ultra-processed foods have the worst nutrient profile, yet they are the most available packaged products in a sample of New Zealand supermarkets. *Public Health Nutr.* 2016;19(3):530-538. doi:10.1017/S1368980015002177

- 30 Baker P, Friel S (2014). Processed foods and the nutrition transition: evidence from Asia *Obes Rev* 15(7):564-77. doi: 10.1111/obr.12174.
- 31 Ministry of Health of Brazil. Dietary guidelines for the Brazilian population. Brasília: Ministério da Saúde; 2014. Available from: http://189.28.128.100/dab/docs/portaldab/publicacoes/guia_alimentar_populacao_ingles.pdf. Available in Spanish, Portuguese, and English.
- 32 Monteiro CA, Cannon G, Moubarac J-C, Martins AP, Martins CA, Garzillo J, et al. Dietary guidelines to nourish humanity and the planet in the twenty-first century. A blueprint from Brazil. *Public Health Nutr.* 2015;18(13):2311-22. doi:10.1017/S1368980015002165
- 33 Ludwig DS. Technology, diet, and the burden of chronic disease. *JAMA* 2011;305(13):1352-1353.
- 34 Monteiro CA. The issue is not food, nor nutrients, so much as processing. *Public Health Nutr.* 2009;12(5):729-731. doi:10.1017/S1368980009005291
- 35 Fardet A. Minimally processed foods are more satiating and less hyperglycemic than ultra-processed foods: a preliminary study with 98 ready-to-eat foods. *Food Funct.* 2016;7(5):2338-2346. doi:10.1039/c6fo00107
- 36 Moss M. *Salt sugar fat: how the food giants hooked us*. New York: Random House; 2013.
- 37 Vandevijvere S, Monteiro CA, Krebs-Smith SM, Lee A, Swinburn B, Kelly B, et al. Informas. Monitoring and benchmarking population diet quality globally: a step-wise approach. *Obes Rev.* 2013;14(Suppl 1):135-149. doi:10.1111/obr.1208239.
- 38 Monteiro CA, Moubarac JC, Levy RB, Canella DS, Louzada MLDC, Cannon G. Household availability of ultra-processed foods and obesity in nineteen European countries. *Public Health Nutr.* 2017 Jul 17:1-9. doi: 10.1017/S1368980017001379
- 39 Mallarino C, Gómez LF, González-Zapata L, Cadena Y, Parra DC. Advertising of ultra-processed foods and beverages: children as a vulnerable population. *Rev Saude Publica* 2013 Oct;47(5):1006-1010.
- 40 Pan American Health Organization. *Recommendations from a Pan American Health Organization expert consultation on the marketing of food and non-alcoholic beverages to children in the Americas*. Washington, DC: PAHO; 2011.
- 41 World Health Organization, Food and Agriculture Organization of the United Nations. Diet, nutrition and the prevention of chronic diseases. Report of the Joint WHO/FAO expert consultation. WHO technical report 916. Geneva: WHO; 2003.
- 42 World Bank. Population, total. Washington, DC: World Bank; 2016. Available from: <http://data.worldbank.org/indicator/SP.POP.TOTL>
- 43 Moubarac J-C, Parra DC, Cannon G, Monteiro CA. Food classification systems based on food processing: significance and implications for policies and actions: a systematic literature review and assessment. *Curr Obes Rep.* 2014;3(2):256-272. doi:10.1007/s13679-014-0092-0
- 44 Food and Agriculture Organization of the United Nations. Guidelines on the collection of information on food processing through food consumption surveys. Rome: FAO; 2015.
- 45 Euromonitor. Passport: Nutrition Database. London: Euromonitor International; 2016. <http://www3.euromonitor.com/passport-nutrition>
- 46 Monteiro CA, Cannon G. The impact of transnational 'Big Food' companies on the South: a view from Brazil. *PLoS Med* 2012;9(7):e1001252. doi:10.1371/journal.pmed.1001252
- 47 World Health Organization. International code of marketing of breast-milk substitutes. Geneva: WHO; 1981. Available from: http://www.who.int/nutrition/publications/code_english.pdf

- 48 Bernstein JT, Schermel A, Mills CM, L'Abbé MR. Total and free sugar content of Canadian prepackaged foods and beverages. *Nutrients* 2016;8(9):e582.
- 49 World Bank. GDP per capita, PPP. Washington, DC: World Bank; 2016. Available from: <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>
- 50 World Health Organization. Guideline: sugars intake for adults and children. Geneva: WHO; 2015.
- 51 World Health Organization. Guideline: sodium intake for adults and children. Geneva: WHO; 2012.
- 52 Katz DL, Meller S. Can we say what diet is best for health? *Ann Rev Public Health* 2014;35:83-103.
- 53 Malik VS, Pan A, Willett WC, Hu F. Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *Am J Clin Nutr*. 2013;98(4):1084-1102. doi:10.3945/ajcn.113.058362
- 54 Malik VS, Popkin B, Bray G, Despres J-P, Hu F. Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. *Circulation* 2010;121(11):1356-1364. doi:10.1161/circulation.aha.109.876185
- 55 Jacobson MF, Havas S, McCarter R. Changes in sodium levels in processed and restaurant foods, 2005 to 2011. *JAMA Intern Med*. 2013;173(14):1285-1291. doi:10.1001/jamainternmed.2013.6154
- 56 Moubarac JC, Claro RM, Baraldi LG, Levy RB, Martins AP, Cannon G, Monteiro CA. International differences in cost and consumption of ready-to-consume food and drink products: United Kingdom and Brazil, 2008-2009. *Glob Public Health* 2013;8(7):845-856. doi:10.1080/17441692.2013.796401
- 57 United Nations. United Nations Decade of Action on Nutrition. Resolution adopted by the General Assembly on 1 April 2016. (A/RES/70/259) http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/259
- 58 United Nations. Sustainable Development Goals. Available from: <https://sustainabledevelopment.un.org/sdgs>
- 59 Monteiro CA, Cannon G, Levy RB, Moubarac J-C, Jaime PC, Martins AP, et al. NOVA. The star shines bright. *World Nutrition* 2016;7(1-3):28-38.
- 60 Brownell K, Gold M. Food and addiction. A comprehensive handbook. Oxford: Oxford University Press; 2012.
- 61 Gearhardt A. The science behind food and addiction and the potential effect on the food system. In: Neff R, ed. Introduction to the US Food System. Public Health, Environment, and Equity. The Johns Hopkins Center for a Liveable Future. San Francisco: Jossey Bass/John Wiley; 2015.
- 62 Schulte E, Avena N, Gearhardt A. Which foods may be addictive? The roles of processing, fat content, and glycemic load. *PloS One* 2015;10:2. doi:10.1371/journal.pone.0117959
- 63 Jacoby E. 2012. The best food on earth. Peru: as good as it gets. *World Nutrition* 2012;3(7):294-306.
- 64 Jacoby E, Murillo P. The best food on earth. Peru. The union of agriculture, gastronomy, nutrition. *World Nutrition* 2012;3(8):358-372.
- 65 Valderrama M. ¿Cuál es el futuro de la gastronomía peruana? Lima: La Sociedad Peruana de Gastronomía; 2016. Available from: <http://www.apega.pe/noticias/prensa-y-difusion/cual-es-el-futuro-de-nuestra-gastronomia.html>
- 66 Colchero M, Popkin B, Rivera J, Ng SW. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. *BMJ* 2016;352:h6704. doi:10.1136/bmj.h6704

- 67 Batis C, Rivera J, Popkin B, Taille LS. First year evaluation of Mexico's tax on nonessential energy-dense foods: an observational study. *PloS Medicine* 2016;13(7):e1002057. doi:10.1371/journal.pmed.1002057
- 68 Colchero MA, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, evidence of sustained consumer response two years after implementing a sugar-sweetened beverage tax. *Health Aff (Millwood)* 2017;36(3):564-571.
- 69 Llorente & Cuanca. *Chile's law on food labelling and advertising: a replicable model for Latin America?* Santiago: Llorente & Cuanca; 2016. Available at: https://www.desarrollando-ideas.com/wp-content/uploads/sites/5/160504_DI_report_food_chile_ENG.pdf.
- 70 Ministry of Health of Uruguay. Guía alimentaria para la población Uruguaya. Montevideo: Ministerio da Salud; 2016. <http://www.msp.gub.uy/publicaci%C3%B3n/gu%C3%ADa-alimentaria-para-la-poblaci%C3%B3n-uruguay>



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE
Americas

