Nutrition labelling and nutrient composition of food products in the Russian Federation

Assessment summary
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Abstract

This summary report presents the results of a cross-sectional survey conducted in Moscow, Russian Federation, between July 2019 and December 2020. The aim was to understand the city’s food environment, in particular the food offered in retail grocery shops and fast-food outlets, their nutrition labelling and the nutritional composition of the most commonly available packaged products, prepared foods and fast food.

Keywords

FAST FOODS
FOOD ANALYSIS
FOOD LABELING
POTASSIUM
RUSSIA
SODIUM
TRANS FATTY ACIDS
The Russian Federation stretches over the northern part of the Eurasian continent, covering over 17 million km² and 11 time zones. The population is about 144 million, about 75% of whom live in urban areas. About 18% of the population is under 15 years of age, and 16% are over 65 years. Life expectancy at birth in 2022 was estimated to be 70 years (1).

Data on mortality from the Federal State Statistics Service in 2019 showed that diseases of the circulatory system accounted for 46.7% of deaths and neoplasms for 16.4% (2); diseases of the respiratory and endocrine systems, including eating disorders and metabolic disorders (5.6%) were the cause of more than 68% of deaths (2).

The results also showed that 51% of the selected samples met the established criteria for the maximum TFA level of 2 g per 100 g.

•  mandatory declaration of the content of nutrients such as salt (sodium), mono- and disaccharides, fat and saturated fatty acids, and TFA in all foods, with interpretative front-of-pack nutrition labelling (e.g. colour indication) (a proposal for an amendment is currently being considered by the European Economic Commission);

•  mandatory declaration of the content of nutrients such as salt (sodium), mono- and disaccharides, fat and saturated fatty acids, and TFA in all foods, with interpretative front-of-pack nutrition labelling (e.g. colour indication) (a proposal for an amendment is currently being considered by the Eurasian Economic Commission);

•  A baseline assessment of the TFA content of the food supply and monitoring changes in the TFA content of food over time should be considered, as proposed in module 4 of the WHO REPLACE package (7).

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•  To achieve the expected reduction in the burden of NCDs, further strengthening of preventive measures through the above steps would be beneficial. WHO-recommended best-practice TFA policy includes: (i) a mandatory national limit of 2 g of iTFA per 100 g of total fat in all foods; and (ii) a mandatory national ban on the production or use of partially hydrogenated oil as an ingredient in all foods. The WHO REPLACE package could be applied to eliminate iTFA (7).

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Discount shop of a mass retailer network with outlets across the country

Discount shop of a mass retailer network with outlets in the Central, North-Western and Ural Federal Districts

References

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Acronyms and abbreviations

EAEU  Eurasian Economic Union
iTFA  industrially produced trans-fatty acids
NCD  noncommunicable diseases
TFA  trans-fatty acids

Glossary

For the purpose of this report, the following terms are used to describe the food environment in the Russian Federation:

Culinary department – a section in a supermarket where ready-to-eat dishes are prepared and sold.

Discounter – a retail grocery store that offers a limited range of products at low prices.

Farmers’ market – a marketplace where farmers sell their homegrown produce, meats, dairy, and other food products directly to consumers.

Fast food – inexpensive, pre-prepared, non-home-made food that is quickly available and usually standardized; generally considered as food with low nutritional value (“junk food”).

Hypermart – a large self-service retail store that offers a wide range of products, including food, groceries, household items, electronics and clothing, all under one roof.

Minimart – a small self-service retail store that sells a limited range of food products and household items.

Packaged food products – food produced on a large scale in factories or other industrial facilities, typically packaged and distributed for sale to consumers through retail outlets or other channels.

Prepared foods – freshly made dishes, including soups, salads, main dishes, snacks and desserts, sold in culinary departments of retail grocery stores, usually prepared on site and sold either hot and ready to eat or cold for later consumption.

Supermarket – a large self-service store that offers a wide variety of food products and household items, often with departments for fresh produce, meat and bakery items.

Traditional food shop – a small shop that sell products over the counter (in contrast to self-service) and typically specializes in local or regional produce, as well as basic grocery items such as bread, dairy and preserved goods.

The following typical food products are referred to in the text:

Chak-chak – Tatar sweet made from unleavened dough rolled into small balls and deep-fried in oil.

Chebureki – deep-fried turnovers with a filling of ground or minced meat and onions.
**Chicken Kiev** – crumbed and fried chicken stuffed with butter.

**Kolbasa** – sausage made from ground meat wrapped in a special casing.

**Kotlety** – pan-fried minced meat croquettes or cutlet-shaped patties.

**Kroshka-kartoshka** – a whole potato baked in foil with various stuffings (cheese, butter, salad).

**Olivier salad** – a traditional salad dish in Russian cuisine, typically made with diced boiled vegetables (usually potatoes, carrots and brined dill pickles or cucumber), boiled eggs, cooked meat and mayonnaise.

**Pelmeni** – dumplings consisting of a filling wrapped in thin, unleavened dough.

**Sardelki** – small thick sausages.
1. Introduction

The Russian Federation stretches over the northern part of the Eurasian continent, covering over 17 million km² and 11 time zones. The population is about 146 million, about 75% of whom live in urban areas. About 19% of the population is under 15 years of age, and 23% are over 60 years. Life expectancy at birth in 2021 was estimated by the United Nations to be 72 years (1).

Of all the countries in the WHO European Region, the Russian Federation is the most severely affected by noncommunicable diseases (NCDs). Data on mortality from the Federal State Statistics Service in 2019 showed that diseases of the circulatory system accounted for 46.7% of deaths and neoplasms for 16.4% (2); together with the diseases of the respiratory and endocrine systems, including eating disorders and metabolic disorders (5.6%), they were the cause of more than 68% of deaths (2). In 2016, the risk of dying from any of the four main NCDs (cardiovascular diseases, cancer, diabetes, chronic respiratory diseases) between the ages of 30 and 70 years was 25.4%, as compared with an average of 16.7% for the WHO European Region (2). As many as 62% of Russian people over 18 years old are living with overweight or obesity (63% of men and 60% of women), and the prevalence of obesity is 22.2% (17.3% of men and 25.3% of women) (3).

Increasing urbanization, the globalization of processed food and changing lifestyles have resulted in a dietary transition in many countries in the WHO European Region in recent decades (4). The dietary changes include decreased intake of foods rich in fibre (such as legumes, fruits, vegetables, whole grains) and increased consumption of processed foods, which are more likely to be energy-dense and high in fats, salt and sugar (5), and are thus associated with a greater risk of gaining weight and developing NCDs.

A high trans-fat intake increases the risk of death from any cause and from cardiovascular diseases in particular (6). WHO recommends that total trans-fatty acids (TFA) intake be limited to <1% of total energy intake (7), equivalent to <2.2 g/day in a 2000-calorie diet. WHO advocates for complete elimination of trans-fat from the global food supply (8), and several countries have banned or regulated them (9).

TFA in food products are either of natural origin or produced from unsaturated fatty acids during hydrogenation of liquid vegetable oils. Partially hydrogenated oils are considered unsafe, and their consumption is restricted (10). In the Russian Federation, however, indication of the content of these trans isomers on the label is not mandatory. Naturally occurring ruminant TFA are produced in the rumen of animals such as cattle and sheep and are present in meat and dairy products. In products of animal origin (butter, meat and beef fat), the TFA content is low (on average, 1–5% of the total fatty acids) (11).

As of 1 January 2018, a new standard for the content of industrially produced TFA (iTFA) in oil and fat products came into force in the Russian Federation and countries of the Eurasian Economic Union (EAEU) (TR CU 024/2011, “Technical regulations for oil and fat products”, approved by the decision of the Customs Union Commission of 09.12.2011 No. 883). According to the regulation, the iTFA content in hard margarines, soft and liquid margarines, milk fat substitutes and fats for special purposes must not exceed 2.0% of the total fat content of the food product. This policy is less restrictive than WHO-recommended best practice TFA policy, which includes a mandatory national limit of 2 g of iTFA per 100 g of total fat in all foods and a mandatory national ban on the production or use of partially hydrogenated oils as an ingredient in all foods.

WHO also calls for a significant reduction in sodium intake (12). Dietary sodium results from the consumption of processed foods, salt added during cooking (including in sauces) and salt added at table. In order to reduce blood pressure and the risk of cardiovascular disease, WHO recommends no more than 2000 mg of sodium per day for the adult population, corresponding to 5 g/day of salt (13). In the vast majority of countries in the WHO European Region for which recent data are available, including the Russian Federation, however, the average population salt intake is much higher (14).

Intake of potassium, another key nutrient, is inversely associated with blood pressure, and WHO recommends a minimum daily intake of 3510 mg to reduce the risk of cardiovascular disease (15). Excess sodium consumption
and insufficient potassium intake contribute to high blood pressure and increase the risks for heart disease, stroke and chronic kidney disease (16).

On 22 July 2021, the guideline MR 2.3.1.0253-21 “Norms of physiological needs for nutrients and energy for various groups of the population of the Russian Federation” came into force (approved by the Chief State Sanitary Doctor of the Russian Federation AY Popova) (11). This was an important step in efforts to improve nutrition, as the guideline introduced the WHO recommendations on limiting the consumption of TFA and sodium into national guidelines for the first time. According to the guidelines, consumption of TFA should not exceed 1% of the daily caloric intake, and the amount of dietary sodium in the daily diet of adults and children should not exceed 2 g/day. The physiological requirement for potassium intake for adults was also specified (3500 mg per day).

The technical regulations of the Customs Union (TR CU 022/2011), “Food products in terms of their labelling”, include mandatory requirements for labelling food products circulating within the EAEU. The regulations stipulate that the labels of packaged food products must include the product name, composition, volume, date of manufacture, shelf life, storage conditions, name and location of the manufacturer, name and address of the official representative of the manufacturer, name and location of the importer, recommendations for use and for preparation (if necessary), the nutritional value of the product, the presence of genetically modified organism, and a unified “Eurasian Conformity” mark. Mandatory requirements for nutritional value include indication of the energy value (caloric content), protein, fat and carbohydrate content, and vitamins and mineral content.

The action plan for implementation of the Strategy for increasing the quality of food products in the Russian Federation up to 2030 (Order of the Government of the Russian Federation of 29 June 2016) included development of criteria for classifying food products with excessive added sugars, sodium, fats, saturated fatty acids and TFA. The criteria were based on an analysis of studies of the chemical composition of Russian food products and regulatory and technical documentation (national standards and technical specifications of manufacturers) for certain types of food products.

In relation to sodium (salt), the classification specified the maximum content in bread and bakery products (480 mg of sodium or 1200 mg of salt per 100 g of product) and for processed meat and fish products, as well as other solid food products (700 mg of sodium or 1750 mg of salt per 100 g of product or per 100 mL of liquid). The maximum content of TFA for all foods, with the exception of milk fat, is set at 2 g per 100 g of product.

To inform the public about the content of critical nutrients in particular foods, the Federal Service for Surveillance of Consumer Rights Protection and Human Wellbeing approved the recommendations of MR 2.3.0122-18 “Colour indication on the labelling of food products in order to inform consumers”. This project for voluntary labelling of food and beverages, known as “traffic light”, proposes that manufacturers colour-code food packaging according to the salt, sugar and fat content as specified in the aforementioned classification. The project was launched on 1 June 2018. Although food manufacturers have recently begun indicating the content of salt and added sugars on labels, colour labelling remains underutilized.

Policy proposals have been prepared and are currently under consideration by the Eurasian Economic Commission on development of draft amendments to the EAEU TR 022/2011 “Food products in terms of their labeling” regarding mandatory inclusion of the content of critically important nutrients (mono- and disaccharides, salt (sodium), fat, saturated fatty acids and TFA), on the labels of packaged food products, as well as the use of colour indications of nutritional value. The proposals also concerned development of a single database of the mandatory nutritional and energy values of food products traded on the EAEU market, with mandatory inclusion of all critically important nutrients.

Despite the progress made in implementation of the State Healthy Nutrition Policy, food consumption in the Russian Federation is characterized by (17):

- consumption of ≥ 400 g or more of vegetables and fruits daily by only 24–27% of the population and no regular consumption of vegetables and fruits by about 20% of children;
• a fat content of the diet of children and adults representing ≤ 38% of total energy intake;
• an added sugar content in diet representing ≤ 13–14% of total energy intake;
• high levels of salt in diets, with ≤ 13 g/day for adults and 7–9 g/day for children; and
• multiple vitamin insufficiency (lack of three vitamins or more) in 22% of the adult population and 40% of the child population.

The City of Moscow was selected for the study for several reasons:
• high proportions of deaths due to diseases of the circulatory system (55%) and neoplasms (22%) (2);
• high population density, an ethnically diverse population, and variations in income;
• a highly developed retail network, with wide representation of federal retailers and shops for population groups with different income levels;
• a wide range of food products, with products in the retail network produced both in the Moscow region and in other regions of the Russian Federation; and
• the availability of technical, logistical, laboratory and other material and technical support and qualified personnel for conducting all aspects of research in one region.

The percentage of household consumer spending on food in Moscow has not changed significantly over time, rising from 20.3% in 2009 to 21% in 2019, while the percentage of spending on eating out increased by 1.3 times, from 3.7% in 2009 to 4.9% in 2019 (18).

The retail market for food products has, however, changed significantly over the past 20 years. In 2000, 67% of the population bought foods in traditional food shops and on farmers’ markets, 29% in minimarkets and 4% in supermarkets, while, in 2018, only 30% shopped in traditional food shops or on farmers’ markets, 23% bought food products in minimarkets (e.g. Avoska, Magnolia, Vkusvill), 20% in discount shops (e.g. Magnit, Dixie, Pyaterochka), 17% in supermarkets, and 10% in hypermarkets (19). Similar trends are observed in Moscow, where food trade is possible only in organized places under the strict control of the Federal Service for Surveillance of Consumer Rights Protection and Human Wellbeing. Spontaneous street trading of ready-to-eat products has long ceased to exist.

In the past several years, culinary departments in supermarkets (e.g. Auchan, Perekrestok, Victoria, Azbuka Vkusa), commonly known as kulinariya (кулинария), have become particularly popular among Moscow residents. These departments offer a wide variety of freshly made dishes, including soups, salads, main dishes and desserts. The food is usually prepared on site by professional chefs and can be bought either hot and ready to eat or cold for later consumption. This trend may be attributed to the constantly accelerating pace of life in the city, as it allows people to save time on cooking. Despite the perceived advantages (especially for households with only a few family members), these dishes may contribute to excessive consumption of energy and critical nutrients such as salt (sodium), fat, saturated fatty acids and TFA, as they are usually unlabelled, and it is difficult to obtain information on their nutritional value and composition.

In view of the contribution of sodium (salt) and TFA to the risk of NCDs and the absence of representative data on their content in commonly available foods in the Russian Federation, data on the actual content of sodium and TFA in packaged food products and prepared dishes sold in retail grocery shops and public catering outlets are relevant. Therefore, a study was conducted by the Federal Research Centre of Nutrition and Food Safety to obtain information on the availability of foods, their nutritional composition and current labelling practices, in collaboration with WHO. Although the study was conducted in Moscow, the findings are expected to be broadly representative of the entire country, especially for packaged items. This first study of the levels of sodium, TFA and potassium in widely available foods in the Russian Federation and of nutrition labelling should provide valuable insights for decision- and policy-makers for nutrition.
2. Objectives of the study

The aim of this study was to characterize the food environment in Moscow. The specific objectives were to:

• analyse the labelling of food products sold in supermarkets;
• assess the TFA, sodium and potassium contents of selected packaged foods sold in retail grocery shops; and
• assess the TFA, sodium and potassium contents of selected fast-food products.

3. Methods

Data were collected and samples purchased in July 2019–July 2020. Laboratory analysis, data analysis and preparation of the report were postponed until late 2020 due to re-profiling of the laboratory and medical staff of the implementing agency for control of the coronavirus disease (COVID-19) pandemic.

3.1 Sampling of retail grocery shops and fast-food outlets

Moscow is divided into 12 administrative okrugs (Fig. 1) and 125 districts.

In the first step, three okrugs were selected randomly with a program provided by the WHO Regional Office for Europe. One district was randomly selected from each chosen okrug, and one retail grocery shop in each of three districts of the administrative okrug was randomly selected for assessment.

Fig. 1. Map of Moscow

[Map of Moscow showing administrative okrugs 1 to 12]
In the next step, 9 of 125 districts of Moscow were randomly selected with the randomization program provided by the WHO Regional Office for Europe for sampling packaged and prepared foods. The following districts were selected: Bogorodskoye, Severnoye Izmajlovo, Troparevo-Nikulino, Ostankinskiy, Khoroshevsksiy, Vykhino-Zhulebino, Yuzhnoportovoy, Yasenevo and Orekhovo-Borisovo Severnoye. The demographics of these districts are similar to those of the entire city (Annex 1, Table A1.1).

One retail grocery shop in each district was selected randomly. The shops belonged to different network retailers, were of different sizes and had different targeting strategies (discount, minimarkets and supermarkets). Most of the shops belong to large retail networks that operate all over the country, the number of outlets ranging from 70 to over 18 000 (Annex 1, Table A1.2).

Four chains of fast-food restaurants with the largest market share were identified and selected for sample purchasing (Annex 1, Table A1.3).

3.2 Sampling of food products

Field researchers visited the selected shops and also accessed their Internet sites to record the numbers of individual food products within food categories. A database of food products was developed based on an adapted classification of the Codex General Standard for Food Additives (Codex STAN 192-1995). Each item was photographed and entered into the database, including the name of the product on the label, price per unit, price per kilogram, brand name, name of the food category in the food categorization system, manufacturer, country of origin, ingredients, weight (g), volume (mL), type of packaging, packaging material, energy value (kcal/100 g), protein (g/100 g), fats (g/100 g), TFA (g/100 g), saturated fats (g/100 g), carbohydrates (g/100 g), sugars (g/100 g), salt (g/100 g) and dietary fibre (g/100 g).

A total of 2886 items was included. The database did not include natural mono-products, products that do not contain table salt and/or TFA (for example, fresh fruits and vegetables, frozen raw fish, drinking-water). Milk and dairy products comprised 25.8% of items in the database, meat products 19.9%, fish and fish products 12.7%, bread and bakery products 8.3%, cereal-based products 7.2%, processed (e.g. preserved, tinned) fruits and vegetables 6%, salts, spices, dry soups and salads 7.3%; ready-to-eat snacks 5.2%, oil and fat products 3.7%, and confectionery 0.69%.

The combined data were used to identify the most commonly available foods by ranking the frequency with which they were observed in supermarkets, by group and category. The number of products to be sampled per group and category was determined by the study coordinator and WHO, depending on the total number of collected samples and their probable relevance for analysis of sodium and iTFA content.

Three to five foods in each group from different manufacturers in different retail chains were purchased. As each chain has its own suppliers and assortment, depending on the demand in a given area and in a given price category, this approach ensured maximum coverage of the main manufacturers of a certain product category.

The samples of prepared foods purchased in culinary departments of each retail grocery shop were: Olivier salad, fried chicken (one piece), meat under a cheese crust, and chicken Kiev.

Samples of packaged food products were purchased from five different retail grocery shops, and prepared foods from eight different shops (Annex 1, Table A1.4).

3.3 Processing and laboratory analysis of food samples

All samples were photographed and then homogenized, and the moisture content was determined. Control samples were frozen for subsequent testing.
Measurement of TFA

Fat was extracted in a chloroform:methanol mixture (2:1 v:v) to quantify the fatty acid profile of the food products (except for butter, the fat content of which was analysed after separation of water and fat in a drying chamber at 75 °C). Methylation was performed with a 2% methanolic solution of acetyl chloride. Then, fatty acids were extracted into hexane and analysed on a gas chromatograph 7890A (Agilent Technologies, USA). Identification of fatty acids and calculation of response rates were conducted with reference mixture FAME 37 component mix, linolenic acid methyl ester isomer mix and linoleic acid methyl ester mix cis/trans. The content of trans-isomers of fatty acids in mg/100 g of product was calculated with reference to the labelled content of total fat. The calculations were based on the peak areas of the following acids: elaidic (C 18:1 9-trans), vaccenic (C18:1 11-trans), iso-octadecadienoic (C18:2 9-trans, 12-trans), cis-, trans-linolic (C18:2 9-cis, 12-trans), trans-, cis-linolic (C18:2 9-trans, 12-cis).

Measurement of sodium and potassium

Sodium, potassium, calcium and magnesium were measured by atomic absorption spectrometry in a diluted sample to which caesium chloride was added for matrix modification to prevent partial metal flame ionization during measurement of sodium and potassium. Sample preparation and pressure decomposition were conducted by ignition in a muffle furnace until a constant ash weight was achieved. The sample was then stood for 12 h, devolatilized and diluted in water to the required volume. Standard reference samples of aqueous solutions of sodium, potassium, magnesium and manganese were also prepared. Calibrated solutions and sample solutions were assayed in accordance with the spectrometer specifications.

Food products that do not contain salt, such as confectionery and creams, were excluded from sodium analysis. As the measurement error in determining TFA exceeds 50% for products with a low fat content, these quantitative results were not considered. The contribution of products with a fat content representing < 1% of the total intake of TFAs is comparable to the measurement error in their determination by traditionally accepted methods.

3.4 Statistical analysis

The food environment in Moscow was characterized by descriptive statistics. The TFA, sodium and potassium contents of each food are presented as means and ranges per serving and as the mean proportion of the recommended intake of each nutrient. The percentage of TFA in total fat was also determined. Mean serving sizes were calculated from data on mean consumption by food category, pack or portion size and subsequent expert consensus.

3.5 Strengths and limitations of the study

This first study in the Russian Federation of nutrition labelling and the levels of trans fats, salt and potassium in food products included the most commonly available food products in supermarkets of various sizes and clientele, ensuring a comprehensive analysis of the entire market. The findings are expected to be broadly representative of the country, as most food shops and fast-food outlets are also present in other regions of the Russian Federation.

As the cross-sectional nature of the study does not account for changes in product assortment, the results might be applicable only to the time at which the products were analysed. Although the study included different chains with shops and outlets across the country and the most commonly available foods from various manufacturers, this approach may not provide a complete picture of the market or consumer behaviour and may be applicable only to the specific region of Moscow. Additionally, the sample size may not have been sufficient to draw reliable conclusions about the nutritional composition and labelling of the products in different food categories.
4. Results

4.1 Nutrition labelling

Analysis of the labelling of packaged food products in the database showed strict observance of the main mandatory requirements for information on product labels (e.g. ingredients, nutritional and energy values, name and address of the manufacturer, country of origin). The labels on all 2886 items contained information on the energy value of the product and the protein, fat and carbohydrates content.

Manufacturers included the distinctive features of food products only rarely. For example, only 3.1% of products were marked with a colour indicating the content of critical nutrients according to the “Traffic light” system. Few manufacturers provided information on the content of salt (1.1%), sugar (4%), saturated fat (1%) or TFA (0.14%) on the label in addition to the mandatory indications of proteins, fats and carbohydrates.

To highlight the distinctive features of products, manufacturers tended to use so-called “nutrient claims” and “health claims”. The labels of about 2% of products included “nutrient claims”, some informing the consumer about the absence or reduced content of certain nutrients, such as sugar, salt and saturated fat. Some of the product labels included claims such as “protein-rich” and “rich in vitamins and minerals”, which complies with Technical regulations TR CU 022/2011, “Food products in terms of their labelling”. Manufacturers are more willing to include statements about the absence of ingredients that are negatively perceived by consumers, such as certain food additives (e.g. sodium glutamate, dyes, preservatives), genetically modified sources, palm oil and soy. Statements about how “natural” (or “pure”) a product or its ingredients are were also used, although use of such statements is not clearly regulated by TR CU 022/2011 and may mislead consumers.

4.2 Nutritional composition of foods

4.2.1 Packaged food products

Detailed information on the TFA, sodium and potassium content of packaged food products by food category is presented in Annex 2.

The mean TFA content per serving was highest in chocolate-glazed Neapolitan wafer cake (1356 mg), tinned fish products (1136 mg; particularly, tinned cod liver, 2067 mg) and frozen pelmeni (666 mg), corresponding to 61.0%, 51.1% (93.0%) and 30.0% of the recommended maximum daily TFA intake, respectively. The mean TFA content per serving was lowest in salted crackers (53 mg), popcorn (63 mg) and dried seaweed (69 mg), corresponding to 2.4%, 2.8% and 3.1% of the recommended maximum daily TFA intake, respectively. The percentage TFA in total fat was highest in chocolate-glazed Neapolitan wafer cake (15.0%), cheese snacks (5.3%) and tinned fish products (5.1%) (tinned cod liver in particular).

The highest mean sodium content per serving was found in fish snacks (7460 mg), sunflower seeds (4110 mg) and salted, smoked delicatessen fish (2655 mg), corresponding to 373.0%, 205.5% and 132.7% of the recommended maximum daily intake, respectively. Chocolate-glazed cottage cheese bars (26 mg), dessert spreads (36 mg) and margarine/spreads (47 mg) contained the lowest mean weight per serving, corresponding to an average of 1.3%, 1.8% and 2.4% of the maximum daily recommendation, respectively.

The mean potassium content per serving was highest in sunflower seeds (1240 mg), fish snacks (640 mg) and instant soups (619 mg), corresponding to 35.3%, 18.2% and 17.6% of the recommended minimum daily potassium intake. The mean potassium content per serving was lowest in butter (6.5 mg), margarine and spreads (6 mg) and mayonnaise (7.4 mg), corresponding to 0.2% of the daily recommended minimum intake for potassium.
4.2.2 Prepared foods

Detailed information on the TFA, sodium and potassium content in prepared foods is presented in Annex 3.

The highest mean amounts of TFA per serving were found in chicken Kiev (725 mg), Olivier salad (616 mg) and fried chicken (544 mg), corresponding to 32.6%, 27.7% and 24.5% of the recommended maximum daily TFA intake, respectively. The mean TFA content was lowest in “healthy meals” (which included green buckwheat with vegetables and a steamed poultry cutlet) (248 mg) and soups (324 mg), accounting for 11.1% and 14.6% of the recommended maximum daily TFA intake, respectively.

Prepared foods with the highest mean sodium content per serving were soups (1607 mg), salads (812 mg) and fried chicken (875 mg), accounting for 80.4%, 40.6% and 43.7% of the recommended maximum daily intake, respectively. Chicken Kiev (451 mg) and meat with a cheese crust (499 mg) had the lowest mean sodium content per serving, corresponding to averages of 22.6% and 24.9% of the maximum daily recommendation, respectively.

The mean potassium content per serving was highest in fried chicken (974 mg) and “healthy meals” (743 mg), corresponding to 27.7% and 21.2% of the recommended minimum daily potassium intake. The mean potassium content per serving was lowest in meat with a cheese crust (449 mg) and soups (478 mg), corresponding to 12.8% and 13.6% of the daily recommended minimum intake.

4.2.3 Fast food

Detailed information on the TFA, sodium and potassium content in fast food is presented in Annex 3.

The mean TFA content per serving was highest in burgers (746 mg), corresponding to 33.6% of the recommended maximum daily TFA intake; the TFA content per serving in other fast foods did not exceed 10% of the maximum intake. The mean TFA content was lowest in sauces (89 mg), at 4.0% of the recommended maximum daily TFA intake. A similar trend was seen in the percentage of TFA per total fat, the highest value being 3% in burgers, followed by chicken Kiev (2.5%).

The highest mean sodium contents per serving were found in kroshka-kartoshka (2149 mg), burgers (1320 mg) and nuggets (1130 mg), corresponding to 107.4%, 66.0% and 56.5% of the recommended maximum daily intake, respectively. Pies (236 mg) and sauces (322 mg) had the lowest mean sodium content per serving, corresponding to averages of 11.8% and 16.1% of the maximum daily intake, respectively.

The mean potassium content per serving was highest in burgers (751 mg) and French fries (619 mg), corresponding to 21.4% and 17.6% of the recommended minimum daily intake. The mean potassium content per serving was lowest in sauces (33 mg) and pies (82 mg), corresponding to 0.9% and 2.3% of the recommended minimum intake.

4.2.4 Summary and discussion

Analysis of the results for the amount of TFA per serving indicated that one serving of each of several packaged food products commonly available in retail grocery shops, such as frozen pelmeni, chebureki and kotlety, as well as various types of sausage, contained almost one third of the maximum TFA intake of 2.2 g/day, and one serving of tinned cod liver accounted for over 90% of the maximum TFA intake. Several types of dessert also had relatively high TFA levels per serving (e.g. wafer cake, 61% of the maximum daily recommended intake; chak-chak, 25%; ice cream, 22%). Other potential sources of TFA identified in the analysis were a serving of burgers sold in fast-food restaurants (34% of the daily recommended maximum intake) and some prepared dishes offered in culinary departments (e.g. chicken Kiev, 33%; salads, 28%).

The results also showed that 51% of the selected samples met the WHO established criteria for the maximum iTFA level of 2 g per 100 g of all fats and oils in all foods. A relatively high content of TFA was found in several meat and fish products, which contained more than 5% of the total fat content, according to the literature on
the fatty acid composition of animal fat. The only food product of non-animal origin in which the content of TFA exceeded the established maximum level was chocolate-glazed Neapolitan wafer cake (4.5 g TFA per 100 g of product), which is due to use of cocoa butter substitutes.

In the analysis of sodium content per serving, about 30% of all the foods analysed contained more than half of the WHO recommended maximum intake (2000 mg sodium per day) per serving, while some foods exceeded this level considerably (dried fish snacks, by 373%; sunflower seeds, by 206%). Many packaged meat products (e.g. frozen kotlety, nuggets, pelmeni, various types of sausage) and pickled products that are common features of the Russian diet were found to contain 50–80% of the recommended maximum daily intake of sodium per serving. The mean sodium content per serving in a dish served in one fast-food outlet (Kroshka-kartoshka) also exceeded the maximum daily intake by about 7%. Soups sold in supermarket culinary departments and some other fast foods (burgers, nuggets) contained more than half the maximum daily intake.

In most of the selected samples of packaged meat products (with the exception of some samples of snacks and frozen semi-finished products), the amount of sodium significantly exceeded 700 mg per 100 g, the established maximum level for classifying a product as having an excess sodium content. In a number of samples of boiled and smoked kolbasa, the excess was almost 3.5 times. Most samples of packaged fish products also contained excess sodium. The sodium content was 10 000–15 000 mg per 100 g of fish snacks (dried fish), more than 5000 mg per 100 g in meat chips, and more than 4000 mg per 100 g in salted sunflower seeds. In dairy products, excess sodium was found in one cheese sample and in all samples of processed cheese. The sodium content of samples of wheat bread did not exceed the established maximum level of 480 mg per 100 g; however, in two samples of rye bread, an average excess of 30% was observed. Excess sodium content was also common in puff pastry products (500–1000 mg per 100 g) and tinned fruits and vegetables (900–2300 mg per 100 g).

Excess sodium was not observed in prepared foods sold in the culinary departments of supermarkets (with the exception of one sample of Korean carrot salad), while analysis of fast-food products showed that a product as popular as French fries contained sodium at a level equal to or greater than the maximum recommended (mean, 731 mg per 100 g). Similar levels of sodium were observed in some burgers and in all samples of chicken nuggets and other types of breaded chicken meat (796–1019 mg per 100 g).

The mean potassium content per serving represented about 6% of the WHO-recommended daily intake from industrial food products and 14% of that from prepared and fast-food products.

Overall, the results of the nutritional composition analysis showed that some food products offered in retail grocery shops and fast-food outlets contribute significantly to the amounts of TFA and sodium in the diet if eaten regularly, exceeding the WHO recommendations for daily consumption of these nutrients. Sodium is of particular concern, as its level in the groups of packaged food products and some categories of prepared and fast foods was equal to or exceeded the established maximum content, thus classifying the foods as having excess sodium.

5. Conclusions

- The high TFA and sodium levels in a considerable number of foods offered in retail grocery shops and fast-food outlets in Moscow raise concern, as many of these foods are eaten regularly by the Russian population in general and Moscow citizens in particular, possibly resulting in excessive intake of nutrients that are harmful to health.
- Practical policies to make the food environment healthier should be integrated into established policies, such as those for preventing diet-related NCDs, which may include an introduction of regulations, monitoring and changing behaviour to adopt healthy diets and lifestyles and prevent obesity.
6. Policy implications

6.1 Nutrition labelling

Nutrition labelling could contribute to making consumers aware of the nutritional content of foods and contribute to informed food choices. Possible courses of actions include:

• mandatory declaration of the content of nutrients such as salt (sodium), mono- and disaccharides, fat and saturated fatty acids, and TFA in all foods, with interpretive front-of-pack nutrition labelling (e.g. colour indication) (a proposal for an amendment is currently being considered by the Eurasian Economic Commission);
• mandatory nutrient declarations on prepared foods sold in the culinary departments of shops and on meals offered in fast-food restaurants; and
• a survey of nutrition labelling (nutrient declarations and back-of-pack labelling) of packaged foods and beverages in order to characterize the situation.

It will be important to ensure effective collaboration among members of the EAEU in order to facilitate implementation of mandatory nutrient declarations and to change use of front-of-pack nutrition labelling from voluntary to mandatory. WHO recommendations, including guidance provided in the WHO manual, for front-of-pack nutrition labelling (20), may be taken into consideration.

6.2 Elimination of iTFA from the food supply

As a member of the EAEU, the Russian Federation has adopted a technical regulation on fats and oils in food products, which prohibits a TFA content of > 2 g/100 g of fat. This regulation was introduced to commit EAEU members to limiting the availability and use of TFA in food products.

• As an immediate step, a study could be conducted to estimate the number of additional deaths in the Russian Federation due to gaps in the TFA policy.
• A baseline assessment of the TFA content of the food supply and monitoring changes in the TFA content of food over time should be considered, as proposed in module 4 of the WHO REPLACE package (8).
• A workshop with participation of representatives of the Eurasian Economic Commission and countries in the EAEU to discuss implementation of WHO best-practice TFA policy could inform decision-makers and obtain the required political commitment.
• To improve compliance with the legislation, the Government might consider additional measures to encourage processors and manufacturers to use healthier oils (e.g. for frying or in pastry preparation). Increasing the availability and affordability of healthier oils for use by manufacturers could significantly change dietary intake, as seen in other contexts (21).
• To achieve the expected reduction in the burden of NCDs, further strengthening of preventive measures through the above steps would be beneficial. WHO-recommended best-practice TFA policy includes: (i) a mandatory national limit of 2 g of iTFA per 100 g of total fat in all foods; and (ii) a mandatory national ban on the production or use of partially hydrogenated oil as an ingredient in all foods. The WHO REPLACE package could be applied to eliminate iTFA (8).

6.3 Reduction of salt consumption

Reduction of salt consumption is one of the most effective measures for reducing preventable mortality from NCDs.
• As a next step, implementation of 24-h urine collection surveys in the Russian Federation at regular intervals would provide the actual sodium intake of the population.

• In view of the high levels of sodium in the food products surveyed, salt reduction targets are necessary. The Government could adopt national targets for sodium in various food categories by applying the WHO-recommended global benchmarks for sodium (22), as successfully implemented in many countries (23). Adapting sodium targets for various food categories would require collaboration among the members of the EAEU. The limit would apply to all foods on the market, including in retail grocery shops and fast-food outlets. The legislation would be consistent with and complement other legislation for food security and nutrition and would not undermine initiatives such as salt iodization.

• Another strategy would be to increase the awareness of manufacturers, fast-food restaurants and culinary departments in retail grocery shops of the association between salt and health and encourage them to use less salt and replace it with flavourings such as herbs and spices.

• A country support package to reduce population salt intake in the WHO European Region includes strategies, tools and relevant examples that could be used by authorities to introduce effective salt reduction strategies (24).

6.4 Cross-cutting recommendations

Strong Government leadership and regular monitoring are necessary to ensure the success of the policies described above. Explanatory sessions could be organized with representatives of the food industry, particularly the meat, fish and confectionery industries, and with industry research organizations under the Ministry of Education and Science and the Ministry of Agriculture, to promote cooperation in joint development of measures and technological solutions to reduce the content of sodium and TFA in food products.

Food suppliers (e.g. manufacturers of oils and fats used in freshly prepared products, wholesale producers, manufacturers of breads, pastries and confectionary, savoury snacks, drinks and processed meats) should be engaged in implementation of both salt reduction and iTFA elimination policies, with monitoring of their compliance with regulations and guidance. Development of a single database of food products traded on the EAEU market and their nutrient values, with mandatory inclusion of data on all nutrients, could be useful.

The general population could be targeted by:

• development of methodological and information materials to foster a healthy food culture and to reduce the consumption of food products with a high content of fat, salt and sugar, with communication strategies and campaigns to achieve maximum coverage and uptake; and

• introduction of healthy lifestyle educational programmes for various population groups in the Russian Federation.
References


# Annex 1. Description of selected districts, retail grocery shops and fast-food restaurants

## Table A1.1. Characteristics of selected districts

<table>
<thead>
<tr>
<th>District name</th>
<th>Administrative okrug</th>
<th>Population (1000)</th>
<th>No. of retail grocery shops</th>
<th>No. of public catering outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bogorodskoye</td>
<td>Eastern</td>
<td>109.3</td>
<td>101</td>
<td>79</td>
</tr>
<tr>
<td>Severnoye Izmailovo</td>
<td>Eastern</td>
<td>87.6</td>
<td>102</td>
<td>93</td>
</tr>
<tr>
<td>Troparevo-Nikulino</td>
<td>Western</td>
<td>124.2</td>
<td>97</td>
<td>192</td>
</tr>
<tr>
<td>Ostankinskiy</td>
<td>North-eastern</td>
<td>63.5</td>
<td>69</td>
<td>113</td>
</tr>
<tr>
<td>Khoroshevskiy</td>
<td>Northern</td>
<td>173.6</td>
<td>166</td>
<td>144</td>
</tr>
<tr>
<td>Vykhino-Zhulebino</td>
<td>South-eastern</td>
<td>225.2</td>
<td>307</td>
<td>190</td>
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<tr>
<td>Yuzhnoportovy</td>
<td>South-eastern</td>
<td>74.7</td>
<td>128</td>
<td>83</td>
</tr>
<tr>
<td>Yasenevo</td>
<td>South-western</td>
<td>177.9</td>
<td>73</td>
<td>145</td>
</tr>
<tr>
<td>Orekhovo-Borisovo Severnoye</td>
<td>Southern</td>
<td>132.3</td>
<td>93</td>
<td>106</td>
</tr>
</tbody>
</table>

## Table A1.2. Description of retail grocery shops randomly selected for evaluation

<table>
<thead>
<tr>
<th>Supermarket code letter</th>
<th>No. of retail outlets in the Russian Federation*</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>196</td>
<td>Minimarket of the Moscow regional network retailer</td>
</tr>
<tr>
<td>B</td>
<td>69</td>
<td>Supermarket of the mass retailer network with outlets in Moscow and Kaliningrad regions</td>
</tr>
<tr>
<td>C</td>
<td>1700</td>
<td>Minimarket within walking distance of a chain retailer with outlets across the country</td>
</tr>
<tr>
<td>D</td>
<td>2333</td>
<td>Discount shop of a mass retailer network with outlets in the Central, North-Western and Ural Federal Districts</td>
</tr>
<tr>
<td>E</td>
<td>18 320</td>
<td>Discount shop of a mass retailer network with outlets across the country</td>
</tr>
<tr>
<td>F</td>
<td>1352</td>
<td>Minimarket for middle- and upper-class consumers with an emphasis on healthy food, with outlets across the country</td>
</tr>
<tr>
<td>G</td>
<td>160</td>
<td>Supermarket of a multinational retail group with outlets across the country</td>
</tr>
<tr>
<td>H</td>
<td>983</td>
<td>Supermarket of the leading network retailer with outlets across the country</td>
</tr>
<tr>
<td>I</td>
<td>173</td>
<td>Supermarket for middle- and upper-class consumers with an emphasis on healthy food with outlets in Moscow and Saint Petersburg regions</td>
</tr>
</tbody>
</table>


## Table A1.3. Description of selected fast-food outlets

<table>
<thead>
<tr>
<th>Fast-food outlet code letter</th>
<th>No. of outlets in the Russian Federation*</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>736</td>
<td>Global chain of fast-food restaurants specializing in burgers</td>
</tr>
<tr>
<td>K</td>
<td>809</td>
<td>Multinational fast-food chain specializing in burgers and French fries</td>
</tr>
<tr>
<td>L</td>
<td>1025</td>
<td>Fast-food restaurant chain specializing in chicken products</td>
</tr>
<tr>
<td>M</td>
<td>197</td>
<td>Russian chain of fast-food cafes specializing in Russian cuisine based on baked potatoes</td>
</tr>
</tbody>
</table>

* Fast food market leaders continue to expand amid the pandemic. Moscow: RBC Market Research; 2022 (https://marketing.rbc.ru/articles/13201/).

## Table A1.4. Retail grocery shops and fast-food outlets selected for sample purchases

<table>
<thead>
<tr>
<th>Packaged food products</th>
<th>Prepared foods</th>
<th>Fast foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>B</td>
<td>J</td>
</tr>
<tr>
<td>E</td>
<td>C</td>
<td>K</td>
</tr>
<tr>
<td>F</td>
<td>D</td>
<td>L</td>
</tr>
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<td>G</td>
<td>E</td>
<td>M</td>
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<td>F</td>
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<tr>
<td>G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex 2. *trans*-Fatty acids, sodium and potassium content of packaged food products

Table A2. *trans*-Fatty acids, sodium and potassium content of packaged food products

<table>
<thead>
<tr>
<th>Food category*</th>
<th>No. of samples</th>
<th>Mean serving size (g)</th>
<th><em>trans</em>-Fatty acids</th>
<th>Sodium</th>
<th>Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (min–max) mg/serving</td>
<td>Proportion of recommended level (% of total fats)</td>
<td>Mean (min–max) mg/serving</td>
<td>Proportion of recommended level (% of total fats)</td>
</tr>
<tr>
<td><strong>Meat products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sausages and sardelki</td>
<td>5</td>
<td>98.7</td>
<td>634.5 (311.8–901.9)</td>
<td>28.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Boiled and smoked kolbass</td>
<td>5</td>
<td>70.2</td>
<td>656.5 (289.8–927)</td>
<td>29.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Ready-to-eat meat snacks</td>
<td>4</td>
<td>77.6</td>
<td>422 (8.5–1171.6)</td>
<td>19.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Frozen chebureki</td>
<td>4</td>
<td>143.5</td>
<td>640.7 (419.0–806.5)</td>
<td>28.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Frozen nuggets</td>
<td>4</td>
<td>143.5</td>
<td>222.4 (169.3–282.7)</td>
<td>10.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Frozen pelmeni</td>
<td>4</td>
<td>143.5</td>
<td>665.9 (380.3–1224.1)</td>
<td>30.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Frozen kotlety</td>
<td>3</td>
<td>143.5</td>
<td>431.5 (238.2–704.6)</td>
<td>19.4</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Fish products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickled herring</td>
<td>4</td>
<td>85.5</td>
<td>- - -</td>
<td>1915.6 (1656.4–2209.3)</td>
<td>95.8</td>
</tr>
<tr>
<td>Salted, smoked delicatessen fish</td>
<td>5</td>
<td>85.5</td>
<td>253.0</td>
<td>11.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Salted fish caviar</td>
<td>4</td>
<td>28.6</td>
<td>106.4 (8.6–144.4)</td>
<td>4.8</td>
<td>1.9</td>
</tr>
<tr>
<td>Semi-finished fish products</td>
<td>4</td>
<td>79.6</td>
<td>93.8 (30.3–172.8)</td>
<td>4.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Tinned fish products</td>
<td>4</td>
<td>68.0</td>
<td>1136.1 (162.2–2406.8)</td>
<td>51.1</td>
<td>5.1</td>
</tr>
<tr>
<td><strong>Dairy products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-hard cheese with 45% mass fraction of fat</td>
<td>4</td>
<td>48.7</td>
<td>479.7 (416.2–583.8)</td>
<td>21.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Processed cheese</td>
<td>6</td>
<td>48.7</td>
<td>292.6 (179.3–481.5)</td>
<td>13.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Chocolate-glazed cottage cheese bar</td>
<td>5</td>
<td>50.0</td>
<td>265.9 (116.0–461.0)</td>
<td>12.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Ice cream</td>
<td>4</td>
<td>102.9</td>
<td>407.3 (332.6–644.2)</td>
<td>22.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Butter</td>
<td>1</td>
<td>19.7</td>
<td>390.0</td>
<td>17.5</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Bakery products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rye bread</td>
<td>4</td>
<td>106.1</td>
<td>- - -</td>
<td>567.9 (422.1–672.4)</td>
<td>28.4</td>
</tr>
<tr>
<td>Wheat bread</td>
<td>5</td>
<td>109.5</td>
<td>- - -</td>
<td>448.4 (377.9–498.4)</td>
<td>22.4</td>
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<tr>
<td>Salted crackers</td>
<td>5</td>
<td>32.9</td>
<td>53.1 (17.1–114.2)</td>
<td>2.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Frozen dough</td>
<td>4</td>
<td>80.0</td>
<td>297.4 (148–616.8)</td>
<td>13.4</td>
<td>2.2</td>
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<tr>
<td>Puff pastry products</td>
<td>4</td>
<td>68.2</td>
<td>277 (147.4–546.5)</td>
<td>12.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Food category</td>
<td>No. of samples</td>
<td>Mean serving size (g)</td>
<td>Mean (min-max) mg/serving</td>
<td>Proportion of recommended level (%)</td>
<td>% of total fats</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>-----------------------</td>
<td>---------------------------</td>
<td>-------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Confectionery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chocolate–glazed Neapolitan wafer cake</td>
<td>4</td>
<td>30.0</td>
<td>1356 (1192.5–1515)</td>
<td>61.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Wafers and waffles</td>
<td>4</td>
<td>44.6</td>
<td>104.7 (5.3–204.6)</td>
<td>4.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Dessert spreads</td>
<td>5</td>
<td>47.4</td>
<td>316.4 (173.1–691.1)</td>
<td>14.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Chok–chok (deep–fried)</td>
<td>3</td>
<td>87.5</td>
<td>559.7 (372.9–708.2)</td>
<td>25.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Chocolate candy</td>
<td>4</td>
<td>39.3</td>
<td>104.8 (73.5–186.6)</td>
<td>4.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Fat and oil products</td>
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<td>Mayonnaise</td>
<td>4</td>
<td>19.1</td>
<td>218.5 (137.8–312.9)</td>
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<td>1.8</td>
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<td>Margarine and spreads</td>
<td>6</td>
<td>21.6</td>
<td>224.1 (159.2–338.6)</td>
<td>10.1</td>
<td>1.5</td>
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<td>Fruit and vegetable products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickled cucumbers</td>
<td>4</td>
<td>93.5</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Pickled mushrooms</td>
<td>2</td>
<td>80.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Sour cabbage</td>
<td>2</td>
<td>110.6</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Dried seaweed</td>
<td>4</td>
<td>70.8</td>
<td>68.7 (65.5–71.9)</td>
<td>3.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Snacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish snacks</td>
<td>2</td>
<td>55.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Meat snacks</td>
<td>1</td>
<td>25.0</td>
<td>99.5</td>
<td>4.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Cheese snacks</td>
<td>1</td>
<td>23.0</td>
<td>280.4</td>
<td>12.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>1</td>
<td>100.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Crisps</td>
<td>1</td>
<td>82.9</td>
<td>321.7</td>
<td>14.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Instant foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instant soups</td>
<td>2</td>
<td>160.0</td>
<td>93.7 (60.2–127.3)</td>
<td>4.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Instant second course dishes</td>
<td>3</td>
<td>44.3</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cereals</td>
<td>4</td>
<td>37.5</td>
<td>150.6 (101.2–200.0)</td>
<td>6.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Popcorn</td>
<td>3</td>
<td>45.0</td>
<td>63.1 (17.6–88.2)</td>
<td>2.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>

* Proportions of WHO-recommended levels were computed for an average adult with an intake of 2000 kcal. WHO-recommended intake: TFA: < 1% total energy value/day; sodium: < 2000 mg/day; potassium: ≥ 3510 mg/day
### Annex 3. *trans*-Fatty acids, sodium and potassium content in prepared foods and fast foods

Table A3. *trans*-Fatty acids, sodium and potassium content in prepared foods and fast foods

<table>
<thead>
<tr>
<th>Food category</th>
<th>No. of samples</th>
<th>Mean serving size (g)</th>
<th>trans-Fatty acids</th>
<th>Sodium</th>
<th>Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean (min–max)</td>
<td>Proportion of recommended level (%)</td>
<td>% of total fats</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mg/serving</td>
<td>(%)</td>
<td></td>
</tr>
<tr>
<td>Prepared foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soups</td>
<td>5</td>
<td>318.0</td>
<td>324.1 (100.9–503.1)</td>
<td>14.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Salads</td>
<td>7</td>
<td>185.7</td>
<td>615.6 (356–818)</td>
<td>27.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Fried chicken</td>
<td>5</td>
<td>200.0</td>
<td>544 (334–850)</td>
<td>24.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Meat with a cheese crust</td>
<td>4</td>
<td>127.5</td>
<td>467.8 (418–517.4)</td>
<td>21.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Healthy meals</td>
<td>2</td>
<td>160.0</td>
<td>247.5 (154.8–340.2)</td>
<td>11.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Chicken Kiev</td>
<td>4</td>
<td>137.5</td>
<td>725.4 (477–878.9)</td>
<td>32.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Fast food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French fries</td>
<td>3</td>
<td>105.3</td>
<td>176.5 (156.9–192.5)</td>
<td>7.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Burgers</td>
<td>3</td>
<td>233.0</td>
<td>745.7 (169.2–1159.2)</td>
<td>33.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Nuggets</td>
<td>3</td>
<td>125.3</td>
<td>218.3 (166.6–278.8)</td>
<td>9.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Pies</td>
<td>4</td>
<td>70.0</td>
<td>199.8 (126.4–245.7)</td>
<td>9.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Sauces</td>
<td>5</td>
<td>25.0</td>
<td>88.8 (77.8–103)</td>
<td>4.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Kroshka–kartoshka</td>
<td>2</td>
<td>320.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

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