Superior
Health Council

DIETARY GUIDELINES FOR THE BELGIAN ADULT POPULATION

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Federal Public Service Health, Food Chain Safety and Environment

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Superior Health Council

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Dietary guidelines for the Belgian adult population

In this scientific advisory report, which offers guidance to public health policy-makers, the Superior Health Council of Belgium provides Food Based Dietary Guidelines (FBDG) for the Belgian adult population.

This report aims at providing professionals in charge of health promotion and disease prevention with specific food based recommendations aiming at maintaining and promoting health for the general adult population.

This version was validated by the Board on
June - 2019[1]

SUMMARY

Diet and health, whilst closely intertwined, stand in a complex relation to each other. Since 1997, the Belgian Superior Health Council has published dietary guidelines aimed at helping the population adopt a healthy and balanced diet. These guidelines focus on nutrients and are used primarily by nutritionists and other healthcare professionals. The *Food Based Dietary Guidelines* (FBDG) in this document translate them into guidelines for every-day life, which is also more convenient for the consumer.

First of all, an inventory was drawn of the main diet-related health problems encountered in Belgium. A list was made of the foods involved, sorted by importance and starting with the foods which affect human health the most in the event of deficiencies or excess intakes.

The foods concerned were organised into groups, and the usual intake of these groups in the Belgian population was summed up in light of the results of the Food Consumption Survey conducted in this country in 2014.

Based on the above, practical guidelines were drawn up for different foods and eating patterns. They are mainly targeted at the adult, healthy population. Moreover, this advisory report also addresses sustainability considerations and social issues regarding the link between eating habits, health and well-being. It also looks at how to improve communication on nutrition with the target audience.

[1] The Council reserves the right to make minor typographical amendments to this document at any time. On the other hand, amendments that alter its content are automatically included in an erratum. In this case, a new version of the advisory report is issued.

The advisory report concludes with a few of the key messages that should be heeded the most in view of preserving and improving health, taking into account the link with the burden of disease:

- Eat at least 125 g of whole-grain products every day and replace refined products with whole-grain products.
- Eat 250 g of fruit every day and give preference to fresh fruit.
- Eat 300 g of vegetables daily (fresh or prepared) and diversify your choices according to seasonal availability.
- Eat legumes at least once a week.
- Eat 15 to 25 g of plain nuts or seeds (i.e. without salt or sweet coating) every day.
- Limit your salt intake.

Keywords and MeSH *descriptor terms*[2]

Mesh terms*	Keywords	Sleutelwoorden	Mots clés	Schlüsselwörter
Guideline	Food-based dietary guidelines	Voedingsaanbevelingen	Recommandations alimentaires	Ernährungsleitlinien
Health	Health	Gezondheid	Santé	Gesundheit
Food	Foods	Voedingsmiddelen	Aliments, denrées alimentaires	Lebensmittel
Nutrients	Nutrients	Voedingsstoffen, nutriënten	Nutriments	Nährstoffe
	Health relationship	Link met de gezondheid	Lien avec la santé	Gesundheitlicher Zusammenhang
Chronic disease	Chronic diseases	Chronische ziekten	Maladies chroniques	Chronische Krankheiten
Risk factors	Risk factors	Risicofactoren	Facteurs de risque	Risikofaktoren
Global burden of disease	Disease burden	Ziektelast	Charge de morbidité	Krankheitslast
	Food groups	Voedingsmiddelengroepen	Groupes alimentaires	Lebensmittelgruppen
	Food consumption	Voedselconsumptie	Consommation alimentaire	Lebensmittelkonsum
Feeding behaviour, food habits	Food consumption pattern	Voedingspatroon	Profil alimentaire	Ernährungsgewohnheiten
Primary prevention	Prevention	Preventie	Prévention	Prävention
Health promotion	Health promotion	Gezondheidspromotie	Promotion de la santé	Gesundheitsförderung
Communication	Communication	Communicatie	Communication	Kommunikation
	Sustainability	Duurzaamheid	Durabilité	Nachhaltigkeit
Social values	Social aspects	Sociale aspecten	Aspects sociaux	Soziale Aspekte
Food policy, Nutrition policy	Food policy, Nutrition policy	Voedingsbeleid	Politique alimentaire, politique nutritionnelle	Ernährungspolitik

MeSH (Medical Subject Headings) is the NLM (National Library of Medicine) controlled vocabulary thesaurus used for indexing articles for PubMed http://www.ncbi.nlm.nih.gov/mesh.

[2] The Council wishes to clarify that the MeSH terms and keywords are used for referencing purposes as well as to provide an easy definition of the scope of the advisory report. For more information, see the section entitled "methodology".

CONTENTS

ABBREVIATIONS

En. %	percentage of the total energy intake.
AICR	American Institute for Cancer Research
AJR	Recommended Daily Allowance
ANSES	*Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail* (French Agency for Food, Environmental, and Occupational Health and Safety)
CVA	Cerebrovascular accident (stroke)
BMI	Body Mass Index
COPD	Chronic Obstructive Pulmonary Disease
SHC	Superior Health Council
DALY	Disability-Adjusted Life Years
DASH	Dietary Approaches to Stop Hypertension
DHA	Docosahexaenoic Acid
DM	Diabetes mellitus
FCS	Food Consumption Survey
EFSA	European Food Safety Authority
EHN	European Heart Network
EPA	Eicosapentaenoic Acid
FAO	Food and Agriculture Organization
FBDG	Food Based Dietary Guidelines
Fe	Iron
GBD	Global Burden of Disease
Gr	*Gezondheidsraad* (Health Council)
ICD	International Statistical Classification of Diseases and Related Health Problems
IHME	Institute for Health Metrics and Evaluation
IoM	Institute of Medicine (US)
IOTF	International Obesity Task Force
IPH	Scientific Institute of Public Health (Since April 1st, 2018: federal research centre Sciensano)
LDL	Low-Density Lipoprotein
LDL-C	LDL-cholesterol
IHD	Ischaemic heart disease
CVD	Cardiovascular disease
MSC	Marine Stewardship Council
MUFA	Monounsaturated fat
NHFS	Nutrition and Health, including Food Safety
NEVO	*Nederlands Voedingstoffenbestand*
NNR	Nordic Nutrition Recommendations
OECD	The Organisation for Economic Co-operation and Development
PCB	polychlorinated biphenyls
PUFA	Polyunsaturated fatty acid

PYLL	Potential Years of Life Lost
RCT	Randomized Controlled Trial
PMR	Proportional mortality ratio
SFA	Saturated Fatty Acids
SPADE	Statistical Program to Assess Dietary Exposure
SPMA	Standardized Procedures for Mortality Analysis
TMREL	Theoretical minimum-risk exposure level
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
U.S. DA	United States Department of Agriculture
U.S. HHS	United States Department of Health and Human Services
VIGez	*Vlaams Instituut Gezond Leven*
WCRF	World Cancer Research Fund International
WHO	World Health Organisation
YLD	Years Lived with Disability
YLL	Standard Expected Years of Life Lost

1 INTRODUCTION

Nutrition plays a key role in our society on a number of fronts. A comprehensive health and nutrition policy therefore requires a multifactorial and multidisciplinary approach which empowers all parties involved in producing, growing, processing, distributing, supplying and consuming food, as well as those in charge of the integrated communication of nutrient composition, etc. This is important for preserving and promoting the physical and mental health of all age groups in society. The taste of the food and conviviality of the meals should also make eating a source of satisfaction. In addition, now more than ever, heed must be paid to ensuring that food production and consumption are both sustainable and environmentally friendly as well as to minimising the resulting waste, from the level of the producer to that of the consumer.

Achieving these objectives requires a multi-factorial approach involving expertise from a wide range of disciplines. The guidelines should be grounded in scientific research on the impact of deficiencies or excessive intakes, interactions, production methods, toxicity, storage, preparation, the social function of food, etc.

In the past, research on dietary health effects mainly focused on nutrients, and this knowledge formed the basis on which national and international expert committees have drawn up nutritional guidelines. (ANSES, 2016 ; EHN, 2017 ; Gr, 2015 ; IoM, 2005 ; IOTF, 2005 ; Micha, 2017 ; NNR, 2014 ; OECD, 2016 ; U.S. HHS & U.S. DA, 2015 ; WCRF/AICR, 2007 ; WHO/FAO, 2003 ; WHO, 2015). In Belgium, it was the Superior Health Council (SHC) that, from 1997, took the initiative of drafting guidelines based on the available scientific knowledge. The sixth version of the dietary guidelines for Belgium was published in 2016 (SHC 2016). These guidelines too are organised around the different nutrients (macronutrients, micronutrients, vitamins, trace elements). Yet it must be admitted that this information is difficult to use in daily practice and that preference often goes to food-based guidelines and/or guidelines based on eating patterns (*Food-Based Dietary Guidelines* or FBDG). According to the United Nations Food and Agriculture Organization - FAO), dietary guidelines that focus on nutrients can very well be transposed into FBDG that focus on foods, the size of the servings and eating habits, which can then be presented as text or as charts (http://www.fao.org/nutrition/education-nutritionnelle/food-dietary-guidelines/home/fr/).

The SHC has decided to draw up such guidelines for Belgium by building on the methodology recommended by the European Food Safety Authority (EFSA) (EFSA 2010).

The purpose of these guidelines is to contribute to health promotion by relying on the scientific knowledge that is currently available on the impact of food on human health. Yet in certain regards, this approach is inextricably linked to nutrients, so that we can legitimately claim that this advisory report covers and clarifies the current state of science regarding nutrients, foods and eating patterns. The guidelines are expressed in terms of foods, but also take into account the knowledge that pertains to nutrients. It should be noted that the health impact of some foods remains uncertain or insufficiently clear for any claims to be made about them.

The preparatory work for this advisory report also provided an opportunity to reflect on certain food safety and sustainability issues, even if the aim of these guidelines was not to dwell upon the details. Nevertheless, we will, from time to time, broach upon them by providing examples

on how a given eating pattern may benefit the protection of the environment or the management of certain safety issues, for example chemical or microbiological safety.
These guidelines target a healthy population and are not addressed to patients or individuals who, for one reason or another, have had to adopt a specific diet. The aims of these food-based guidelines can be summarised as follows:

- Draw up an advisory report on the impact of food and eating patterns on health and well-being. This especially concerns all the effects that are beneficial to and preserve health, and are therefore useful to prevent the morbidity, mortality and burden of disease of non-communicable diseases that are partly due to an unbalanced diet.
- Translate these fairly theoretical nutrient-based dietary guidelines into more practical advice.
- These guidelines are primarily aimed at "intermediaries" working in health promotion and disease prevention and, in this context, with an interest in the various aspects of the relationship between diet and health in the general healthy population.
- These guidelines don't pertain to nutrients added to fortified foods or food-supplements; this is extensively discussed in the dietary guidelines for Belgium - 2016 (SHC 2016).

The SHC is aware of the fact that the FBDG are just a tool to convey messages on a healthy and balanced diet. The manner in which they are then spread and the channels to use are issues that go beyond the scope of these guidelines. Various communication tools can be used to convey a message in a visual format or other. The SHC expects that this crucial communication process will be undertaken by the appropriate institutions in the different Communities of the country that have the necessary expertise to carry out this task independently and in a scientifically responsible manner.

2 METHODOLOGY

As these guidelines on food and eating patterns also need to take into account sociocultural aspects, the SHC has, first of all, sought to set up an *ad hoc* working group with experts from various disciplines who are also involved in health promotion in the Belgian Communities.
The setting up of this working group was prepared by a strategic committee of the SHC in collaboration with organisations operated by the Communities and Regions. This has led to an extensive call for collaboration that has proved successful and allowed to bring together 29 experts from a broad range of backgrounds, both affiliated and not affiliated to the SHC. However, all potential members had to be willing to comply with the procedure used by the SHC to avoid any conflict of interest.

From the start, the methodology chosen was in line with the EFSA guidelines of 2010 on drawing up FBDG (EFSA 2010).
The decision was made to build on the Dietary Guidelines for Belgium (SHC, 2016) for the data pertaining to nutrients and on the results of the Food Consumption Survey conducted in 2014 (Bel, 2016 ; De Ridder, 2016) for the data pertaining to the current eating habits of the Belgian population.

The 2010 EFSA guidelines suggest the following stepwise approach:
Step 1: identify the main diet-related health issues in Belgium and the foods and nutrients associated with them.
Step 2: identify and categorise foods that largely contribute to the main health problems in Belgium
Step 3: determine the amounts consumed daily and/ or intake frequency. Assign a nutritional value to the data.
Step 4: broaden the choice in foods and translate the findings into concrete and practical guidelines.
The EFSA model was supplemented with sustainability considerations, social aspects of the link between eating habits, health and well-being and elements pertaining to communication with the target audience.

As regards the implementation, the decision was made to set up 4 ad hoc working groups tasked with preparatory work on the following subjects:
a) Food groups
Food classification
b) Diet-related health problems
Inventory of the main diet-related health problems in Belgium

c) Consumption and usual eating habits in Belgium.
   Assessment of the data from the 2014 Food Consumption Survey and identification, on this basis, of the main public health problems. This working group was also tasked with the issue of sustainability.
d) Drawing up of food-based dietary guidelines.

The work of the 4 groups was then compiled, and, even though differing views remain among scientists and therefore also among the members of the ad hoc working group, a consensus was reached over the content of these guidelines.

The ad hoc working groups included experts in the fields mentioned in the table in chapter 11.

The experts of these working groups provided a general and an ad hoc declaration of interests and the Committee on Deontology assessed the potential risk of conflicts of interest.

These guidelines are based on a review of the scientific literature published in both scientific journals and reports from national and international organisations competent in this field (peer-reviewed), as well as on the opinion of the experts.

Once the guidelines were endorsed by the ad hoc working groups and by the standing working group "Nutrition and Health, including Food Safety" (NHIFS), they were ultimately validated by the Board.

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3 IDENTIFYING THE LINK BETWEEN DIET AND HEALTH

3.1 General observations

Several recent reports from national and international expert committees are available to identify the links between diet and health (U.S. HHS & U.S. DA, 2015 ; IoM, 2005 ; IOTF, 2005 ; WCRF/AICR, 2007 ; WHO/FAO, 2003 ; NNR, 2014 ; Gr, 2015 ; OECD, 2016 ; ANSES, 2016 ; WHO, 2015 ; Micha, 2017 ; Jegatheesan, 2017; EHN, 2017; Willett, 2019). In Belgium, the SHC has already published various guidelines in connection with this link, including, in particular, the recent "dietary guidelines for Belgium 2016" (SHC 2016). Yet, in recent years, the Council has also published advisory reports that are more specifically concerned with the health effects of salt (SHC 2012a), atherogenic saturated fatty acids (SHC 2013a), trans fatty acids (SHC 2012b), red meat (SHC 2013b), milk (SHC 2015), iodine (SHC 2014), fluoride (SHC 2012c) and alcohol (SHC 2006; SHC 2009; SHC 2018). All these (advisory) reports are grounded in an analysis of the current literature, with a particular focus on systematic reviews and meta-analyses of randomised and controlled trials (RCT) and observational cohort studies on diet and health.

It is striking, though not really surprising, that, for a number of nutrients and foods, these guidelines aimed at preventing non-communicable diseases are fairly consistent from one country to another. They cover a series of chronic diseases that are a significant cause of premature mortality and/or morbidity in all of these countries, as well as a number of "mediators" that have a causal relationship with these diseases, such as blood pressure, low-density lipoprotein cholesterol levels (LDL-C), fasting blood sugar and body mass index (BMI). Generally speaking, the substance of the main guidelines amounts to seeking a balance by avoiding, on the one hand, to exceed the Tolerable Upper Intake Level for nutrients, whilst ensuring to reach the Recommended Dietary Allowance on the other:

- The energy intake should be proportional to energy expenditure in order to keep an optimal BMI.
- The fat intake and, more specifically, the intake of certain fatty acids, has been associated with cardiovascular disease (CVD), certain types of cancer, obesity and gallstones. However, stronger emphasis is placed on the fatty acid composition (e.g. saturated vs. polyunsaturated fatty acid intake) than on the total fat intake.
- A high intake of fruits and vegetables reduces the risk of obesity, coronary disease, stroke and diabetes. These foods also provide an important source of fibre, vitamins, and trace elements. An adequate fibre intake has been associated with optimal gut function and a lower risk of CVD as well as certain types of cancer. It can also contribute to maintaining an ideal weight or reducing overweight, and is therefore indirectly useful in preventing diabetes.

- Excess intake of certain types of sugar (mainly sucrose, glucose, and fructose) has been associated with tooth decay in children, especially in the event of poor dental hygiene. An association could be made between added sugar, especially fructose, and the development of non-alcoholic fatty liver disease, which can then progress to more severe liver diseases. Added sugar could also have an effect on the appearance of overweight, though no consensus has been reached to date on this subject. Yet it is generally acknowledged that added sugar in soft drinks has a negative impact on cardiometabolic risk factors.
- There is a link between calcium and vitamin D on the one hand, and the risk of osteoporosis on the other.
- Excess sodium intake (through salt) raises the risk of high blood pressure and, as a corollary, of cardiovascular and kidney disease.
- Iron (Fe) deficiency can lead to anaemia, especially in children and women of childbearing age.
- A diet low in folic acid just prior to pregnancy and during the first trimester increases the risk of neural tube defects in the unborn child.
- Iodine deficiency can have an adverse effect on foetal development or on the development of small children and promote thyroid disease in adults.
- An adequate water intake is crucial for various functions of the body and must be in balance with fluid loss.
- Finally, it should be noted that, when consumed at all, alcohol abuse can cause a series of severe health problem. However, this issue requires a specific approach and strategy with no connection to the FBDG.

3.2 Identifying the link between diet and health, specifically for Belgium

The second step recommended by EFSA when drawing up FBDG in a given country is to identify the links between diet and health that are specific to that country, as well as the nutrients and foods concerned (EFSA 2010).

Although European lifestyles and eating habits seem to be increasingly converging, there remain substantial differences between countries. Diet-related health problems may therefore also differ from one country to another, even if the overall picture of the burden of disease is roughly comparable. Ideally, FBDG should always be based on the relationships between diet and health that apply specifically to the country concerned. It is therefore necessary to have a comprehensive view of the health status of the Belgian population and more particularly of the effects of diet on health. The main relationships between diet and public health can then be identified and ranked in order of priority on this basis.

A variety of indicators can be used to draw up a picture of the health status of a population and the burden of disease within a population, taking into account many aspects of public health. Traditional public health indicators include life expectancy, cause-specific mortality, incidence and prevalence of specific clinical pictures, and perceived health.

In light of the ageing population and the growing significance of chronic non-communicable diseases, it is necessary to allow current evidence-based health policy to rest on a

comprehensive overview of public health that takes into account both morbidity and mortality as well as quality of life.
Synthetic public health indicators such as Disability-Adjusted Life Years (DALYs) are therefore extremely useful to quantify the burden of disease. DALY-calculation takes into account the loss of years of life in full health due to illness and/or premature death.
To date, there is no report available in Belgium that provides an overview of the health status of the population and draws up a ranking of the main causes of illness and death. However, there are data on mortality and its causes that are based on *standardized procedures for mortality analysis* (SPMA) drawn up and managed by Sciensano (previously Scientific Institute of Public Health (IPH) (https://spma.wiv-isp.be/). Information on the burden of disease in this country can be obtained through the *Global Burden of Disease* (GBD) project conducted by the *Institute for Health Metrics and Evaluation* (IHME) (GBD, 2017). This initiative also provides an assessment of the burden of disease that is due to certain risk factors, especially dietary risk factors, which makes it possible to focus on Belgium to identify and classify a number of diet-related health problems.

Classification of the cause-specific mortality figures:
Based on the SPMA data, an interactive analysis can be made of the birth and death figures among the Belgian population on an annual basis. The data used in this report concern the year 2014. Among other things, this tool allows to draw up different classifications of the causes of death (defined according to the *International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10).* Table 1 contains the 20 leading causes of mortality, classified according to the proportional mortality ratio (PMR) and the '*Potential Years of Life Lost'* (PYLLs (75)). The PMR shows the percentage of the overall mortality that can be attributed to a given cause. The PYLLs (75) show how many years of life out of 100.000 years of life are lost due to death before the age of 75 for a given cause.

Table 1. 20 leading causes of mortality in Belgium in 2014

Rank	Proportional mortality ratio		PYLLs(75)	
	Cause	*%*	*Cause*	*n per 100.000*
1	Ischaemic heart disease	7.36	Suicide	439
2	Cerebrovascular disease	6.49	Lung cancer	425
3	Lung cancer	6.23	Ischaemic heart disease	255
4	Cond. ill-defined°	5.12	Cond. ill-defined°	248
5	Heart failure	4.81	Motor vehicle accident	201
6	Chronic lower respiratory tract infections	4.07	Breast cancer	163
7	Pneumonia/influenza	3.26	Cirrhosis	158
8	Colorectal cancer	2.66	Cerebrovascular disease	130
9	Infectious diseases	2.39	Colorectal cancer	116
10	Breast cancer	2.16	Chronic lower respiratory tract infections	116
11	Suicide	1.81	Infectious diseases	81
12	Diabetes	1.46	Injuries undetermined circumstances	81
13	Accidental fall	1.44	Accidental fall	63
14	Prostate cancer	1.37	Cancer NOS	57
15	Cirrhosis	1.21	Pneumonia/influenza	52
16	Cancer NOS	1.10	Heart failure	51
17	Motor vehicle accidents	0.66	Diabetes	43
18	Cancer uterus	0.38	Prostate cancer	23
19	Injuries undetermined circumstances	0.36	Cervical cancer	20
20	Cervical cancer	0.15	Cancer uterus	14

°: based on ICD codes with no direct link to a specific disease
PMR: proportional mortality ratio in percent
PYLLs (75): number of potential years of life lost due to death before the age of 75 per 100.000 years of life

Unlike PMRs, which are based on overall mortality, PYLLs (75) are calculated in relation to a benchmark age of 75 and are therefore a more synthetic measure of premature mortality. It follows that this concept of loss of potential life years gives more weight to deaths that occur at a younger age. Unsurprisingly, a comparison of both rankings shows that deaths due to suicide or accidents appear higher on the list of PYLLs (75). As regards mortality, the main diet-related causes are various types of cancer and cardiovascular diseases, liver cirrhosis, chronic obstructive pulmonary disease (COPD), pneumonia and diabetes. The relative significance of the latter is likely to be greater than appears to be the case at first glance, as it is often not the direct cause of death but contributes strongly to the complications that are, such as cardiovascular and kidney disease.

The GBD research conducted by the IHME provides estimates of the burden of disease and risk factors by age, gender, year and country (GBD, 2017). The study used here was the 2016 GBD-study, which contains estimates for the period 1990-2016. In addition to quantifying the burden of disease in terms of prevalence and mortality, the GBD study also provides an assessment expressed in DALYs, which covers both the number of *Years Lived with Disability* (YLD) and the loss of years of life linked to premature death (*Standard Expected Years of Life Lost* or YLL).

YLDs are a measurement of the number of years in good health lost as a result of illness; they are computed by multiplying the number of prevalent cases by a "weight" factor that is attributed to each disease (on a scale from 0 to 1). This weight expresses the relative deterioration in quality of life associated with living with that disease.

The YLLs are a measurement of the number of years of life lost due to premature mortality. They are computed by multiplying the number of deaths by the expected remaining years of life at the time of death, which are determined on the basis of a table with the biologically optimal life expectancy.

The GBD estimates can be viewed in an interactive form at https://vizhub.healthdata.org/gbd-compare.

Table 2 provides a list based on the 2016 GBD-study (GBD 217) with the 20 leading causes of disease and mortality in Belgium, ranked in terms of YLDs (as a percentage of the total number of YLDs) and in terms of DALYs (as a percentage of the total number of DALYs).

Table 2. 20 leading causes of YLDs and DALYs in Belgium, 2016

Position	YLD	% of total	DALY	% of total
1	Lumbago and neck pains	16.5	Lumbago and neck pains	8.0
2	Sensory disorders	7.5	Ischaemic heart disease	7.2
3	Skin diseases	6.7	Lung cancer	4.6
4	Migraine	6.2	Alzheimer/dementia	4.1
5	Depression	5.9	CVA	3.8
6	Falls	4.6	Sensory disorders	3.6
7	Oral diseases	3.9	Skin diseases	3.4
8	Anxiety disorders	3.7	COPD	3.1
9	Diabetes	2.7	Falls	3.1
10	Other musculoskeletal diseases	2.3	Migraine	3.0
11	CVA	2.1	Depression	2.8
12	Osteoarthritis	2.0	"self-harm"	2.6
13	Other CVDs	1.9	Other CVDs	2.1
14	Alzheimer/dementia	1.9	Motor vehicle accident	2.0
15	Bipolar disorders	1.7	Diabetes	2.0
16	Motor vehicle accident	1.7	Oral diseases	1.9
17	Asthma	1.6	Colorectal cancer	1.9
18	COPD	1.5	Anxiety disorders	1.8
19	Ischaemic heart disease	1.4	Breast cancer	1.8
20	Schizophrenia	1.4	Lower respiratory tract infections	1.8

COPD: Chronic Obstructive Pulmonary Disease; CVD: Cardiovascular disease; CVA: Cerebrovascular accident/stroke

In terms of DALYs, the main diet-related health problems are found in the following groups: cancer, cardiovascular disease, diabetes, COPD and lower respiratory infections. It is worth mentioning that nutritional deficiencies are not among the 20 leading causes of YLDs and DALYs, but are nonetheless responsible for a relatively considerable number of DALYs: iron deficiencies account for 0.17 % of all DALYs, followed by iodine deficiencies (0.11 %) and malnutrition due to protein deficiency (0.084 %).

Using the SPMA and IHME data, it is possible to draw up a list with the health problems that are the main causes of mortality, premature mortality and DALYs in Belgium. Moreover, the health problems that are directly or indirectly linked to nutrients, foods or dietary patterns can be identified on the basis of the scientific literature (U.S. HHS & U.S. DA, 2015 ; IoM, 2005 ; IOTF, 2005 ; WCRF/AICR, 2007 ; WHO/FAO, 2003 ; NNR, 2014 ; Gr, 2015 ; OECD, 2016 ; ANSES, 2016 ; WHO, 2015 ; Micha, 2017 ; SHC, 2016). However, it should be pointed out that the direction of this link and the causal relationship cannot always be clearly established. For example, malnutrition may be a consequence of Alzheimer's disease or anorexia, rather than their cause. In a nutshell, the following list of diet-related pathologies can be ranked by order of importance for Belgium:

1) Various clinical forms of atherosclerotic CVD, such as ischaemic heart disease, cerebrovascular disease or cardiac failure, the mediators of which are blood pressure and LDL-cholesterol levels;
2) Different types of cancer: lung, breast, colorectal, prostate, uterine, cervical cancer;
3) Type 2 diabetes mellitus, the mediators of which are obesity, central obesity and fasting glucose;
4) COPD;
5) Musculoskeletal diseases (lumbago and neck pains), the mediators of which are overweight and obesity;
6) Liver cirrhosis;
7) Neurocognitive disorders such as Alzheimer's disease and other forms of dementia, depression and anxiety disorder;
8) Nutritional deficiencies: iron, iodine and protein deficiency.

The 2016 GBD-study (GBD, 2017) also provides estimates, per country, of the burden of disease due to diet-related risk factors.
The methods used to make these estimates are discussed in the GBD publication and its supplements (GBD, 2017). Very briefly, let us just say that they are carried out on the basis of a framework that compares risk estimates, which allows for an assessment to be made of the share of mortality and DALYs that can be attributed to a given risk. This process covers, inter alia, the assessment of relative risks, exposure levels and theoretical minimum-risk exposure levels. This in turn make it possible to calculate which share of the burden of disease can be attributed to certain risk factors.

Relative risks

The risk-outcome pairs were selected on the basis of evidence graded as strong, convincing or probable evidence in the World Cancer Research Fund (WCRF, 2007). In this respect, evidence is graded as "convincing" if biologically plausible links between exposure and illness have been observed in several epidemiological studies involving different populations. Table 3 provides the risk-outcome pairs for 15 diet-related risk factors in relation to the clinical tables from the GBD-study (GBD, 2017).

Table 3. Risk-outcome pairs for 15 diet-related risk factors used in the Global Burden of Disease study (GBD, 2017).

Risk factor	Outcome(s)
Diet low in fruits	Lip cancer, oral cancer, nasopharyngeal cancer, throat cancer, oesophageal cancer, laryngeal cancer, cancer of the trachea, bronchial cancer, lung cancer; IHD, ischaemic stroke, haemorrhagic stroke, DM.
Diet low in legumes	IHD
Diet low in vegetables	Oesophageal cancer, IHD, ischaemic stroke, haemorrhagic stroke
Diet low in whole grains	IHD, ischaemic stroke, haemorrhagic stroke, DM
Diet low in nuts and seeds	IHD, DM
Diet low in fibre	Colorectal Cancer, IHD
Diet low in seafood omega-3 fatty acids	IHD
Diet low in polyunsaturated fatty acids (PUFAs)	IHD
Diet low in calcium	Colorectal cancer
Diet low in milk	Colorectal cancer
Diet high in red meat	Colorectal Cancer, DM
Diet high in processed meat	Colorectal Cancer, IHD, DM
Diet high in sugar-sweetened beverages	*Estimate, with BMI as a mediator* Oesophageal cancer, colorectal cancer, liver, gallbladder and biliary tract cancer, pancreatic cancer, breast cancer, uterine cancer, ovarian cancer, kidney cancer, thyroid cancer, leukaemia; IHD, ischaemic stroke, haemorrhagic stroke, hypertensive heart disease, atrial fibrillation and atrial flutter, asthma, gallbladder and biliary tract diseases, Alzheimer's disease and other forms of dementia, DM, chronic kidney disease, low back pain, gout, cataract, osteoarthritis
Diet high in trans fats	IHD
Diet high in sodium	*Estimate, with systolic pressure as a mediator:* Rheumatic heart disease, IHD, ischaemic stroke, haemorrhagic stroke, hypertensive heart disease, cardiomyopathy and myocarditis, atrial fibrillation and atrial flutter, aortic aneurysm, peripheral vascular disease, endocarditis, other CVDs, chronic kidney disease.

IHD: ischaemic heart disease DM: diabetes mellitus, BMI: *body mass index*, PUFAs: *Poly-Unsaturated Fatty Acids*

The relative risk of developing a given disease per amount of a dietary component was drawn from recent meta-analyses of prospective observational studies as well as, when available, from RCTs on "dose-response" effects.

Exposure levels

Table 4 includes the definitions of the diet-related risk factors used in the GBD-study (GBD, 2017).

Table 4. Definitions of the diet-related risk factors (GBD, 2017)

Risk factor	Definition
Diet low in fruits	Less than 3 servings (< 300 g in total) of fruit per day (fresh, frozen, cooked, canned, or dried fruits, excluding fruit juices and salted or pickled fruits)
Diet low in vegetables/legumes	Less than 4 servings (< 400 g in total) per day of vegetables (fresh, frozen, cooked, canned, or dried vegetables and legumes, excluding salted or pickled vegetables, juices, nuts, seeds, and starchy vegetables such as potatoes or corn)
Diet low in whole grains	Less than 2.5 servings (< 115 g in total) per day of whole grains (bran, germ, and endosperm in their natural proportion) from breakfast cereals, bread, rice, pasta, rusks, muffins, tortillas, pancakes, and other sources.
Diet low in nuts and seeds	Less than 4 servings (< 115 g au total) of nut and seed foods per week
Diet low in fibre	Less than 30 g of dietary fibre from all sources including fruits, vegetables, grains, legumes
Diet low in omega-3 fatty acids (EPA and DHA)	Less than 250 mg omega-3 fatty acids (eicosapentaenoic acid and docosahexaenoic acid) per day, from fish or supplements
Diet low in PUFAs	Less than 12 % of total daily energy as PUFAs from all sources, including vegetable oils (soybean oil, corn oil, and safflower oil)
Diet low in calcium	Less than 1200 mg of calcium per day from all sources, including milk, yoghurt, and cheese
Diet low in milk	Less than 2 cups or 435 g of milk per day, including non-fat, low-fat, and full-fat milk, excluding soy milk and other plant derivatives
Diet high in red meat	More than one serving (115 g in total) of red meat per week (beef, pork, lamb, and goat, but excluding poultry, fish, eggs, and all processed meats)
Diet high in processed meat	Consumption of any processed meat (meat preserved by smoking, curing, salting, or addition of chemical preservatives, e.g. bacon, salami, sausages and deli meats such as ham, turkey and pastrami)
Diet high in sugar-sweetened beverages	Beverages with ≥ 50 kcal from sugar per 227 ml serving, including carbonated beverages, soft drinks, energy drinks, fruit drinks, but excluding 100% fruit and vegetable juices
Diet high in trans fatty acids	More than 0.5 % of the total daily energy intake from trans fat (from all sources, mainly hydrogenated vegetable oils and animal products).
Diet high in sodium	More than 1000 mg of sodium per day (= 2.5 g of salt)

The exposure data were drawn from systematic reviews of published and unpublished reports and have undergone statistical processing in order to aggregate information from various sources. Any "biases" could be verified and adapted and other information, such as country-specific covariates, could also be incorporated.

Theoretical minimum-risk exposure levels.
(TMREL)

In order to assess the theoretical minimum-risk exposure levels (TMRELs), an estimate was first made, for each nutrient or foodstuff, of the amount consumed that is associated with the lowest risk of developing the diseases taken into account. This estimate builds on the published results of cohort studies and RCTs on the link between exposure and illness. The TMRELs were then calculated as the weighted average of these estimates. They can be found in table 5.

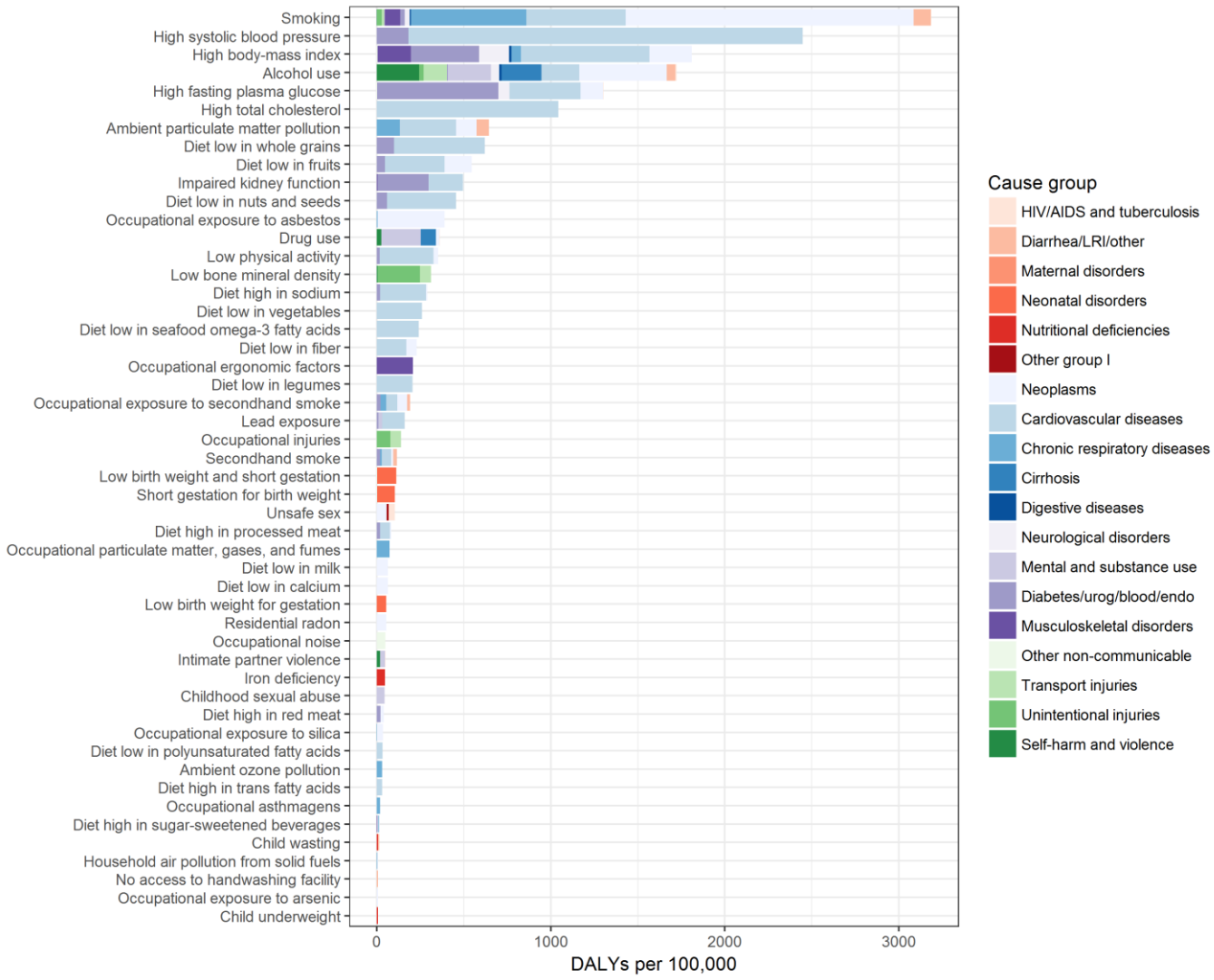
Table 5. Theoretical minimum-risk exposure levels (TMRELs) (GBD, 2017).

Dietary factor	TMREL
Fruit	200-300 g/day
Vegetables	290-430 g/day
Legumes	50-70 g/day
Whole grains	100-150 g/day
Nuts and seeds	16-25 g/day
Dietary fibre	19-28 g/day
Omega-3 fatty acids from fish	200-300 g/day
PUFAs	9-13 % of the total energy intake
Calcium	1-1.5 g/day
Milk	350-520 g/day
Red meat	18-27 g/day
Processed meat	0-4 g/day
Sugar-sweetened beverages	0-5 g/day
Sodium	Urinary excretion of sodium of 1-5 g/day

Contribution of the risk factors to the DALYs in Belgium

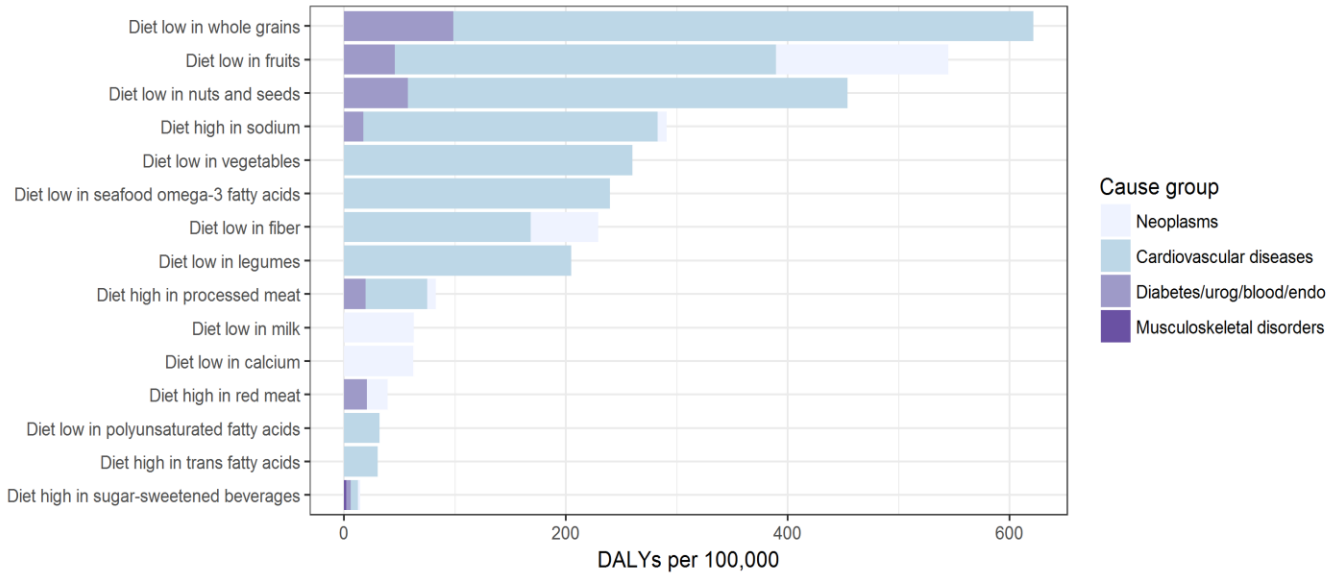
Figure 1 shows the relative contribution of various risk factors linked to eating habits, metabolism or the environment to the burden of disease (in DALYs) for Belgium. It includes several diet-related risk factors that mainly account for the burden of disease due to cardiovascular disease, diabetes and cancer.

Figure 1. Contribution of the risk factors to the burden of disease (in DALYs) in Belgium, 2016 (GBD, 2017)



The diet-related risk factors include 15 specific risk categories (Figure 2). Diets low in whole grains account for the largest number of DALYs/100.000, followed by diets low in fruit, nuts/seeds and vegetables, then by diets high in sodium.

Figure 2. Contribution of the diet-related risk factors to DALYs in Belgium, 2016 (GBD, 2017)



3.3 Identifying the nutrients and foods linked to the main health problems in Belgium

Based on the above, as well as on the recommendations of other expert committees (U.S. HHS & U.S. DA, 2015 ; IoM, 2005 ; IOTF, 2005 ; WCRF/AICR, 2007 ; WHO/FAO, 2003 ; NNR, 2014 ; Gr, 2015 ; OECD, 2016 ; ANSES, 2016 ; WHO, 2015 ; Micha, 2017 ; SHC, 2016), it is possible to compile an inventory of the nutrients and foods that are linked to the main health problems in Belgium.

Alcohol abuse overwhelmingly tops the list; the SHC has devoted several specific recommendations to this issue (SHC, 2006; SHC, 2009; SHC, 2016; SHC, 2018).

It should also be noted that some diseases can alter eating habits, food absorption and metabolism, which are in turn liable to result in comorbidity. However, this issue goes beyond the scope of the FBDG.

Overweight and obesity are a significant cause of morbidity, related mainly to an imbalance between energy intake and energy expenditure, combined with endocrine mechanisms that affect satiety. In this respect, an overweight and obesity prevention strategy will also focus on the balance between physical activity and energy intake. These recommendations do not expand on this issue, which was discussed extensively in chapter 3 of the dietary guidelines for Belgium-2016 (SHC, 2016).

As part of the drawing up of these FBDG for Belgium, the SHC compiled an inventory of the main diet-related health problems that is grounded in the available scientific literature. The deficiencies in or excess intakes of nutrients or specific foods that induce them are summed up in the left-hand column in table 6, headed "problems". A first series rests mainly on the data from the GBD-2016 study (GBD 2017) for Belgium, with problems 1-12 ranked in order of importance; the latter is determined on the basis of the number of DALYs/100.000 that seems to be linked to deficiencies or excess intakes of the foodstuff concerned. A second set (problems 13-18) is also worth considering in light of the recommendations issued by other expert committees (EFSA, 2010 ; U.S. HHS & U.S. DA, 2015 ; IoM, 2005 ; IOTF, 2005 ; WCRF/AICR, 2007 ; WHO/FAO, 2003 ; NNR, 2014 ; Gr, 2015 ; OECD, 2016 ; ANSES, 2016 ; WHO, 2015 ; Micha, 2017 ; SHC, 2016 ; Jegatheesan, 2017). Yet most of them concern nutrients that were already addressed in detail in the dietary guidelines for Belgium-2016 (SHC 2016), which also provide advice and practical information on preventing or overcoming deficiencies and/or excess intakes.

For each of these problems, the right-hand column of table 6 also mentions the recommended daily allowance (RDA) for adults, which is grounded in the scientific literature, including the dietary guidelines for Belgium-2016 (SHC, 2016).

Table 6: Nutrients and foods linked to major health problems in Belgium and recommended daily allowance for these products for the adult population

Problems	RDA (for adults)
1) Diet low in whole grains	> 125 g/day
2) Diet low in fruit	> 250 g/j
3) Diet low in vegetables and legumes	> 400 g/j
4) Diet low in seeds and nuts	> 20 g/day
5) Diet high in sodium chloride	< 5 g/day
6) Diet low in polyunsaturated fatty acids (PUFAs), especially omega-3 fatty acids (EPA and DHA) PUFA SFA Omega-3 fatty acids	 5-10 En. %. < 10 En. % 1-2 En. %
7) Diet high in « processed meat »	As little as possible
8) Diet low in dietary fibre	> 25 g/day
9) Diet low in calcium	950 mg/day
10) Diet high in trans fatty acids	As little as possible
11) Diet high in red meat	< 300 g/week
12) Diet high in beverages containing added sugar	As little as possible
13) Diet low in vitamin D	> 10-15 < 50 µg/day vit. D3
14) Diet low in folic acid	200-300 µg/day (400 for women who wish to become pregnant)
15) Diet low in iodine	150 µg/day
16) Diet low in iron	9 g/day (15 g/day for women before menopause)
17) Diet high in added sugar	< 10 En. %
18) Insufficient water intake	1.5 l/d

En. %: percentage of total energy intake; RDA: Recommended Daily Allowance

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4 CLASSIFICATION AND CATEGORISATION OF FOODS THAT ARE IMPORTANT TO PUBLIC HEALTH

4.1 Introduction

The suggested food groups have been selected on the basis of a consensus among experts. They have been restricted to food categories for which there is an established health link. Foods for which there is no health link in the Global Burden of Disease study, such as e.g. potatoes, vegetable-based drinks and derived products, have not been treated as a priority in these food-based dietary guidelines.

Foods have been organised into groups taking into account underlying considerations on the links between food and health, which are highlighted in chapter 3, as well as nutritional criteria. The analysis and discussions are also grounded in different reports from other national and international bodies, and in the scientific literature.

The food groups have been divided into three subgroups based on the links between diet and health.

- **Food groups to focus on**: an adequate intake of these food groups should be promoted to reduce the risks associated with a low consumption. They are mentioned in the order of priority that was set e.g. in the Global Burden of Disease-study based on estimates from 2016 for Belgium (GBD, 2017).
- **Food groups to limit**: a high intake of these food groups has in fact been associated with the risk of the main diet related health problems. They are also mentioned in the order of priority that was set in the Global Burden of Disease project.
- **Other food groups**: food groups that have not been defined as having priority or for which the health links are insufficiently documented. Yet with our eating habits also including the consumption of these foods, the SHC has decided to draw up of classification for them too.

In chapter 6, the examples provided for each food group are given in the order of priority in which their consumption should be encouraged.

Some of the goals mentioned are cross-cutting issues that do not result in the creation of food groups in their own right: omega-3, sodium, calcium, fibres, PUFA. These issues are addressed in the Dietary Guidelines for Belgium from 2016 (SHC 2016).

4.2 Classification methodology

Foods were assigned to one of the food groups based on the following classification criteria:

- the health relationship,
- added sugars, salt or fat and sugar, salt or fat content,
- degree of processing.

There is no clear relationship between the degree of processing and health. Some processing methods are crucial and benefit health because they concern the shelf life, microbiological quality, safety or digestibility of the food (Clemens & Pressmann, 2019). Others do not always have health benefits, but are safe. Yet there are also methods that are liable to have harmful effects on health (FAO 2015; Schnabel et al., 2019; Fiolet et al., 2018). There is currently no consensus as regards the classification of foods in terms of their degree of processing.

Several countries use the NOVA classification. Here, the foods are divided into categories based on the nature, extent and purpose of the processing they undergo (Monteiro, 2016).
The NOVA classification has been used in several studies on the relationship between ultra-processed food and health: in a Belgian study that also used the NOVA classification, the consumption of ultra-processed foods was associated with a poorer quality of the dietary profile (Vandevijvere et al., 2018).
As regards the classification of foods, the decision was made to take into account the degree of processing by using the NOVA classification system and distinguishing between three groups, viz:

1) Simply processed foods:

Simple processing includes cleaning, peeling, or disposing of non-edible parts, slicing, grinding, drying, roasting, squeezing, skimming, cooking in water, pasteurising, sterilising, refrigerating, freezing, packaging, and non-alcoholic fermentation. There are no ingredients added such as salt, sugar or fat (Monteiro, 2016).

2) Prepared or processed foods:

These foods are produced by adding salt or sugar (or other substances for culinary use, such as oil or vinegar) to whole foods to extend their shelf life as well as, occasionally, to improve their taste. They are derived directly from these foods, of which they are recognisable versions, with the addition of 1-3 ingredients. These processes involve different preservation or cooking methods, and, for bread and cheese, non-alcoholic fermentation (Monteiro, 2016). The main examples for such foods are canned or bottled vegetables, fruit or fish, salted or sugared nuts, cooked, salted or smoked meat or fish, cheeses, freshly made bread.

3) Ultra-processed foods:

These foods are formulated mainly or entirely from substances extracted from foods, usually involve little or no whole foods, and often contain additives (colouring agents, sweeteners, emulsifiers, flavour enhancers, etc.) or flavourings that enhance their organoleptic qualities. They are convenient, ready-to-eat or ready-to-heat and are very attractive (PAHO 2015).

These industrial formulations are typically non recognisable versions of food, although they may imitate the appearance, shape and sensory qualities of food. Many ingredients are not usually used in home-made preparations and are derived from food constituents (milk proteins, lactose, gluten, hydrogenated fat, hydrolysed proteins, protein isolates, glucose or fructose syrup, etc.). These preparations can contain many additives, may be fortified with micronutrients and are characterised by several of the processing methods used (extruding, frying, hydrogenation, hydrolysis, etc.) (Monteiro, 2016). The main examples are certain breakfast cereals, certain mass-produced packaged breads, sauces, certain mass-produced pastries and cakes, breaded foods such as nuggets, lemonades, reconstituted meat products, sweets, instant soups, etc. (FAO, 2015).
Most ultra-processed foods should by no means replace basic foods. Yet some ultra-processed foods may have an acceptable nutritional quality or beneficial nutritional density (e.g. omega-3- enriched minarine).

The NOVA classification also has its limits; certain types of processing are hard to describe and variations often occur across foods that have been defined as belonging to the same group (Gibney, 2019; Clemens & Pressmann, 2019). That is e.g. the case with breakfast cereals, dairy-based desserts, pizzas, pastries and bread. It is therefore necessary to pay heed to both the degree of processing and the nutritional composition of the food.

4.3 Summary table

Table 7: Summary table: food groups

Food groups to focus on

1.	Whole grains and derivatives
2.	Fruits
3.	Nuts and seeds
4.	Vegetables
5.	Legumes
6.	Milk and dairy products
7.	Fish, shellfish and seafood
8.	Oils and derivatives high in omega-3 fatty acids and olive oil

Food groups to limit

1.	Processed red meat and processed poultry
2.	Red meat, except poultry
3.	Beverages with added sugars
4.	Fats high in saturated atherogenic / trans fatty acids
5.	Sugar-sweetened products
6.	Salted products

Other food groups

1.	Other fats high in unsaturated fatty acids
2.	Unsweetened beverages
3.	Tubers, refined grains and derivatives
4.	Poultry
5.	Eggs
6.	Herbs and spices
7.	Other vegetarian products

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5 USUAL FOOD CONSUMPTION IN BELGIUM

5.1 Introduction

The most recent representative Food Consumption Survey in this country was conducted in 2014-2015 (FCS 2014) (Bel et al., 2016 ; De Ridder et al., 2016). It covered a population composed of children (aged 3-9), adolescents (aged 10-17) and adults (aged 18-64). The methodology used has already been described elsewhere (Bel et al., 2016) (https://fcs.wiv-isp.be) ; in brief, suffice it to say that the data on the dietary intake were obtained from 1000 children, 1000 adolescents and 1200 adults by means of two non-consecutive 24-hour dietary recalls carried out with the GloboDiet® software. In order to be able to calculate the nutrient intake as well, the consumption data were linked to food composition tables (Nubel and NEVO). The usual consumption was calculated using the *Statistical Program to Assess Dietary Exposure* (SPADE) software (Dekkers et al., 2014a; Dekkers et al., 2014b).

This chapter gives an overview of the average usual consumption (= consumption over an extended period of time) of different food groups based on the 2014 FCS results (De Ridder et al., 2016). All results were weighted for age, gender, province, day of interview and season.

There are many approaches that can be used for defining food groups, and, at the time of the 2014 FCS, there were no national dietary guidelines expressed in terms of foods available yet. However, there were guidelines available that had been formulated by the *Actieve voedingsdriehoek*/VIGeZ and *Food in Action*/Institut Paul Lambin ; there were also international guidelines available such as those of the World Health Organisation (Vanhauwaert, 2012 ; Food in Action en collaboration avec l'Institut Paul Lambin, 2011 ; WHO, 2015). In order to use an approach similar to that of the first FCS (2004), the decision was made to apply the classifications of the *Actieve Voedingsdriehoek* that were used in 2015 by the VIGeZ, the Flemish institute for health promotion and disease prevention. Sometimes, another classification from the 2014 FCS (FoodEx2) provides more detailed information. In these cases, it is this classification that is referred to. With no national guidelines available, the pragmatic choice was made to draw a comparison with the VIGeZ guidelines (Vanhauwaert, 2012).

As regards the discussion of the food groups, we will endeavour to follow, as far as possible, the order suggested in chapter 4 by focussing above all on the intake of food categories that should be encouraged.

The ultimate purpose of a healthy diet is to achieve a balanced intake of macronutrients, vitamins, minerals and trace elements. Guidelines on the nutrient intake have already been widely conveyed by the Superior Health Council (SHC, 2015 ; SHC, 2016).

5.2 Usual food consumption in 2014

5.2.1 Whole grains and derivatives

In Belgium, the average usual consumption of bread, rusks and breakfast cereals was 141 g/day, with bread representing the largest share at 104 g/day. The recommended intake in the *Actieve Voedingsdriehoek* ranged between 90 and 420 g depending on age - which is a threshold that most of the population actually does not reach (83 %). Around one Belgian in two (49 %) stated that they ate brown and/or wholemeal bread on a daily basis, the usual consumption of which (44 g/day) amounted to 42 % of the total bread consumption. Yet the usual consumption of wholemeal bread in the narrow sense remained very low (8 g/day). Moreover, older adults were found to eat more brown or wholemeal bread than white bread, whereas younger people ate more white bread. It is worth noting too that, whilst current legislation does require that wholemeal bread produced in Belgium be manufactured exclusively with wholemeal flour, there are, however, no unambiguous criteria for the other products, for which the term "wholemeal" is therefore used fairly freely.
The consumption of rice, pasta, quinoa, couscous and bulgur, which averaged 62 g/day, was significantly lower than the consumption of bread and breakfast cereals. Pasta amounted to around two thirds of the consumption in this category. The guideline from the *Actieve Voedingsdriehoek* cannot be applied to this subgroup, because it is based on potatoes and their substitutes (rice, pasta, etc.). It set the desirable intake at 50 to 350 g and, even when taking into account the consumption of potatoes, 88 % of the Belgian population seems to remain under the guideline. Over 90 % of the Belgian population reported eating white pasta and rice, less than half wholegrain rice or pasta.

In brief: according to the 2014 FCS, the overall consumption of grains and derivatives was too low, and (products made with) whole grains represented only a small fraction of this consumption. Under the current circumstances, it is difficult to make a correct assessment of the consumption of whole grains due to the lack of legislation on the composition of grain products other than bread made in Belgium. For the consumer too, it has, to date, not been easy to know the whole-grain content of a given product.

Table 8. Usual consumption (g/day) of grains and derivatives in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
BREAD, RUSKS AND BREAKFAST CEREALS							
Bread, rusks and breakfast cereals	Male	100	131	154	168	180	165
	Female	91	115	123	124	122	113
Whole-meal bread	Male	4	5	5	6	7	9
	Female	5	4	3	3	6	11
Brown bread	Male	23	25	28	28	41	56
	Female	22	22	21	23	26	36
White bread	Male	40	53	65	73	71	55
	Female	39	48	54	56	51	33
RICE,PASTA, QUINOA, COUSCOUS AND BULGUR							
Rice, pasta, quinoa, couscous and bulgur	Male	38	58	72	81	89	59
	Female	33	47	53	57	62	44

5.2.2 Fruit and vegetables

In 2014, the Belgian population's average usual consumption of fruits and vegetables amounted to 110 and 145 g/day, respectively, whilst the World Health Organisation (WHO) advises to eat at least 400 g/day (5 servings). With an average total of 255 g/day, the Belgian population's consumption fell far short of the recommended intake.

As regards the fruit intake, the *Actieve Voedingsdriehoek* recommended a daily consumption of 100 - 250 g depending upon age. This consumption follows a U-shaped curve according to age: whilst the intake of 64 % of young children reached the recommended amount, substantially all adolescents ate too little fruit, as was the case with over 90 % of adults. Yet children and adolescents were also found to consume significantly more fruit juice (80 to 100 g/day) than older age groups (50 to 75 g/day). Based on the FoodEx2-classification, some 85 % of fruit is known to be consumed fresh and 15 % in a processed form.

Moreover, the *Actieve Voedingsdriehoek* recommended a daily intake of 100 to 300 g of vegetables, again according to age. The consumption of vegetables increased with age, but not enough: whereas the intake of 35 % of young children (aged 3-5) was in line with the guidelines, this was virtually never the case for adolescents or adults (1-6 %).

In brief: according to the 2014 FCS, the overall fruit and vegetable consumption remained far too low, except for young children, who (almost) ate enough fruit. However, children and adolescents were the biggest consumers of fruit juices.

Table 9. Usual consumption (g/day) of fruit and vegetables in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
FRUIT							
Fruit	Male	139	119	92	74	80	115
	Female	130	118	102	94	101	135
Fruit, including olives and fruit juices	Male	254	227	194	167	155	162
	Female	224	210	189	173	166	182
VEGETABLES							
Vegetables	Male	82	94	103	111	133	156
	Female	88	94	102	111	149	177

5.2.3 Legumes

A fifth (19.5 %) of the Belgian population stated they never ate legumes. The consumption of legumes was in fact too low to be examined separately in the 2014 FCS. The average usual consumption of legumes and vegetarian meat-substitutes amounted to 4 g/g/day. The *Actieve Voedingsdriehoek* recommended a daily intake of 100 g of tofu, tempeh or seitan *or* 150 g of legumes or 100 g of meat or fish *or* an equivalent combination of different products.

In brief: Legumes were a source of proteins and essential amino acids that was little consumed by the Belgian population. Their consumption should be promoted to increase the diversity of protein sources.

5.2.4 Nuts and seeds

In the 2014 FCS, 16 % of the Belgian population reported that they never ate nuts, whereas half (52.1 %) never ate seeds. The average usual consumption of nuts and seeds amounted to 3 g/day. The *Actieve Voedingsdriehoek* recommended eating nuts and seeds in moderation (max. 20-25 g/day). For this food group, there is no over-consumption problem in the Belgian population.

In brief: Nuts and seeds are a good source of unsaturated fatty acids and other nutrients. The Belgian population could consume more, the risk of over-consumption being negligible.

5.2.5 Fish, shellfish and seafood

The 2014 FCS revealed that the average usual consumption of (preparations with) fish, shellfish and seafood in the Belgian population totalled 23 g/day with, once again, a sharp rise in the older age groups. The *Actieve Voedingsdriehoek* considered this food category as a source of proteins on a par with meat, eggs, vegetarian meat substitutes and legumes, with a recommended daily amount of 100 g. It was the second most important source of proteins, despite the fact that its contribution to the protein intake remains well below that from meat. 7 % of the Belgian population stated that they never ate fish; 23 % never ate shellfish or seafood.

In brief: Fish is a good source of protein, but also of omega-3 fatty acids, iodine and vitamins. Its consumption as an alternative to meat should therefore be further encouraged.

Table 10. Usual consumption (g/day) of (preparations with) fish, shellfish and seafood in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
(preparations with) fish, shellfish and seafood	Male	13	15	15	17	23	34
	Female	15	15	14	16	19	25

5.2.6 Oils high in omega-3 fatty acids and olive oil

According to the 2014 FCS, the average usual consumption of spreadable and cooking fats (oils, margarines, butter) was 18 g/day in the population aged 3-64. It is in this food group that the most significant trend has been observed since the 2004 FCS, with their consumption dropping from 27 to 19 g per day in the population aged 15-64. The consumption of spreadable and cooking fats in the Belgian population was lower than the maximum reference quantities of the *Actieve Voedingsdriehoek*.

The 2014 FCS reports did not address oils high in omega-3 fatty acids and olive oil separately. However, based on the FoodEx2 classification, the average usual consumption of oils in general (including sunflower, coconut oil, etc.) is known to amount to about 6.4 g/day and the consumption of fat emulsions and mixed fats (butter, margarines, etc.) to 11.4 g/day (European Food Safety Authority, 2015 ; De Ridder et al., 2016). Barely 6.4 % of the population declared they never consumed oil, while one third used it every day.

In brief: On the one hand, the consumption of spreadable and cooking fats shows a positive trend in the sense that it has dropped significantly compared to 2004. On the other hand, the consumption of oils high in omega-3 fatty acids and olive oil should be further promoted, as it accounted for well under half of the total consumption of spreadable and cooking fats, despite the fact that virtually the whole population claimed to use oil (more or less frequently).

Table 11. Usual consumption (g/day) of spreadable and cooking fats in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
Spreadable and cooking fats	Male	10	13	15	16	21	27
	Female	12	12	12	12	14	18

5.2.7 Milk, dairy products and cheese

The average usual consumption of dairy products (except cheese) in the 2014 FCS was 147 g/day. There was a marked age gradient: young children (aged 3-5) consumed more than twice as much as adults. The *Actieve Voedingsdriehoek* recommended a daily intake between 450 and 600 ml of milk (or calcium-enriched soya products) per day, depending on age. Virtually the whole Belgian population remained below these values, except for children: 10 % had an intake in line with the guidelines.

The average usual consumption of cheese was 30 g/day, once again with a marked age gradient: yet in this case, adults ate twice as much cheese as children. The *Actieve Voedingsdriehoek* advised not to exceed 20 to 40 g of cheese per day, depending on age Three quarters of children and adolescents and about one third of adults had a consumption that met this guideline.

In brief : The 2014 FCS showed that the dairy consumption in Belgium was low, especially in the older population. Adults ate proportionally more cheese than other dairy products compared to younger age groups.

Table 12. Usual consumption (g/day) of dairy products (except cheese) and cheese in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
Dairy products (except cheese)	Male	279	253	216	186	137	112
	Female	273	207	167	142	128	134
Cheese	Male	15	18	21	26	37	34
	Female	14	19	21	23	27	31

5.2.8 Red and processed meat

In the 2014 FCS, the average usual consumption of meat totalled 111 g/day, but women ate significantly less meat than men (88 vs. 132 g per day). A more detailed analysis leads to the conclusion that the most important subgroup was processed meat (66 g/day), which includes products such as sausages, cordon bleus and cold cuts, but also processed poultry meat. The usual consumption of unprocessed meat (e.g. steak, fillet, roast, chops, etc.) was comparable for red meat and poultry, and amounted to 23 and 22 g, respectively. It should be noted, however, that these calculations are based on a slightly broader definition of 'processed meat' than the one used in the Global Burden of Disease study ('meat preserved by smoking, curing, salting, or addition of chemical preservatives' -such as nitrates or nitrites-).
The consumption of processed meat (among 15-64 year-olds) had increased slightly since 2004 (2004 vs. 2014: 64 g/day vs. 68 g/day). It had fallen for red meat (34 g/day vs 25 g/day) and risen for poultry (19 g/day vs 23 g/day).
Depending on age, the *Actieve Voedingsdriehoek* recommended a daily high-protein food intake of 40-100 g (whether meat or an equivalent combination of products from the protein-source group). The average total meat consumption was therefore well above this standard. Yet more women than men limited their consumption to the recommended quantities.

In *brief* : The 2014 FCS revealed that the total meat consumption, especially processed meat, was too high. The total meat consumption in itself practically equalled the total recommended protein quota found in the *Actieve Voedingsdriehoek.* Belgians also ate three times more processed meat than poultry or fish. The rising consumption of processed meat products is an undesirable trend. Clearly, then, a lower intake is both achievable and necessary and should come from a greater variety of sources, with processed meat avoided as much as possible.

Table 13. Usual consumption (g/day) of meat (all types), red meat, processed meat and poultry in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
Meat (preparations)	Male	72	96	114	125	140	140
	Female	61	77	84	86	89	93
Red meat	Male	9	14	18	22	29	35
	Female	8	9	10	11	13	24
Processed meat	Male	44	59	72	79	84	79
	Female	45	54	58	59	59	49
Poultry	Male	16	18	20	22	29	27
	Female	14	15	18	19	20	18

5.2.9 Beverages containing added sugars

The 2014 FCS revealed an average usual consumption of sugary drinks of 152 g/day. It was significantly higher in men than women (197 vs 112 g/j) (table 14). In this respect, it was striking that the intake amongst 10-39 year-olds was at least twice to three times higher than that among older adults.

In brief: the consumption of sugary drinks (a significant source of calories and poor source of nutrients) is a problem for all age groups, but more markedly so for adolescents and young adults.

5.2.10 Fats high in saturated and trans fatty acids

Fats high in saturated fatty acids are found in a multitude of foods such as spreadable and cooking fats, some dairy products, pastry and sweet biscuits, chocolate products and sauces. This set of foods was not dealt with separately in the 2014 FCS, but the consumption of saturated fat (13 En. %) was known to exceed the recommended upper limit of 10 % of the energy intake (De Ridder, 2016; SHC, 2016). The average usual consumption of trans fatty acids (natural and mass-produced) was 0.8 g/day, which represents a clear and positive drop compared to the 2004 FCS, in which the intake was 1.9 g/day.

In brief: The consumption of fats high in saturated fatty acids and foods that contain them remained too high and should be further reduced.

5.2.11 Products high in sugar

This is an extremely large group, ranging from actual sugar to spreadable products that contain it and snacks such as caramelised nuts and ultra-processed foods such as biscuits and sweets. The group of "sometimes foods" or foods low in nutrients in the 2014 FCS covers these products, which are high in sugar, but also salted and/or fried snacks, sauces, as well as the alcoholic beverages and sugary drinks already mentioned above. Table 14 shows only sweet biscuits/pastries and chocolate products/sweets.
The average usual intake of nutrient-poor foods (including salty snacks) was 390 g/day or 575 kcal/d and was higher in men than in women (462 g/day vs. 324 g/day or 663 kcal/day vs. 494 kcal/d).
The average consumption of sweet biscuits/pastries and sweets/chocolates was 43 g/day and 29 g/day, respectively. It is striking that the consumption of food belonging to these two groups was the highest among 6-17 year-olds.

Sugary drinks make up the largest group in terms of volume, but the picture is somewhat different when looking at the energy intake: it is the groups "sweet biscuits/pastries" and "sugar,sweets and chocolate" that represent the most important source of calories in nutrient-poor foods in the Belgian population. Among young children (aged 3-5) and adults (aged 18-64), sugary drinks only ranked fifth, whilst they rounded out the top 3 among 6-17 year olds.

In brief: The consumption of sugar-high products was considerable in all age groups. There is clearly room left for reducing it.

Table 14. Usual consumption (g/day) of nutrient-poor foods (except alcohol) in the population aged 3-64, per age group and gender. Food Consumption Survey, Belgium, 2014 (n = 3146)

		3-5 y	6-9 y	10-13 y	14-17 y	18-39 y	40-64 y
Food group	**Gender**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
Nutrient-poor foods (except alcohol)	Male	245	391	499	558	559	386
	Female	235	322	376	401	381	265
Nutrient-poor foods (except alcohol) in *kcal/day*	Male	486	672	764	797	746	568
	Female	467	569	608	613	547	406
SUGAR-SWEETENED							
Sugary drinks	Male	86	159	234	294	277	121
	Female	80	127	172	196	150	58
Biscuits and pastries	Male	47	62	62	57	46	41
	Female	46	52	51	47	41	35
Sweets and chocolate	Male	28	42	45	43	33	25
	Female	29	38	38	35	27	19
SALTED							
Fried foods and salty snacks	Male	15	26	35	44	50	35
	Female	16	23	29	32	30	21
Sauces	Male	12	20	29	36	43	33
	Female	11	18	22	24	24	20

5.2.12 Products high in salt

Though the categories "Fried foods and salty snacks" and "sauces" in the 2014 FCS report largely overlap with high-salt food, there is no perfect correspondence between them. Thus, they also include fried foods, but not salty products such as gherkins in vinegar or capers.
According to the 2014 FCS, the average usual consumption of "Fried foods and salty snacks" amounted to 32 g/day, that of "sauces" to 27 g/day. Moreover, it increased with age and peaked in young adults (aged 18-39). In terms of energy intake, sauces generally ranked fourth (third in adults) among nutrient-poor foods.

In brief: The consumption of high-salt products was significant. There is therefore room for reducing it. High consumers were mainly adolescents and young adults.

5.2.13 Other products

Chapter 4 looks at a set of food groups with a neutral or poorly established health link.

- Fats that are not high in polyunsaturated nor in saturated fatty acids. As mentioned in sections 5.2.7 and 5.2.10, the 2014 FCS report does not include calculations based on this distinction.
- Unsweetened drinks such as water, coffee, tea, unsweetened flavoured drinks and natural fruit or vegetable juices. The average usual fruit juice consumption was around 65 g/day, but this figure also included juices liable to contain added sugar. The consumption of vegetable juices was very limited in the Belgian population. The consumption of other beverages was 1.168 g/day on average and increased markedly with age. Over 90 % of young people (aged 6-17) drank less than the recommended amount of 1.5 litres per day. 40 % of young children (aged 3-5) and older adults (aged 40-64) had an intake that was in line with the guideline for their age group in the *Actieve Voedingsdriehoek*.
- Tubers, refined grains and derivatives. The average usual consumption of (products with) potatoes was 44 g/day and increased with age. The 2014 FCS report did not contain a separate category for refined grains. As already mentioned in section 5.2.1 (see discussion on bread),these refined products constituted the most highly consumed group in the grains category.
- Poultry. As mentioned in section 5.2.8, the average poultry consumption was 22 g/day, i.e. barely 20 % of the meat consumption in 2014.
- Eggs. The average usual consumption was 10 g/day.
- Other vegetarian products. As described in section 5.2.3, the consumption of these products was very limited (about 4 g/day).

5.3 References from chapter 5

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6 PRACTICAL DIETARY GUIDELINES FOR THE BELGIAN ADULT POPULATION

The practical dietary guidelines for the Belgian adult population consist of key messages, recommended intakes defined on the basis of RDAs and the minimum health risk (TMREL), as well as a definition with a description of the food group.

These guidelines were organised according to food groups which, when the intake is excessive or inadequate, were associated with a burden of disease (DALY) in the GBD study (see Figure 2, Chapter 3). They are therefore ranked in order of importance.
In this regard, attention was paid to the following:

- A diet low in certain foods and nutrients increases the risk of disease. Particular attention should therefore be devoted to an adequate intake of such foods, i.e. an intake that is in line with the guidelines. More specifically, this concerns whole grains, fruit, vegetables and legumes, seeds and nuts, polyunsaturated fatty acids (and in particular omega-3 fatty acids), calcium, dietary fibre and water.
- A diet high in certain foods and nutrients has a negative impact on health and their intake should therefore be limited. Such foods include products high in salt, saturated and trans fatty acids, red meat, processed meat and drinks and other products containing added sugars.

The Food Consumption Survey also shows that greater attention should be paid to an adequate intake of vitamin D, folic acid, iodine and iron, especially in certain target groups.

The key messages below, organised by food group or nutrient, are divided into three parts: a key message, a guideline and a description.

6.1 Whole grains and derivatives

6.1.1 Key messages

To enjoy the health benefits of whole grains, they should replace refined grains (e.g. eat whole-grain or wholemeal bread rather than white bread, give preference to wholemeal pasta over white pasta, etc.). Eat enough whole-grain products every day to meet your energy needs.

6.1.2 Guidelines for whole grains and derivatives

Eat at least 125 g of whole-grain products every day.

A diet low in whole-grain products poses health risks. The GBD study defines a diet low in whole grains as a daily intake of less than 115 g, with the amount corresponding to the minimum health risk calculated at an average of 100 to 150 g per day (GBD, 2017). This guideline should also be viewed within the broader context of the guidelines on the consumption of carbohydrates and dietary fibre, since these foods also play a key role, e.g. they are required to achieve the recommended daily intake of 25 to 30 g of dietary fibre. For further information on this subject, please consult the Dietary Guidelines for Belgium (SHC, 2016).

6.1.3 Whole grains and derivatives: description and criteria

Whole-grain products can be made from wheat, rice, rye, corn, barley, spelt, oats, amaranth, buckwheat or quinoa. Examples include brown and wild rice, whole-grain and wholemeal bread, whole-grain pasta, whole-grain rusks, whole-grain breakfast cereals and whole-grain cereals in other foods.

A definition of whole grains has been developed as part of the European Healthgrain project (van der Kamp et al., 2014): "Whole grains shall consist of the intact, ground, cracked or flaked kernel after the removal of inedible parts such as the hull and husk. The principal anatomical components - the starchy endosperm, germ and bran - are present in the same relative proportions as they exist in the intact kernel". This applies not only to wheat, but also to other species such as corn, rye, barley, spelt and oats. On this basis, Ross et al. (2017) developed a definition of whole-grain products: "A whole-grain food is one for which the product is made with ≥30 % whole-grain ingredients on a dry-weight basis and more whole-grain ingredients than refined-grain ingredients." This is the definition used in the text below for whole-grain products. In this food group, the focus will only be on whole-grain products. Potatoes are not classified as whole-grain products and along with refined grains will not be discussed further in this text. Boiled or steamed potatoes are recommended as part of a balanced diet, provided that the whole-grain intake is sufficient.

Table 15: Whole grains and derivatives: definition, criteria and categories

Whole grains and derivatives	Definition criteria	Exclusion
- *Wheat, rice, rye, corn, barley, spelt, oats, amaranth, buckwheat, quinoa, wild rice* - Whole-grain products: *whole-grain and wholemeal bread, whole-grain pasta, flakes, flour, semolina, puffed grains, whole-grain breakfast cereals, whole-grain muesli*	- Definition of whole grains (GBD, 2017) (van der Kamp, 2014) (germ, bran, endosperm in their natural proportions) - Whole grains/refined grains ratio >1 - Products containing a minimum of 30 % whole grains (dry weight) (Ross 2017, GBD 2017)	- Refined grains - Products containing less than 30% whole grains

6.2 Fruits

6.2.1 Key messages

Eat 250 g of fruit each day, which, on average, amounts to two pieces of fruit. To avoid an excessive intake of sugar and/or added fat, give preference to fresh fruit without added sugar or fat. Vary your consumption, making your choices according to seasonal availability. Always wash and, if necessary, peel the fruit before eating it.

6.2.2 Guidelines for fruit

An average consumption of less than 300 g of fruit per day is associated with an increased health risk. The minimum risk level (TMREL) has been estimated at an average intake of 200-300 g per day, excluding juices. Fruit is a source of dietary fibre, carbohydrates, vitamins and minerals.

The Superior Health Council recommends eating an average of 250 g of fruit every day to prevent chronic diseases and maintain good health. Fruit can be enjoyed for breakfast, as a snack, on toast or as a dessert.
Examples for 125 g of fruit (SHC, 2005):

- 1 medium apple, pear or orange
- 1 small banana
- 1 small grapefruit
- 1 peach
- 1 small bunch of grapes
- 2 handfuls of cherries
- 2 mandarins
- ¼ melon or ½ mango
- a small bowl of fruit salad.

6.2.3 Fruit: description and criteria

Fruit is divided into three subgroups:

1) all fresh and minimally processed fruit
2) dried fruit
3) fruit with added sugar and/or fat.

Juices and jams are excluded from our definition of fruit and therefore are not taken into account in the recommended daily intakes. Juices are considered beverages because they contain much less dietary fibre than a whole piece of fresh fruit and have less effect on the feeling of fullness, although they provide the same amount of energy (Konde, 2015).

Table 16: Fruit: definition, criteria and categories

Fruit	Definition criteria	Exclusion
- Unprepared or minimally processed fruit *Fresh fruit, frozen fruit, unsweetened compote, canned in juice or water, freeze-dried fruit* - Dried fruit *Dehydrated fruit: apricots, prunes, grapes, etc.* - Fruits with added sugar / fat *Sweetened compotes, canned food in syrup, fruit coulis*	Whole fruit except its water content (does not apply to just a part of the fruit, such as only the fibre or juice, or the fruit without the fibre)	- Fruit juices - Jam - Salted fruits, pickled fruit, chutney (GBD, 2017)

6.3 Vegetables

6.3.1 Key messages

Eat at least 300 g of vegetables daily and diversify your choices based on seasonal availability. This will provide you with a wide range of useful vitamins and minerals.

Divide your vegetable consumption over several meals, e.g. as a portion of vegetables with your hot meal (half a plate), a bowl or plate of vegetable soup, raw vegetables on your toast or a snack (e.g. cherry tomatoes, raw carrots, pieces of cucumber, etc.).

Always wash and, if necessary, peel your vegetables.

Each serving of vegetable soup should contain at least 80 g of vegetables (200 ml). Half a plate of vegetables amounts to an average of 200 g. A tomato, a medium-sized carrot or chicory bulb each weigh about 100 g.

6.3.2 Guidelines for vegetables

A daily consumption of less than 300 g of vegetables or 400 g of vegetables and legumes has been associated with an increased health risk (GBD, 2017). The minimum risk level (TMREL) has been estimated to be a daily consumption of 290 to 430 g of vegetables and legumes. The GBD uses the term "vegetables" to refer to all fresh, frozen, cooked, canned, bottled or dried vegetables, excluding salted or pickled vegetables and juices. Also excluded from this guideline are starchy vegetables such as potatoes or corn. Preference should be given to fresh or frozen vegetables without any added salt or fat.

6.3.3 Vegetables: description and criteria

Table 17: Definition, criteria and composition of the vegetable group

Vegetables	Definition criteria	Exclusion
- Unprepared or minimally processed vegetables *Fresh vegetables, unprepared frozen vegetables, freeze-dried/dehydrated vegetables* - Vegetables prepared with added fat / salt *Preserved vegetables, vegetables in sauce, vegetable soups*	Vegetable soup: min 80 g of vegetables/portion (WHO, 2015)	• Vegetable juices (GBD, 2017) • Salted vegetables in brine / vinegar / sweet and sour (considered condiments [GBD, 2017]: Capers, salted dried tomatoes) • Starchy vegetables (potato, sweet potato, tubers) (GBD, 2017)

6.4 Legumes

6.4.1 Key messages

Legumes can be a suitable alternative to meat or an important source of carbohydrates in a meal. They can be served in a soup or as a purée to spread on bread. Eat legumes weekly and use them to replace meat at least once a week to increase your intake of vegetable protein. Another advantage is that the cultivation and production of legumes has a low impact on the environment.

6.4.2 Guidelines for legumes

See vegetables

6.4.3 Legumes: description and criteria

Legumes are seeds that grow in pods. They are high in carbohydrates, protein and dietary fibre and have the potential to make a significant contribution to the fibre intake. Examples include white or brown beans, split peas, chickpeas, lentils, protein peas and soybeans. Peas and green beans also belong to the legumes family from a botanical point of view but are classified as vegetables here because of their nutritional properties. Tofu, tempeh and hummus are processed products made from legumes (soybeans for tofu and tempeh and chickpeas for hummus) (Gr, 2015). Peanuts will be dealt with separately in the section on seeds and nuts.

Table 18: Legumes: definition, criteria and categories

Legumes	Definition criteria	Exclusion
- Unprepared or minimally processed legumes *Lentils, beans, white beans, red beans, chickpeas, split peas, etc.* *Soya, tempeh, tofu* - Legumes with added fat / salt *Preserves* *Hummus-type purées*	Plants from the Fabaceae family produce their fruits as pods containing edible seeds. It is the seeds that are referred to as legumes. This group includes beans, lentils and peas. They are used mainly in dried form (Gr, 2015).	Peanuts are considered nuts. Peas, green beans, string beans, snow peas and mangetout are classified as vegetables.

6.5 Seeds and nuts

6.5.1 Key messages

Eat 15 to 25 g of plain seeds or nuts (unsalted or without a sweet coating) every day; a handful is about 30 g. These foods are a source of good fats, protein and fibre; walnuts, for example, are high in omega-3 fatty acids.

6.5.2 Guidelines for seeds and nuts

According to the GBD study, the TMREL for seeds and nuts is 16.4 g per day or 115 g per week, so consuming less than 115 g per week or < 16.4 g per day of nuts, seeds or peanut butter is associated with an increased health risk. Eat 15 to 25 g of unsalted (uncoated) nuts daily, which is about a handful of whole nuts or a "pure" peanut butter (100 % peanuts) sandwich per day. It is not advised to consume more due to the high energy content of this product group.

6.5.3 Seeds and nuts: description and criteria

Table 19: Seeds and nuts: definition, criteria and categories

Nuts and seeds	Definition criteria	Exclusion
Nuts and seeds, unprepared or minimally processed *Hazelnuts, almonds, walnuts, Brazil nuts, cashews, pecans, macadamia nuts, pine nuts, pistachios, etc.* *Seeds: Sunflower, sesame, pumpkin, chia, flax* *Peanuts* *Butters from these nuts or seeds (e.g. 100 % peanut butter)*		Sweetened, salted or coated nuts (chocolate, batter)

6.6 Milk and dairy products

6.6.1 Key messages

Milk and dairy products are an important source of protein, calcium, vitamin B2 and vitamin B12 and can contribute to a healthy and complete diet.

6.6.2 Milk and dairy products: description and criteria

Dairy products include milk and milk-based products such as cheese and yoghurt. As butter and cream are not included in this group, we will continue to refer to milk and dairy products. Full-fat dairy products contain proportionally more fat, especially cheese - with the exception of certain types of cheese such as fromage blanc (soft, fresh, white cheese). Semi-skimmed and skimmed (low-fat) dairy products contain as much protein, water-soluble vitamins and minerals as do full-fat dairy products.

Vegetable juices and products derived from soya, rice, almonds or hazelnuts, for example, are not included in this group. They were not related to health in the GBD study (GBD, 2017). Vegetable juices enriched with soya have a nutritional composition that is close to that of milk in terms of protein, vitamins and minerals, unlike other vegetable juices. However, nutritional similarity does not imply that the health effects will be the same. Accordingly, the results of research on the health effects of milk and dairy products cannot simply be extended to vegetable juices. Consequently, none of these alternatives is considered equivalent to milk as regards their effects on health (Vanga & Raghavan, 2018). The review by Kongerslev et al. (2016) indicates that further research is needed on the relationship between health and vegetable juices for decisions to be made in view of drawing up guidelines (Kongerslev et al, 2016).

Table 20: Milk and dairy products: definition, categories and criteria

Milk and dairy products	Definition criteria	Exclusion
- Dairy products with no added sugars *Milk, fermented dairy products (yoghurt, kefir, etc.), buttermilk, unsweetened condensed milk* - Dairy products with added sugars / fat / salt *Flavoured milk, fermented dairy products sweetened with sugar or fruit, sweetened dairy products, sweetened condensed milk* *Sweet milk-based desserts (pudding, etc.)* - Cheeses *Fromage blanc, ricotta* *Fromage blanc with fruit* *Soft and hard cheese, rind-washed cheese, blue cheese, processed cheese.*		• Vegetable juices and derivatives (GBD, 2017) (soya, rice, almond, hazelnut, etc.) • Butter, cream

6.6.3 Guidelines for milk, dairy products and calcium

Dairy products are an important source of calcium. Other calcium-rich products include certain fruits and vegetables, hard mineral water and, to a lesser extent, nuts, seeds, whole grains and legumes. You can achieve an adequate calcium intake by consuming a variety of foods. See chapter 8.3 of the 2016 Nutritional Guidelines for Belgium (SHC, 2016) for further information on the health effects, requirements, upper tolerable intake, important sources of and practical guidelines on calcium.

The GBD study linked the consumption of milk and dairy products to the burden of disease and recommends a daily intake of 350-520 ml of milk or dairy products (GBD, 2017). However, the authors of the study state that this link is due to the health effect of calcium.
A recent report by an international committee of experts on nutrition and health, which also took sustainability into account, recommends an intake of 0-500 g of dairy products. According to current knowledge, more than 500 g/day would not provide any additional health benefit. A

benchmark of 250 g/day is recommended as a "target", but an optimal intake would be even lower (EAT Lancet report: Willet et al., 2019).

In the Netherlands, the *Gezondheidsraad* has issued an advisory report recommending the daily consumption of a few servings of dairy products, including milk or yoghurt (Gr, 2015).

In France, the *Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail* (French Agency for Food, Environmental, and Occupational Health and Safety ANSES) recommends 2 servings of milk and dairy products per day (https://www.anses.fr/fr/system/files/NUT2012SA0103Ra-1.pdf).

The effects of milk and dairy products on health are not depicted as unequivocally beneficial in the scientific literature. They also appear to vary according to the type of dairy product (Zuivel- achtergronddocument: Gr, 2015). For example, the *Gezondheidsraad* of the Netherlands has established that the consumption of dairy products is associated with a lower risk of colorectal cancer and the consumption of yoghurt with a low risk of diabetes (Gr, 2015). With regard to cardiovascular health, all forms of dairy products (low-fat to full-fat) are recommended (Drouin-Chartier et al., 2016; Lordan et al., 2018).
There are diverging views in the literature on the effect of milk and dairy products on the appearance of overweight and obesity (Benatar et al., 2013; Lu et al., 2016). Nor is there any consensus on the effect of specific or low-fat dairy products compared to full-fat dairy products on the appearance of overweight and obesity (Freeman et al., 2018).

From an environmental sustainability perspective, it is advisable to limit the consumption of milk and dairy products. In the above-mentioned Lancet EAT report, an intake of 250 g/day is considered a safe limit for global capacity. This report also argues that a higher intake - from a global standard perspective - will increasingly exceed this capacity because of its impact on important indicators such as greenhouse gas emissions and biodiversity loss (Willett et al., 2019).

Based on the above, a consumption between 250 and 500 ml/day is recommended for milk and dairy products. If the intake is less than 250 ml/day, care should be taken to provide calcium, vitamin B2, vitamin B12 and protein from other foodstuffs.

6.7 Polyunsaturated fatty acids, omega-3 fatty acids and fish

According to the GBD study, the PUFA intake should be at least 12 % of the energy intake to prevent health problems, with a particular focus on omega-3 fatty acids (GBD, 2017).

6.7.1 Key messages

Eat fish, seafood or shellfish once to twice a week, including oily fish once a week.
To replace hard margarines and butter, give preference to non-tropical oils, spreadable fats and soft or liquid cooking fats, which have a healthier fatty acid composition for the heart and blood vessels.

6.7.2 Guidelines for polyunsaturated fatty acids, omega-3 fatty acids and fish, shellfish and seafood

A diet low in polyunsaturated fatty acids and omega-3 fatty acids from fish, shellfish and seafood consumption and high in trans and/or saturated fatty acids increases the risk of cardiovascular disease.

The SHC recommends that 5-10 % of adult energy intake should come from polyunsaturated fatty acids, including 4-8 % as omega-6 polyunsaturated fatty acids and 1-2 % as omega-3 polyunsaturated fatty acids (SHC, 2016). The GBD study suggests that the ideal proportion of polyunsaturated fatty acids in the diet should not be less than 12 % of energy intake.

Examples of oils high in polyunsaturated fatty acids include, in descending order, safflower oil, walnut oil, linseed oil, sunflower oil, soybean oil, corn germ oil, sesame oil and rapeseed oil. Linseed, walnut, rapeseed and soybean oils have the highest omega-3 -fatty-acid content; safflower, sunflower, walnut, corn germ and soybean oils are high in omega-6 fatty acids.

Oils high in monounsaturated fatty acids include, in descending order, hazelnut oil, olive oil, rapeseed oil, groundnut oil and sesame oil. A sunflower oil with a high oleic fatty acid content has a fatty acid composition comparable to that of olive oil.

Coconut and palm oil should be avoided because of their high content of saturated fatty acids.

The GBD study found that daily intakes of less than 250 mg of omega-3 fatty acids from fish (EPA and DHA) are associated with an increased health risk; the TMREL for omega-3 fatty acids from fish, shellfish and seafood is between 200 and 300 mg/day (GBD, 2017). Eat oily fish once a week, varying the species and origin. Children, women of childbearing age and pregnant or breastfeeding women should limit their consumption of certain fish for toxicological reasons (swordfish, fresh tuna, carp, eel, pike, etc.).
Regarding the consumption of fish, eat oily fish once a week but in moderate consumption, not only for the sake of environmental protection, but also because they are liable to contain contaminants (heavy metals, dioxins, polychlorinated biphenyls [PCBs], etc.), and because of the sensitivity of omega-3 fatty acids to oxidation (ANSES 2013; Freeman et al 2018; SHC, 2011).

Some of the main dietary sources of omega-3 fatty acids include (De Henauw, 2017):

- Oily and medium-oily fish such as mackerel, sardines, herring, sea trout, salmon, sea bass, anchovies and red mullet, among others.
- Spreadable or cooking fats high in polyunsaturated fatty acids, and more specifically in omega-3 fatty acids. Vegetable oils high in omega-3 fatty acids include e.g. linseed, rapeseed, walnut and soybean oil. Oils high in omega-3 fatty acids are best used in cold preparations (e.g. as a salad dressing); not all varieties are suitable for cooking.
- Foods (pork, poultry and eggs) with a higher omega-3 fatty acid content due to the adapted feed given to the animals these products were made from.

Also limit the consumption of products high in saturated fatty acids and avoid trans fatty acids as much as possible.

6.7.3 Products high in PUFAs, particularly omega-3 fatty acids: description and criteria

Table 21: Fish, shellfish and seafood: categories and criteria

Fish, shellfish and seafood
- Fish, shellfish and seafood, unprepared or minimally processed *Fish, shellfish and seafood which are fresh, frozen, or canned in water/natural juice* - Processed fish, shellfish and seafood (with added salt and/or added fat and/or added vinegar and/or smoked) *Canned in oil/vinegar* *Smoked fish; fish in brine*

In order to increase intakes of EPA/DHA, iodine and other important nutrients, it was decided to keep smoked and highly salted fish in this group.
It is advisable to encourage eating different types of fish and suggest fish as an alternative to meat.

Table 22: Products high in unsaturated fatty acids: categories and criteria

Fat content	Definition criteria	Exclusion
Fats high in PUFAs and omega-3 - *Rapeseed, walnut, linseed, soybean oils* - *Spreadable and cooking fats and sauces based on these oils.* **High PUFA and omega-6 fat content** - Oils and derivatives *Sunflower, groundnut, corn germ, soybean oils, etc.* *Spreadable and cooking fats and sauces based on these oils.* **Fats high in monounsaturated fatty acids (MUFA):** Olive oil, groundnut oil, rapeseed oil, sesame oil, etc. Spreadable fats and cooking fats based on these oils		**Fats high in saturated atherogenic / trans fatty acids** - *Butter, hard fat, coconut, palm, palm kernel fat; tallow, for frying, lard, creams* - *Fats and cooking oils and sauces based on these oils.* (SHC, 2013b; SHC 2012)

The consumption of olive oil, particularly extra virgin olive oil, is associated with a lesser incidence of cardiovascular diseases and lower cancer risk. This effect is at least partly due to its content of MUFAs and polyphenols with high antioxidant activity (Psaltopoulou et al., 2011; Buckland G et al., 2015). The positive health effects of olive oil cannot be extrapolated to other oils high in MUFAs due to different levels of other compounds such as polyphenols and phytosterols (Ros, 2014).

Note: The table above focuses on omega-3 fatty acids and foods high in polyunsaturated fatty acids. However, the proportion of omega-6 and omega-3 PUFAs does not matter per se, as long as the intakes for these two groups are in line with the amounts recommended in the Nutritional Guidelines for Belgium-2016 (SHC 2016).

6.8 Sodium and salt

6.8.1 Key messages

To prevent high blood pressure, choose low-salt products and avoid adding salt when preparing food and during meals. Herbs and spices (fresh, frozen or dehydrated/freeze-dried) are excellent alternatives for adding flavour to foods.

6.8.2 Guidelines for sodium and salt

Your diet should not consist of more than 5 g of salt per day (GBD, 2017; SHC 2016). Intakes above 5 g per day increase the risk of hypertension and related health problems.
In Belgium, the main dietary sources of salt are meat and meat products, bread and breakfast cereals, cheeses, sauces, high-salt spice mixes as well as pastries and sweet biscuits.

High-salt products include snacks such as crisps, coated peanuts, salty snack foods, crackers, salt and salted condiments, stock, stock cubes, pickles, onions in brine/vinegar, capers.

To limit salt intake, it is important (SHC, 2016):

- to cut down on products with a high salt content
- that manufacturers reduce the amount of salt added to foods consumed on a regular basis
- to avoid adding salt to dishes during their preparation as well as during meals, or to do so sparingly.

6.9 Red meat and meat products

6.9.1 Key messages

Limit the consumption of red meat, especially processed meat.

Red meat can be replaced by e.g. legumes, fish, eggs or poultry.

6.9.2 Guidelines for meat and meat products

“Red meat” includes beef, pork, veal, mutton, and goat meat and horsemeat. This guideline does not apply to poultry (chicken, turkey, duck, goose), rabbit meat, fish and eggs (GBD, 2017; SHC, 2013a; Gr, 2015). Poultry is excluded from the red meat group (feathered animals, unseasoned poultry mince, etc.) because it does not relate to health in the same way.

Based on the RDAs, the red meat consumption should be limited to 25 g per day (or 175 g per week). Eating more than one 115 g serving of red meat per week increases the risk of colon cancer and diabetes (GBD, 2017). The TMREL has been set at 18-27 g of red meat per day, which amounts to 126-189 g per week. To limit the risk of colon cancer, the red meat intake should not exceed 300 g (SHC, 2013) or 350 to 500 g (WCRF, 2018) per week.

The above-mentioned report from an international committee of experts on the importance of a healthy and sustainable diet advises to cut down significantly on the consumption of red meat and processed red meat, not only to prevent cardiovascular disease, diabetes and certain cancers, but especially to protect the environment and reduce the food-production related climate burden (EAT Lancet report: Willet et al, 2019).

Given the contribution of red meat to the burden of disease (DALY) and risk of colon cancer (WCRF) and taking into account sustainability considerations, the SHC decided to retain the guideline to limit consumption to a maximum of 300 g per week (SHC, 2013). Red meat can be replaced by e.g. legumes, fish, eggs or poultry, but it is important to ensure that this choice represents an equivalent alternative to meat (in terms of quantities and types of proteins and other nutrients), possibly by combining several plant products. Foods high in fat or salt should be limited.

To minimize the risk of cardiovascular disease, colon cancer and diabetes, it is advisable to limit the consumption of processed meat to 30 g per week (GBD, 2017). “Processed meat” means any meat which is smoked, dried or salted for preservation purposes or treated with (chemical) preservatives such as nitrites or nitrates. The definition of processed meat includes all meat-based products, including ham, bacon, salami and sausages. Most products in this category are made from red meat (GBD, 2017; Gr, 2015, SHC, 2013a).

In practice:
A maximum of 300 g of red meat per week
Fish, shellfish or seafood: 1 to 2x/week, including 1x oily fish
Legumes (chickpeas, lentils, white beans, etc.): at least once a week
Poultry, eggs or other meat substitutes: 1 to 3x/week.

6.9.3 Red meat and meat products: description and criteria

Table 23: Red meat and processed meat: definition, classification and criteria

Meat products	Definition criteria	Exclusion
Red meat, except poultry - Unprepared or minimally processed meat *Pork, beef, veal, horse, lamb, mutton, goat, game, bison* *Offal* *Minced meat* - Prepared meats *Sausage, seasoned mince*		• Poultry, fish, eggs, vegetarian products (Quorn, vegetable burger, vegetarian spread, legume burger)
Processed red meat and processed poultry - Deli meats *Cooked, cured and smoked ham, sausage, pâté, bacon, dried salted meat, etc.* - Meat and poultry with additives	Meat preserved by smoking, desiccation/drying, curing or the addition of additives, including bacon, salami, sausage, ham, pastrami (GBD, 2017; SHC, 2013a)	

6.10 Sugar, beverages and foods containing added sugars

6.10.1 Key messages

Consume as few drinks with added sugars as possible and choose water instead. Our body is 60 % water, and its water reserves need to be replenished on a regular basis. To maintain a healthy water balance, adults and young people should consume 1 to 1.5 litres of water daily, spread out over the day, in addition to the fluids absorbed through food.

6.10.2 Guidelines for beverages containing added sugars

Given the data from the GBD study, avoid sugary drinks with an energy content over 50 kcal per 227 ml serving or 22 kcal/100 ml, or that contain more than 5 % sugar. This applies to soft drinks, energy drinks, lemonades, etc. but not to fruit and vegetable juices, soups or milk drinks.

As already mentioned, these guidelines do not address alcohol. As regards the consumption of alcohol, we refer to the advisory report previously issued by the Superior Health Council (SHC, 2018).

6.10.3 Sugar, beverages and foods containing added sugars: description and criteria

Table 24: Beverages containing added sugars: definition, categories and criteria

Beverages with added sugars	Definition criteria	Exclusion
Lemonades, nectars *Energy drinks* *Sweetened vegetable juices and sweetened milk drinks*	Water, coffee, tea (infusions), drinks with an added sugar content of 5 % or greater, which corresponds to 22 kcal or more per 100 ml (GBD, 2017)	Water, coffee, tea (infusions), artificially sweetened drinks and unsweetened flavoured drinks, fruit juices without added sugar, smoothies, vegetable juices, soup, milk drinks without added sugar, plain vegetable juices, etc.

Table 25: Sugar and foods containing added sugars: definition and categories

Sugar and foods containing added sugars can be divided into three groups:

Added sugars	Sugar (saccharose or sucrose), honey, brown sugar, fructose, glucose, grain syrup, maple syrup, fruit syrup, agave syrup, rapadura (unrefined sugar), coconut sugar
Sweet spreads	Jam, chocolate, speculoos spread
Ultra-processed sweet products	Sweets, biscuits, etc.

6.11 Summary table of practical dietary guidelines for the adult population

Table 26: Practical dietary guidelines for adults: an overview in order of importance

	Guideline	Advice/Messages
Foodstuffs/Foods		
Whole-grain products	At least 125 g per day of whole-grain products	Eat enough whole-grain products each day to meet your energy needs. Replace refined products with whole-grain products.
Fruits	250 g of fruit per day	Choose fresh fruit.
Vegetables	300 g of vegetables per day	Vary your choices according to seasonal availability.
Legumes	Eat legumes every week	Replace meat with legumes at least once a week.
Seeds and nuts	15-25 g per day	Choose varieties high in omega-3 (e.g. walnuts). Choose plain seeds or nuts (unsalted or without a sweet coating).
Milk and dairy products	Consume between 250 and 500 ml of milk or dairy products per day	If you eat less than 250 ml/day, be aware of other sources of protein, calcium and vitamins.
Fish, shellfish and seafood	Eat fish, shellfish or seafood once or twice a week, including oily fish once a week.	Eat fish once or twice a week, focusing on sustainable products high in omega-3 fatty acids.
Red meat	Limit your consumption of red meat to a maximum of 300 g per week.	Red meat can be replaced by legumes, fish, poultry, eggs or other substitutes. Choose alternatives that are an equivalent substitute for meat.
Processed meat	Limit your processed meat intake to max. 30 g per week.	Replace deli meats with canned fish, legume or vegetable fillings, fruit or fresh cheese
Beverages and foods containing added sugars	Drink as few beverages with added sugars as possible.	Choose drinks with no added sugars, water being the first choice.

Nutrients *		
Calcium	Ensure you have an adequate intake of calcium from a variety of sources, including milk and dairy products.	Make sure you get at least 950 mg of calcium daily.
Polyunsaturated fatty acids, in particular omega-3 fatty acids	Choose rapeseed, soybean and walnut oils and eat nuts and seeds.	Choose non-tropical oils, spreads and liquid cooking fats instead of hard margarines and butter.
Sodium and salt	Limit your salt intake to a maximum of 5 g per day.	Choose products that are low in salt and avoid adding salt when preparing food or during meals. Unsalted herbs and spices are good alternatives for adding flavour to foods.

*see also: SHC - Superior Health Council Nutritional guidelines for Belgium - 2016. Brussels: SHC; 2016. Advisory report No. 9285.

6.12 Eating patterns

The concept of an eating pattern refers to the totality of all foods consumed. It covers the quantity, proportions, variation or combination of foods consumed, related to their frequency of use. According to this definition, each individual has his or her own specific eating pattern that reflects his or her life experiences, enriched by specific socio-cultural influences and other environmental factors (U.S. HHS & U.S. DA, 2015).

The nutritional quality of an eating pattern can be defined by comparing its nutritional value with specific nutritional guidelines for the age and gender of the individual concerned (U.S. HHS & USDA, 2015). The eating pattern is of significant importance, since the sum of all eating habits is linked to different health outcomes. The advantage of a scientific analysis at the level of the eating pattern is that it will automatically take into account the interactions between the different foods (Ocké, 2013).

Since it would be impossible to analyse the health impact of all individual eating patterns, they are grouped into clusters. Such compilations of individual eating patterns can be obtained in different ways. A first possibility is to create an a priori index based on the recommendations made about nutrients from a health promotion perspective based on the available scientific evidence. The “Healthy Eating Index” is a good example (Fransen & Ocké, 2008).

A second option is an a posteriori approach based on the statistical method of typological analysis - an analytical technique that first identifies clusters of foods consumed and then a profile, so that the relationship between clusters and health outcomes can then be investigated (Ocké M, 2013).

A third way of compiling eating patterns is based on personal preferences. These will most often be self-quantified eating patterns, e.g. vegetarian, vegan, low carbohydrate, Mediterranean or DASH (Dietary Approaches to Stop Hypertension) (U.S. HHS & USDA, 2015). There are a multitude of such self-quantified diets, but no comprehensive inventory.

The study of eating patterns and associated health outcomes faces limitations in terms of methodology (definition of the eating pattern) and practical implementation (opinion on a given pattern versus feeding trials). However, the link between various eating patterns and health outcomes has been investigated. Accordingly, the U.S. dietary guidelines report mentions the impact of various eating patterns on cardiovascular disease, type 2 diabetes, cancer, congenital malformations, neurological and mental diseases and bone health (U.S. HHS & USDA, 2015).

Regarding cardiovascular disease, it is generally acknowledged that there is convincing evidence that eating patterns associated with reduced risk are characterised by a high consumption of vegetables, fruits, whole grains, low-fat dairy products and fish and a lower consumption of red and processed meats and products containing added sugars, regular intakes of nuts and legumes and moderate alcohol consumption (U.S. HHS & USDA, 2015).

An eating pattern characterised by a high consumption of vegetables, fruit and whole grains and a lower consumption of red and processed meat, whole-milk products, refined grains and foods containing added sugars is associated with a reduced risk of type 2 diabetes. The scientific evidence to support this is described as moderate (U.S. HHS & USDA, 2015).

The association between certain eating patterns and various types of cancer is supported by different levels of scientific evidence. There is moderate evidence that an eating pattern with a high intake of vegetables, fruits, legumes, whole grains, lean meat and fish and low-fat dairy products as well as a moderate alcohol consumption and a low consumption of red/processed meat, soft drinks and products high in added sugars has a protective effect against colorectal cancer. There is also moderate evidence of the effect of such an eating pattern on the risk of breast cancer in postmenopausal women. However, other studies have already observed an increased risk with moderate alcohol consumption (Hamajima N et al, 2002; U.S. HHS & USDA, 2015; LoConte et al, 2018).

The available evidence regarding the association between breast cancer and certain eating patterns in women before menopause is currently too limited.
Due to the small number of studies on the link between lung cancer and diet, evidence of the protective effect of a diet high in vegetables, fruit, seafood, grains, legumes, lean meat and low-fat dairy products also remains limited.
It has not been possible to find convincing data on the relationship between diet and the risk of prostate cancer. However, few studies have been conducted on this subject (U.S. HHS & USDA, 2015).

Regarding neural tube defects, there is limited evidence in support of the protective effect of an eating pattern characterised by a high consumption of vegetables, fruit and grains and a lower consumption of red and processed meat and sweets, mainly in women not taking folic acid supplements (U.S. HHS & USDA, 2015).

Limited evidence suggests that a diet high in vegetables, fruit, nuts, legumes, fish and seafood in adulthood has a protective effect against age-related cognitive decline, dementia and Alzheimer's disease (U.S. HHS & USDA, 2015).

Finally, limited data suggest that a diet high in vegetables, fruit, grains, nuts and dairy products and low in meat has a protective effect on bone health. In this specific case, it is mainly the lack of methodological consistency in studies that limits the available evidence (U.S. HHS & USDA, 2015).

Despite the limited evidence available for some health outcomes, it is striking that the positive aspects of the different eating patterns are largely the same. The key elements of an optimal eating pattern include a high consumption of vegetables, fruit and whole grains, low-fat dairy products, fish, legumes and nuts, a lower consumption of red and processed meat, sweetened products and refined grains, and limited alcohol use. The importance of fruit and vegetables

in particular turned out to be very clear (Katz *et al*, 2014; U.S. HHS & U.S. DA, 2015).

Such findings can be translated into practice in different ways. The DASH diet is the textbook example of a scientifically grounded eating pattern, and its importance has already been widely confirmed (National Heart, Lung, and Blood Institute, 2012; Lopes et al, 2003; Blumenthal et al, 2010). The Mediterranean diet is another widely studied eating pattern (Koloverou *et al*, 2014); it is also on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity but without a description of the foods it contains (www.unesco.org/culture/ich/RL/00884). When comparing the overall quality of eating patterns in the prevention of various health outcomes, it can be argued that Mediterranean diets, eating patterns with low glycaemic index and vegetarian diets have added value compared to current Western dietary habits (Katz et al, 2014), but that they do not differ significantly from each other, and that there are therefore no grounds for clearly preferring one of these approaches over the other. A number of regions have also developed their own eating patterns - this is particularly the case in the Scandinavian countries. Thus, the "Nordic" diet takes into account nutritional and sustainability concerns as well as gastronomic considerations (Mithril et al, 2012).

A diet high in whole grains, fruit, vegetables, legumes and nuts and low in added sugars, red meat/red meat products and sweetened soft drinks that meets the individual's tastes and preferences is most likely to have a long-term health effect and become an integral part of the population's lifestyle.

6.13 References from chapter 6

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7 SUSTAINABILITY CONSIDERATIONS

According to the most recent FAO definition, "Food Based Dietary Guidelines" are a set of recommendations for foods, food groups and dietary patterns which aim to provide people with the necessary nutrient intakes and prevent diet-related health problems as much as possible (FAO: http://www.fao.org/nutrition/education/food-dietary-guidelines/en/). http://www.fao.org/nutrition/education/food-dietary-guidelines/en/).
The FBDG framework must include simple messages that can help any consumer make informed - and therefore healthy - choices in the complex and extremely diverse food supply of a given country or region.

FBDGs are generally developed by experts at the request of a public authority and are an integral part of a set of strategic measures to promote human **health** by influencing lifestyle and more specifically, in this case, eating behaviour. Current practice in this area directly links the underlying decision-making patterns, choices and priorities to the most recent scientific knowledge on adequate nutrition and the link between diet and health indicators throughout life. The place given to an individual food in the hierarchy of a given FBDG system will therefore depend primarily on its nutritional profile and the need for the nutrients it contains (Bechthold et al., 2018; Montagnese et al., 2015; EFSA, 2010).

Since the focus is mainly on disease prevention and health promotion, and given the close link between diet and physical activity in this context, there has also been a trend to include recommendations and messages on physical activity in FBDGs. However, it is clear that an adequate public health policy should pay due attention to other lifestyle factors and health determinants, and that, in other words, FBDGs should always be defined and promoted as part of a broader integrated disease prevention and health promotion strategy and perspective.

However, there is a growing consensus in favour of FBDGs focusing not only on human health, but also on a number of current **sustainability** issues (FAO, 2016).
In recent decades, sustainability has become a major new societal theme that draws attention to the considerable discrepancies across the globe in meeting needs that are crucial for quality of life, as well as to what our planet is able to sustain and the need for intergenerational solidarity on this issue.
On this second point, there is a broad consensus that human activity in all its diversity has an increasing, often very significant and in many cases irreversible impact on the Earth's natural state as well as on a number of resources (Steffen et al., 2015).
The global biosphere is under pressure from a number of factors, most of which are closely interrelated, and the origin of which is essentially anthropogenic. Among the most important are the rise in the world's population, increasing disturbance of ecosystems and associated loss of biodiversity, pollution in all its forms, a growing scarcity and, in many regions, shortage of fresh water, degradation and decline of usable agricultural land, increasing desertification

and climate change (Steffen et al., 2015). As such, the most intensive forms of agriculture and industrial food production methods bear their share of responsibility for this problem, whilst their primary function is to feed the ever-increasing human population. Thus, on a global scale, agriculture and food production are responsible for over a quarter of greenhouse gas emissions and for the gradual disappearance of tropical rainforest, which is known for its essential function as a biodiversity reservoir, water flow regulator and carbon sink, with the potential to absorb and store significant quantities of atmospheric CO2 (Tubiello et al., 2014). Industrial livestock farming plays an important role in this phenomenon because this production method leads to significant emissions of methane, a powerful greenhouse gas, and the feeding of animals in battery breeding depends on the importation of feed (such as soya) mainly from South America. This massive importation of protein crops contributes to a significant increase in greenhouse gas emissions. Their cultivation over large areas undeniably plays a part in the deforestation of tropical rainforests such as the Amazon, which are important carbon sinks. In addition, this production output must then be transported over long distances, which contributes to increasing the carbon footprint of the food of animal origin that is obtained at the end of the chain (Pussemier & Goeyens, 2017).

In recent decades, the Earth's carrying capacity has been chronically overstretched, as evidenced, for example, by the press attention given each year to "Earth Overshoot Day" - the date on which the Earth's intrinsic capacity to regenerate the resources used is exceeded in a given year, resulting in a net loss for the rest of that year (Whitmee et al., 2015; Steffen et al., 2011; Wackernagel et al., 2002) (https://www.overshootday.org/).

In the long term, this set of major changes will inevitably have an impact on living conditions and human health (a reality that, incidentally, is already clearly measurable in some parts of the world). Predictions vary, but include shifts in the geographical distribution of disease vectors, an increase in the number of natural disasters, migration, war and many other phenomena that are liable to have an impact on public health.
This dimension of sustainability is linked to the development of FBDGs in the sense that most of the factors that disrupt the planetary balance are also strongly embedded in the global food production and consumption system (UNEP, 2016; Rizvi, 2018).

Thus, while nearly a billion people still suffer from unbalanced diets and unsatisfactory availability of quality food (FAO, 2009), an ever-increasing number of people base their diets on foods that are too high in saturated fats, salt and added sugars as well as refined carbohydrates. These ultra-processed products are one of the important components of recent dietary changes and their contribution to what is known as chronic diseases of civilisation (obesity, type 2 diabetes, cardiovascular and neurodegenerative diseases) is increasingly well documented (Tilman & Clark, 2014).

In contrast, it must be noted that a new form of "transition" advocating responsible consumption is attracting a growing number of followers. Thus, it is noticeable that, in many parts of the world, preference is given to local products with the intent of countering the trend of globalisation. A specific example is the flourishing of artisanal products (e.g. beer and

cheese) and the renewal of short supply chains promoting, for example, sales at the place of production. As far as food is concerned, this movement brings a return to fresh, seasonal, minimally processed products, which will enable households and local communities to produce their own food with a smaller carbon footprint due to the drastic reduction in the energy costs of transporting and storing the goods. Responsible consumption also includes an ethical dimension, since one of the key issues of the approach is decent producer remuneration. This form of empowerment is not limited to local products, and fair trade is also very popular for exotic products such as coffee, cocoa and bananas, for example. The impact on the environment and biodiversity also focusses consumers' attention on sustainability aspects. For example, for fish, specific labels such as the MSC (Marine Stewardship Council) label have been created to help consumers avoid certain overexploited marine species (Pussemier & Goeyens, 2017).

Also worth highlighting is the important trend towards different forms of vegetarianism and veganism . This choice is triggered in many people for various reasons : (i) environmental (the carbon footprint of food of animal origin is greater than that of plant products), (ii) ethical (refusal to mistreat farm animals and sacrifice their lives for food) and (iii) health (excessive consumption of red meat, especially processed meat, increases the risk of certain forms of cancer) (Pussemier & Goeyens, 2017).

On the basis of these considerations, it is now increasingly assumed that FBDGs are not only a tool for improving the health of individuals in a society within the broader framework of public health policy and health education: as part of a much broader approach, efforts are being made to achieve **a new paradigm where the global interconnection of food production/consumption and sustainability issues are taken into account when drawing up these guidelines.** The means to achieve this objective are currently the subject of extensive societal and scientific debate and research.
The need to implement such an integrated approach regarding the FBDGs is already explicitly included in the strategy of a number of countries and international expert organisations. The FAO defines a "sustainable diet" as " those diets with low environmental impacts that contribute to food and nutritional security and to healthy lives for present and future generations. *Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, are nutritionally adequate, safe, and healthy, and optimise natural and human resources* " (FAO, 2012).
The FAO now explicitly states that dietary guidelines should not only be the basis for the development of diet and health policy, but also of agricultural and other sectoral policies.
In the Netherlands, FBDGs that take sustainability into account (Richtlijnen goede voeding ecologisch belicht) have been drafted quite recently (Gr, 2011). The Scandinavian countries and Brazil have also made significant additions to the traditional FBDGs regarding sustainability (NNR, 2012; Brazil, 2015). More recently, the Flemish government has integrated clear messages on this aspect into the new model of its food pyramid ("Actieve Voedingsdriehoek").

The SHC wishes to endorse this approach explicitly and calls for these sustainability considerations to remain an integral part of future updates of the FBDGs developed at the Belgian level and/or that of specific regions.

In addition to the direct link between dietary guidelines and agricultural policy, a whole series of other corollary dimensions could be addressed in a single integrated FBDG network. For example, food production and consumption also have links with urban vs. rural life as well as with political strategy in urban planning, environment and transport, agriculture, fishing industry and international trade, north-south relations and many other aspects of society.

By developing dietary guidelines within this broader framework, in which they are intricately intertwined with the global challenges of our time, we can take an important step towards an integrated sustainable policy that is now more essential than ever to protect current and future generations from the negative consequences of the depletion of the planet's natural resources and climate change.

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8 SOCIAL ASPECTS OF THE LINK BETWEEN EATING HABITS, HEALTH AND WELL-BEING

Leading a healthy life undoubtedly requires knowledge of nutrition but also the time and willingness to plan healthy meals and prepare them oneself as much as possible. However, all this is still not enough to develop a healthy relationship with food throughout life: heed must also be paid to eating itself, as well as to the pleasure and company associated with it (Vidgen & Gallegos, 2014). Shared meals are important for the physical and psychological well-being of the individual, but also for the well-being of others in society.

Eating together is beneficial to physical health and can even be an important factor in the fight against obesity (Fischler, 2011). As a review of the literature has suggested, not only adults, but especially young people, tend to eat more healthily when they do so with others and in particular with their families (Fulkerson et al. 2014). Young children, in particular, consume more fruit and vegetables when eating with their parents (Melbye et al. 2013). This is not only true for supper: eating breakfast together too can encourage children to eat more fruit and reduce their risk of overweight and obesity (Larson et al. 2013). Subjects belonging to certain vulnerable groups, such as institutionalised elderly people, also benefit from meals organised in a so-called "family" setting: they then tend to eat more, which is often a good thing to prevent malnutrition problems, but also find more pleasure in the meal itself as well as the company (de Graaf et al., 2006). The possibility of participating in organised shared meals can also be beneficial for elderly people who are still independent but often live alone (Ishikawa et al. 2017). According to these studies, eating together improves physical health as well as psychological well-being.

People who share meals more regularly also feel happier (Dunbar, 2017). It is too easy to forget that food is not just about nutrients: it is closely linked to our social structure (Fischler, 2011). Thus, the pleasure of sharing a meal is a fundamental part of the Mediterranean diet (Phull et al., 2015) and is associated with good mental health throughout life (Yannakouilia et al., 2015). It is an opportunity to spend time together that, like all the activities we share with others, can contribute to our happiness. A study on the impact of family activities on the psychological well-being of adolescents even revealed that sharing meals may be more important than other joint activities, to the extent that not eating together was virtually the best predictor of poor mental health in young people (Maynard & Harding, 2010).

Yet sharing meals is beneficial not only for individual well-being but also for the well-being of society. The more we eat together, the more we trust others and the more we get involved in the community (Dunbar, 2017). Compared to those who have little opportunity to eat together, young people who grow up in a home where it is important for the whole family to gather together to eat "what is served" are more likely to become helpful and prosocial adults willing to help both their friends and complete strangers later in life (De Backer et al., 2015). Shared meals are a pillar of society - their significance can be traced back to our very distant ancestors at a time when collaboration with others was essential to obtain enough food (Hill, 2002) and when food preservation was also a challenge. This regularly led to social dilemmas around

sharing large amounts of food (Gurven et al., 2000; Hill, 2002): when a group of individuals managed to kill large prey, they sometimes found themselves with more provisions than they could consume, and the question then arose as to how to share the rest, with whom and to what extent. The introduction of meat into the human diet, in particular, helped to shape our current understanding of collaboration and moral principles (Mameli, 2013). Thus, it was the dilemmas caused by food shortages or surpluses in a distant past that led humans to reflect on the importance of collaboration and fairness, etc. and ultimately, this has not changed. Even today, eating together still raises the question of sharing leftovers as well as of sharing the meal itself. For example, it is better to serve a single, large cake than ten individual portions, especially when the guests are children. Indeed, serving one large cake raises a series of dilemmas. How will it be shared? Will all the pieces be the same size? Who will be the first to be served? Eating together can thus be a means of transmitting highly subtle concepts of justice and authority (De Backer et al., 2015), both through the most popular foods and those that are less so: when it comes to sharing eleven meatballs and eleven Brussels sprouts as a family, it is likely that children will eagerly set their sights on the former and do their best to avoid the latter. In addition to spending time together, a shared meal can have very real importance for the well-being of society.

Throughout history, sharing a meal has been a fundamental and festive ritual (Jones, 2007). Eating together was a way of celebrating having something to feed the whole group but also all kinds of other events; even today, food and traditions related to shared meals remain a key element of many holidays. To this day, people prefer to eat together, although it is becoming increasingly common to eat alone. Sharing meals is one of the fundamental elements of a healthy relationship with food throughout life (Vidgen & Gallegos, 2014). This is why the importance of sharing meals and the pleasure they bring must be at the heart of advice on diet and health. However, it is important to extend this reflection beyond the family context: schools, the work environment, rest and care homes and even restaurants could still make (additional) efforts in this regard, to the greater benefit of the physical and mental health of their guests.

Summary of guidelines:

- Eating with others is not only more enjoyable but also, in the long term, healthier for the individual and society.
- It is important to take the time to eat together at home as well as at school, work, in (care) centres and other settings.
- Shared meals have social benefits that eating alone does not. Having all guests eat “what is served” requires less work and is a healthier option from a social perspective.

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9 COMMUNICATION WITH THE TARGET AUDIENCE

Our food is part of a social fabric and a set of habits (see also chapters 6 and 8) that help determine how to communicate with a given target audience. Communicating clearly and correctly about nutrition is undeniably a challenge and an important task. Nutrisciences, perhaps even more than other scientific disciplines, suffer from a crisis of public confidence (Penders et al., 2017, Garza et al., 2019). Consumers receive information about nutrition from different (and often conflicting) perspectives and believe that they also develop some personal expertise through their own eating habits. In this context, it is essential to communicate correctly and reliably (Brown et al., 2014). This also means communicating based on solid evidence and with the necessary nuance regarding the importance of the guidelines and their expected impact. After all, communication is often a chain of processes where nuances are lost between the source (e.g. an academic article) and subsequent stages such as press releases and, ultimately, newspaper articles, resulting in messages that are presented too strongly (Haber et al., 2018). In addition to the obligation to communicate correctly and reliably to maintain or restore trust, it is also useful to communicate effectively. Experts generally have far fewer opportunities to communicate with consumers than food brands or the popular press. That is why these rare opportunities must be as convincing as possible.

We have to make a multitude of food-related decisions every day, and it seems that the more we pay attention to them, the less we eat (Polivy et al., Herman & Hackett, 1986). Most of the many food choices we make on a daily basis are made on "automatic pilot" (Coelho do Vale et al., 2008). Therefore, we are only fully aware of a small part of such decisions, for instance when we think about the groceries we need from the supermarket to prepare supper. Many decisions remain unconscious even at this level (Coelho do Vale et al., 2008), such as whether to buy a particular food from a particular brand, prepare a specific quantity, serve the dish on a particular plate, leave the television on as a backdrop or not, etc. - all of which can have a subtle influence on our consumption. Communication about diet and health must be planned in light of the knowledge that there are myriad of such – largely unconscious - choices, since, as is the case with the food decisions themselves, people often receive these messages without much heed (Kahneman, 2011; Petty & Cacioppo, 1986). However, having the time, mental energy and motivation to do so can encourage these recipients to pay more attention (Petty & Cacioppo, 1986). Rather than merely adopting a traditional approach to nutritional education, it might therefore be productive and effective to start by thinking about more common persuasion processes that also apply in the field of (social) marketing (e.g. Sharp et al., 2010).

More specifically, this means that, in the context of nutrition communication, messages intended for a wide audience or broadcast in a setting where they may receive little explicit attention, the focus should be on clear and easily understandable language to convey a limited number of key messages. A **clear message** is needed to counter the proliferation of journalistic articles reporting about dietary studies with an overabundance of detail and, at times, abusive interpretations (Nagler, 2014; see also https://www.gezondheidenwetenschap.be/). A message repeated over and over again will have an effect, even if people only process it inattentively (Sharp et al., 2010). However, it

must also be **understandable**, which implies that it allows for easy cognitive processing and implementation - for example, recommendations to substitute one choice for another ("replace white bread with brown bread"), to increase or moderate consumption ("add less salt") or to achieve a certain number of servings ("eat two pieces of fruit per day"), the understanding and implementation of which do not require much thought. Finally, it is important to work with **key messages** in order to address the most important issues first (at an individual level or at group level). It should also be noted that consumers are only able to retain a few messages at a time even when they are paying attention (see LC4MP model, Lang, 2017), and that it is therefore not easy to implement multiple messages. Accordingly, it is important to focus particularly on the message that will achieve the greatest health benefit. It is with this in mind that the key messages in the next chapter (Chapter 10) must be understood. They are mentioned in order of priority, as simple advice that can be repeated clearly.

The role of communication therefore goes far beyond traditional information, which is explicitly provided in the hope that the message will then be activated when decisions are made. As we have seen, well-placed communication can also influence less conscious choices. Two factors are of great importance in this context. The first is the location and timing of the communication: the closer it is to decision-making in time and space, the more likely it is to be successful. For example, messages placed directly on food packaging influence our consumption without our realising it (see e.g. Neyens et al., 2015), precisely because they are visible in the right place and at the right time, i.e. just before consumption. The lesson to be learned is that health promotion messages at that time also should have an impact. Studies have also shown that simply increasing the portion of healthy food also increases the portion consumed (e.g. in children, see Aerts & Smits, 2017). Secondly, it is also possible to work with cues or markers that promote greater attention to the choices made - for example, by providing key messages or logos where decisions are made (e.g. in the kitchen, on the shopping list, etc.). At the same time, it is obviously desirable to avoid cues that encourage the consumption of unhealthy products (e.g. the direct visibility and accessibility of these undesirable options).

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10 KEY MESSAGES

Table 26 (Chapter 6.11) summarises practical recommendations for foods and nutrients useful for health protection and promotion. Some of them are more important than others, as shown in Table 6 (Chapter 3.3).
According to 2016 data from the Global Burden of Disease initiative for Belgium (see Figure 2 in Chapter 3), Disability-Adjusted Life Years in Belgium are mainly related to a diet low in whole-grain products, fruits, vegetables, legumes, nuts and seeds, as well as to excess salt. To reduce the diet-related burden of disease, it is therefore desirable to focus first on these foods without losing sight of the importance of the other guidelines. Consequently, the main key messages from this advisory report focus, in order of importance, on the following points:

1. To enjoy the benefits of whole grains, they should replace refined grains, e.g. eat whole-grain or wholemeal bread rather than white bread, give preference to wholemeal pasta over white pasta, etc. Eat at least 125 g of whole-grain products that meet your energy needs every day.

2. Eat 250 g of fruit daily, or an average of two pieces of fruit per day. To avoid an excess of added sugars and/or fats, choose fresh fruit without adding sugar or fats. Vary your choices according to seasonal availability. Always wash and, if necessary, peel the fruit before eating it.

   Eat at least 300 g of vegetables (raw or prepared) every day and vary your choices according to seasonal availability: they will provide you with a wide range of useful vitamins and minerals.

3. Eat legumes every week: this allows you to combine certain proteins and essential amino acids from a variety of sources. Replace meat with legumes at least once a week. Another advantage is that the cultivation and production of legumes has a low impact on climate because the production of vegetable proteins results in lower greenhouse gas emissions compared to the production of animal proteins.

4. Eat 15 to 25 g of plain nuts or seeds (unsalted and/or without a sweet coating) every day; a handful is about 30 g. Nuts contain useful fats, proteins and fibres. Walnuts, for example, are high in omega-3 fatty acids.

5. Choose products that are low in salt and avoid adding salt when cooking or during meals: this will contribute to a healthy blood pressure!

11 COMPOSITION OF THE WORKING GROUP

The composition of the Committee and that of the Board as well as the list of experts appointed by Royal Decree are available on the following website: About us.

All experts joined the working group ***in a private capacity***. Their general declarations of interests as well as those of the members of the Committee and the Board can be viewed on the SHC website (site: conflicts of interest).

The following experts were involved in drawing up and endorsing this advisory report. The working group was chaired by **Guy DE BACKER**; the scientific secretary were Michèle ULENS and Florence BERNARDY.

CASTETBON Katia	Public health, nutrition	ULB
CLARYS Peter	Athlete Nutrition	VUB
DE BACKER Charlotte	Communication	UAntwerpen
DE BACKER Guy	Preventive medicine, public health, epidemiology	UGent
DE HENAUW Stefaan	Public Health Nutrition	UGent
DELWAIDE Marc	Health promotion, disease prevention and surveillance	AVIQ – Branche santé
DE RIDDER Karin	Public health and surveillance, food consumption surveys	Sciensano
DE RUYCK Hendrik	Technology and food, safety, quality and food innovation	ILVO
DEVLEESSCHAUWER Brecht	Epidemiology, Lifestyle and chronic diseases	Sciensano
DILLIS Aude	Dietetics, public health	Haute école Lucia de Brouckère (HELdB)
GUGGENBUHL Nicolas	Dietetics, nutrition	Karott - HE Vinci - Institut Paul Lambin
JACOBS Magali	Dietetics, nutrition	HE Vinci - Institut Paul Lambin
MAINDIAUX Véronique	Dietetics, nutrition	HE Vinci - Institut Paul Lambin
MATTHYS Christophe	Clinical and experimental endocrinology	KULeuven
MULLIE Patrick	Epidemiology, nutrition and health	VUB, iPRI - Lyon,
NEVE Jean	Therapeutic chemistry and nutritional sciences	ULB
NEVEN Loes	Health promotion, nutrition and health	Vlaams Instituut Gezond Leven
PAQUOT Nicolas	Nutrition, metabolic and endocrine systems	ULiège
PUSSEMIER Luc	Residues and contaminants, chemical risks	Ex-CODA/CERVA

SEEUWS Carine	Dietetics, food composition	NUBEL
SMITS Tim	Communication	KULeuven
VANHAUWAERT Erika	Dietetics, food and health	UCLeuven-Limburg
VANLINDEN Veerle	Agro-technology	ILVO
VANSANT Greet	Food and health	KULeuven
VEREECKEN Suzy	Dietetics, nutrition	Ex-Erasme ULB, HELB Prigogine

The standing working group NHFS has endorsed the advisory report. The standing working group was chaired by **Stefaan DE HENAUW**; the scientific secretary were Michèle ULENS and Florence BERNARDY.

The following administrations and/or ministerial cabinets were heard:

DOUGHAN Laurence	Politique nutritionnelle	SPF SPSCAE, DG4
LOKIETEK Sophie	Promotion de la santé, prévention et surveillance des maladies	AVIQ – Branche Santé

This opinion has been translated by an external office.

About the Superior Health Council (SHC)

The Superior Health Council is a federal advisory body. Its secretariat is provided by the Federal Public Service Health, Food Chain Safety and Environment. It was founded in 1849 and provides scientific advisory reports on public health issues to the Ministers of Public Health and the Environment, their administration, and a few agencies. These advisory reports are drawn up on request or on the SHC's own initiative. The SHC aims at giving guidance to political decision-makers on public health matters. It does this on the basis of the most recent scientific knowledge.

Apart from its 25-member internal secretariat, the Council draws upon a vast network of over 500 experts (university professors, staff members of scientific institutions, stakeholders in the field, etc.), 300 of whom are appointed experts of the Council by Royal Decree. These experts meet in multidisciplinary working groups in order to write the advisory reports.

As an official body, the Superior Health Council takes the view that it is of key importance to guarantee that the scientific advisory reports it issues are neutral and impartial. In order to do so, it has provided itself with a structure, rules and procedures with which these requirements can be met efficiently at each stage of the coming into being of the advisory reports. The key stages in the latter process are: 1) the preliminary analysis of the request, 2) the appointing of the experts within the working groups, 3) the implementation of the procedures for managing potential conflicts of interest (based on the declaration of interest, the analysis of possible conflicts of interest, and a Committee on Professional Conduct) as well as the final endorsement of the advisory reports by the Board (ultimate decision-making body of the SHC, which consists of 30 members from the pool of appointed experts). This coherent set of procedures aims at allowing the SHC to issue advisory reports that are based on the highest level of scientific expertise available whilst maintaining all possible impartiality.

Once they have been endorsed by the Board, the advisory reports are sent to those who requested them as well as to the Minister of Public Health and are subsequently published on the SHC website (www.hgr-css.be). Some of them are also communicated to the press and to specific target groups (healthcare professionals, universities, politicians, consumer organisations, etc.).

In order to receive notification about the activities and publications of the SHC, please contact: info.hgr-css@health.belgium.be.

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