

5. Lifestyle

Lifestyle is the strongest influential determinant of health. Estimates of the degree of determination undoubtedly vary by source, but the point is that there is no other factor, or group of factors, that has such a strong influence on health. Lifestyle can be considered to be currently a realistic contributor at 40%, with factors such as genetics (30%), socio-economic circumstances (15%), health care (10%) and environmental factors, which are actually a minority in this review (5%), appearing to be clearly less important.¹ Lifestyle modification is at the heart of almost all primary prevention of non-communicable diseases and must be part of disease therapy, as it delays drug therapy, improves its effect and reduces the therapeutic dose required, which has a positive impact on the incidence of adverse effects. Today, there is even a field of 'lifestyle medicine'. Lifestyle medicine is a branch of evidence-based medicine (EBM) that uses comprehensive lifestyle changes (including nutrition, physical activity, stress management, social support and environmental exposure) to prevent, treat and reverse the progression of chronic diseases by addressing their underlying causes. Preventive counselling is a key part of this, so further lifestyle intervention options are discussed in Section 5.5 Preventive counselling. Lifestyle is a very complex issue (see Table 1) and not all factors are of equal importance and impact. In general, non-smoking, healthy diet, physical activity, and (non-) alcohol consumption are considered to be the pillars of a healthy lifestyle. They are highlighted in the table and are also addressed in the following sections.

Table 1: Lifestyle factors - behavioural determinants of health

<ul style="list-style-type: none">▪ Smoking▪ Nutrition - nutritional behaviour▪ Physical activity▪ Alcohol▪ Illicit drug use▪ Personal hygiene, hand washing▪ Social contacts▪ Jobs▪ Stress management	<ul style="list-style-type: none">▪ Sexual activity▪ Sleep, sleep habits▪ Behaviour regarding sun exposure▪ Behaviour in road traffic
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¹ However, the allocation of health spending is fundamentally at odds with this. While approximately 90% of expenditure is allocated to health services, approximately 9% is allocated to influencing behaviour (i.e. lifestyle). There are certainly complex reasons for this, the analysis of which is well beyond the scope of this introduction.

5.1. Physical activity

Physical activity (PA) is one of the main pillars of a healthy lifestyle. It has a major impact on overall health, but also on specific diseases. Therefore, physical activity recommendations are the basis of general healthy lifestyle recommendations, but also recommendations for specific diseases, including cardiovascular disease, cancer, diabetes and osteoporosis, and needless to say, the key influence on the risk of obesity as the most widespread pandemic with enormous health consequences. Lack of exercise is extremely common and can be counted among the most prevalent risk factors. This is why the WHO has paid particular attention to physical activity and, among other documents, the Global action plan on physical activity 2018-2030 - More active people for a healthier world. And, of course, the most relevant material in practical terms is the WHO Guidelines on physical activity and sedentary behaviour 2020.

5.1.1. Basic terms

There are a number of terms that are clearly defined in relation to physical activity and a good knowledge of these terms is very important for a proper understanding of the whole issue. They are used both to characterise different types of physical activity, its components and parameters, its intensity and its categories, and some of the consequences of physical activity.

Physical activity: Any bodily movement that is performed by skeletal muscles and that requires energy expenditure.

Physical inactivity: An insufficient level of physical activity that does not meet current recommendations for physical activity.

Domains of physical activity: The level of physical activity can be assessed in different domains such as leisure, employment, education, household and transport.

Aerobic physical activity: An activity in which the large muscles of the body move rhythmically over an extended period of time. Aerobic activity - also called endurance activity - improves cardiorespiratory fitness. Examples include walking, running, swimming and cycling.

Anaerobic physical activity: Anaerobic physical activity consists of short, intense bouts of exercise, such as weightlifting and sprinting, in which oxygen demand exceeds oxygen supply.

Metabolic equivalent of task – MET: Metabolic equivalent of task or simply metabolic equivalent is a physiological measure of the intensity of physical activity. **One MET is the equivalent of the energy expended by an individual at rest in a sitting position.**

Light-intensity physical activity: Low-intensity physical activity ranges from **1.5 to 3 METs**, i.e. activities with an energy expenditure less than three times the resting energy expenditure of the person. This may be slow walking, swimming or other casual activities that do not lead to a significant increase in heart rate or respiratory rate.

Moderate-intensity physical activity: In absolute terms, moderate-intensity physical activity is defined as activity that is performed between **3 and <6 METs** (i.e., a multiple of resting activity intensity). On a scale related to an individual's personal capabilities, moderate intensity physical activity is usually **5 or 6** on a scale of **0-10**.

Vigorous-intensity physical activity: On an absolute scale, vigorous-intensity physical activity refers to activity that is performed at **6 METs or more**. On a scale relative to an individual's personal capabilities, vigorous physical activity is usually **7 or 8** on a scale of **0-10**.

Exercise: A subset of physical activity that is planned, structured, repetitive and purposeful - the goal is to improve or maintain fitness and health.

Sport: Sport includes a range of activities carried out within a set of rules that are part of leisure or competition. Sports activities include physical activity performed by teams or individuals and may be supported by an institutional framework, such as a sports agency.

Muscle-strengthening activity: Physical activity and exercises that increase strength, power, endurance and skeletal muscle mass (e.g. strength training, resistance training or exercises to increase muscle strength and endurance).

Bone-strengthening activity: A physical activity primarily designed to increase the strength of specific points in the bones that make up the skeletal system. Bone-strengthening activities create an impact or tensile force on the bone that promotes bone growth and strength. Running, jumping rope and lifting weights are examples of bone strengthening activities.

Functional exercises: Exercises that can be incorporated into daily activities to improve lower body strength, balance and motor performance. Examples include balancing on one or both feet, squats, repeatedly getting up from a chair, lifting the toes and crossing obstacles.

Balance training: Static and dynamic exercises designed to improve an individual's ability to resist problems caused by postural fluctuations or destabilizing stimuli caused by their own movement, the environment or other objects.

Multicomponent physical activity: For older adults, multicomponent physical activity is important to improve physical function and reduce the risk of falls or injuries from falls. These activities can be done at home or in a structured group setting. Many of the interventions studied combine all types of exercise (aerobic, muscle strengthening, and balance training) into one segment of exercise, which has been shown to be effective. An example of a multi-component physical activity program might be a combination of walking (aerobic activity), weight lifting (muscle strengthening) and balance training. An example of balance training might be walking backwards or sideways, or standing on one leg during an activity that strengthens the muscles of the upper body, such as a bicep lift. Dance also combines aerobic and balance components.

Sedentary behaviour: Any alert behaviour characterised by an energy expenditure of **1.5 MET** or less when sitting, lying down or lying down. Examples of sedentary behaviour include

most office work, driving a car and watching television; it can also apply to people who cannot stand, such as wheelchair users.

Sedentary screen time: Time spent watching entertainment on a screen (TV, computer, mobile device). Does not include active screen games where physical activity is required.

Recreational screen time: Time spent watching screens (television (TV), computers, mobile devices) for purposes other than those related to education/study or work.

Fitness: A measure of the body's ability to function efficiently and effectively in work and leisure activities and includes, for example, physical fitness and cardiorespiratory fitness.

Cardiorespiratory fitness (endurance): The health-related component of physical fitness. The ability of the circulatory and respiratory systems to deliver oxygen during sustained physical activity. It is usually expressed as measured or estimated maximal oxygen uptake (VO₂ max).

Flexibility: A component of fitness related to health and performance that represents the range of possible movement in a joint. Flexibility is specific to each joint and depends on a number of specific variables, including the tightness of specific ligaments and tendons. Flexibility exercises increase the joint's ability to move through its full range of motion.

Cardiometabolic health: The interplay of blood pressure, blood lipids, glucose and insulin on health.

Cognitive function: Brain activities, i.e. reasoning, memory, attention and speech, that lead to the acquisition of information and knowledge. This may include learning.

Executive function: Executive function can be understood as performance and management functions. They control behaviour and determine certain abilities. They include elements such as working memory, cognitive flexibility (also called flexible thinking) and inhibitory control (which includes self-control). They provide control of our behaviour and coordination of other cognitive functions such as planning or organising.

Dose of Physical activity (Dose of PA): Dose is a complex parameter, including all relevant individual parameters. It is usually the total number of minutes per week devoted to physical activity of a certain intensity (or intensity category), in one number MET-minutes per week. It is therefore the product of the total number of minutes per week and the MET intensity of the activity. This is particularly relevant for aerobic physical activity. Muscle strengthening activities are usually expressed separately. For example, for resistance exercises, intensity is usually expressed as a percentage of the individual 1 repetition maximum (% 1-RM), and dose is expressed as the number of sets containing a certain number of repetitions (usually 8-12) at a given intensity (usually 60-80 % 1-RM).

5.1.2. Effect of physical activity on health

Virtually all primary prevention of chronic non-infectious diseases involves physical activity as an essential element. In terms of health outcomes, the following are the most important regarding the positive effects of physical activity: ²

- Reduced all-cause and cause-specific mortality (cardiovascular disease and cancer);
- Reduced incidence of cardiovascular disease;
- Reduced incidence of tumours (site-specific - according to WHO and AICR: colon, breast, endometrium, oesophagus, stomach, bladder, kidney);
- Reduced incidence of type 2 diabetes;
- Improved physical fitness (e.g. cardiorespiratory, motor development, muscular fitness);
- Improved cardiometabolic health (e.g., blood pressure, dyslipidaemia, glucose, insulin resistance);
- Better bone health;
- Improved mental health (e.g. reduced depressive symptoms, increased self-esteem, reduced anxiety symptoms, reduced ADHD);
- Improved cognitive outcomes (e.g. academic performance, executive functioning);
- Decreased adiposity.

The health effects of physical activity are also included in the chapters on the prevention of non-communicable diseases, specifically the prevention of cardiovascular disease, cancer, obesity, osteoporosis and diabetes.

5.1.3. Parameters of physical activity

Parameters are used to describe and quantify PAs and therefore also to estimate the predicted health effects. The basic parameters are as follows:

- Type of activity
- Frequency
- Duration
- Intensity

Type of physical activity

Physical activity exists in many different variations and can be divided according to many different aspects. For the practice of counselling, i.e. the detection, assessment and recommendation - prescription of PA, one of the most important divisions is between aerobic and anaerobic. At the same time, this division is very closely related to other divisions and parameters, such as intensity, duration of execution, or mechanical category regarding the affiliation to a more dynamic or isometric activity in the sense of resistance exercise. In **aerobic**

² At the same time, these are the outcomes that served as criteria for the validity of the current physical activity recommendations (see below), as to be substantiated and justified, a specific recommendation must be shown to be beneficial for some health outcome. Therefore, health outcomes are a direct part of the recommendation materials and are reported hereafter.

activity, the large muscles of the body move rhythmically over a prolonged period of time, and examples of such activities are prolonged running or cycling. The intrinsic criterion is that the oxygen demand does not exceed the oxygen supply. **Anaerobic** activity, on the other hand, consists of short intense loads such as weightlifting and sprinting. The intrinsic criterion is that oxygen demand exceeds oxygen supply. Thus, the muscles must use up short-term energy resources not needing oxygen, working on "oxygen debt". At the same time, everything is very closely related to heart rate (see further in the passages on energy sources and heart rate). Another possibility is, for example, to divide by domain (area, context) - i.e. whether the domain is leisure (recreation), transport, home or work. In addition, it should be borne in mind that many activities can be multi-component (see terms and their definitions).

Frequency

Frequency (how often) is usually evaluated in terms of a week. Although it is used to calculate the total weekly amount of physical activity in minutes, it is also important in itself, as it is desirable that PA is performed regularly, spread over as many days of the week as possible. Thus, frequency is also considered in the assessment of PA and the requirement for a certain number of days per week is also included in some parts of the recommendations.

Length - duration of one activity

Meant as the time of performing one segment of activity, without major interruption. When multiplied by the weekly frequency, or summed over a week, the weekly dose of a given type of activity is obtained. However, duration itself is also important, as it is closely related to the use of various energy and oxygen sources, and sufficient duration is a criterion of aerobic activity.

Intensity

Along with the previous ones, intensity is one of the main parameters of PA. Its importance is evidenced by its use as the main categorisation of PA, both in survey and assessment and in recommendations. The most important and commonly used intensity parameter is **MET - metabolic equivalent**. The MET is also used to express the basic PA intensity categories, see basic terms. The IPAQ questionnaire uses for PA assessment a simplified assignment of average values for each category of PA according to its usual intensity, namely 3.3 METs for walking, 4 METs for moderate activity and 8 METs for vigorous PA. In practice, it is usually sufficient to use these categories and to classify them on the basis of information about the type of specific PA, mainly by asking a question about the difficulty - exertion of breathing, which is usually associated with the ability to carry on a fluent conversation.

Although the best immediate indicator of intensity is the heart rate (HR), which objectively shows the intensity in terms of the organism and its response and is also an indicator of the use of different energy sources in relation to oxygen, i.e. aerobic - anaerobic activity, However, in the vast majority of counselling and routine clinical practice, PA assessment is purely

anamnestic and therefore the use of heart rate for intensity assessment cannot be counted on for this purpose and is not even included in general recommendations for physical activity for the general population.

HR is, however, of good use in the eventual individual prescription of PA. If the person has one of the commonly available wearable SF monitors, a range within which their HR should be during the activity can be recommended. The individual then has immediate feedback as to whether they are maintaining their optimal PA intensity. The recommended intensity in this case is expressed as a % of the individual's HR maximum. The abbreviation % HR_{max} is usually used.

Table 2 shows the basic classification of physical activity intensity in the three categories, including the corresponding MET values as well as % HR_{max}.

Table 2: Classification of intensity of physical activity

Intensity	MET	On a scale relative to an individual's personal capacity (0 – 10)	% HR _{max}	Talk test
Light	1,5 - 3,0		57 - 63	
Moderate	3,0 - 5,9	Usually 5 or 6	64 - 76	Breathing is faster, but compatible with fluent speaking of full sentences (you can talk, but not sing) .
Vigorous	≥6	Usually 7 - 8	77 - 95	Breathing very hard, incompatible with carrying on a conversation fluently. you will not be able to say more than a few words without pausing for a breath

% HR_{max} = percentage of maximum heart rate. HR_{max} = 220 - age.

Number of steps

The number of steps is a very specific indicator related to only one type of activity - walking. However, it is a practically usable parameter that can be used in the prescription of PA, control of its fulfilment and also in terms of motivation. The parameter is also related to the description of various methods of assessing physical activity, as its assessment is usually carried out by a certain monitoring and recording device, i.e. a pedometer, either a classical as a separate small device or nowadays most often as a part of a so-called "smart" watch or mobile phone, generally wearables.

Relationship between intensity, energy source and heart rate

The organism uses different energy sources for physical activity, their involvement depends on the time phase and also on the intensity, as shown in Table 3. In particular, the division into aerobic and anaerobic activity is essential. If the intensity is too high, approximately above 80% of HR_{max}, the oxygen supply is insufficient and the metabolism switches to anaerobic glycolysis. Then the accumulating intermediate lactate gradually creates fatigue to pain in the muscles and makes further PA impossible in relatively very short time. The typical range for

aerobic activity (higher intensities) is 70-80%. However, if fat is to be burned preferentially (e.g. for weight loss), lower intensities, approximately 60-70% HRmax, are preferable. Also, it takes some activity time before fats start to be utilized.

Table 3: Relationship between intensity, energy source used and HRmax

Zone	Energy source	% HRmax	Usage - effect
Aerobic	Predominance of carbohydrate burning, fat burning at longer exercise (A marathon runner can only run about 90 minutes on glycogen)	70 -80	For health and fitness training (fitness zone)
Anaerobic	Immediate sources and carbohydrates (glycogen), lactate formation	80 - 90	Spec. performance training
Weight reduction - fat burning	Predominance of fat burning (after the start-up)	60 -70	Weight reduction (weight management zone)

5.1.4. Methods of assessing physical activity

A wide variety of methods exist for individual assessment of physical activity. To choose the appropriate one, one has to consider first of all the balance between validity and feasibility and of course how the result can provide the necessary information, i.e. describe (quantify) the usual physical activity of the person in the long term. The methods can be divided into the following main groups:

- Questionnaires
- Diaries/logs (self-report)
- Devices

Questionnaires are the most widely used method of identifying and assessing PA. They can be sufficiently simple and easy to use, yet provide the most comprehensive and meaningful information on an individual's long-term habitual activity, with adequate - sufficient validity. In contrast to free anamnestic surveys, which may otherwise be directed at similar parameters, they offer a fixed structure, also given by a specific form, while also allowing for systematic assessment and categorisation and quantification of the result obtained.

5.1.4.1. IPAQ questionnaire

The short version of the IPAQ (IPAQ-S) has so far proven to be the most suitable for the purpose of individual assessment of physical activity and subsequent advice in the form of actual PA recommendations. It can also be used for completion by the patient (self-administered) or by questioning in the form of a guided interview. The relevant form is shown in Figure 1.

Fig. 1: IPAQ-S questionnaire form

IPAQ

Questionnaire on physical activity in the last 7 days

Vigorous activity:

1. During the last 7 days, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

Think about only those physical activities that you did for at least 10 minutes at a time.

_____ days per week

2. How much time in total did you usually spend on one of those days doing vigorous physical activities?

_____ hours _____ minutes

Moderate:

3. During the last 7 days, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

Think about only those physical activities that you did for at least 10 minutes at a time.

_____ days per week

4. How much time in total did you usually spend on one of those days doing moderate physical activities?

_____ hours _____ minutes

Walking:

5. During the last 7 days, on how many days did you **walk** for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

_____ days per week

6. How much time in total did you usually spend walking on one of those days?

_____ hours _____ minutes

Sitting:

The last question is about the time you spent sitting on weekdays while at work, at home, while doing course work and during leisure time. This includes time spent sitting at a desk, visiting friends, reading traveling on a bus or sitting or lying down to watch television.

7. During the last 7 days, how much time in total did you usually spend **sitting** on a week day?

_____ hours _____ minutes

Explanation of the intensity of activity:

- **Vigorous** physical activity refers to activities that require a lot of physical effort and force you to breathe much more than usual.
- **Moderate** activities refer to activities that require moderate physical exertion and make it a little harder than usual to breathe

Evaluation of the IPAQ-S questionnaire

A) Continuous score

The continuous score is the basic output and, in addition to being usable on its own, is required for the categorical score. The continuous score is expressed as the number of MET-minutes per week and is therefore calculated as the intensity of the MET activity performed multiplied by the total number of minutes per week spent on that activity. The following values are assigned to each activity category in the IPAQ (Table 4):

Table 4: MET values assigned to physical activity categories by intensity

Activity	Intensity in MET
Walking	3.3
Moderate intensity PA	4.0
Vigorous intensity PA	8.0

Table 5 shows an example calculation where each of the three types of activities was performed 5 days a week, each time 30 min/day.

Table 5: Example of continuous evaluation of the IPAQ in MET-min/week

Activity	MET		Days		Minutes/day		MET-min/week
Walking	3.3	x	5	x	30	=	495
Moderate intensity PA	4.0	x	5	x	30	=	600
Vigorous intensity PA	8.0	x	5	x	30	=	1 200
Total						=	2 295

A) Categorical score

The categorical score results in the individual being placed into one of three categories according to their level of weekly physical activity - high, moderate, low (the names are similar to the intensity label, but in this case, it is different) (Table 6). The criteria for placement into the respective categories allow for different variations in the combination of different types of activity. Continuous scores in MET-min/week can also be used.

Table 6: IPAQ categorical scoring - three levels of PA and inclusion criteria

<p>1) High = active, HEPA-level (Health-Enhancing Physical Activity)</p> <p><i>Either of the following 2 criteria:</i></p> <ul style="list-style-type: none"> • Vigorous-intensity PA on at least 3 days per week and accumulating at least 1 500 MET-minutes/week <p><i>OR</i></p> <ul style="list-style-type: none"> • 5 or more days of any combination of walking, moderate- or vigorous-intensity activities accumulating at least 3,000 MET/minutes/week
<p>2) Moderate = minimally (sufficiently) active, achieving the minimum recommended</p> <p><i>Either of the following 3 criteria:</i></p> <ul style="list-style-type: none"> • 3 or more days of vigorous activity for at least 20 minutes per day (= 480) <p><i>OR</i></p>

<ul style="list-style-type: none"> • 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities and/or walking of at least 30 minutes per day (=495) <p><i>OR</i></p> <ul style="list-style-type: none"> • 5 or more days of any combination of walking, moderate or vigorous activity reaching at least 600 MET-minutes/week.
<p>3) Low = not active enough, inactive</p> <ul style="list-style-type: none"> • No activity is reported <p><i>OR</i></p> <ul style="list-style-type: none"> • Some activity is reported but not enough to meet categories 1 or 2.

The individual categories can therefore be met by different variations of activities or combinations of activities. An example of the different options for meeting the "High PA" category is shown in Table 7:

Table 7: Examples of different options for meeting the criteria of the "High PA" category

Activity	Required amount – at least	Calculation for METmin/week
Walking only	130 min per day	3.3 MET x 7 days x 130 min = 3003
Only moderate activity	110 min per day	4 MET x 7 days x 110 min = 3080
Equivalent in steps	12 500 steps /day	

5.1.4.2. Assessment using devices

In terms of devices, the following options are under consideration:

- Pedometers
- HR monitors³
- Accelerometers⁴

They usually fall today into the category of so-called wearable devices (wearables). While mobile devices (e.g., a so-called smartphone) can also be worn, wearable device products include a system of some kind of wearable - a body attachment. Typical examples are, for example, so-called smart watches or fitness bracelets.

³ HR (Heart Rate) monitors: these devices do not directly assess the amount of physical activity, but the intensity. They can be very useful for PA prescription and verification of appropriate intensity (see Chapter 5.2.5 Relationship between intensity, energy source and heart rate). They are now readily available individually, usually in the form of a watch (receiver) and a chest belt (transmitter). With the use of appropriate software and by recording even the activity time, they can serve well for a very objective assessment of the amount of PA.

⁴ Accelerometers are more sophisticated devices that, unlike pedometers, record movement in 3 axes and can therefore evaluate it much better, more accurately and more comprehensively. However, their use is more for research and/or purely sporting purposes.

5.1.4.3. Walking - assessing the level of PA and the rate of implementation of recommendations using the number of steps

Walking is a very natural physical activity that is the easiest to incorporate into daily routines and can largely meet PA recommendations. In addition to the usual parameters such as frequency and duration of exercise, or intensity in terms of walking speed, the number of steps is quite often used as a parameter, especially in the sense of various popular and professional recommendations. In this context, there are sometimes discussions about the validity of the recommendations, of which '10 000 steps per day' is probably the most widely used.

If we go by the current PA recommendations (see below, chapter 5.1.4) then the recommended range of 150-300 minutes of moderate intensity activity corresponds to a range of 6,000-12,000 steps each day. The calculation is based on an average walking intensity of 3.3 MET (according to the IPAQ scoring). Such walking corresponds to a pace of 4.8 km/h or 85 steps/min. Then: $(150 \text{ min} \times 85 \text{ steps})/7 \text{ days} \approx 42\,000 \text{ steps/week}$, i.e. $\approx 6\,000/\text{day}$. 150 minutes is the minimum, but for a higher goal and benefit to aim for, the calculation is: $(300 \text{ min} \times 85 \text{ steps})/7 \text{ days} \approx 84\,000 \text{ steps/week}$, i.e. $\approx 12\,000/\text{day}$. In the IPAQ assessment, the criterion regarding walking for the "high activity" category is directly stated as "at least 12 500 steps/day". We can also use the IPAQ continuous score calculation, where the criterion for the moderate activity category is at least 600 MET-min/week and for the high activity category 3 000 (MET-min/week). The calculation is then again based on an average intensity value of 3.3 METs and that such walking represents 85 steps/min. The resulting values in steps are very similar to that according to the recommended number of minutes per week. It can therefore be concluded that the often recommended amount of 10 000 steps per day is justified.

5.1.5 Recommendations for physical activity

The new 2020 WHO Guidelines on physical activity and sedentary behaviour are now in force, replacing the previous 2010 recommendations. One of their features is the inclusion of sedentary behaviour as a separate commodity different from just physical inactivity. Sedentary behaviour is addressed in specific recommendations in a separate item.

Relationship between levels of sedentary behaviour and physical activity

There is moderate-certainty evidence that the relationship between sedentary behaviour and all-cause mortality, cardiovascular disease and cancer mortality varies with the amount of moderate to high-intensity physical activity. Thus, higher amounts of moderate- to high-intensity activity may mitigate the detrimental health effects of sedentary behaviour.

Recommendations on physical activity and sedentary behaviour for age groups and other population groups

Recommendations are made separately for the following groups:

- Children and adolescents (ages 5-17)
- Adults (ages 18-64)

- Older adults (aged 65 and over)
- Pregnant and postpartum women
- Adults and older adults with chronic diseases (18 years and older)
- Children and adolescents (5-17 years) with disabilities
- Adults (18 years and over) with disabilities

To maintain clarity and brevity, only the adult recommendations are presented in full below, including the original graphics and supporting text (benefits, statements of good practice, assessment of strength of recommendations and certainty of evidence). Further we provide only a brief summary of the main points of the recommendations for selected groups, namely children and adolescents, older adults and adults with chronic conditions. For the full version of the recommendations for all groups, we refer to the expanded version in the study materials or the original text of the recommendations.

Adults (aged 18-64)

Recommendations for adults are summarised in Figures 2 and 3.

Figure 2: Physical activity recommendations for adults (ages 18-64)

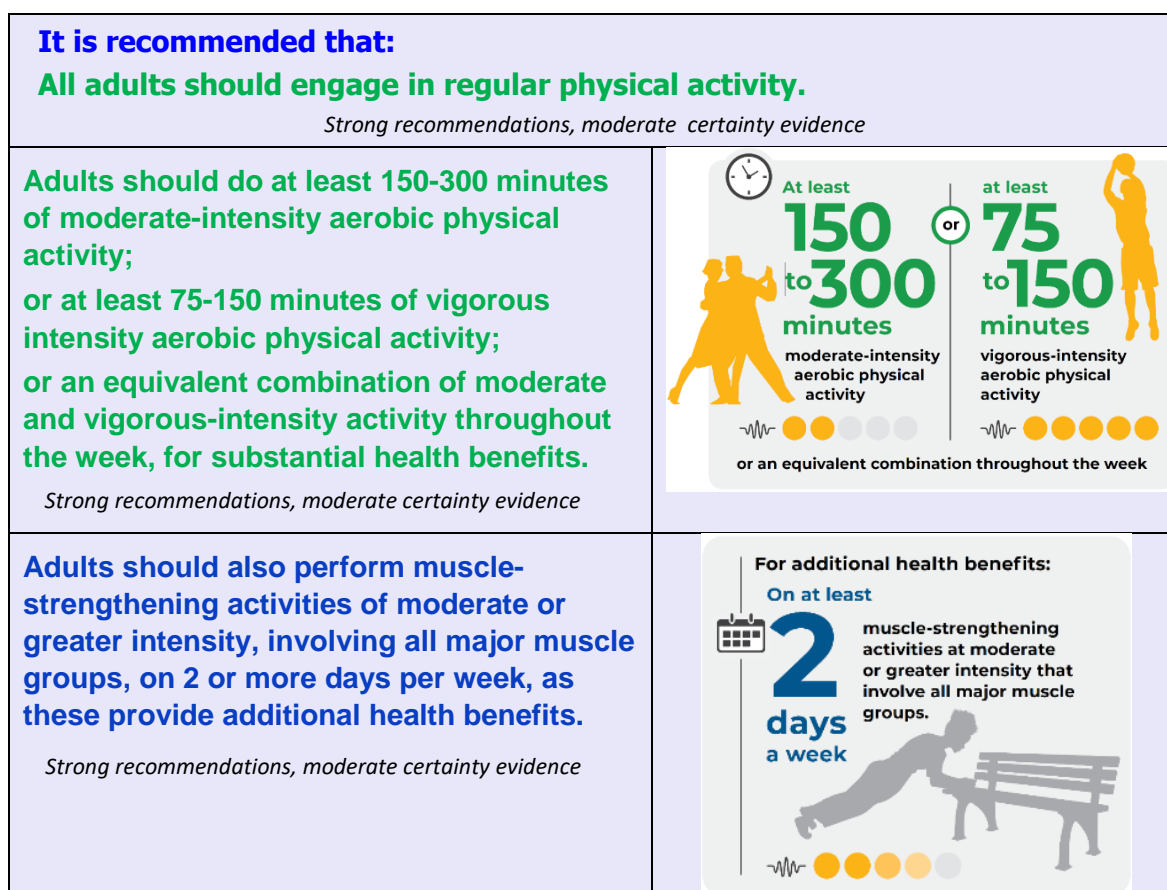
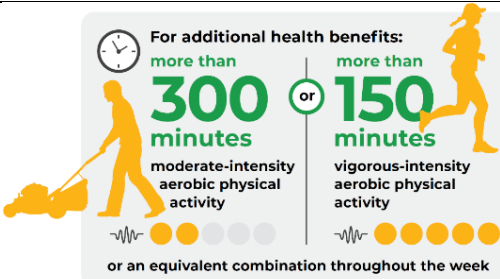
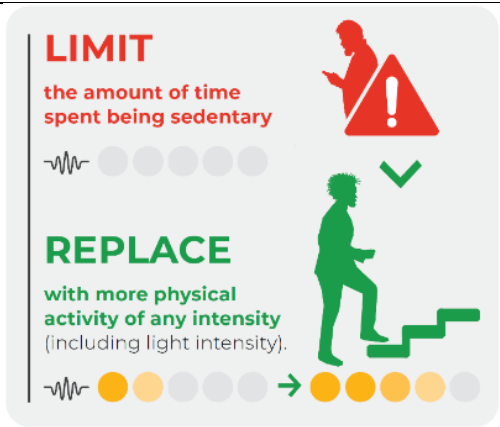


Figure 3: Physical activity recommendations for adults (aged 18-64) - cont'd.

<p>Adults may increase moderate-intensity aerobic physical activity to more than 300 minutes; or do more than 150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for additional health benefits.</p> <p><i>Conditional recommendation, moderate certainty evidence</i></p>	
<p>It is recommended that:</p> <p>Adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.</p> <p><i>Strong recommendations, moderate certainty evidence</i></p> <p>To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity.</p> <p><i>Strong recommendations, moderate certainty evidence</i></p>	

Statement of good practice:

- Doing at least some physical activity is better than nothing.
- If adults do not meet these recommendations, doing at least some physical activity will benefit their health.
- Adults should start with a small amount of physical activity and gradually increase the frequency, intensity and duration over time.

Children and adolescents (ages 5-17)

Recommendation:

- At least an average of **60 minutes per day of moderate- to vigorous-intensity**, mostly aerobic, physical activity, across the week.
- At least 3 days a week **vigorous-intensity aerobic activities**, as well as those that **strengthen muscle and bone**.
- **Limit the amount of time spent being sedentary**, particularly recreational screen time.

Older adults (age 65 and older) and adults with chronic diseases

The recommendation is the same as for ages 18-64 and includes the following recommendation:

- As part of their weekly physical activity, older adults should do varied **multicomponent physical activity** that emphasizes **functional balance** and **strength training** at moderate or greater intensity, on **3 or more days a week**, to enhance **functional capacity** and to **prevent falls**.

Control questions:

- What are the parameters of physical activity?
- What is a metabolic equivalent and what is it used for?
- What is the relationship between PA intensity, duration, energy sources and %HRmax?
- What are appropriate methods for assessing physical activity in routine HR counselling?
- What are the current PA recommendations? What is their content?
- Why is the focus on different population groups?
- Why is there an emphasis on sedentary behaviour?
- How is the validity of the recommendations ensured?

Literature:

WHO: WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020. ISBN 978-92-4-001512-8 (electronic version). ISBN 978-92-4-001513-5 (print edition)

WHO: Limiting sedentary time and being more physically active (Measuring physical activity, helping people to be more physically active) In: **BRIEF** - Integrated brief interventions for noncommunicable disease risk factors in primary care: the manual.

<https://www.who.int/europe/publications/i/item/9789289058551>

5.2. Nutrition

Nutrition undoubtedly forms one of the pillars of lifestyle. It will not be elaborated on here as it is the subject of the whole of Chapter 3. Nutrition. In addition, as nutrition is one of the main determinants of all major non-communicable diseases, nutritional factors are also detailed in Chapter 6 Prevention of non-communicable diseases. The influence of nutritional factors forms the basis for the prevention of CVD, cancer, osteoporosis, obesity and diabetes.

5.3 Risk behaviour

5.3.1. Smoking

5.3.1.1. Epidemiology

Tobacco, as one of the legal addictive substances, is a commodity, alongside alcohol, that has greatly influenced the social, cultural, economic and health development of societies around the world.

Plants of the *Nicotiana* genus have been used by ancient civilizations of the American continent for ritual and "medicinal" purposes for centuries. Although the active ingredient nicotine can be injected into the body in various ways (orally, by snorting, by means of decoctions and infusions), ritual use has mainly consisted of **smoking**, i.e. **inhaling tobacco**

smoke. Either rolls of dried tobacco leaves were used, or dried (and perhaps already partially fermented) tobacco was inserted into tubes, the precursors of pipes.

Even in Europe, tobacco was initially used as a new "medicine". At the same time, however, the effects of tobacco were more and more noted, giving users a sense of pain relief, relaxation, experiencing pleasurable sensations. The social classes, for whom precious tobacco was economically accessible, then gradually began to use it as a kind of 'self-medication' or pleasure. Indeed, until the invention and spread of cigarettes, smoking was the privilege of the wealthier social circles. Then, from the second half of the 19th century onwards, a new era dawned, an era of massive smoking and the gradual evolution of smoking towards what the World Health Organisation calls the 'epidemic' or even 'pandemic' of smoking in the 20th century.

The availability of cigarettes, coupled with the economic rise of much of society, led many countries to record adult smoking prevalence rates of up to 70 per cent in the second half of the 20th century.

From the beginning of the 20th century at the latest, some thinkers, scholars and physicians (often in one person) began to make statements pointing out the link between smoking and certain diseases, but also, for example, the risks of smoking for children and women. The real breakthrough in the perception of smoking in the professional community can only be dated from the second half of the 20th century, when the first large epidemiological studies were launched (e.g. Richard Doll: **The British doctors' study**, but similar studies were also carried out in the United States and other countries), which aimed to provide exact evidence of the link between smoking and the development of lung cancer in particular. Thanks to a new methodological approach and the persistence of researchers, it has gradually been possible to demonstrate the influence of smoking not only on the development of many cancers and lung diseases, but also on other diseases seemingly unrelated to smoking. Today we are working with a list of diseases across medical specialities.

Around the 1980s, social perceptions of smoking began to change. Today, most of society does not consider smoking to be a fashionable and normal part of life, as it was for much of the last century, but rather perceives the negative effects on health.

The prevalence of **smoking** (i.e. regular smoking) is also gradually changing in the Czech Republic. In recent years, studies by the National Institute of Health have also shown a **decline in the overall prevalence of smoking** in the Czech Republic, **but** this is due to a greater decline in the older adult population, while it has not declined much in the younger age groups. In addition, the decline in the number of regular smokers is offset by a higher prevalence of **nicotine use** through **non-traditional tobacco products** (which include cigarettes, cigars and pipes). The spread of water pipe smoking in the early 21st century, which many children and young people do not consider to be conventional and therefore dangerous, as well as the wide availability of oral tobacco and, more recently, the increasingly massive spread of 'heated

tobacco' products, de facto offset the reduced number of conventional cigarette smokers, so that the real decline in nicotine use is at least questionable.

Thus, at the beginning of the 21st century, we seem to be facing a further transformation of smoking and use habits towards smokeless tobacco, oral and electronic nicotine products. Hand in hand with the change in these user habits, a wider range of health impacts can be observed than in the era of cigarettes and conventional tobacco products.

5.3.1.2. Nicotine as an active ingredient

Nicotine is a highly toxic plant alkaloid produced by plants of the *Solanaceae* family to defend against animal pests. Its wide spectrum of effects can be observed both in its influence on the **nervous system** (stimulating and relaxing effects) and in its influence on many **bodily functions**. In the human body, it binds to acetylcholine receptors, causing changes in the production of neurotransmitters and some hormones. In addition, although its molecule in its pure form is not considered a carcinogen, in the form of metabolites it already has carcinogenic effects, nicotine has a **very high potential for addiction**. It is a highly psychoactive substance whose addictiveness has been compared to heroin and cocaine.

5.3.1.3. Effect of smoking on health

Conventional tobacco products have a negative impact on health both because of the **nicotine** itself and because of the simultaneous inhalation of the large number of other toxic, carcinogenic, mutagenic and teratogenic **substances contained in tobacco smoke**. This contains hundreds of other harmful substances in addition to the most well-known components such as tar, carbon monoxide and nitrogen oxides. Of these, more than 70 are proven carcinogens and about 30 are considered to be significant and dangerous environmental contaminants.

Regular inhalation of tobacco smoke causes increased morbidity in smokers and has been shown to cause premature mortality. Half of all smokers die as a direct result of smoking, and half of these die prematurely. Differences in mortality between smokers and non-smokers are statistically confirmed after only twenty years of smoking. Given that about 85% of regular smokers started smoking before reaching adulthood, these differences are already detectable in the middle-aged population.

According to global statistics, the most common causes of death among smokers are cardiovascular disease, chronic obstructive pulmonary disease and lung cancer.

However, smoking causes or has been shown to exacerbate a wide range of other diseases, including other cancers, digestive diseases, immune disorders, diabetes, reproductive disorders, neurological, psychiatric and many others.

However, in addition to the health of the smoker himself, smoking also negatively affects his surroundings. Cases of non-smokers, both adults and children, suffering from smoking-related diseases are well known and quite common when they live in close contact (in the

same household, formerly in the same workplace for example) with a smoker who is used to smoking indoors for a long time.

5.3.14. Types of exposure

Active smoking (also known as **First-hand smoke**) is the inhalation of tobacco smoke by the user. The type of smoke or aerosol inhaled by an active smoker is referred to in the literature as **Main stream smoke**. In contrast, **Side stream smoke** is the type of smoke that is emitted by a burning tobacco product into the environment between puffs.

Side stream smoke is the main source of air pollution around the smoker, for which the name **Environmental tobacco smoke (ETS)** is used. The smoker contributes to some extent by exhaling smoke residues back into the environment. ETS is a source of health risks both for the smoker himself (potentiating exposure to pollutants) and especially for non-smokers who are involuntarily exposed to the pollution. **Passive smoking**, i.e. inhalation of ETS, is referred to as **Second-hand smoke**.

Involuntary inhalation takes another form, also dangerous to health and somewhat more insidious than passive smoking, and that is exposure to **Residual smoke**, known as **Third-hand smoke**. Residues of nicotine and other components of tobacco smoke in the environment change over time. They interact with other substances in the environment to form new types of harmful compounds. They bind to dust particles and thus form toxic, carcinogenic and, above all, persistent substances in the environment, which settle especially in porous materials and in places that cannot be removed by normal cleaning or ventilation of residual smoke. These are mainly textiles, such as upholstery fabrics, car upholstery, carpets or furnishings made of porous materials (various tiles, partitions, etc.). It has been shown that the highest concentration of these residues is up to a height of about 1.4 m, so residual smoke is more dangerous for small children. Their greater risk is also due to immaturity of biological structures, faster breathing rate, movement in the lower breathing zone and specific habits (climbing on all fours, licking hands, etc.).

5.3.1.5. Health effects of the use of tobacco products other than conventional tobacco

Many people believe that by choosing a tobacco product other than conventional tobacco they will eliminate the negative health effects of smoking, or at least significantly reduce them. However, this is only true when considering the effect of second-hand smoke and third-hand smoke on non-smokers.

The use of smokeless tobacco or nicotine products reduces the risk from tobacco smoke to some extent, even for the user, but it cannot be said to be 'safe' to smoke or use nicotine. The toxic effects of nicotine and in particular the potential for addiction are factors often underestimated, especially by the younger generation.

5.3.1.6. Nicotine addiction

For most smokers, regular smoking leads first to a gradual tolerance to nicotine (users need larger and larger doses to feel the desired effect) and then gradually to the development of addiction. Currently, nicotine dependence is defined as a separate diagnosis in the International List of Diseases. **Dg. F17** thus denotes the stage of a fully developed dependence syndrome, preceded by longer or shorter periods of so-called "psychological" or behavioural dependence and the gradual development of "physical" dependence.

Whether and how quickly a smoker approaches this diagnosis is still under investigation. Research to date suggests that the potential for developing addiction is highly individual and depends on many factors, both internal (genetic disposition, maturity of the nervous system, certain diseases) and external (use of other psychotropic substances or drugs, social environmental factors, traumatic experiences, etc.). However, we know unequivocally that children are most at risk. The earlier and more frequently they start using nicotine, the more likely and faster they are to develop an addiction. We therefore consider the high prevalence of smoking and nicotine use by children to be an alarming social problem with potentially serious health consequences.

Diagnosing addiction, and especially the stages of its development, is difficult. Experts dealing with this issue recommend combining several methods - the so-called triangulation, where both the manifestations of typical features of addiction are taken into account and the degree and intensity of addiction are assessed by methods independent of each other. Examples of such methods include the Fagerström test or similar and the Minnesota Withdrawal Symptoms Scale. **Withdrawal symptoms** are important indicators of the onset and development of addiction and are also an important indicator in addiction treatment and smoking cessation. A typical withdrawal symptom in smoking is **craving**, an uncontrollable urge to light up or craving for a cigarette. Other symptoms include nervousness, irritability, aggression, anger, frustration, depressive states, fatigue and insomnia, as well as digestive problems such as nausea, constipation, flatulence, headaches, severe heart palpitations, dizziness, increased hunger and others.

In nicotine deficiency, they appear a few hours after the last dose, come in waves, and last for several weeks to months in abstinence. In simple terms, the greater the range of withdrawal symptoms a person experiences and the more intense and unmanageable the symptoms, the more severe the addiction.

5.3.1.7. Addiction treatment and smoking cessation

The most important prerequisite for **quitting smoking and successful treatment of addiction** is clearly the personal conviction and **motivation** of the smoker. **Proper preparation** and **individualised treatment settings** are an essential part of the preparation. A **supportive environment** and **family support** also play an important role. Currently, it is recommended to choose a **combination of smoking cessation methods** that use **psychological and behavioural methods** as well as **treatment of the physical component of addiction**, which consists of reducing the symptoms of withdrawal. These include **nicotine replacement therapy (NRT)** or

pharmacotherapy.⁵ In cases where, for various reasons, the smoker is unable to quit, it is recommended to choose what is known as risk minimisation, an approach called **Harm Reduction**. This is about reducing the health risks of smoking to the lowest possible level. The aim is to permanently reduce the number of cigarettes smoked (usually with the help of NRT or pharmacotherapy) or replace them with other products. This is where some experts recommend e-cigarettes or heated tobacco, although these products are by no means accepted as smoking cessation aids.

5.3.1.8. The role of the doctor and other health professionals

International recommendations for smoking cessation also include brief intervention by a specialist (**every doctor, general nurse and pharmacist should be trained and able to help at this level**), accessible quality intensive treatment in specialised settings (counselling centres and stop smoking centres) and a smoking cessation helpline.

The involvement of health professionals is often described by **the 5A's for Smoking Cessation** scheme, which includes five points representing the steps in helping people to quit smoking.

1. **Ask** – to ask questions, talk to the patient about smoking, the causes of smoking and other circumstances
2. **Advice** – to advise on quitting smoking, inform about the risks of smoking
3. **Assess** - to assess and support the patient's motivation to quit smoking
4. **Assist** - to help, to guide the patient through the quitting process
5. **Arrange follow up** – to plan follow up, provide long term support during and after treatment

5.3.1.9. Prevention

Smoking prevention must be comprehensive. First and foremost, it is an effort to **change societal and individual attitudes** towards smoking **based on education, awareness and education.**

As in other themes, a **community-based approach** and a focus on children and young people **through prevention programmes** not only in schools is recommended. In the Czech Republic, too, there are a number of educational and prevention programmes that seek to encourage the young population not to smoke. All of them emphasise not only sharing information and examples of good practice, but also the cooperation of the wider community - schools and after-school facilities, local authorities, health and other professionals and families. Other prevention activities target adult smokers through education, Harm Reduction

⁵ In pharmacotherapy, the most commonly used drugs are bupropion and varenicline (on prescription) or the recently reintroduced cytisine, which, like NRT products, is freely available in pharmacies. Combinations of substitution therapy and pharmacotherapy may also be chosen to achieve maximum treatment effect.

referrals and the 5A's programme in pharmacies, as well as through prevention programmes by health insurance companies and, in particular, preventive care in the health sector.

In addition to promoting education for the general public, the state has a range of tools to use to **regulate tobacco advertising and availability, labelling or manufacturing rules for tobacco and nicotine products, and restrictions on smoking in public places**. Other options for a restrictive approach, in addition to legislative ones, include economic instruments such as a **tax on tobacco products** (It is described in detail in the chapter "Population prevention through physical activity" in 6.6.2. Influencing (intervening) specific risk factors at the population level). When setting individual legal standards, it should be borne in mind that strict restrictions alone, without offering positive and compensatory solutions within a society-wide approach, can result in a reverse trend in smoking prevalence, the development of a grey market and many other negative effects. Practice shows that the prevalence of use of 'classic' tobacco products, i.e. mainly cigarettes, has been gradually decreasing in recent years (in the Czech Republic from 31.3% of cigarette smokers in 2012 to 23.1% in 2020). However, statistics show us a simultaneous increase in the number of users of new tobacco and nicotine products. This means, therefore, that children and young people in particular are still looking to nicotine as a means of solving certain problems and that more attention needs to be paid to education and training, as well as to tackling other forms of risk behaviour, prevention of socio-pathological phenomena and functional support for smoking cessation. The role of the state, but also of non-governmental organisations, non-profit and non-profit societies and volunteers, therefore, lies in a much more differentiated approach.

An example could be countries that have been able to apply the rules set out in the Framework Convention on Tobacco Control (FCTC) for a long time, such as Norway, Finland, Ireland, the United Kingdom and the Netherlands, where smoking prevalence is between 10 and 15% and continues to decline.

Conversely, countries that have not sufficiently implemented the FCTC in their national strategies and face higher smoking prevalence rates are also struggling with high tobacco tolerance, lack of enforcement of legislation and the reluctance of sub-actors to actively promote smoking and tobacco and nicotine use prevention.

Literature:

<https://www.ctsu.ox.ac.uk/research/british-doctors-study>

https://www.who.int/health-topics/tobacco#tab=tab_1

<https://fctc.who.int/who-fctc/overview>

<http://www.ensp.org>

<http://www.tobaccopreventioncessation.com/>

http://www.slzt.cz/dokumenty/doporuceni_odvykani.pdf

WHO: Quitting tobacco. In: BRIEF - Integrated brief interventions for noncommunicable disease risk factors in primary care: the manual.

<https://www.who.int/europe/publications/i/item/9789289058551>

5.3.2. Alcohol

Alcohol is one of the factors that has enormous negative effects on health, and its consumption is not inevitable, as it is possible to abstain, not only without any adverse effects, but with many beneficial ones. Yet, in general, consumption is so high and the consequences so adverse that the WHO considers the issue of alcohol to be one of its top current priorities and has now adopted the Action Plan to Reduce Harmful Use of Alcohol 2022-2030, among many other documents and activities against alcohol. One of the reasons for the widespread abuse of alcohol (apart from the fact that alcohol is an addictive substance) is the wide social tolerance that extends into the medical sphere. Even today, it is still possible to find doctors advocating or even recommending moderate alcohol consumption as beneficial to health. At the same time, knowledge of the health effects has also expanded considerably and, as a consequence, the various official recommendations on limits are changing in the sense of tightening - lowering them. Thus, often 5-10-year-old information on both proven health effects and recommendations is not valid and has had to be revised. The aim is to describe and explain the issue of alcohol with emphasis on what clinicians should know and use in their clinical work. Risky and harmful drinking is defined, and the health problems associated with it are described. It is explained that harmful drinking is not necessarily associated with alcohol dependence and that even moderate consumption can lead to damage to the body. Methods to detect problems associated with alcohol consumption are explained, as well as methods to quantify consumption and ways of determining the amount of alcohol consumed, and finally, current alcohol recommendations are given.

5.3.2.1. Health effects of alcohol consumption

Alcohol is a particular risk factor as it adversely affects the risk of approximately 230 diseases (according to ICD), both non-infectious and infectious, and injuries. We describe here the most important ones in which the impacts are most frequent and most pronounced. Furthermore, from a public health perspective, health consequences are expressed in terms of the number of deaths (mortality) and years of life lost through death and/or illness (disability).

The health and social harms caused by drinking alcohol are manifested by three main interrelated mechanisms: **1) the toxic effects of alcohol on various organs and tissues in the body** (leading, for example, to liver disease, heart disease or cancer); **2) the development of alcohol dependence**, where the drinker's self-control over drinking is impaired, often involving alcohol-induced mental disorders such as depression or psychosis; and **3) intoxication - the psychoactive effects of alcohol** in the hours after drinking.

Globally, alcohol-related deaths account for **5.3%** of all deaths and **5.1%** of DALYs. However, there are large variations between world regions (Europe is the worst, with **10.1%** of all **deaths** and **10.8%** of all **DALYs** attributable to alcohol consumption).

Of the 230 three-digit ICD-10 codes associated with alcohol, CVDs (36.4%), digestive diseases (14.6%), malignant neoplasms (13.4%) and unintentional injuries (13.0%) accounted for the highest proportion of alcohol-related deaths (in the European region), as shown in Table 1. The global figures are different because there are quite substantial differences in this sense in the different major regions of the world, both in terms of alcohol consumption and in terms of the many other circumstances that modify the health effects of alcohol. In terms of years lost (DALYs) due to alcohol, the largest proportions have unintentional injuries (24.5%), CVD (19.9%), AUD (17.6%) and gastrointestinal disorders (12.8%), table 9.

Table 8: Age-standardized alcohol-attributable deaths per 100 000 peoples by broad disease category in European WHO region and the world, 2016

Cause - disease	EUR Age-standardized alcohol-attributable deaths per 100 000	EUR share of total* (%)	World Age-standardized alcohol-attributable deaths per 100 000	World share of total*(%)
All causes	62.8	100	38.8	100
Cardiovascular disease	22.8	36.4	7.4	19.0
Injuries	14.6	23.2	11.4	29.4
Unintentional	8.2	13.0	8.3	21.4
Intentional	6.4	10.2	3.1	8.0
Digestive diseases	9.2	14.6	8.3	21,4
Malignant neoplasms	8.4	13.4	4.8	12.4
Alcohol use disorders (AUD)	4.9	7.8	1.9	4.9
Communicable, maternal, perinatal and nutritional conditions	2.7	4.3	5.0	12.9
Epilepsy	0.3	0.5	0.2	0.5

*Total means all deaths attributable to alcohol

Table 9: Age-standardized alcohol-attributable disability-adjusted life years (DALYs) per 100 000 people by broad disease category in European WHO region and the world (2016)

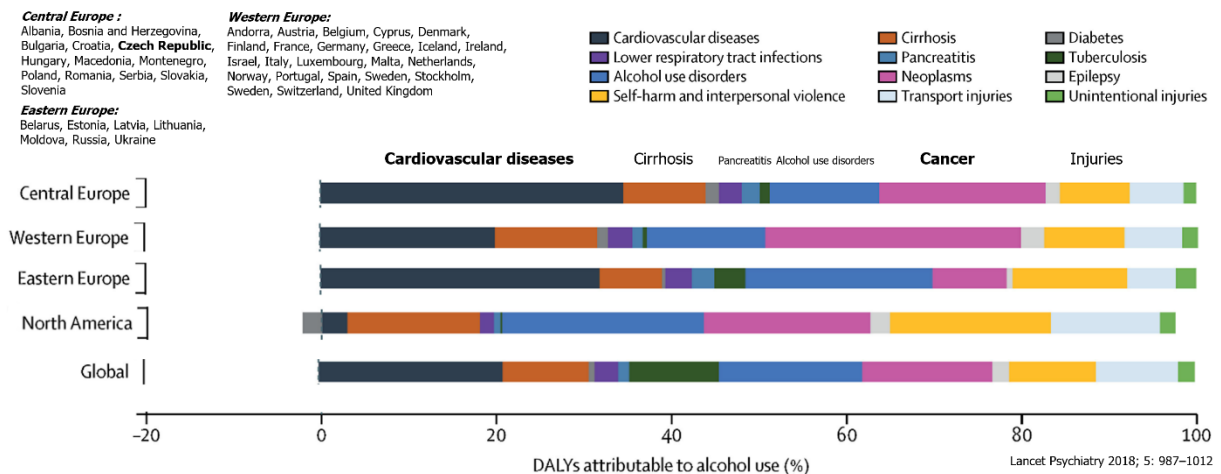
Cause - disease	EUR Age-standardized alcohol-attributable DALYs per 100 000	EUR share of total* (%)	World Age-standardized alcohol-attributable DALYs per 100 000	World share of total*(%)
All causes	2 727	100	1 758	100
Injuries	1 004	36.8	700	39.8
Unintentional	669	24.5	531	30.2
Intentional	335	12.3	170	9.7
Cardiovascular disease	541	19.8	168	9.6
Alcohol use disorders	478	17.5	246	13.9
Digestive diseases	348	12.8	307	17.5

Malignant neoplasms	238	8.7	134	7.6
Communicable, maternal, perinatal and nutritional conditions	106	3.9	197	11.2
Epilepsy	23	0.8	20	1.1

*Total means all DALYs attributable to alcohol

Years lost (DALYs) due to alcohol are also shown in Figure 4, where the data come from a different source than the previous two tables, but also offer a more detailed comparison of selected regions (Central, Western and Eastern Europe vs. North America and vs. the World overall), and also use a different division of diseases.

Fig. 4: Disability-Adjusted Life-Years (DALYs) lost due to alcohol - representation of major diseases in different regions (according to Lancet Psychiatry 2018; 5: 987-1012)



Cardiovascular diseases

The health impacts of alcohol through CVDs are the most significant ever, at least in the European region, as is well illustrated in the tables and graph above. A number of epidemiological studies have reported a complex relationship between the volume and pattern of alcohol consumption and the incidence of CVD. Specifically, the risk of the following diseases in particular is increased:

- Hypertension
- Atrial fibrillation and atrial flutter
- Haemorrhagic and other non-ischemic strokes

The relationship between alcohol and the development of coronary heart disease or ischaemic stroke is more complex. People who consume small to moderate amounts of alcohol and do not engage in irregular heavy drinking have a lower risk of disease, while people who engage in irregular heavy drinking or who consume larger amounts of alcohol have a higher risk of disease. As CVD are usually multifactorial, in terms of the influence of alcohol, it may not be, and usually is not, a cardiovascular diagnosis that is explicitly labelled as 'alcoholic'

or alcohol-related according to ICD codes. Nevertheless, there are some, e.g. I42.6 - Alcoholic cardiomyopathy (according to ICD-10).

Cancer

There is a proven causal link between alcohol use and cancers of the oropharynx, larynx, oesophagus, liver, colon, rectum and female breast. Risks are generally higher in women than in men. Even moderate alcohol consumption has been shown to increase the risk of breast cancer in women. The biological mechanisms of alcohol-related carcinogenesis have not been fully elucidated, but several pathways through which alcohol is likely to contribute to cancer have been identified. In particular, alcohol has been shown to permanently damage DNA in the cell and to inhibit the functioning of DNA repair processes, particularly through acetaldehyde, an immediate product of alcohol metabolism. Alcohol use can also lead to nutritional deficiencies that affect DNA processing pathways. Alcohol is also thought to modulate estrogenic pathways, increasing the risk of breast cancer in women. A summary of the evidence on the effect of alcohol on cancer risk is shown in fig. 5.

Fig. 5: Effect of alcoholic drinks on cancer risk

ALCOHOLIC DRINKS					
Evidence (WCRF/AICR grading)		Decreases risk		Increases risk	
		Exposure	Cancer site	Exposure	Cancer site
STRONG	Convincing			Alcoholic drinks	<ul style="list-style-type: none"> • Mouth, pharynx, and larynx • Oesophagus • Liver • Colorectum • Breast (post-meno)
	Probable	Alcoholic drinks	• Kidney	Alcoholic drinks	<ul style="list-style-type: none"> • Stomach • Breast (pre-meno)

Diseases of the digestive system

Liver and pancreas are the most important, although other organs such as the stomach and intestine can also be affected. Liver diseases in particular are very specific to alcohol and there are therefore a number of specific ICD entries for them.⁶

Liver damage: The causal link between alcohol consumption and liver disease is well established and it has been shown that alcohol can cause liver cell damage through mechanisms linked to ethanol metabolism and malnutrition. Alcohol is one of the most common causes of liver disease; subtypes of alcohol-induced liver disease include alcoholic hepatitis, steatosis, steatohepatitis, fibrosis and cirrhosis. Acute alcoholic hepatitis and liver cirrhosis are associated with a high mortality rate (which can be as high as 50% in acute

⁶ However, as with other non-communicable diseases, GIT disorders are also multifactorial and alcohol-related GIT damage is certainly not exclusively linked to the relevant ICD item.

alcoholic hepatitis) and the median survival time for patients with advanced liver cirrhosis can be as low as 1-2 years.

Damage to the pancreas: As regards damage to the pancreas, there are 2 items under MK10, K85.2 - Alcohol-induced acute pancreatitis and K86.0 - Alcoholic chronic pancreatitis.

Other GIT damage: A number of other lesions are manifested, e.g. stomach, which is expressed by K29.2 - Alcoholic gastritis. In addition, however, there is a convincing contribution to stomach cancer (see tumours) and undoubtedly damage to the colon, which, in addition to colitis, is again reflected in a convincing increase in the risk of colorectal cancer.

Alcohol use disorders (AUD)

The acronym AUD (Alcohol Use Disorders) is now commonly used for this group of alcohol use disorders and includes, among other things, alcohol dependence, to which the issue of alcohol is sometimes wrongly simplified and concentrated. Alcohol dependence is undoubtedly a major problem both in terms of health and societal risk, but in reality, it is only a relatively small part of the health consequences of alcohol consumption. Although alcohol-related health impairment is related to the amount of alcohol consumed, it is certainly not linked to alcohol dependence. In fact, most impairment occurs without alcohol dependence and health consequences can occur with even moderate consumption. But AUDs certainly represent an important part of the alcohol problem. The ICD-10 addresses this group by dedicating one code (F10-F19) to alcohol within the section 'Mental and behavioural disorders due to the use of psychoactive substances (F10-F19)', and the detailed breakdown in the third numerical position corresponds to codes 0-6, which are made up of the following items: acute intoxication, harmful use - abusive use, dependence syndrome, withdrawal state, withdrawal state with delirium, psychotic disorder, amnestic syndrome. In the ICD-11, 11 four-digit diagnostic categories are assigned to alcohol-related mental disorders, which we list simply: Single harmful use of alcohol, harmful pattern of alcohol use, alcohol dependence, alcohol intoxication, alcohol withdrawal syndrome, alcohol-induced delirium, alcohol-induced psychotic disorder, alcohol-induced mood disorder, alcohol-induced anxiety disorder, alcohol-induced dementia, alcohol-induced amnestic disorder, other specified alcohol-induced disorders, and unspecified alcohol-induced disorders.

Injuries

Injuries account for a significant proportion of the overall health impact of alcohol. In relation to deaths, they account for 23% of all deaths attributed to alcohol, second only to CVD, and in terms of DALYs lost, they account for almost 37%, by far the highest of all other health harms (data for the European region).

Infectious diseases

In terms of the infectious effects of alcohol, the risk of sexually transmitted diseases, including HIV/AIDS, viral hepatitis and tuberculosis, is a major concern. Alcohol consumption can suppress the immune system response, which has been documented particularly in

individuals with high exposure. Alcohol-impaired behaviour is an important element of transmission. People with alcohol use disorders are also at greater risk of poor adherence to treatment for infections.

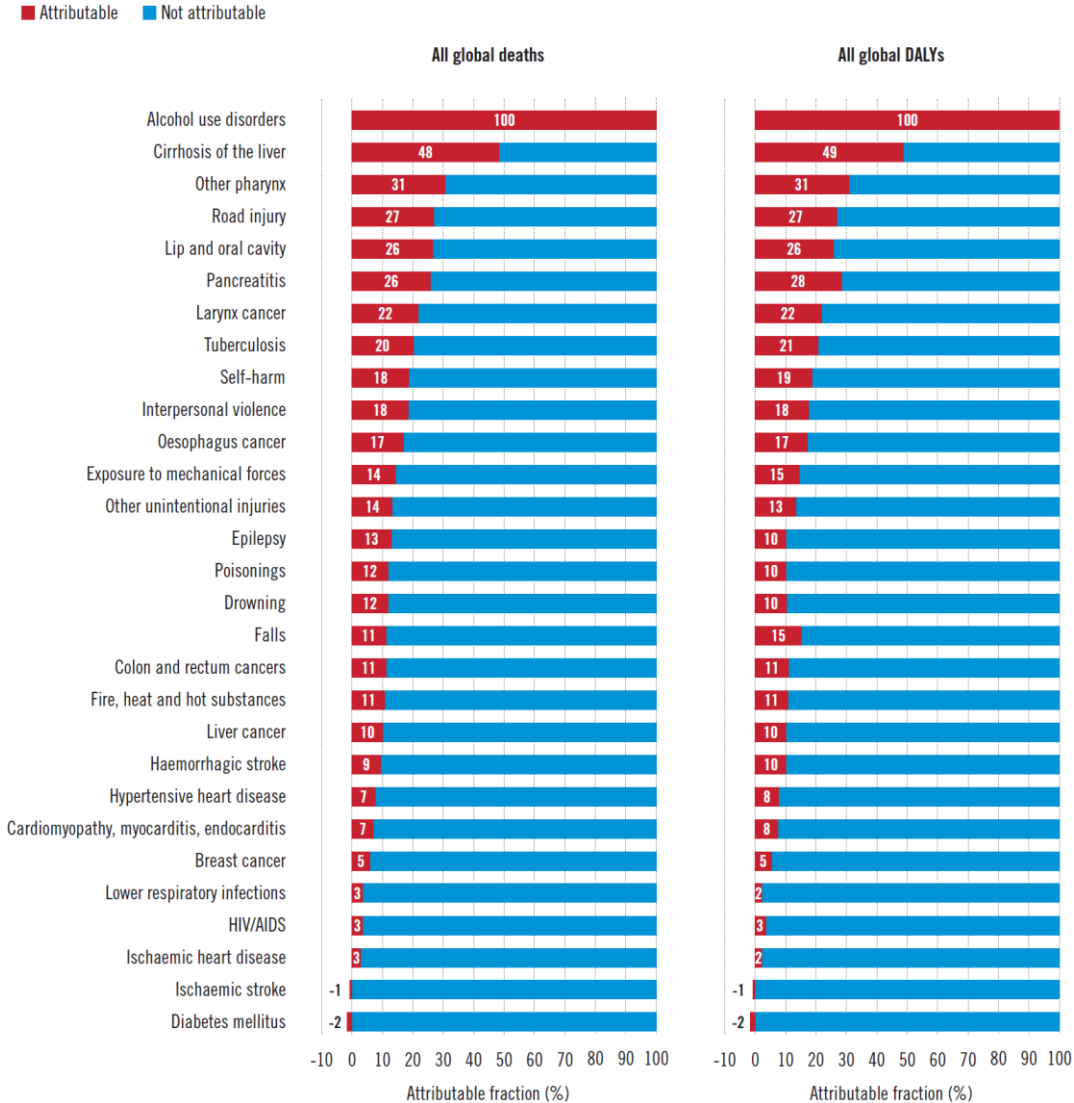
Alcohol-attributable fractions (AAFs) for selected diseases

Since most alcohol-related diseases are multifactorial, alcohol is not a single cause but only contributes a proportion, referred to as the AAF - Alcohol Attributable Fraction.

The contribution of alcohol to disease- and injury-specific health burdens ranges from 100% for AUDs to 3% for deaths from ischaemic heart disease (a population-attributable fraction of 2% was observed for DALYs caused by ischaemic heart disease). Furthermore, an overall protective effect was observed for the impact of alcohol on ischaemic stroke and diabetes at the global level (Fig. 6).

The AAF parameter does not change or make smaller the impact of alcohol on the overall burden of these diseases, it is just a different view.

Fig. 6: Alcohol-attributable fractions (AAFs) for selected diseases , 2016



5.3.2.2. Risky drinking, harmful drinking - definition and criteria

Hazardous drinking (hazardous alcohol consumption): According to the WHO, consumption or drinking patterns that are likely to cause harm if continued. Traditionally, a guideline dose of 40-60 g/day for men and 20-40 g/day for women has been given in this sense. But by now recognising that there is no safe dose of alcohol (no-threshold limit of harm), any numerical limit is abandoned and, to a large extent, the very notion of risky drinking (because all drinking is risky) is abandoned. But at the same time, despite the threshold lessness, the dose-dependence of the effect holds, i.e., as the dose increases, the risk increases.

Harmful drinking: Defined as drinking alcohol to such an extent that it harms health, physical or mental. Traditionally, a guideline dose of regular intake of >60 g/day for men and >40 g/day for women has been given in this sense. However, what is stated in the previous paragraph also applies here. However, it can be concluded that when these limits are exceeded, it is already very likely, if not certain, that damage is occurring.

Heavy episodic drinking (HED): Defined by the WHO as 60 grams or more of pure alcohol on at least one occasion at least once a month. This is considered a significant health risk. Basically, it a single dose risk criterion. It is the dose that will raise the blood alcohol concentration (BAC) to the level of intoxication. A BAC of 0,08 % (0,8 ‰) is considered to be the limit of intoxication. What alcohol intake leads to this blood level depends on many individual factors, in particular body weight, sex, body water content or concurrent food intake.⁷ The HED is one of the very important indicators of the risky alcohol consumption and is used both in population-based indicators (prevalence of HED) and especially in individual assessment. Here it is one of the essential components and is also included in all standardised questionnaires (some of which are based on this very question).

5.3.2.3. Alcohol consumption - population indicators

These data can provide some information on the exposure of a given population and can be used for public health purposes, e.g. to design and implement measures to reduce consumption. However, they provide almost no information **on individual** consumption, which may differ quite substantially from the population average. Different indicators and, in particular, different methods of measurement and evaluation are used to assess individual consumption. Some of the level indicators are common and valid across the population and the individual, e.g. baseline categories of consumption or abstinence. Population indicators of alcohol consumption are shown in the overview Table 10.

Table 10: Population indicators of levels of alcohol consumption

⁷ For an 80 kg man, an intake of 50 g of ethanol leads to a BAC of 0.87 ‰ on average, for a 70 kg woman, an intake of 40 g leads to an average of 0.98 ‰.

Current drinkers: the percentage of those in the population aged 15 years and older who have consumed alcoholic beverages in the previous 12-month period.
Total alcohol per capita consumption (APC) is defined as the total (recorded plus estimated unrecorded) alcohol per capita (i.e. persons aged 15 years and older) consumption within a calendar year in litres of pure alcohol, adjusted for tourist consumption. It makes a difference whether it is used for the total population aged 15 and over (including non-drinkers) or only for current drinkers in the population.
Grams of pure ethanol per day is another often-used measure of alcohol consumption. In particular, this measure is used by a number of countries that have set guidelines for daily drinking limits to minimise health and injury risks. Given the specific weight of alcohol of 0.793 g/cm ³ , litres of pure ethanol per year can be converted to grams per day as follows: g/day = APC x 1000 x 0.793 / 365 days

Current drinking and abstention

A majority of the world's adult population abstained from drinking alcohol in the last 12 months. These persons may be lifetime abstainers or former drinkers. The categories of abstainers are shown in Table 11. The proportion of current drinkers, former drinkers and lifetime abstainers (%) in the total population is shown in Table 12.

Table 11: Types of abstainers

Lifetime abstainers: people who have never consumed alcohol.
Former drinkers: people who have previously consumed alcohol but have not done so in the previous 12-month period.
Past 12-month abstainers: people who did not drink any alcohol in the previous 12-month period. This includes former drinkers and lifetime abstainers.

Table 12: Percentage of current drinkers, former drinkers and lifetime abstainers (%) in the total population (15+ years) (2016)

Region	Current drinkers (%)	Former drinkers (%)	Lifetime abstainers (%)
CZ	75.4	15.7	9.3
CZ ♂	86.0	9.7	4.4
CZ ♀	65.4	20.6	14.0
EUR	59.9	18.6	20.6
World	45.5	12.5	43.0

Total alcohol per capita consumption (APC)

Total APC comprises two components, namely the consumption of **recorded** and **unrecorded** alcohol. **Recorded alcohol** is alcohol consumed as a beverage that is recorded in official statistics, such as data on alcohol taxation or sales. **Unrecorded alcohol** refers to alcohol that is not accounted for in official statistics on alcohol taxation or sales in the country

where it is consumed because it is usually produced, distributed and sold outside official channels that are under government control. There are different data sources and different approaches to estimating unrecorded alcohol, and the APC indicator also includes unrecorded alcohol. Further, total per capita consumption does not match per capita consumption among drinkers because of differences in the prevalence of abstinence. The higher the prevalence of current drinkers, the lower the ratio of per capita alcohol consumption among drinkers to consumption in the general population. Therefore, in addition to the APC, the APC among drinkers only is also reported. An overview of APC overall and among drinkers is shown in Table 13.

Table 13: Alcohol consumption per capita (litres of pure alcohol and grams per day) (2016)

Region	All		Only current drinkers		
	APC (litres)	Grams of ethanol/day	APC (litres)	Grams of ethanol/day	Current drinkers (%)
CZ	14.4	31,1	19.1	41.3	75.4
CZ ♂	23.2	50.2	26.9	58.1	86.0
CZ ♀	6.1	13.2	9.3	20.1	65.4
EUR	9.8	21.3	17.2	37.4	59.9
World	6.4	13.9	15.1	32.8	43.0

Heavy episodic drinking (HED)

Heavy Episodic Drinking (HED) is an indicator of alcohol consumption patterns (defined as 60 grams or more of pure alcohol on at least one occasion at least once a month) that varies widely across countries. As shown in Table 14, the Czech Republic is one of the countries with a very high prevalence of HED.

Table 14: Total APC (litres of pure alcohol) and prevalence of heavy episodic drinking (HED) (in %) among the total population aged 15+ years and among drinkers (15+ years), 2016

Region	All		Only current drinkers	
	Total APC (litres)	HED prevalence (%)	Total APC (litres)	HED prevalence (%)
CZ	14.4	42.1	19.1	55.9
CZ ♂	23.2	61.6	26.9	71.6
CZ ♀	6.1	23.6	9.3	36.1
EUR	9.8	26.4	17.2	42.6
World	6.4	18.2	15.1	39.5

5.3.2.4. Expressing and determining the amount of alcohol

For alcohol, the quantity is the most important parameter, meaning the amount of ethanol. A complication is that there are several ways of expressing used for different purposes and they are not interchangeable. It is therefore necessary to know them, understand them and

be able to convert them. The volume expression is used for the content in beverages, while the mass expression (in grams) is used to determine the amount of alcohol consumed, to assess health effects and for recommendations. In addition, so-called units are used, which are particularly important for assessing individual consumption and for recommendations, but are also increasingly appearing on packaging as part of labelling. Blood alcohol content is a special chapter.

ABV (Alcohol by Volume, Alc/Vol): The ABV is the most common way of expressing the alcohol content in beverages and is now part of the mandatory labelling on packaging. It is expressed as a percentage. It therefore expresses the concentration of ethanol in the beverage. It would also be possible to indicate what volume of ethanol in ml is in the whole package, or in a specific quantity of beverage, but this is not usually used.

ABW (Alcohol by Weight): Weight (in grams of ethanol) is the most common expression in relation to alcohol intake and also in terms of recommendations. It is not indicated for labelling on packaging. Therefore, for any further work with alcohol quantities, including the situation where we want to know how much ethanol in grams is ingested by drinking a certain amount of a drink, we need to convert the volumetric content into weight. But this cannot be done by simply changing the units from ml to g, since ethanol has a density less than 1, specifically 0.789 g/cm³. E.g. In 100 ml of 40% alcohol there will be 40 ml of ethanol, but only 31.56 g. $ABW (g) = ABV (ml) \times 0.789$.

Alcohol unit, standard drink

The term alcohol unit is used to simply express the quantity of alcohol, particularly in terms of consumption and its assessing and recommendation. The same meaning is also given to the expression in consumed number of 'drinks'. The expression in number of units is sometimes also used in the context of labelling on packaging (total number of units contained in the package). A unit represents the equivalent of a certain amount of ethanol in grams, most commonly 10 g. It should correspond to the amount of ethanol in the volume usually served for each type of alcoholic beverage, typically a large glass of beer or a glass of wine or a small glass ('shot') of spirits. The problem is that there is no international consensus on the size of the unit. The differences can be as much as twofold. For example, in the UK it is 8 g, in Austria 20. But 10 g is the most frequent.

Differently defined units can be a problem in practice, especially when risk limits and recommendations are formulated in units. Therefore, it is always necessary to make sure how the relevant unit is defined. Alcohol consumption questionnaires also often ask for the number of units, so it is also necessary to check what is meant by a unit in that case. Also, the number of units of alcohol is increasingly being indicated directly on the packaging of drinks. But it is on beverage packaging that you can most often see UK units of 8g, although globally the most common unit is a 10g. The tables in the chapter on the alcohol content of common

beverages can be used to determine the number of units drunk as part of an individual assessment of alcohol intake.

BAC (Blood Alcohol Content) - the amount of alcohol in the blood

The amount of alcohol in the blood (BAC) is expressed in relative terms, i.e. in percentages % (or promiles ‰). This parameter is the best known and widespread in terms of legislative limits for driving, control of compliance and subsequent penalties. It is an indicator of the degree of acute intoxication or exposure. The detection of alcohol in exhaled air can be placed in a similar category. These are not indicators that would be used in the routine assessment of habitual alcohol intake as part of a lifestyle assessment and subsequent counselling. However, blood alcohol concentration is related to the determination of the riskiness of binge drinking, in the sense of 'binge drinking' or HED - Heavy Episodic Drinking, as discussed in the chapter on Risky drinking, harmful drinking - definitions and criteria.

Alcohol content of common drinks

Beer: For a correct estimation of the amount of alcohol, the ABV (Alcohol By Volume (concentration in %)) in the beer is important as a starting point. This information is mandatory on every beer package label. Other beer labelling, e.g. in degrees, are not indicative of the alcohol content. Table 15 shows the amount of ethanol in grams in the most commonly served types and volumes of beer, as well as the amount of the drink per unit of alcohol.

Table 15: Alcohol content of beer

Beer categories	ABV (%)	Ethanol (g) in 0.5 L	Ethanol (g) in 0.4 L	Ethanol (g) in 0.3 L	Beverage quantity (ml) corresponding to the unit (10g)
Lower alcohol (≈ 4.0- 4.3)	4.0	16.0	12.6	9.6	313
	4.2	16.6	13.3	9.9	302
Standard (≈ 4.4 - 5.2)	4.4	17.4	13.9	10.4	288
	4.7	18.5	14.8	11.1	270
	4.8	18.9	15.1	11.4	264
	5.0	19.5	15.6	11.7	256
	5.2	20.5	16.4	12.3	244
Higher alcohol (≈ >5.2)	6.0	23.5	18.9	14.0	211

Wine: Table 16 shows the amount of alcohol in wine. Since most common wines are within a fairly narrow range of 12-14 %, a unit (10 g of ethanol) can generally be taken as 1 dcl.

Table 16: Alcohol content of wine

Wine categories	ABV (%)	Ethanol (g) in 0.1 L	Ethanol (g) in 0.2 L	Beverage quantity (ml) corresponding to the unit (10g)
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Wine	12	9.5	19.0	105
	13	10.3	20.6	97
	13.5	10.6	21.3	94
	14	11.0	22.0	91
Dessert wine	15-20	11.8-15.8	23.6-31.6	63-85

Spirits: The alcohol content of spirits is given in Table 17. In the past a concentration of 40 % was significantly the most common, but for many years there has been a trend towards lower concentrations; it is not uncommon for spirits to have a concentration of 27 %, often in the range 30-37 %. But for example, plum brandies had and have a higher concentration, 45 % or more. There is also a certain trend towards a reduction in the volume served, e.g. it used to be 50 ml, now it is almost exclusively 40 ml ('big shot'), a small shot is 20 ml. For the practical estimation of the number of units, it is therefore usually possible to work with reasonable accuracy on the assumption that 1 drink (shot) of spirits corresponds to approx. 1 unit (of 10 g).

Table 17: Alcohol content of spirits

ABV (%)	Ethanol (g) in 20 ml	Ethanol (g) in 40 ml	Ethanol (g) in 50 ml	Beverage quantity (ml) corresponding to the unit (10g)
27	4.3	8.5	10.7	47
30	4.7	9.5	11.8	42
35	5.5	11.0	13.8	36
36	5.7	11.4	14.2	35
37	5.8	11.6	14.6	34
38	6.0	12.0	15.0	33
40	6.3	12.6	15.8	32
45	7.1	14.2	17.8	28

5.3.2.5 Assessing individual alcohol consumption

Many tools can be used to measure and assess individual alcohol consumption. They differ in their focus, their domains, i.e. what they actually detect, their scope, and for which uses they are designed. Some assess the amount of alcohol and the resulting risk of drinking (risky, hazardous drinking), others focus on symptoms of dependence, and still others assess the consequences of harmful drinking, i.e. harmful alcohol use. Some tools are comprehensive and cover multiple domains, while others may focus specifically on only one of these domains.

The most comprehensive, most universal, fully validated and most widely used and recommended questionnaire is the AUDIT. For common screening, the AUDIT-C, which consist of first 3 questions of the entire AUDIT, is preferable. Even more concise is the M-SASQ instrument, consisting only of the 3rd question of full AUDIT. As an example of an outdated

tool, previously widespread, we mention CAGE. We also will briefly mention some other methodological approaches used to quantify consumption, which usually with alcohol units.

AUDIT

AUDIT, the Alcohol Use Disorders Identification Test, was developed by the WHO as a simple method of screening for excessive drinking and to assist in brief assessment. It can help in identifying excessive drinking as the cause of the presenting illness. It also provides a framework for intervention to help hazardous and harmful drinkers reduce or cease alcohol consumption and thereby avoid the harmful consequences of their drinking. Table 18 describes the conceptual domains and item content of the AUDIT, which consists of 10 questions about recent alcohol use, alcohol dependence symptoms, and alcohol-related problems.

Table 18: Domains and Item content of the AUDIT

Domains	Question number	Item content
Hazardous Alcohol Use	1	Frequency of drinking
	2	Typical quantity
	3	Frequency of heavy drinking
Dependence Symptoms	4	Impaired control over drinking
	5	Increased salience of drinking
	6	Morning drinking
Harmful Alcohol Use	7	Guilt after drinking
	8	Blackouts
	9	Alcohol-related injuries
	10	Others concerned about drinking

Fig. 7 shows the AUDIT test form - self report version. Each of the questions has a set of responses to choose from, and each response has a score ranging from 0 to 4. In the interview format the interviewer enters the score (the number within parentheses) corresponding to the patient’s response into the box beside each question. In the self-report questionnaire format, the number in the column of each response checked by the patient should be entered by the scorer in the extreme right-hand column. All the response scores should then be added and recorded in the box labelled “Total”.

Fig. 7: The AUDIT (Alcohol Use Disorders Identification Test) – Self-report version

	Questions	0	1	2	3	4	Score
1	How often do have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week	
2	How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	

3	How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4	How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5	How often during the last year have you failed to do what was normally expected from you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7	How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8	How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9	Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10	Has a relative, friend, doctor or other health care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	
						Total:	

Scoring and interpretation

Total scores of 8 or more (>7 for those aged 65 years) are recommended as indicators of hazardous and harmful alcohol use, as well as possible alcohol dependence.

More detailed interpretation of a patient's total score may be obtained by determining on which questions points were scored:

Question 2 and 3:

Score of 1 or more on Question 2 or Question 3 indicates consumption at a hazardous level.

Question 4, 5, 6:

Points scored above 0 on questions 4-6 (especially weekly or daily symptoms) imply the presence or incipience of alcohol dependence.

Questions 7,8,9,10:

Points scored on questions 7-10 indicate that alcohol-related harm is already being experienced.

The total score, consumption level, signs of dependence, and present harm all should play a role in determining how to manage a patient. The final two questions should also be reviewed to determine whether patients give evidence of a past problem (i.e., “yes, but not in the past year”). Even in the absence of current hazardous drinking, positive responses on these items should be used to discuss the need for vigilance by the patient.

In most cases the total AUDIT score will reflect the patient’s level of risk related to alcohol. In general health care settings and in community surveys, most patients will score under the cut-offs and may be considered to have low risk of alcohol related problems. But that doesn't necessarily mean their alcohol consumption is okay. The AUDIT total score primarily detects problems related to alcohol consumption. But even relatively moderate consumption without obvious problems can pose an increased risk for various diseases, such as cancer.

AUDIT-C

As the first three questions of the AUDIT questionnaire focus on the quantity of alcohol intake, frequency and quantity, while the remaining items seek to assess the extent to which drinking interferes with an individual's daily life and social functioning, the three-item AUDIT-C (Alcohol Use Disorders Identification Test Consumption) was developed, the score of which increases with increasing levels of alcohol consumption. AUDIT-C comprises the three alcohol-consumption questions out of the full 10-item AUDIT tool.

The AUDIT-C is now recommended as a basic tool for measuring alcohol consumption in practice. It is part of the WHO BRIEF manual of recommended practices for brief interventions.

All individuals should be asked the first question of the AUDIT-C; if the answer is other than "Never", questions 2 and 3 should be completed.

Fig. 8. AUDIT-C questions and scoring

AUDIT-C QUESTIONS	SCORING SYSTEM					SCORE
	0	1	2	3	4	
1. How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times per month	2-3 times per week	4 or more times per week	
2. How many standard ^a drinks of alcohol do you drink on a typical day when you are drinking?	1-2	3-4	5-6	7-9	10 or more	
3. How often do you have 6 or more standard drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
TOTAL:						

^aA standard drink is a measure of alcohol consumption that represents a hypothetical beverage that contains a fixed amount of pure alcohol. The concept of a standard drink was introduced to help conceptualize and measure the absolute alcohol content of various beverage types and serving sizes. Various European countries have a standard drink which is equivalent to 10–12 g of pure alcohol. However, standard drink sizes vary, and the precise meaning may depend on the country and cultural context. In this manual, a standard drink is equivalent to 10 g of pure alcohol

Scoring:

In general, anyone with an AUDIT-C score of 5 or more should be advised to drink less alcohol or quit. If only question 1 of the AUDIT-C is asked, anyone with a score of 4 should be advised to drink less alcohol or quit.

People should be advised that alcohol causes cancer, for which there is no level of consumption that is risk-free. Women who are trying to become pregnant and women who are pregnant or are breastfeeding should be advised not to drink any alcohol. All people with alcohol-related end-organ damage (including, for example, brain damage and cirrhosis of the liver) should be advised not to drink any alcohol.

SASQ

SASQ is an acronym for Single Alcohol Screening Question, so this screening test consists of a single question:

'How many times have you had 6 or more drinks per day in the last year?'

A response of two or more warrants follow-up, because it's considered a positive for possible alcohol problems. Because it is not a scored instrument, the SASQ can be woven easily into a verbal clinical interview. Before asking the SASQ, you can ask a pre-screen along the lines of "How often did you have a drink containing alcohol in the past year?"

M-SASQ

The M-SASQ tool, The Modified-Single Alcohol Screening Question, is now used for screening purposes rather than the original SASQ. The original open-ended question has been replaced by multiple choice (frequency scale). In fact, the M SASQ consists of one question from the full alcohol use disorders identification test (AUDIT), the 3rd question. This single question test was developed for use in emergency departments. The M-SASQ is the most efficient and effective screening tool in the emergency department setting.

Fig. 9: M-SASQ

Question	Scoring					Your score
	0	1	2	3	4	
How often have you had 6 or more drinks, on a single occasion in the last year?	Never	Less than once a month	Every month	Every week	Daily or almost daily	

Scoring:

0-1 Indicate low risk drinkers = No intervention required

2-4 Indicates increasing or higher risk drinkers

- A score of 2 = Brief Intervention
- A score of 3 = Brief intervention only and possibly referral
- A score of 4 = Referral to specialist services

CAGE

It is currently recommended to avoid using this widely used but outdated questionnaire as a screening tool. We can even give them as an example of what and why alcohol screening should not be used. CAGE is an acronym for four questions: Cut down, Annoyed, Guilty, Eye-opener). The CAGE is now not recommended for screening because it does not identify all patients who could benefit from a brief intervention. The CAGE only captures patients already experiencing adverse consequences of heavy drinking, so you miss many prevention opportunities. The CAGE test is detecting only symptoms of alcohol dependence, it doesn't assess in any way the quantity of alcohol intake. Each of the 4 questions of the CAGE questionnaire can be answered with a simple yes or no response. That is another problem, because generally we should avoid "yes/no" or leading questions such as "Did you drink (4 for women, or 5 for men) drinks at one sitting?" or "You don't drink very often, do you?".

Fig. 10: CAGE questionnaire (Note: Outdated, not recommended!)

CAGE Questionnaire for Detecting Alcoholism			
Question		Yes	No
C (Cut down)	Have you ever felt you should C ut down on your drinking?	1	0
A (Annoyed)	Have people A nnoyed you by criticizing your drinking?	1	0
G (Guilty)	Have you ever felt G uilty about your drinking?	1	0
E (Eye opener)	Have you ever had a drink first think in the morning (E ye opener)?	1	0

Scoring:

Each "no" answer is given a 0 and each "yes" answer is given a 1. If the total sum of the scores for the questions is greater, it may indicate an alcohol use issue. A total score of 2 or higher is considered clinically significant.

Other methods

There are a number of other methods for quantifying consumption that can be used in more detailed surveys or epidemiological studies. Among the most common are the following:

WR – Weekly Recall

- Determination of alcohol consumption (beverage + quantity) on individual days of the past week, sum and expression in units / week

BSQF - Beverage Specific Quantified Frequency

- Frequency with quantity (amount), for a certain period (month, year..) usually separately for individual types of alcohol

GF – Graduated Frequency

- First, the highest amount consumed + its frequency in the monitored period (e.g. 1 year) is determined. Furthermore, queries on gradually decreasing quantities + their frequency.

For completeness we also mention biochemical markers, where practically the only useful one (due to sufficient specificity and sensitivity) is CDT - carbohydrate deficient transferrin. In common practice, however, biochemical methods are not used to determine usual alcohol consumption. An exception is the determination of the instantaneous breath or blood alcohol level, but this reflects the immediate state, not long-term consumption, and is used for quite different purposes, to check compliance with regulations and limits, especially in traffic or in the workplace.

5.3.2.6. Recommendations on consumption

At present, expert authorities are reticent to state any so-called safe limits for alcohol consumption, however expressed. For example, the WHO states: 'Given that all alcohol use is associated with certain short- and long-term health risks, it is very difficult to define universally applicable population thresholds for low-risk drinking'. This could be said to represent both the current generally accepted expert opinion and the current recommendation on alcohol, which could therefore be formulated as that it is best from a health perspective not to drink alcoholic beverages at all. Nevertheless, some so-called safe or recommended specific limits can still be found, both in national recommendations, in some specific recommendations (e.g. for the prevention of various specific diseases) and undoubtedly in various older materials, which may also be carried over into current materials. For example, new recommendations for the prevention of CVD state that alcohol consumption should be limited to no more than 100 g per week. In contrast, cancer prevention recommendations state that it is best not to drink alcohol to prevent cancer. Years ago, a limit of 21 units per week for men and 14 for women was often quoted. But this is undoubtedly no longer the case. The current limit of 14 units per week for men and 7 for women is still quite often quoted, but this too tends to be tightened up. Sometimes grams are also used, e.g. in Germany it is recommended not more than 24 g/day for men and 12 g/day for women and at least 2 alcohol-free days per week.

5.3.2.7 Prevention of alcohol abuse

Similar to prevention of other lifestyle factors or harmful behaviours, there are several main possible courses of action. First of all, there is a division between individual and population level. Both approaches have their advantages and disadvantages and complement each other, so it is desirable to apply them together. However, historical developments show that the individual approach alone is completely insufficient, and this is particularly true for alcohol. The individual approach in this case is screening high-risk individuals and trying to influence them positively, stopping and reversing an incipient problem, rather than primary prevention.

A population-based approach targets everyone and in particular makes unhealthy choices and decisions difficult or impossible.

Programmes aimed at increasing health literacy, i.e. increasing knowledge and awareness of the health risks of alcohol, can also be effective, but this also falls under prevention at the population level. Population prevention is the subject of a separate chapter 6.6, which also includes a detailed section on alcohol. Population-based prevention, based on policy and organisational measures, should be seen as the key to reducing the negative impact of alcohol on public health and, in the case of the Czech Republic, to reversing the extremely unfavourable current situation.

Questions:

- What are the health effects of alcohol consumption?
- What is risky and harmful drinking?
- What are the population indicators of alcohol consumption?
- What are the options for expressing alcohol content?
- What is an alcohol unit and what is it for?
- What are the methods to identify alcohol-related problems?
- What are the methods of assessing (quantifying) individual alcohol consumption?
- What are the current recommendations on alcohol consumption?

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5.3.3. Drugs (addictive substances)

5.3.3.1. Drugs and risky behaviour, addiction

Drugs are most often defined as natural or synthetic psychotropic and narcotic substances that alter the mental state, perception and experience of reality and whose use leads to addiction, whether psychological or physical.

Abuse is defined as the excessive use or misuse of these substances leading to dependence.

Risk behaviour is behaviour that threatens the health or life of an individual, disrupts social ties or social norms and laws.

It is most often manifested by substance abuse, aggressive behaviour, social maladaptation and sexual behaviour disorders. Sources of risk behaviour can be biological factors (genetic influences, congenital or acquired defects or psychiatric illnesses), psychological disorders such as the effects of long-term stress, depressive states, feelings of frustration or reactions to trauma or abuse. Last but not least, socio-economic influences may also apply.

We describe the simultaneous occurrence of multiple manifestations caused by the same causes as a **risk behaviour syndrome**.

Drug addiction, as defined by the World Health Organization, is "a mental state of recurrent or chronic intoxication, harmful to the individual and society, brought about by repeated use of a drug, natural or synthetic". It manifests itself in changes in experience and behaviour, leading to social exclusion, aggression and violent or criminal behaviour with risks of damage to health. **Drug or 'substance' dependence**, which is created and reinforced by the regular use of an addictive substance, can take the form of **psychological (behavioural) or physical (somatic) dependence**. In the latter, changes in the body can be detected, in particular the manifestations of a lack of the substance in the body, such as **withdrawal symptoms**.

In addition to the most commonly abused legal substances such as alcohol and nicotine, various other psychotropic and toxic substances are illegally used and are then referred to as drugs.

Drugs can be **classified** simply according to their origin into **natural and synthetic**, according to their effects, e.g. as **depressants, stimulants or hallucinogens**, but most often they are classified into groups according to their complex properties and actions, the main ones being:

Opioids, which include heroin, codeine, morphine, opium, hydromorphone, fentanyl and methadone. They are made from the dried sap of immature poppies and include semi-synthetic and synthetic substances. They can cause euphoria, but are mostly depressant, causing drowsiness, confusion and gagging. They cause psychological and somatic dependence, and people using them for health reasons may be at risk of this. **Cannabinoids**, which come from cannabis and hashish, are natural substances derived from Indian hemp. Marijuana (a mixture of the dried petals and stems of the plant) is one of the most commonly used addictive substances. The main active ingredient, tetrahydrocannabinol (THC), can cause euphoria, mirthless laughter, increased sensitivity to certain stimuli,

distorted perception of space and time, as well as impaired coordination and even temporary paralysis. Health risks of long-term use include impaired attention and memory, psychotic states, bronchitis if smoked, frequent respiratory infections and lung cancer.

There is currently a professional and social debate in the Czech Republic about the legalization of marijuana and the health effects of cannabinoids (not only THC). THC-free cannabis products are becoming popular and legally available.

Hallucinogenic mushrooms (lysergic mushrooms) and LSD (lysergic acid diethylamide) are used to induce changes in sensory perception, a different view of time, space and the self, and to deliberately induce hallucinations. Their use causes dilation of the pupils, reddening of the skin, especially in the face, increased sweating, tremors, dizziness, as well as nausea and dry mouth. It leads to perceptual disturbances, euphoria, but also to anxiety and depressive states, delusions, overestimation of one's own abilities and impaired judgment. It leads to overheating, unquenchable thirst and restlessness. As a result of these conditions, aggression towards self and others or behaviour leading to injury or death may occur.

Organic solvents, also known as volatile substances, which include solvents, glues, thinners or certain gaseous substances, are used as inhalation drugs. The best known are toluene (methylbenzene) and trichloroethylene. Despite the ban on the free sale of these substances, they are relatively easy to obtain. In addition to direct inhalation, the fumes are inhaled from impregnated fabric (sniffing). The effect is rapid, within a few minutes, and short-lived. When used repeatedly, these substances produce euphoria, hallucinations, and later also depression and sleep. Long-term use leads to emotional and behavioural disturbances, increased aggression and a large loss of brain cells. Psychological dependence develops very quickly.

Pervitin (methamphetamine) and amphetamines, cocaine. Substances in this group were formerly used as antidepressants, but are now sometimes given for conditions such as bulimia or narcolepsy. As drugs, these substances are taken intravenously or by snorting. The main effects are euphoria, hyperactivity, insomnia, rapid speech, but also lack of appetite. After the effect wears off (after three to four hours), depression, aggressiveness and drowsiness set in. With prolonged use, neurological and cardiac problems, central nervous system disorders, impaired concentration and memory, even permanent.

5.3.3.2. Prevalence of drug use in the Czech Republic

According to regular surveys carried out in the Czech Republic as part of studies by the National Monitoring Centre for Drugs and Drug Addiction, marijuana is the most commonly used drug in the general population, especially among adolescents and young adults under 35. Due to availability, there is a noticeably high number of users of hallucinogenic mushrooms, often in a seasonal pattern of use. A relatively high lifetime prevalence of around 15 % is detected in the older population in the use of drugs (sedatives, hypnotics and opioid analgesics) and this trend is increasing.

5.3.3.3. Health and social risks of drug addiction, economic impacts and solutions

The health risks for drug users depend on the type and characteristics of the substance or combination of substances used. A major concern for injecting drug users is the risk of infected wounds from unsterile instruments and needles, as well as the transmission of serious infections such as AIDS, blood-borne hepatitis and many other diseases. As drug users are often marginalised people living in difficult socio-economic conditions, their general health status is also not at the level of the general population. This makes them all the more vulnerable to infections.

The risky behaviour often associated with drug use is both dangerous for the drug addicts themselves and has an impact on the surrounding society, especially on the family and immediate surroundings. It leads to an increase in criminal behaviour and an increase in crime, and it is an economically costly negative phenomenon that needs to be given due attention.

5.3.3.4 .Prevention of addictions and risky behaviour

Primary prevention of addiction includes environmental prevention (creating an environment that significantly reduces the availability of grog and addictive substances, especially for groups at risk), primary prevention programmes including educational activities for teachers and parents, information and counselling services available to the general public and coordination activities. The main objectives are to educate children and young people in families, schools and communities, and to promote healthy social attitudes and norms and lifestyles free from the need to use substances.

Secondary prevention is the care of children and adolescents at risk and increased attention is paid to individuals at risk.

Tertiary prevention is dedicated to the identification and care of problematic drug users.

Care for drug addicts is gradually and, as experience and research show, this care is an important aspect of addressing the drug problem.

Literature:

https://www.who.int/health-topics/drugs-psychoactive#tab=tab_1

5.4 Preventive counselling

Lifestyle-focused preventive counselling is one of the most powerful and effective ways to reduce the risk of diseases and positively influence health overall. However, quality is an essential criterion - any specific recommendations must be supported by adequate evidence within the EBD framework. It is therefore not possible to make recommendations based on one's own subjective opinion.

It is also important that the recommendations in the individual counselling are also based on the patient's specific condition, i.e. based on knowledge of the individual risk profile. This also means that adequate counselling must be preceded by a diagnosis in the form of a preventive examination. Its aim is not only to detect any incipient, i.e. pre-pathological, changes in the body, but above all to describe not only the state of the body but also the lifestyle in terms of individual parameters. On this basis, it is then possible to recommend individually optimal measures "tailored" to the individual, generally based on lifestyle modification and at the same time corresponding to the overall general recommendations, approved and substantiated.

Such counselling is significantly effective not only for primary prevention, i.e. to prevent the onset of the disease, but also to improve - to accentuate the effects of other therapies (e.g. pharmacological) or to reduce the dosage (and side effects) while maintaining the therapeutic effect.

Thus, in practice, mastering the methodology of counselling presupposes mastery of examination methods for the assessment of lifestyle factors, but also for the assessment of clinical status (e.g. assessment of nutritional status), knowledge of general recommendations in the given areas of intervention (nutritional recommendations, recommendations for physical activity, recommendations regarding alcohol consumption, recommendations for the prevention of cardiovascular diseases, recommendations for cancer prevention, etc.). All of these sections are described in the relevant chapters. It is then necessary to build on these general recommendations, which are well founded, and to be able to apply and adapt them to the patient's current condition, risk profile and overall risk. This approach is incidentally used, for example, in the clinical recommendations for the prevention of CVD, see the relevant chapter. Last but not least, it is necessary to master motivational techniques and communication with the patient in general. However, these areas are beyond the scope of this material.