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Lifestyle-oriented counselling in prevention

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Basic points - outline

- **Introduction** (goals, determinants of health, importance of lifestyle)
- **System of general preventive examinations** in the Czech Republic
- **Examination methods** (Examination = the basis for individualized recommendations)
  - General personal and medical history
  - Lifestyle assessment (retrospective)
    - Smoking - active, passive – SHS (Second Hand Smoke), ETS (Environmental Tobacco Smoke)
    - Dietary habits
    - Alcohol
    - Physical activity
  - Objective examination a measurements
    - Nutritional status - anthropometry
    - Physical condition (fitness)
    - Blood pressure
    - Selected biochemical examination
- **Generally valid recommendations** based on EBD principles
  - **Dietary** guidelines
  - **Physical activity** guidelines
  - Guidelines on the primary prevention of **Cardiovascular Disease**
  - Primary prevention of **Cancer**
- **Intervention methods, work with motivation, counseling techniques**

Preventive examinations by law (in the Czech Republic)

- Decree No. 70/2012 Coll. "**Decree on preventive examinations**"
  - + DECREE of 21 September 2016 amending Decree No. 70/2012 Coll.

  - § 1 -**Types of preventive examinations** and **providers** performing them
  - § 2 - **Contents** and **timetable** of the general preventive examination
  - § 3 - Content and timetable of general preventive examination **in children**

- §1 - **Types of preventive examinations and providers performing them**
  a) General medical practice - „**General preventive examination**"
  b) GP for children and adolescents - „**General preventive examination of children**"
  c) Dentistry - „**Dental preventive check-up**"
  d) Gynecology and obstetrics - „**Gynecological preventive examination**"

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§2 - Content and scheduling of the general preventive examination

A general preventive examination is performed **every 2 years**, usually after 23 months after the last general preventive examination. The content of the general preventive examination is:

a) History

- Completing including social history, focusing on changes, risk factors and professional risks
- In FH (family history) emphasis on: CVD, pulmonary, hypertension, DM, lipid metabolism disorders, cancer, addictions

b) Checking of vaccination

c) Complete physical examination

- **BP, BMI, eyesight**
- **Oncological prevention**
  - Risk assessment in terms of history (family, personal, occupational), skin examination, in case of suspicion, per rectum examination, in men with a positive family history or other signs, testicular examination
  - Women from 25 years with positive FH or other risk factors - clinical breast examinations, breast self-examination instruction

d) Urine examination with diagnostic paper

e) Checking and evaluating the results of ordered preventions. examination

1) Chol, HDL, LDL, TGA - in 18, 30, 40, 50 a 60 years of age
2) Glycaemia – At 18, and then at 30, and from 40 at 2-year intervals since the last one
3) ECG - at 40, then four-year intervals
4) FOBT (Fecal Occult Blood Test) from 50 yrs., from 55 can be replaced by colonoscopy once every 10 yrs.
5) Women over 45y. - mammography result not older than 2 years
6) Serum creatinine and glomerular filtration rate estimation in patients with DM, hypertension or HF complications over 50 years at 4-year intervals

Objectives of counseling (not by law, generally)

- **To Reduce the risk of disease** (primary prevention)
- **To Improve physical status -** present physical condition (body composition - obesity, BP, cholesterol, glycaemia, fitness, immunity…)
- To address any pre-pathological phases **non-pharmacologically** (non-pharmacological intervention – therapy)
- For existing diseases, to **reduce the need for drugs** and improve the condition, preventing progression

Who and when provides the counselling

- **General practitioner**
  - As part of the general preventive examination
  - In any therapeutic contact with the patient
- **Any specialist**
  - Within treatment (and prevention - primary, secondary, tertiary)

How to proceed - steps

Asses

- To obtain the patient's individual risk profile (based on examination, both lifestyle and objective)

Inform

- To inform the patient about the result
- To explain impact and importance of lifestyle as a health determinant

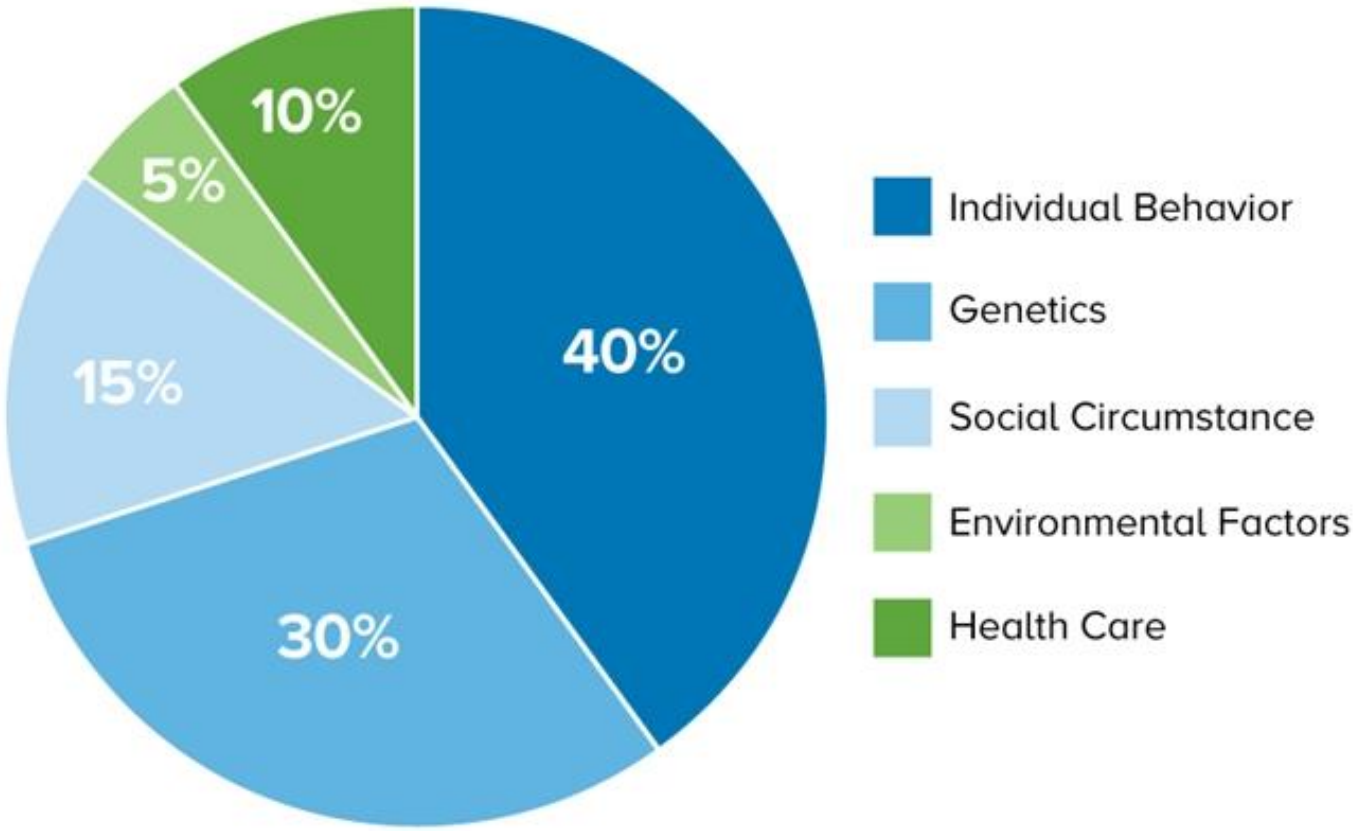
Advise (recommend) and motivate, set goals

- General population recommendations - guidelines (on nutrition, physical activity, alcohol)
- Individualized recommendations according to health status and current lifestyle
- Motivational techniques

Monitor, control, assist

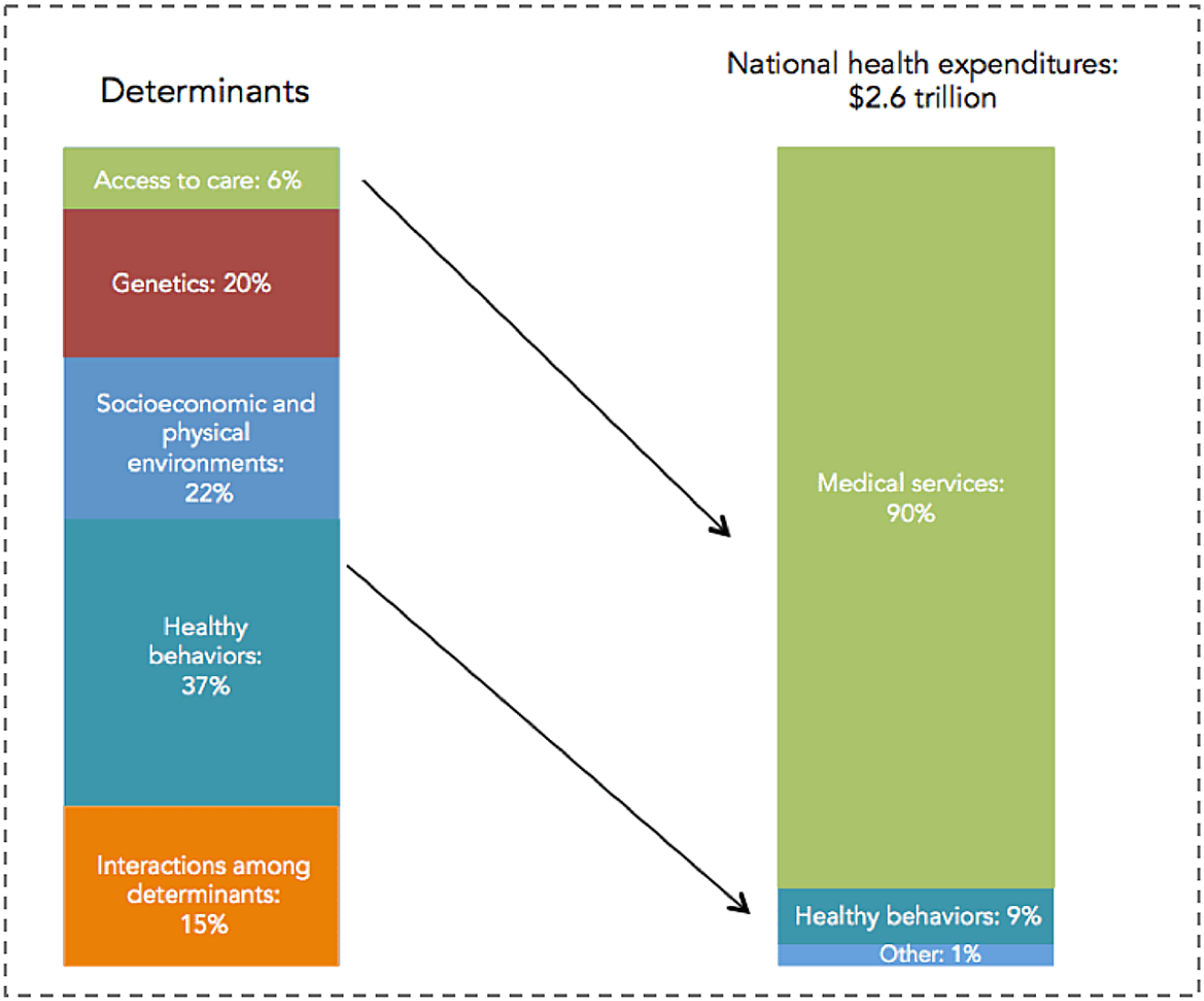
- Progress and effect monitoring, compliance support

Determinants of overall health



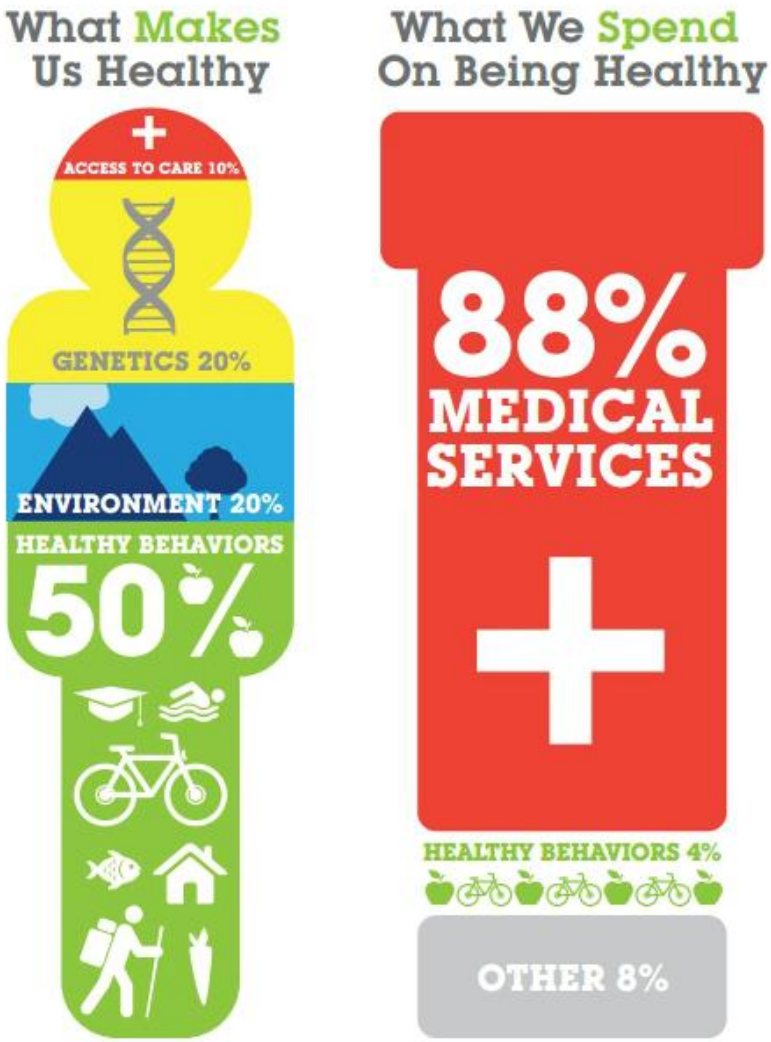
Source: *We Can Do Better—Improving the Health of the American People*, The New England Journal of Medicine, September 2007

Determinants of health vs expenditure



https://www.publichealthpost.org/databyte/public-health-spending-mismatch/

Determinants of health vs expenditure



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Lifestyle factors – behavioral determinants of health

Attitudes, Beliefs, Lifestyle

- **Smoking**
- **Nutrition** – dietary behavior
- **Physical activity**
- **Alcohol**
- Illicit drug use
- Personal hygiene, washing hands
- Social contacts
- Work / Occupation
- Stress coping
- Sexual activity
- Sleep patterns
- Sun exposure behavior
- Motor vehicle behavior

History (anamnesis)

- **FH (Family history)**
  - Family history of premature CVD (defined as fatal or non-fatal CVD event./diagnosis of CVD in first degree relatives – male <55 yrs., female <65 yrs.
  - DM (type 2)
  - Obesity
  - Cancer

Important:
Not only genetic predispositions are inherited, but also lifestyle.

- **PH (Personal/medical history)**
  - All present diseases
  - Medications
  - Health restrictions/limitations (incl. diets, mobility restrictions, etc.)

- **SH (Social history)**

- **OH (Occupational history**

Smoking - the impact of smoking on health

Smoking is the strongest risk factor for:
- Cancer
- Cardiovascular diseases
- Chronic respiratory diseases

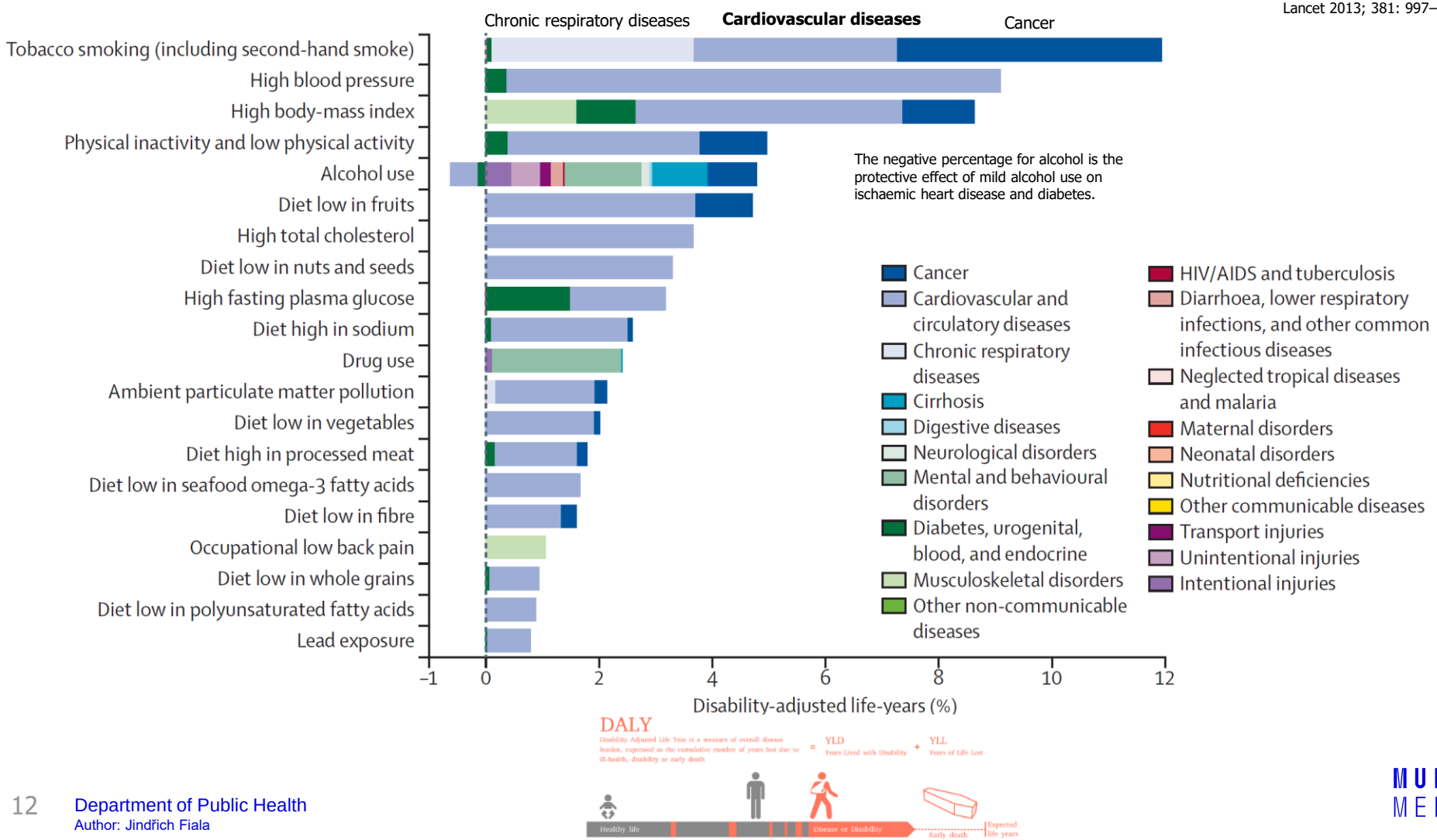
Smoking is the strongest influenceable determinant of health

Smoking is responsible for 50% of all avoidable deaths in smokers

A smoker on average will lose 10 years of life

Burden of disease attributable to 20 leading risk factors for both sexes in 2010, expressed as a percentage of UK disability-adjusted life-years:

Lancet 2013; 381: 997–1020



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Examination of smoking status, categorization

Ask: To detect patient's smoking status and passive exposure:

- **Active smoking** (first-hand smoke, main stream)
  - How many cigarettes do you smoke on average during the day?*
  - How old did you start smoking regularly
  - Have you ever tried to quit smoking?
  - What was the longest time you lasted not to smoke one cigarette a day

Table:
Smoking status:

Category	*Criterion*
Current smoker: **Everyday smoker** (previously called „Regular smoker")	≥1 cigarette /day
Current smoker: **Someday smoker** (previously called „Occasional smoker")	<1 cigarette /day
Former smoker (Ex-smoker)	• He/she has smoked at least 100 cigarettes in his or her lifetime, but had quit smoking at the time of interview. • Currently, he/she doesn't smoke for at least 6 months
Never smoker	An adult who: • Has never smoked, or • Who has smoked less than 100 cigarettes in his or her lifetime

- **Passive smoking -exposure (ETS – Environmental Tobacco Smoke)**
  - **SHS (Second Hand Smo**re), ETS – Environmental Tobacco Smoke
    - At work - occupational
    - Family members
    - Elsewhere (friends, acquaintances…)
  - **THS (Third Hand Smoke)**
    - From materials in the indoor environment - furniture, plasters, fabrics, carpets, plastics

Smoking - recommended intervention in contact with a smoker

The "**Five A's**" for a smoking cessation strategy for routine practice:

A-ASK:	Systematically inquire about smoking status at every opportunity.
A-ADVISE:	Unequivocally urge all smokers to quit.
A-ASSES:	Determine the person's degree of addiction and readiness to quit.
A-ASSIST:	Agree on a smoking cessation strategy, including setting a quit date, behavioural counselling, and pharmacological support.
A-ARRANGE:	Arrange a schedule of follow-up.

Smoking - Fagerström Test of Nicotine Dependence, FTND

PLEASE TICK {✓) ONE BOX FOR EACH QUESTION			
How soon after waking do you smoke your first cigarette?	Within 5 minutes	☐	3
	6-30 minutes	☐	2
	31-60 minutes	☐	1
	After 60 minutes	☐	0
Do you find it difficult to refrain from smoking in places where it is forbidden? e.g. Church, Library, etc.	Yes	☐	1
	No	☐	0
Which cigarette would you hate to give up?	The first in the morning	☐	1
	Any other	☐	0
How many cigarettes a day do you smoke?	10 or less	☐	0
	11 -20	☐	1
	21 -30	☐	2
	31 or more	☐	3
Do you smoke more frequently in the morning?	Yes	☐	1
	No	☐	0
Do you smoke even if you are sick in bed most of the day?	Yes	☐	1
	No	☐	0
	Total Score		

SCORE		
	1- 2 = low dependence	5 - 7= moderate dependence
	3-4 = low to mod dependence	8 + = high dependence

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Pharmacological assistance in smoking cessation

Following the failure of advice, encouragement and motivational interventions, or in addition to them

- There is a strong evidence base for brief interventions with advice to stop smoking, all types of nicotine replacement therapy (NRT), bupropion, varenicline and greater effectiveness of drugs in combination, except for NRT plus varenicline.
- The most effective are brief interventions plus assistance with stopping using drug therapy and follow-up support.
- Electronic cigarettes (e-cigarettes) may help in smoking cessation but should be covered by the same marketing restrictions as cigarettes.

NRT - Nicotine Replacement Therapy

- Nicotine substitution to alleviate withdrawal symptoms
- Various forms of NRT: chewing gum, transdermal nicotine patches, nasal spray, inhaler, sublingual tablets

Bupropion (**antidepresant**, brand name *Zyban*)

- Noradrenaline and dopamine reuptake inhibitor (NDRI), which has antidepressant activity and reduces withdrawal symptoms during smoking cessation.
- Bupropion suppresses craving and withdrawal symptoms after nicotine withdrawal due to increased levels of dopamine and noradrenaline

Vareniclin (**partial nicotine receptor agonist**, *Champix*)

- Partial agonist of acetylcholine-nicotinic receptors, which decreases craving for a cigarette and other withdrawal symptoms from nicotine deficiency (agonist effect) while blocking the nicotine effect on the brain (antagonist effect)
- Agonist activity of Vareniclin alleviates the withdrawal symptoms of nicotine deficiency and its antagonistic function reduces the sense of satisfaction from smoking and thus the smoker's attachment to the cigarette

Combination

- Combining more types increases effectiveness and chance of quitting
- The most common combination is a nicotine patch with one of the oral forms of nicotine, bupropion and nicotine, or bupropion and varenicline.
- Varenicline with nicotine can also be combined, especially in heavily dependent patients, but they compete for the same receptors.

Other forms

- Both individual and group **behavioural interventions** are effective in helping smokers quit. Support from the individual's partner and family is important.
- There are **no reliable data** that acupuncture, acupressure, laser therapy, hypnotherapy or electrostimulation are effective for smoking cessation.

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http://www.kardio-cz.cz/data/upload/Doporuceni_pro_lecbu_zavislosti_na_tabaku.pdf

Dietary assessment (dietary habits, dietary consumption)

Taught earlier in Public Health II subject, topic "Evaluation of nutritional habits"

- **Retrospective methods:**
  - Dietary (nutritional) history
  - 24-hours diet recall (with computerized evaluation)
  - FFQ – Food Frequency Questionnaire
  - Brief methods, scoring (e.g. WHO nutritional score)

- **Prospective methods:**
  - Usually not applicable - too demanding (Dietary records, Double portions etc.)

Nutritional history

Gender:
Age:
Height (cm):
Weight (kg):

	Indicator	Description	Evaluation
1	**BMI**: kg/m^2		
2	**Weight change history**		
3	**Food allergies** **Food intolerance**		
4	**Usual eating habits,** incl. alternative diets such as vegetarianism, veganism etc.		
4	**Therapeutic diet** - according to the Dietary System of the Czech Republic, e.g. diabetic, gluten-free, sparing etc.		
6	**Appetite** **Current dietary intake** **Dyspeptic problems**	Distaste 0.....5.....10 normal 0 - 100% of usual intake:_____ %	
7	**Drug interactions**		
8	**Dietary supplements**		

A brief dietary assessment

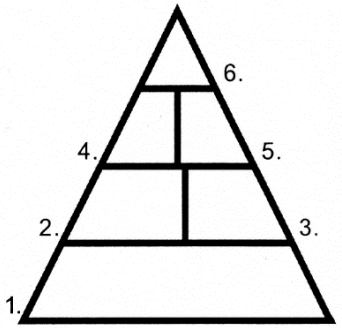
- **A Form for 24 hours recall and quick manual assessment:**

Identification ..... Age ..... Gender: Male 0 Female 1 Date .....

Examination 1 2

Record of the dietary consumption over the last 24 hours

Food / drink (please specify each item)	Amount
Breakfast	
Snack	
Lunch	
Snack	
Dinner	



Number of portions in food groups

1.	
2.	
3.	
4.	
5.	
6.	

What is one serving for each food group (aid for counting the number of servings):

1. **Cereals:** 1 slice of bread (60g) or 1 roll or 1 bowl of oatmeal or 1 scoop of cooked pasta or rice about 125 g
2. **Vegetables**: 100g piece of pepper or carrot or about 2 tomatoes or bowl of salad
3. **Fruit**: 1 apple, orange or banana approx. 100 g or 1 bowl of strawberries, currant or blueberry or glass of fruit juice undiluted with water
4. **Milk and dairy products:** 1 glass of milk or 1 cup of yoghurt about 200 ml or 55 g of average cheese
5. **Meat, poultry, fish**...: 80 g of fish, poultry or other meat or 2 cooked egg whites or 1 bowl of soybeans or lentils
6. **Other:** 10 g sugar or fat (caution - even hidden)

Nutritional score (by WHO)

Nutritional score by WHO

Evaluate your diet within the last 1 day (give 1 POINT for each YES answer

		Points
1.	**Were there at least 3 servings of cereals, pasta, bread or rice in the diet?**	
2.	**Were there at least 3 servings of vegetables (total 300g) in the diet?**	
3.	**Were there at least 2 servings raw?**	
4.	**Were there at least 2 servings of fruit (total 200g) in the diet?**	
5.	**Was at least 1 serving raw?**	
6.	**Have different (i.e. not just the same) foods been consumed within each food group?**	
7.	**Did the snacks and meals consumed outside main meals have, besides energy, some other nutritional value?** (e.g. vitamins, minerals, proteins, etc.)?	
8.	**Have at least 2 servings of milk, dairy products been consumed / day?**	
9.	**Have at least 1 portion of fish, poultry, meat or legumes, etc. been consumed?**	
10.	**Were mostly non-fat, lean or low-fat food alternatives chosen?**	

What is one serving for each food group (aid for counting the number of servings):

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5. **Meat, poultry, fish**...: 80 g of fish, poultry or other meat or 2 cooked egg whites or 1 bowl of soybeans or lentils
6. **Other:** 10 g sugar or fat (caution - even hidden)

Rating:

10 points: Your nutrition is excellent, perfectly fine! It will be very appropriate to eat according to the same principles as before.

9 to 7 points: There are still reserves in the quality of the diet, but it will not be too difficult to make positive changes to make the nutrition completely error-free.

6 to 4 points: Nutrition is not sufficient in terms of quality. Major changes are needed in order to assess it at least as sufficient.

3 to 0 points: Absolutely inadequate nutritional quality, immediate and vigorous remedy required.

NutriPro – An example of computerized dietary assessment

- Input of data from 24hod recall/record is required
- Meals/foods and their quantities are entered
- The procedure is relatively demanding
- Software is not free (quite costly)

Datum 11.7.2018
Klient klient 2

nutripro

Základní přehled

	Energie	Sacharidy	Cukry	Tuky	Sat. tuky	Bílkoviny	Vláknina	Cholest.	Vápník	Vit. C
Průměr	3120 kcal	376,9 g	53,8 g	72,1 g	16,7 g	236,8 g	33,9 g	841,7 mg	762,1 mg	201,7 mg
DDD / Cíl	167 %	164 %	65 %	115 %	OK	504 %	OK	281 %	76 %	202 %

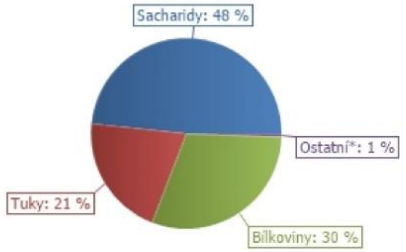
	Železo	Sodík	Draslík	Fosfor	Hořčík
Průměr	20 mg	1758 mg	5960 mg	2980 mg	589 mg
DDD / Cíl	132 %	OK	298 %	426 %	196 %

Hodnoty na kilogram hmotnosti

	Hodnoty	Referenční
Bílkoviny na kg	-	0,8 - 1,5 g/kg
Energie na kg	-	25 - 35 kcal/kg

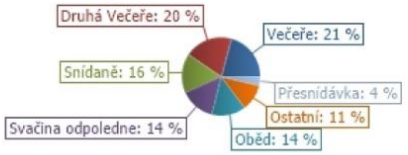
Rozložení energie

1g S/4 kcal, 1g T/9 kcal, 1g B/4 kcal



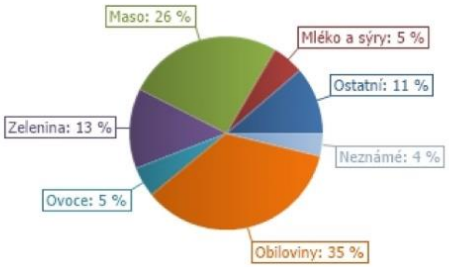
* Ostatní zahrnuje alkohol, polyoly, vlákninu a organické kyseliny

Rozložení energie v jídlech



Kategorie podle hmotnosti

Kategorie podle energie



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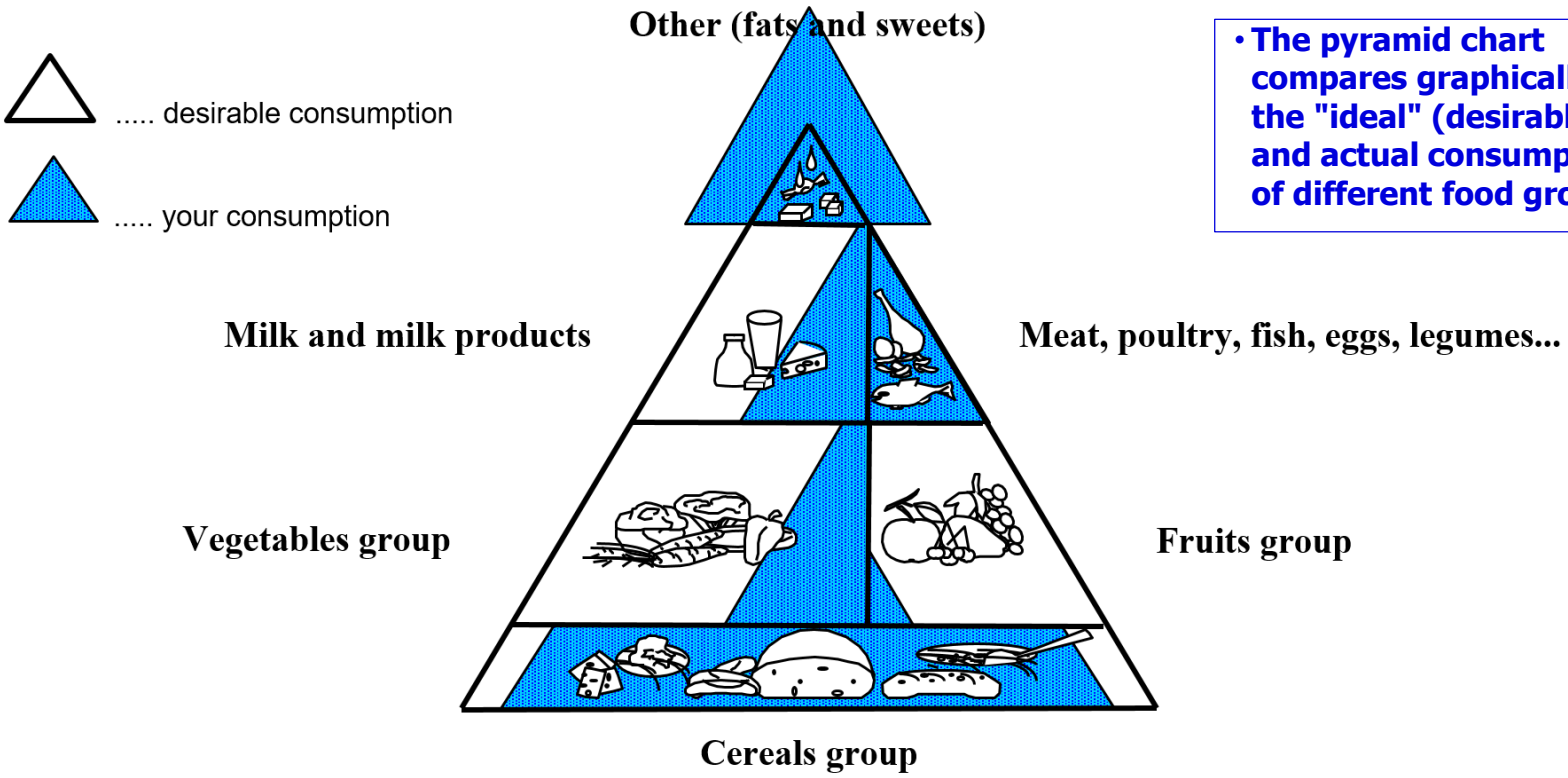
Older software used at our dept. for dietary assessment

The food pyramid expresses the principles of everyday well-balanced diet.

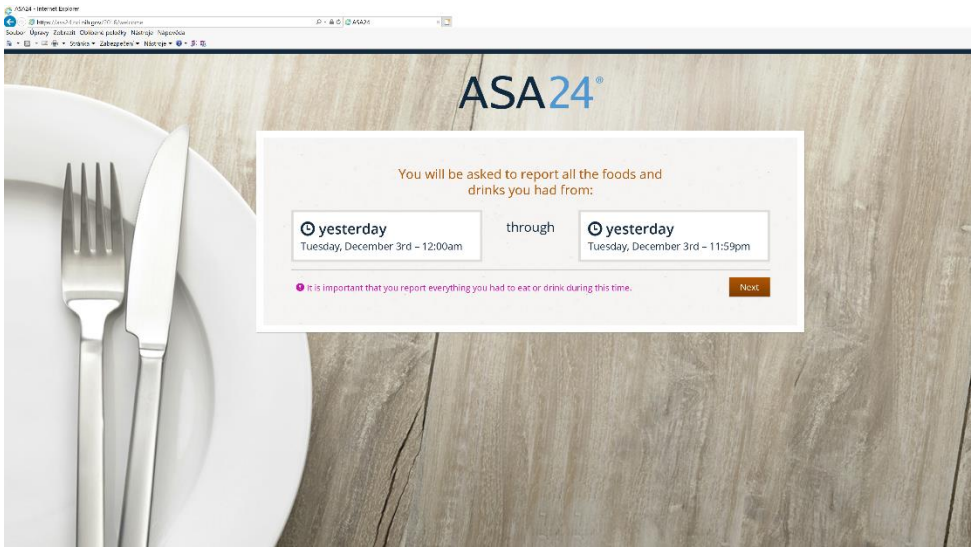


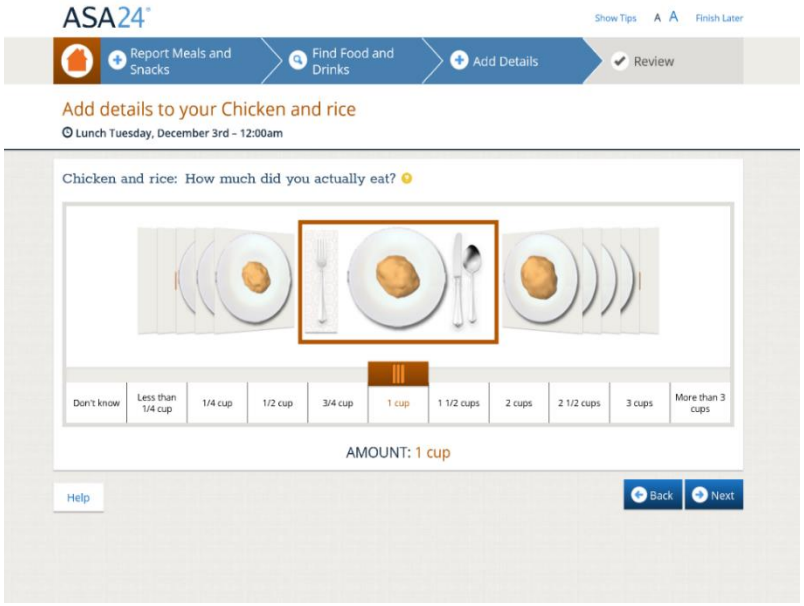
- **The pyramid chart compares graphically the "ideal" (desirable) and actual consumption of different food groups.**

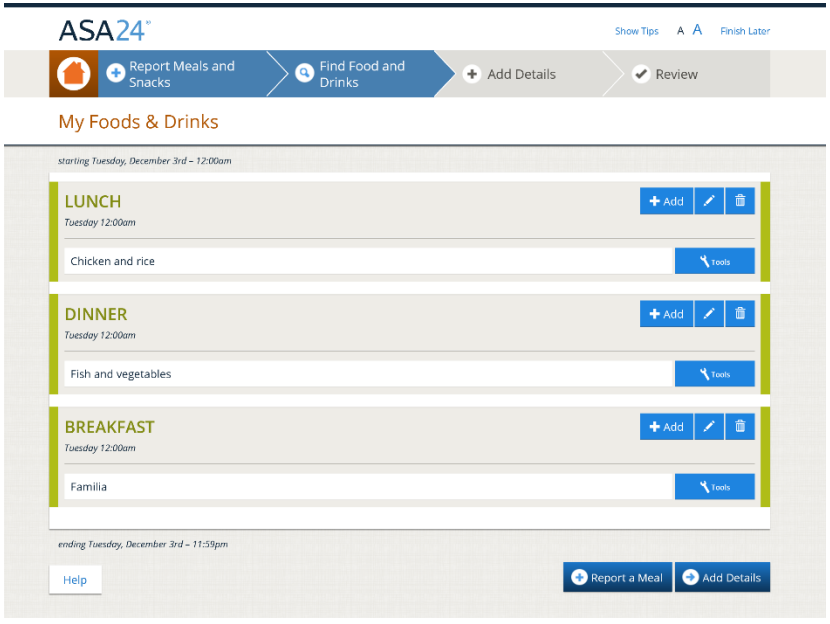
Food group	*Servings consumed*	*Servings recommended*	*Percentage reached*
Breads, cereals, pasta, rice, cakes	3.9	4.5	87
Vegetables	1.4	5.0	28
Fruits	0.1	3.0	5
Milk and milk products	1.1	3.0	38
Meat, poultry, fish, eggs, legumes	1.0	1.0	105
Other (fats and sweets)	2.4	0.5	476

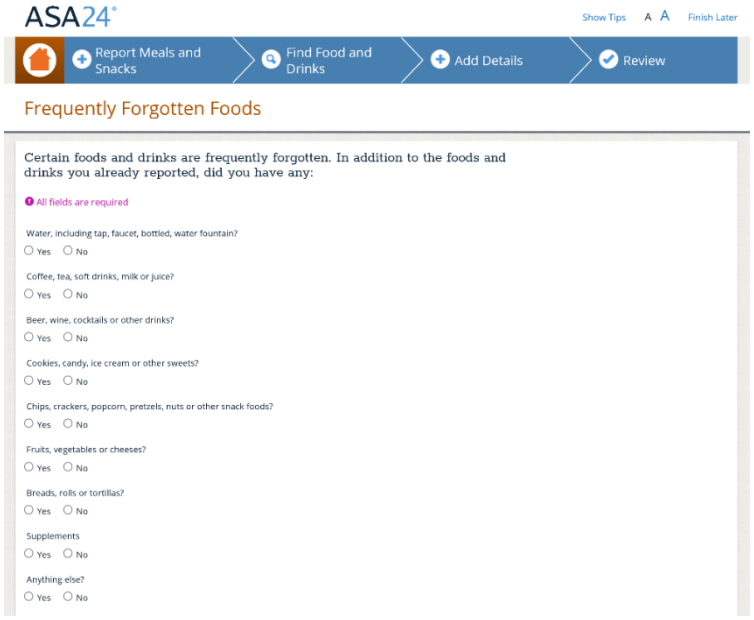
ASA24 – Computerized dietary assessment of 24hr recalls

https://asa24.nci.nih.gov/demo







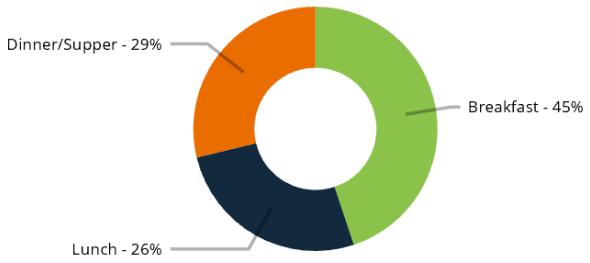


ASA24 – An example of the result of computerized dietary assessment

ASA24®

Nutrition Profile

Caloric Intake By Meal



Day(s)

From: Dec 3, 2019 12:00:00 AM

To: Dec 3, 2019 11:59:59 PM

Daily Calories More Info

Allowance	2,000
Eaten	659

Daily Food Group Targets More Info

	Grains	Vegetables	Fruits	Dairy	Protein Foods
Target	6.0 ounces	2.5 cups	2.0 cups	3.0 cups	5.5 ounces
Eaten	2.1 ounces	1.0 cups	0.6 cups	0.9 cups	3.0 ounces
Status	Under	Under	Under	Under	Under

ASA24 – An example of the result of computerized dietary assessment

Daily Food Group Targets

Data | Chart

Grains

Total target	6.0 ounces
Total eaten	2.1 ounces
Total status	Under

Grains Subgroups	Amount Eaten
Whole grains	1.3 ounces
Refined grains	0.8 ounces

Fruits

Total target	2.0 cups
Total eaten	0.6 cups
Total status	Under

Fruits Subgroups	Amount Eaten
Whole fruits	0.3 cups
Juice	0.0 cups

Dairy

Total target	3.0 cups
Total eaten	0.9 cups
Total status	Under

Dairy Subgroups	Amount Eaten
Milk	0.9 cups
Yogurt	0.0 cups
Cheese	0.0 cups

Protein Foods

Total target	5.5 ounces
Total eaten	3.0 ounces
Total status	Under

Protein Foods Subgroups	Amount Eaten
Meat, Poultry and Eggs	3.0 ounces
Seafood	0.0 ounces
Nuts, Seeds and Soy	0.0 ounces

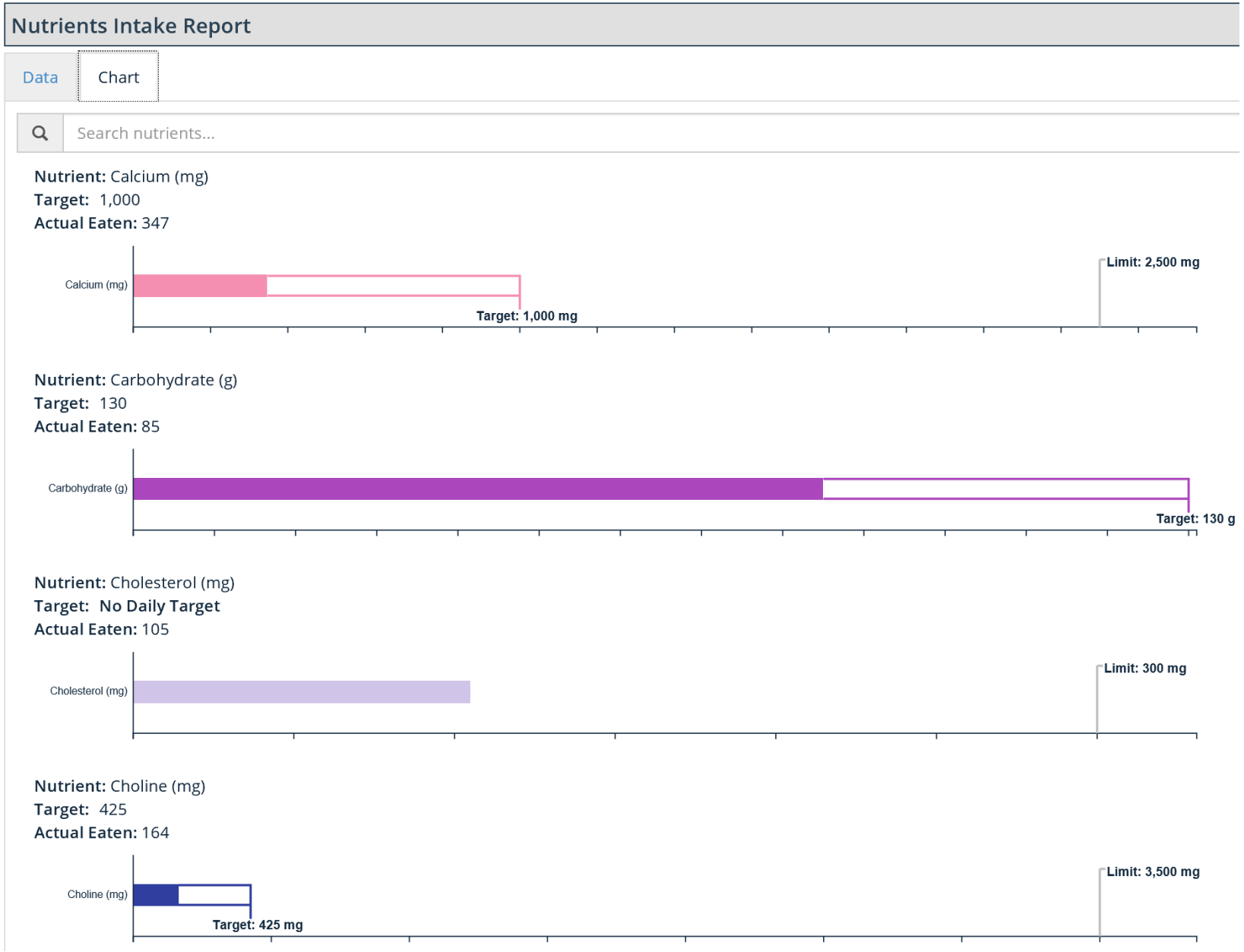
*The Protein Foods Group consists of meat, poultry, seafood, eggs, nuts and seeds, soy products (other than soymilk), and legumes.

Vegetables

Total target	2.5 cups
Total eaten	1.0 cups
Total status	Under

Vegetables Subgroups	Amount Eaten
Dark Green vegetables	0.1 cups
Red and Orange vegetables	0.2 cups
Legumes (beans and peas)	0.0 cups
Starchy vegetables	0.4 cups
Other vegetables	0.3 cups

ASA24 – An example of the result of computerized dietary assessment



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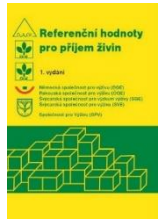
Dietary guidelines - Basic forms of reference values and nutritional recommendations

Dietary Reference Values (DRV)

- Numerical reference values for daily intake of **individual nutrients** (by sex, age, pregnancy, lactation). Multiple options (lowest, average, recommended, tolerable income). They are intended for experts.
- Other possible terms:
  - RDI – Recommended Dietary Intake
  - RDA – Recommended Dietary Allowances
  - GDA* - Guideline Daily Amount * Food labeling



- *Current valid documents:*
  - **DACH Reference values for nutrient intake** *(D= Germany, A= Austria, CH = Confœderatio Helvetica (Switzerland). Therefore, it refers to German-speaking Europe.*
  - **European DRV – EFSA** (European Food Safety Authority)

General nutritional recommendations (dietary guidelines)

- Verbal nutrition recommendations - guidelines that are not primarily quantitative, but rather guidelines for changing consumption. They can be both for professionals and public.
- *Specific examples:*
  - Nutritional recommendations for the population of the Czech Republic (Nutrition Society, 2012)

FBDG – Food Based Dietary Guidelines

- Transformation into a practically applicable verbal (or graphic) form, working with whole foods and food groups. It is „translation" for ordinary people, based on DRV and scientific knowledge.
- An attempt to translate the evidence base on the relationship between food, eating habits and health into concrete, culturally appropriate and applicable recommendations.

Food Based Dietary Guidelines (FBDG)

- Simple messages on healthy eating, **aimed at the general public**
- Nutrition education tool translating scientific knowledge and dietary standards and recommendations into an **understandable and practical form** for use by those who have little or no training in nutrition.
- FBDG are generally **based upon scientific evidence on the relationship between diet and chronic disease risk**, taking into account nutrient recommendations.
- They give an indication of what a person should be eating **in terms of foods rather than nutrients**, and provide a basic framework to use when planning meals or daily menus.
- Foods are **classified into basic groups** according to **similarity of nutrient content** or some other criteria.

WHY? BALANCED, ADEQUATE AND VARIED DIET

- To help consumers in planning an overall healthy diet, while achieving an adequate nutrient intake

Czech Food Pyramid

FBDG - Graphic format

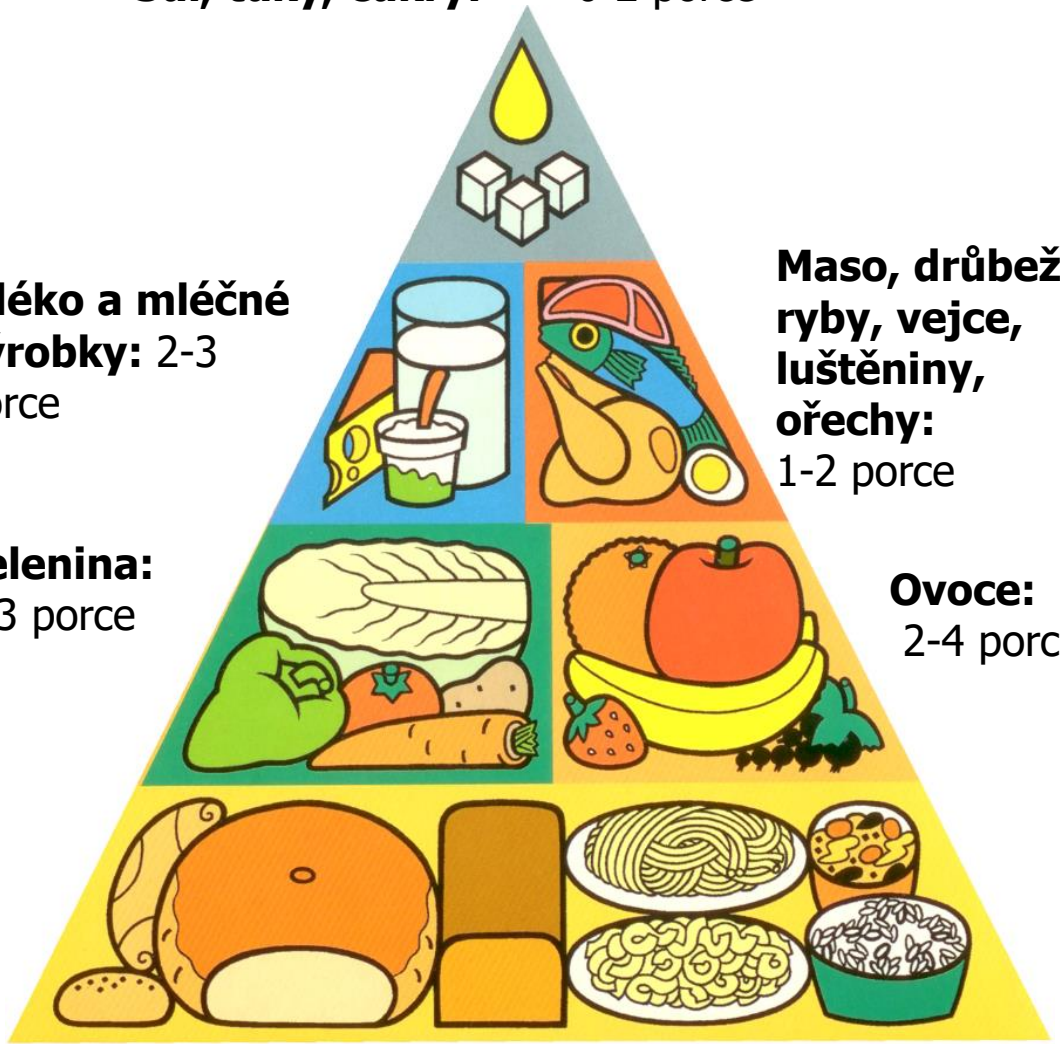
Sůl, tuky, cukry: 0-2 porce

Mléko a mléčné výrobky: 2-3 porce

Maso, drůbež, ryby, vejce, luštěniny, ořechy: 1-2 porce

Zelenina: 2-3 porce

Ovoce: 2-4 porce



Obiloviny, těstoviny rýže, pečivo: 3-6 porcí denně

Definice porce pro jednotlivé potravinové skupiny:

1. **Obiloviny, těstoviny, rýže, pečivo:** 1 krajíc chleba (60g) nebo 1 rohlík či 1 miska ovesných vloček nebo 1 kopeček vařených těstovin či rýže cca 125 g

2. **Zelenina:** 100g kus papriky nebo mrkve nebo cca 2 rajčata nebo miska salátu

3. **Ovoce:** 1 jablko, pomeranč nebo banán cca 100 g nebo 1 miska jahod, rybízu nebo borůvek nebo sklenice ovocné šťávy neředěné vodou

4. **Mléko a mléčné výrobky:** 1 sklenice mléka nebo 1 kelímek jogurtu cca 200 ml nebo 55 g průměrného sýra

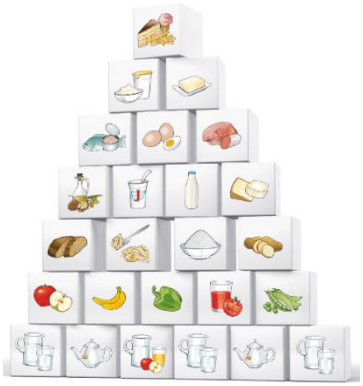
5. **Maso, drůbež, ryby**…: 80 g rybího, drůbežího či jiného masa nebo 2 vařené bílky nebo 1 miska sójových bobů nebo čočky

6. **Ostatní:** 10 g cukru nebo tuku (pozor – i skrytých)

FBDG - Graphic formats

Germany
DGE-Ernährungskreis (nutrition circle)

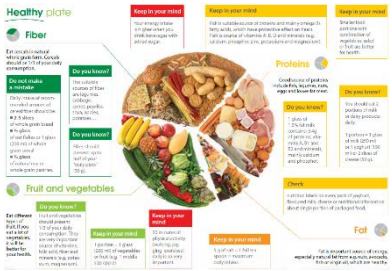
Austria
Die österreichische Ernährungspyramide



Swiss Food Pyramid

Czech Food Pyramid

Slovakia

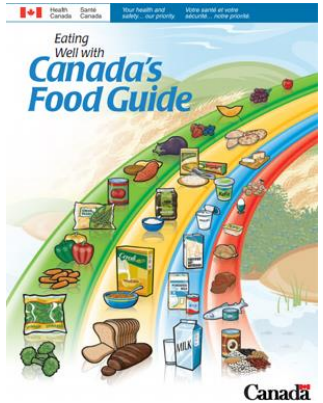


Slovenia

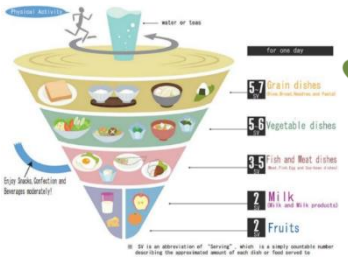
Portugal
Roda dos alimentos

UK – Eatwell guide (2016)

US My Plate

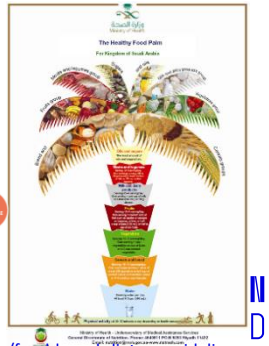


Japan – spinning top



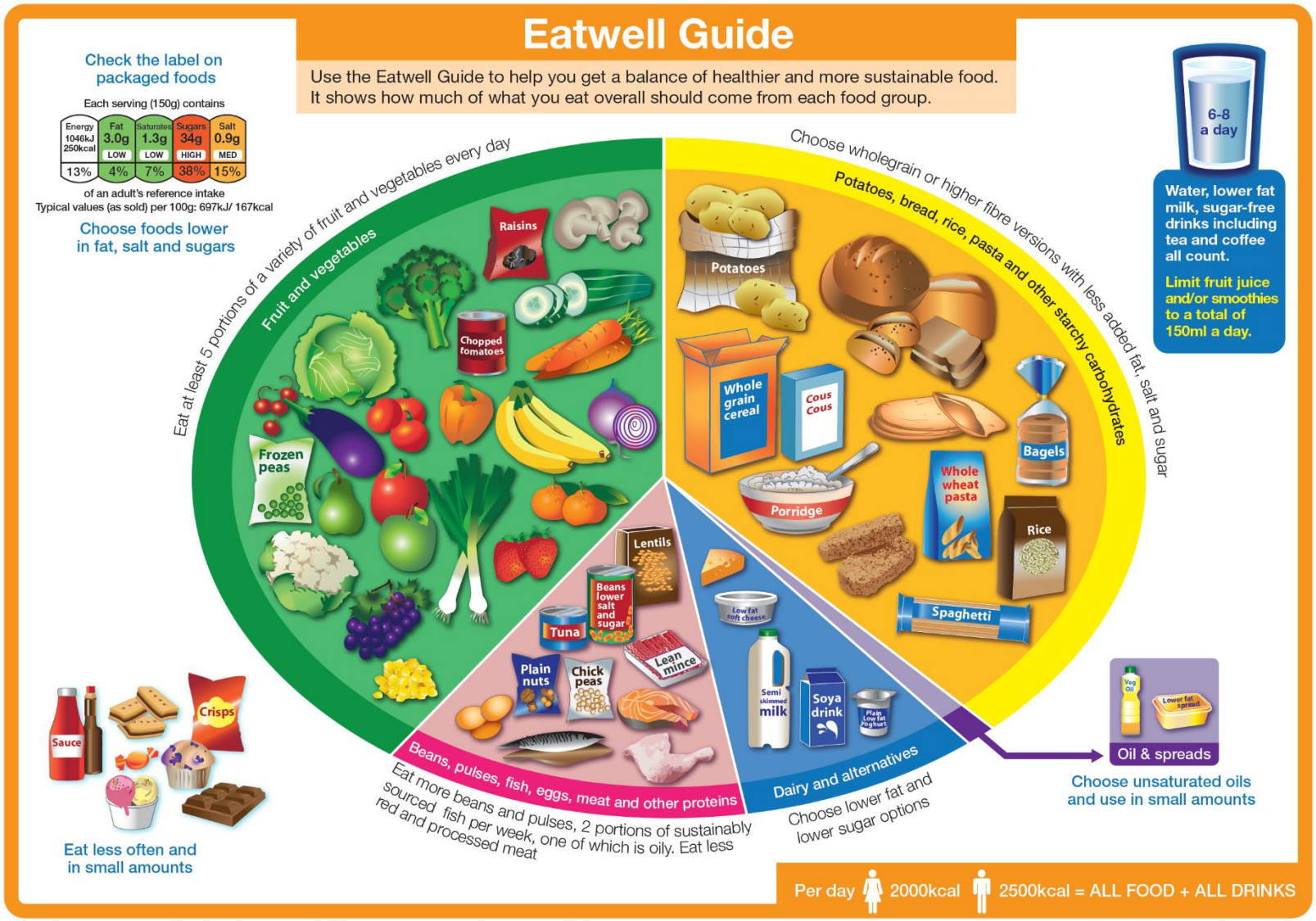
Belgium
inverted pyramid

Saudi Arabia



https://ec.europa.eu/jrc/en/health-knowledge-gateway/promotion-prevention/nutrition/food-based-dietary-guidelines

FBDG – UK - 2016


Eatwell Guide
Use the Eatwell Guide to help you get a balance of healthier and more sustainable food.
It shows how much of what you eat overall should come from each food group.
Check the label on packaged foods
Each serving (150g) contains
Energy 1046kJ 250kcal
Fat 3.0g LOW
Saturates 1.3g LOW
Sugars 34g HIGH
Salt 0.9g MED
13% 4% 7% 38% 15%
of an adult's reference intake
Typical values (as sold) per 100g: 697kJ/ 167kcal
Choose foods lower in fat, salt and sugars
Eat at least 5 portions of a variety of fruit and vegetables every day
Fruit and vegetables
Raisins
Chopped tomatoes
Frozen peas
Choose wholegrain or higher fibre versions with less added fat, salt and sugar
Potatoes, bread, rice, pasta and other starchy carbohydrates
Potatoes
Whole grain cereal
Cous Cous
Bagels
Whole wheat pasta
Porridge
Rice
Spaghetti
Beans, pulses, fish, eggs, meat and other proteins
Lentils
Beans lower salt and sugar
Tuna
Plain nuts
Chick peas
Lean mince
Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat
Dairy and alternatives
Low fat soft cheese
Semi skimmed milk
Soya drink
Choose lower fat and lower sugar options
Oil & spreads
Choose unsaturated oils and use in small amounts
Sauce
Crisps
Eat less often and in small amounts
6-8 a day
Water, lower fat milk, sugar-free drinks including tea and coffee all count.
Limit fruit juice and/or smoothies to a total of 150ml a day.
Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS
Source: Public Health England in association with the Welsh government, Food Standards Scotland and the Food Standards Agency in Northern Ireland
© Crown copyright 2016

Norwegian dietary guidelines

Nutrition information - Food labelling

Nutrition declaration

- The mandatory nutrition declaration shall include:
  - Energy value
  - The amounts of fat, saturates, carbohydrate, sugars, protein and salt

Nutrition claim

- Any claim which states, suggests or implies that a food has particular beneficial nutritional properties due to:
  - The energy (caloric value) - provides in reduced or increased rate
  - The nutrients - provides in reduced or increased rate

Permitted nutrition claims:

- Low sugars
- Low fat
- High fibre
- High omega-3 FA

Health claim

- Any statement about a relationship between food and health
  - The Commission authorises different health claims provided they are based on scientific evidence and can be easily understood by consumers. The European Food Safety Authority (EFSA) is responsible for evaluating the scientific evidence supporting health claims
  - Regulation (EC) No 1924/2006

Permitted health claims:

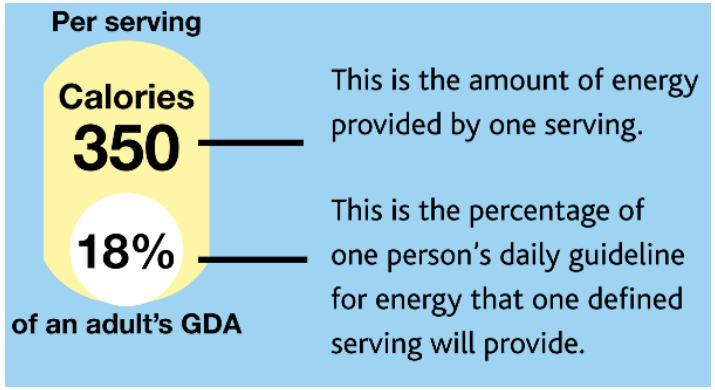
- "Vitamin D is needed for the normal growth and development of bone in children."
- „Iodine contributes to normal functioning of the nervous system."

GDA - Guideline Daily Amounts

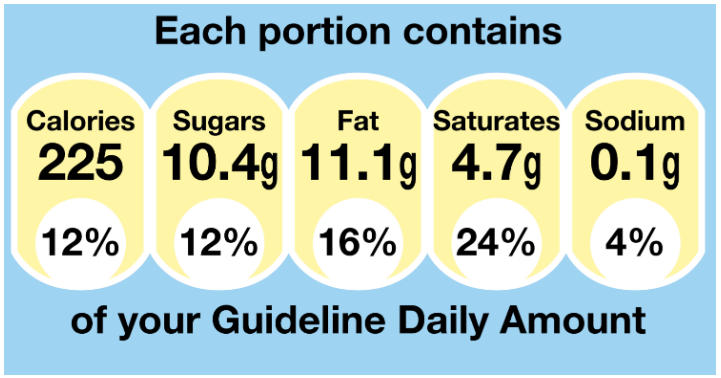
To help consumers make sense of the nutrition information provided on food labels, they translate science into consumer friendly information, providing guidelines on pack that help consumers put the nutrition information they read **on a food label** into the context of their overall diet.

- GDAs are guidelines for healthy adults and children about the approximate amount of calories, fat, saturated fat, total sugars, and sodium/salt.
- The GDA labels have the **percentage of daily value per serving** and the **absolute amount per serving** of these categories.
- **The front-of-packages (FOP)** GDAs must at least have **calories** listed
- **The back-of-package (BOP)** GDAs must list, at a minimum, these five key nutrients: **Energy**, **Fat**, **Saturates**, **Sugar** and **Salt**

FOP - Front-of package:



BOP – Back-of-package:



Mediterranean diet

https://www.medicalnewstoday.com/articles/149090.php#diet

The Mediterranean diet is not a single diet but rather an **eating pattern** that takes inspiration from the diet of **southern European countries**. There is an emphasis on **plant foods**, **olive oil**, **fish**, **poultry**, **beans**, and **grains**

The diet draws together the common food types and healthful habits from the traditions of several different regions, including Greece, Spain, southern France, Portugal, and Italy.

Studies suggest that people who live in the Mediterranean area or follow the Mediterranean diet have a lower risk of various diseases, including **obesity**, **diabetes**, **cancer**, and **cardiovascular disease**. They are also more likely to enjoy a longer life than people in other regions.

Key ingredients of the diet include **fresh fruits** and **vegetables**, **unsaturated fats**, **oily fish**, a **moderate** intake of **dairy**, and a **low consumption** of **meat** and **added sugar**. Studies have linked these factors with positive health outcomes.

There is no single definition of the Mediterranean diet

The main components of Mediterranean diet include:

- **Daily consumption of vegetables, fruits, whole grains and healthy fats.**
- **Weekly intake of fish, poultry, beans and eggs.**
- **Moderate portions of dairy products.**
- **Limited intake of red meat**
- **Along with food, the Mediterranean diet emphasizes the need to spend time eating with family and physical activity.**

Typical ingredients in Mediterranean diet:

Vegetables: Tomatoes, peppers, onions, eggplant, zucchini, cucumber, leafy green vegetables, plus others.

Fruits: Melon, apples, apricots, peaches, oranges, and lemons, and so on.

Legumes: Beans, lentils, and chickpeas.

Nuts and seeds: Almonds, walnuts, sunflower seeds, and cashews.

Unsaturated fat: Olive oil, sunflower oil, olives, and avocados.

Dairy products: Cheese and yogurt are the main dairy foods.

Cereals: These are mostly whole grain and include wheat and rice with bread accompanying many meals.

Fish: Sardines and other oily fish, as well as oysters and other shellfish.

Poultry: Chicken or turkey.

Eggs: Chicken, quail, and duck eggs.

Drinks: A person can drink red wine in moderation.

Definition of the Mediterranean Diet: A Literature Review: Nutrients 2015 7(11):9139-9153 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663587

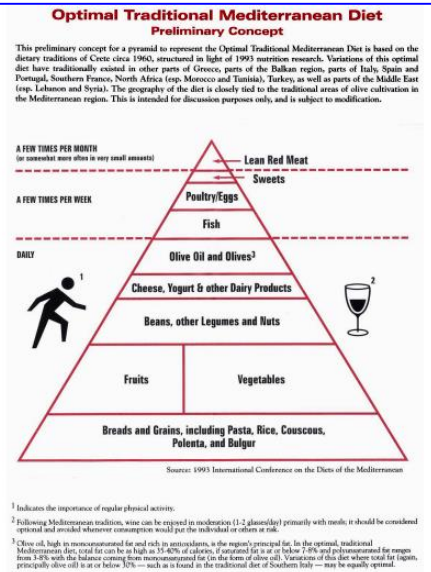
Various forms of Mediterranean diet pyramid

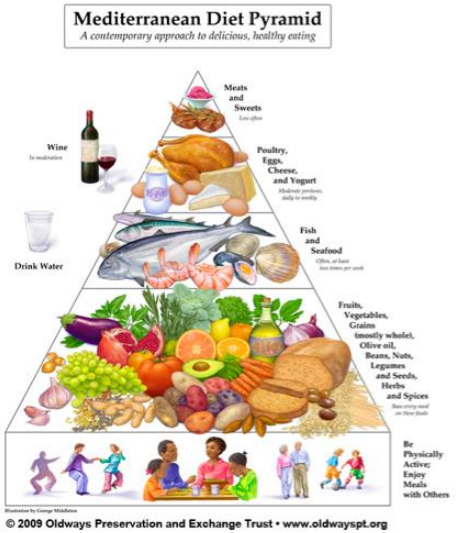
Main principles:

It is not only food but an outlook on life that contributes to the success of the Mediterranean diet. As well as a focus on plant-based foods, a philosophy that emphasizes the following is essential:

- **Moderation and variety**
- **Living in harmony with nature**
- **Valuing relationships with others, including sharing meals and enjoying chat around the table**
- **Having an active lifestyle, but relaxing after a meal**

1993





2018

Diet composition:

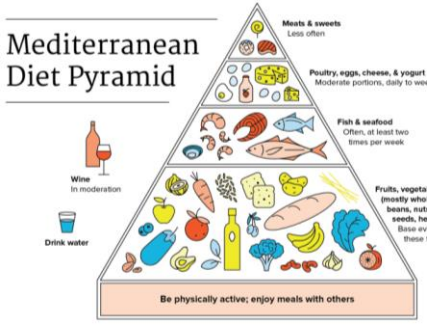
Vegetables: Include 3 to 9 servings a day.

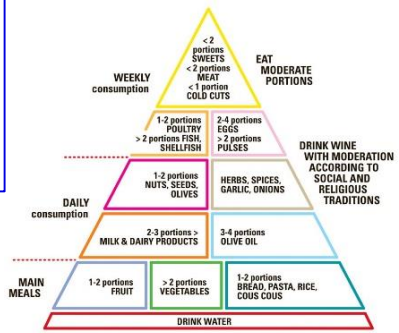
Fresh fruit: Up to 2 servings a day.

Cereals: Mostly whole grain from 1 to 13 servings a day.

Oil: Up to 8 servings of extra virgin (cold pressed) olive oil a day.

Fat: Mostly unsaturated — made up 37% of the total calories. Unsaturated fat comes from plant sources, such as olives and avocado. The Mediterranean diet also provided 33 grams (g) of fiber a day.





Definition of the Mediterranean Diet: A Literature Review: Nutrients 2015 7(11):9139-9153 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663587

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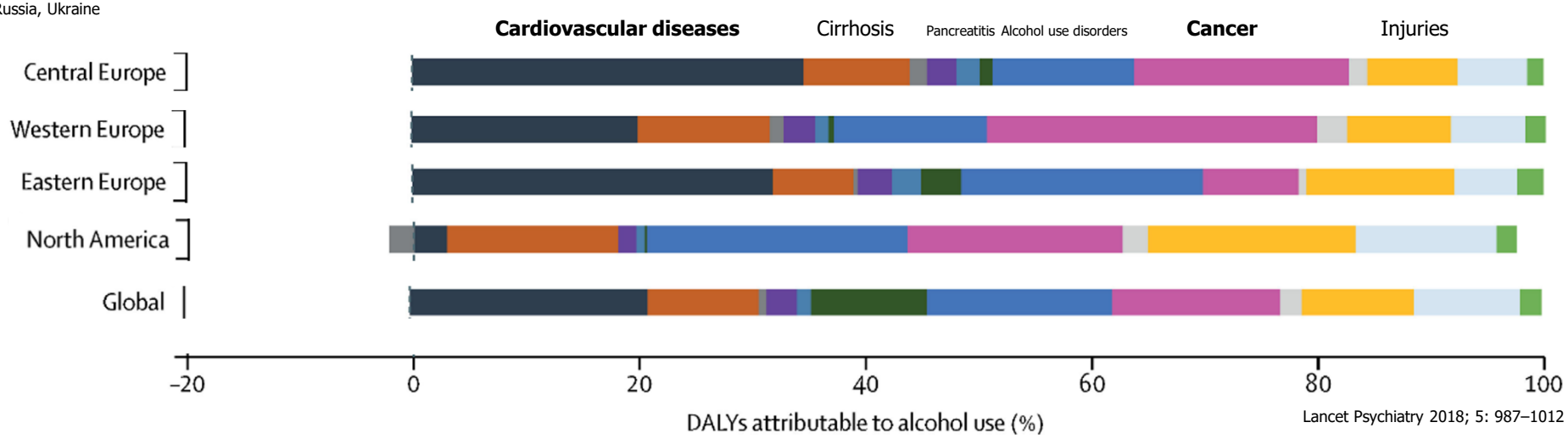
Impact of alcohol consumption on health

DALYs (Disability-Adjusted Life-Years) attributable to alcohol use in 2016:

Central Europe :
Albania, Bosnia and Herzegovina, Bulgaria, Croatia, **Czech Republic**, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia

Western Europe:
Andorra, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Stockholm, Sweden, Switzerland, United Kingdom

Eastern Europe:
Belarus, Estonia, Latvia, Lithuania, Moldova, Russia, Ukraine



Lancet Psychiatry 2018; 5: 987–1012

The main diseases caused by alcohol use:

1) **Cardiovascular (CHD, Hypertension, Stroke, Arrytmias, Cardiomyopathy)**
2) **Cancer (Mouth, Pharynx and Larynx, Oesophagus, Stomach, Liver, Colorectum, Breast)**
3) **Cirrhosis**
4) **Alcohol use disorders**
5) **Pancreatitis**

Age-standardised DALYs per 100 000 people attributable to alcohol:

Russia	4 942
Ukraine	4 488
Romania	3 244
Hungary	2 797
Croatia	2 135
Poland	2 065
Slovakia	1 991
Bulgaria	1 906
Slovenia	1 636
Czech Republic	**1 633**

***Mediterranean*:**

France	1 528
Spain	1 185
Greece	1 004
Italy	823

Nordic:

Finland	1 567
Denmark	1 531
Sweden	951
Norway	698

Germany	1 362
Austria	1 357
Switzerland	755
UK	965
USA	1 179

Department of Public Health
Author: Jindřich Fiala
MUNI MED

Health problems associated with alcohol use

ICD-10:
F10 – Alcohol related disorders
F10.2 - Alcohol dependence
F10.1 - Harmful alcohol use (alcohol abuse)

A) Alcohol dependence

Alcohol dependence syndrome is a cluster of cognitive, behavioural, and physiological symptoms. A diagnosis of dependence should only be made if **three or more** of the following have been experienced or exhibited at some time in the previous twelve months:

- A strong desire or sense of compulsion to drink;
- Difficulties in controlling drinking in terms of onset, termination, or levels of use;
- A physiological withdrawal state when alcohol use has ceased or been reduced, or use of alcohol to relieve or avoid withdrawal symptoms;
- Evidence of tolerance, such that increased doses of alcohol are required to achieve effects originally produced by lower doses;
- Progressive neglect of alternative pleasures or interests because of alcohol use;
- ·Continued use despite clear evidence of harmful consequences.

B) Health harm

Because alcohol misuse can produce **medical harm without the presence of dependence**, ICD-10 introduced the term **harmful use** into the nomenclature. This category is concerned with medical or related types of harm, since the purpose of ICD is to classify diseases, injuries, and causes of death. Harmful use is defined as a pattern of drinking that is already **causing damage to health**. The damage may be either physical (e.g., liver damage from chronic drinking) or mental (e.g., depressive episodes secondary to drinking).

Note: In fact, somatic damage is much more common (and caused by lower doses) than the damage reported as dg. F10.1 - due to the attributable contribution to diseases such as cancer, cardiovascular diseases, etc.!

What is „hazardous drinking", „harmful drinking" - criteria

According to WHO:

Hazardous (heavy) drinking: Alcohol consumption that is **likely cause adverse health effects** if these habits continue (*20-40 g/day for women, 40-60 g/ day for men – but currently the limits getting stricter!)

Harmful drinking: Alcohol consumption that **results in physical or psychological harm**. (*regularly >40 g per day for women,>60 g for men – but currently the limits getting stricter!)

Heavy episodic (binge) drinkig: >60 g on one occasion

**Most authorities and recommendations currently set stricter limits, see below*

Setting criteria for riskiness:

- For single dose size (= on one occasion)
- For total weekly consumption
- For drinking pattern

Risky patterns of drinking

- Heavy single occasion drinking
- Episodic heavy drinking (binge drinking)
- Regular (daily) heavy drinking (exceeding weeklyy thresholds)

Risk of regular long-term consumption:

- **WHO:**
  - *Hazardous drinking*: 20-40 g / day for women, 40-60 g/day for men
  - *Harmful drinking*: >40 g per day for women, >60 g for men
- Cancer risk: limit of 30 g/day for men and 20 g/day for women - but in fact a **threshold-free** risk, no safe consumption!
- **Most frequently cited current weekly limits**:
  - Previously: men 21 units/week, women 14 units/week
  - Currently: **men 14 units/week**, **women 7 units/week**
- **NIAA** (The National Institute on Alcohol Abuse and Alcoholism):
  - No more than 4 drinks per day and no more than **14 drinks per week** - men age 65 and younger
  - Not more than 3 drinks / day and not more than **7 drinks/week** - women and men +65
- **Germany: 12g/day** women and **24g/day** men, at least 2 days a week without alcohol

Riskiness threshold for 1 dose:

- Generally defined as a dose that raises blood concentration (BAC) to a **level of intoxication**
- This also corresponds to the definition of "**binge drinking**"
- **0.08 BAC** (0.8 ‰) is considered the **limit of intoxication**
- This corresponds to drinking about 4-5 units of alcohol.
- *Example*:
  - For 80 kg men **5 units** (á10g = 50g) leads to BAC 0.87 ‰
  - For 70 kg women **4 units** (á10g = 40g) leads to 0.98 ‰)
- In fact, the BAC depends on a number of factors (body weight, gender, body water content, etc.)
- In grams, the most commonly reported value is **60 g** (this is also taken as a criterion for binge drinking)
- In the UK 6-8 units (but have 1 unit = 8g), in the US 3 and 4 units

Alcohol consumption screening

A) Identification of alcohol-related problems (problem drinking, addiction, alcohol-related disorders)

- **CAGE**
  - **C**ut down, **A**ngry, **G**uilty, **E**ye opener
    (Short test using 4 questions)
- **AUDIT**
  - **A**lcohol **U**se **D**isorder **I**dentification **T**est
    (Test to identify alcohol-related disorders)
- **SASQ**
  - **S**ingle **A**lcohol **S**creening **Q**uestion

Output for A:

- Scoring showing the risk or degree of dependence or alcohol-related problems (to detect „alcoholics", or potential alcoholics)

B) Quantification of consumption (of any, even moderate)

- **SF – Simple Frequency**
  - The mere frequency of alcohol consumption, without quantity
- **QF, 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 (eg 1 year) is determined. Furthermore, queries on gradually decreasing quantities + their frequency.
- **WR – Weekly Recall**
  - Determination of alcohol consumption (beverage + quantity) on individual days of the past week, sum and expression in units / week

Output for B:

- Amount of alcohol consumed, in units or grams/week;
- Frequency of exceeding 5/4 units / day

CAGE qquestionnaire

Cut down, Angry, Guilty, Eye opener

CAGE Questionnaire for Detecting Alcoholism		
Question	**Yes**	**No**
C: Have you ever felt you should **C**ut down on your drinking?	1	0
A: Have people **A**nnoyed you by criticizing your drinking?	1	0
G: Have you ever felt **G**uilty about your drinking?	1	0
E: Have you ever had a drink first thing in the morning (**E**ye opener)?	1	0
A total score of 0 or 1 suggests low risk of problem drinking A total score of 2 or 3 indicates high suspicion for alcoholism A total score of 4 is virtually diagnostic for alcoholism		

References

Ewing, John A. "Detecting Alcoholism: The CAGE Questionnaire" JAMA 252: 1905-1907, 1984 PMID 6471323 "CAGE Substance Abuse Screening Tool" (PDF). Johns Hopkins Medicine. Retrieved 30 July 2014. Kitchens JM (1994). "Does this patient have an alcohol problem?". JAMA 272 (22): 1782–7. doi:10.1001/jama.1994.03520220076034. PMID 7966928. Bernadt, MW; Mumford, J; Taylor, C; Smith, B; Murray, RM (1982). "Comparison of questionnaire and laboratory tests in the detection of excessive drinking and alcoholism". Lancet 6 (8267): 325–8. doi:10.1016/S0140-6736(82)91579-3. PMID 6120322.

AUDIT - Alcohol Use Disorders Identification Test

The following questions are validated as screening tools for alcohol use

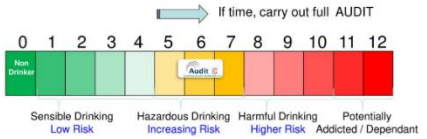
AUDIT- C Questions	Scoring system					Your score
	0	1	2	3	4	
How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times per month	2-3 times per week	4+ times per week	
How many units of alcohol do you drink on a typical day when you are drinking?	1 -2	3-4	5-6	7-9	10+	
How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
					TOTAL :	

A score of **less than 5** indicates *lower risk drinking* (see overleaf)

Scores of 5+ requires the following 7 questions to be completed:

AUDIT Questions (after completing 3 AUDIT-C questions above)	Scoring system					Your score
	0	1	2	3	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	
How often during the last year have you failed to do what was normally expected from you because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
How often during the last year have you needed an alcoholic drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
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	
How often during the last year have you been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
Have you or somebody else been injured as a result of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down?	No		Yes, but not in the last year		Yes, during the last year	
					TOTAL	

The **AUDIT-C** Score **(0-12)**



AUDIT-C + AUDIT = Total score:

AUDIT SCORE	RISK CATEGORY		DESIRED ACTION
0 –7	Lower risk	=	No intervention required
8 –15	Increasing risk	=	Brief Advice
16-19	Higher risk	=	Brief Advice and/or extended BA
20+	Possible dependence	=	Referral to services (see below)

Department of Public Health,
Faculty of Medicine, Masaryk University

MUNI MED

SASQ - Single Alcohol Screening Question

SASQ:

When was the last time you had more then x* drinks in 1 day?

*X = 4 units for women and 5 units for men (in UK 6 and 8)

Result: Answer „**In the past month**" (in some versions less than 3 months) is a **positive** result

M SASQ (= Modified SASQ):

M SASQ is an alcohol harm assessment tool consists of **one question** from the full alcohol use disorders identification **test (AUDIT).** This single question test was developed for use in emergency departments.

Questions	Scoring system					Your score
	0	1	2	3	4	
How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	

M SASQ scoring:

- A total of **0 - 1** indicates lower risk drinkers
- A total of **2 - 4** indicates increasing or higher risk drinkers
- An overall total score of **2 or above** is M SASQ positive

Department of Public Health
Author: Jindřich Fiala

Alcohol quantification - concept of „alcohol unit"

The term "alcohol unit" (one drink):

- It is a simple way to express the amount of alcohol - the equivalent of a certain amount
- It corresponds to the **alcohol content in g in the usually served volume** for each type of alcoholic beverage
- There is no international agreement - see tab. on right

- Australia: 8 – 10 g
- USA: 12 g, 14 g
- Japan 23.5 g
- CZ: **10 g**, 12g, 16g

Expression of alcohol content in beverages:

- **ABV** - Alcohol by Volume (in %)
- **ABW** - Alcohol by Weight -% alcohol content by weight
- **Proof** - spec. for spirits - 100° Proof = 57.15% ABV (Gunpowder soaked in rum does not burn if ABV of rum <57.15%)

Conversion of ABV to ABW: ABW (g) = ABV (ml) x 0.789
E.g. 330 ml 5% beer = 3.3 x 5 x 0.789 = 13 g

1 glass of beer (0,3 L) **≈ 1 glass of wine** (1 dcl) **≈ 1 glass of spirit** (30ml) **≈ 1 unit (10g), 1 „drink"**

Beer:

Type of bier	An example of a particular beer	ABV (%)	Alcohol (g) in 0,5 L	Alcohol (g) in 0,4 L	Alcohol (g) in 0,3 L
Draft ("Výčepní" 10°)	10° Braník, Bernard…	3.8	15.0	12.0	9.0
	Starobrno – výčepní	4.0	16.0	12.6	**9.6**
	Gambrinus - výčepní	4.1	16.2	12.9	**9.7**
Lager 11° ("Jedenáctka")	Starobrno11° Medium světlý ležák	4.7	18.5	14.8	**11.1**
		4.8	18.9	15.1	**11.4**
Lager 12° ("Dvanáctka")	Pilsner Urquell – světlý ležák	4.4	17.4	13.9	**10.4**
	Most of "12 degree" lagers	5.0	19.5	15.6	**11.7**
	Gambrinus - patron	5.2	20.5	16.4	12.3
		6.0	23.5	18.9	14.0

Wine:

	ABV (%)	Alcohol (g) in 1 dcl	Alcohol (g) in 2 dcl
White, Red	11	8.7	17.4
	12	9.5	19.0
	13	10.3	20.6
	14	11.0	22.0

Spirits:

ABV (%)	Alcohol (g) in 25 ml	Alcohol (g) in 40 ml	Alcohol (g) in 50 ml
30	5.9	9.5	11.8
35	6.9	11.0	13.8
38	7.5	**12.0**	**15.0**
40	7.9	**12.6**	**15.8**
42	8.3	13.2	16.6
45	8.9	14.2	17.8
50	9.9	15.8	19.8
70	13.8	22.1	27.6

Definition of alcohol unit by country:

Country	Number of grams
Austria	20g
Croatia	10g, 14g
Czech Republic	16g
Denmark	12g
Estonia	10g
Finland	12g
France	10g
Germany	10g, 12g
Greece	10g, 16g
Hungary	10g, 14g
Iceland	8g, 12g
Ireland	10g
Italy	12g
Latvia	12g
Lithuania	10g
Luxembourg	12g
Malta	8g, 10g
Netherlands	10g
Norway	12g, 15g
Poland	10g
Portugal	10g
Romania	12g
Slovenia	10g
Spain	10g
Sweden	12g
Switzerland	10g, 12g
United Kingdom	8g

Department of Public Health
Author: Jindřich Fiala

Biochemical markers of high alcohol consumption

Blood examination:

- **CDT** - carbo-hydrate-deficient transferrin

  Currently the most appropriate indicator - the highest dg validity:
  - High specifity (80-95 %)
  - It responds flexibly to current changes in alcohol intake

Liver enzymes (serum transaminases):

- **GGT** (GMT) – Gama Glutamyl Transferase
- **AST** - Aspartate Aminotransferase
- **ALT** – Alanine Aminotransferase

Another:

- **MCV** – Mean Corpuscular Volume
- **HDL-C**
- **Acetaldehyd adducts**

Screening of alcohol abuse:

	Alcohol abuse		Alcohol addiction	
	Sensitivity %	Specifity %	Sensitivity %	Specifity %
AST	10-30	>90	33 -55	>90
GGT	20–50	55-100	60-90	55-100
MCV	20–30	64-100	40-50	64-100
CDT	26-62	>90	65-69	>90

Time intervals of laboratory markers during chronic abuse and in the period of abstinence:

Marker	Increase after abuse	Normalization at abstinence
CDT	2 weeks	2-3 weeks
GGT	5 weeks	5 weeks
MCV	6 weeks	2-3 months

Biochemical markers of high alcohol consumption

Biomarker	Remarks	Sensitivity	Specificity	Possible or current use
State markers (recent drinking activity)				
GGT (gamma-glutamyltransferase)	Early indicator of chronic heavy drinkers, liver disease	61	n/a	Chronic alcohol abuse
ALT (alanine aminotransferase)	More useful for liver disease; AST/ALT ratio: heavy alcohol consumption	n/a	n/a	Chronic alcohol abuse
AST (aspartate aminotransferase)		56	n/a	Chronic alcohol abuse
MCV (mean corpuscular volume)	Less useful, but high level is maintained for several months after stop drinking	47	n/a	Heavy alcohol use
Beta-Hex (*N*-acetyl-b-hexosaminidase)	Elevated in heavy drinkers; difficult to assay	94	91	Heavy alcohol use
CDT (carbohydrate-deficient transferrin)	Higher amounts of CDT in heavy drinkers; highly specific to alcohol consumption; difficult to measure	26–83	92	Heavy alcohol use
SIJ (plasma sialic acid index of apoJ)	Sialilated ApoJ decrease after alcohol consumption	n/a	n/a	
TSA (total serum sialic acid)	Elevated in alcoholics; long-term elevation even during abstinent	n/a	n/a	
5-HTOL (5-hyderoxytryptophol)	24-h biomarker; useful in forensic toxicology	n/a	n/a	Monitoring sobriety
FAEE (fatty acid ethyl esters)	24-h biomarker; distinguishable social drinkers from heavy drinker or alcoholics	100	90	Recent heavy alcohol use
EtG (ethyl glucuronide)	24-h (blood) or 36-hour (urine) biomarker; detectable in other body fluids tissue or hair	n/a	n/a	Monitoring sobriety; forensics
WBAA (whole blood-associated acetaldehyde)	Alcohol specific biomarker; Hb-bound acetaldehyde accumulate in RBC over 120 days	100	95	Recent alcohol consumption at all levels; monitoring abstinence
Salsolinol	Better marker for chronic alcohol consumption (blood); no difference between alcoholics and nonalcoholics (brain)	n/a	n/a	Chronic alcohol consumption
CPK (creatine phosphokinase)	Elevated in alcoholics(hallucination, delirium)	n/a	n/a	
Fisher ratio (BCAA/AAA)	Low level in alcohol dependence	n/a	n/a	
MAO-B (monoamine oxidase B)	Low level in hazardous/harmful alcohol use	n/a	n/a	Recent alcohol consumption; monitoring success of treatment

Physical activity assessment

*Taught also earlier in "Public Health II" subject (6th semester) topic "**Assessment of physical activity**"*

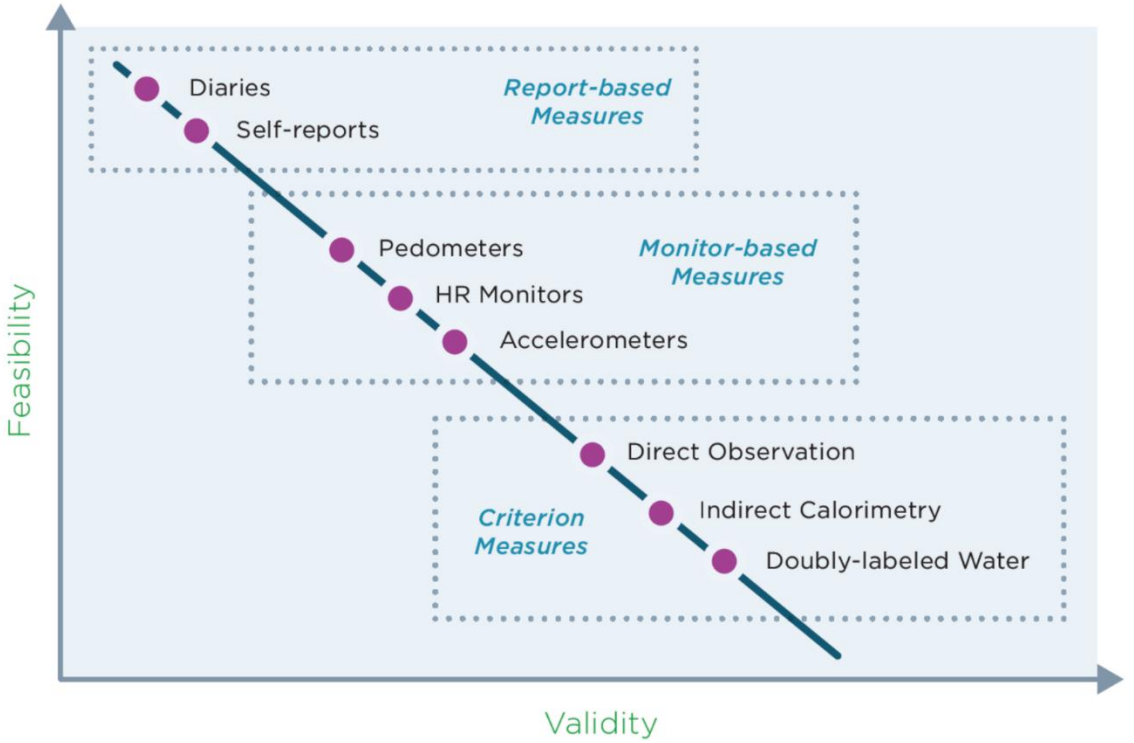
- Self-Report **Questionnaires**
  - These questionnaires are the most common method of PA assessment and rely on participants' recall ability
- Self-Report Activity **Diaries/Logs**
- Direct **Observation**

Devices:

- Pedometers
- Accelerometers
- Heart-Rate Monitors
- Multiple sensors, e.g. Armbands

More complex – scientific measurements:

- Indirect calorimetry
- Double labelled water



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3915355/

Physical Activity: The Secret—Not So Secret—to Prevent and Revert Metabolic Dysregulation in People of All Sizes. November 2019, Mayo Clinic Proceedings 94(11):2164-2165, DOI:10.1016/j.mayocp.2019.09.018

IPAQ short - International Physical Activity Questionnaire

- **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder that normal.
- **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder that normal.

IPAQ – short

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**

IPAQ short - scoring

A) Continuous score

Expressed as MET-min per week: **MET level** x **days/week** x **minutes/day**

Total MET-min/week = **sum** of walking, moderate and vigorous PA

MET is a multiple of estimated resting metabolic rate energy expenditure).

MET levels:

- Walking = **3.3** METs
- Moderate intensity = **4.0** METs
- Vigorous intensity = **8.0** METs

- Resting metabolic rate (of quite sitting) = **1** MET

An example of calculation - each activity 5 days a week, 30 min / day:

Activity	*MET*		*Days*		*Min /week*		*MET-min/week*
Walking	3.3	x	5	x	30	=	495
Moderate	4.0	x	5	x	30	=	600
Vigorous	8.0	x	5	x	30	=	1 200
					TOTAL	=	2 295

B) Categorical score

1) High = active, HEPA-level (Health-Enhancing Physical Activity)

Either of the following 2 criteria:

- **Vigorous**-intensity activity on **at least 3 days** and accumulating at least **1500** MET-minutes/week

OR

- 7 or more days of **any combination** of walking, moderate- or vigorous-intensity activities accumulating at least **3000** MET-minutes/week

2) Moderate = minimally (sufficiently) active, achieving the minimum recommended

Either of the following 3 criteria:

- **3 or more days** of **vigorous** activity of at least **20 minutes** per day (=480)

OR

- **5 or more days** of **moderate**-intensity activity and/or **walking** of at least **30 minutes** per day (=495)

OR

- **5 or more days** of **any combination** of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least **600** MET-minutes/week.

3) Low = insufficiently active, inactive

- No activity is reported

OR

- Some activity is reported but not enough to meet Categories 2 or 3.

Bouts of activity lasting **less than 10 minutes** duration are **not counted!**

What can fulfill "High" category:

- Walking: 130 min/day (3,3 x 7 x130 = 3003)
- Moderate activity.: 110 min/day (4 x 7 y 110 = 3 080)
- Equivalent in steps: at least **12 500 steps/day**

HEPA level (**H**ealth-**E**nhancing **P**hysical **A**ctivity), which is a more active category.

People who:

- **exceed the minimum** public health physical activity recommendations, and
- **are accumulating enough activity for a healthy lifestyle**.

Cut-off for **Moderate (basal) category** in steps: at least **5 000 steps/day**

WHO Guidelines on physical activity and sedentary behaviour 2020

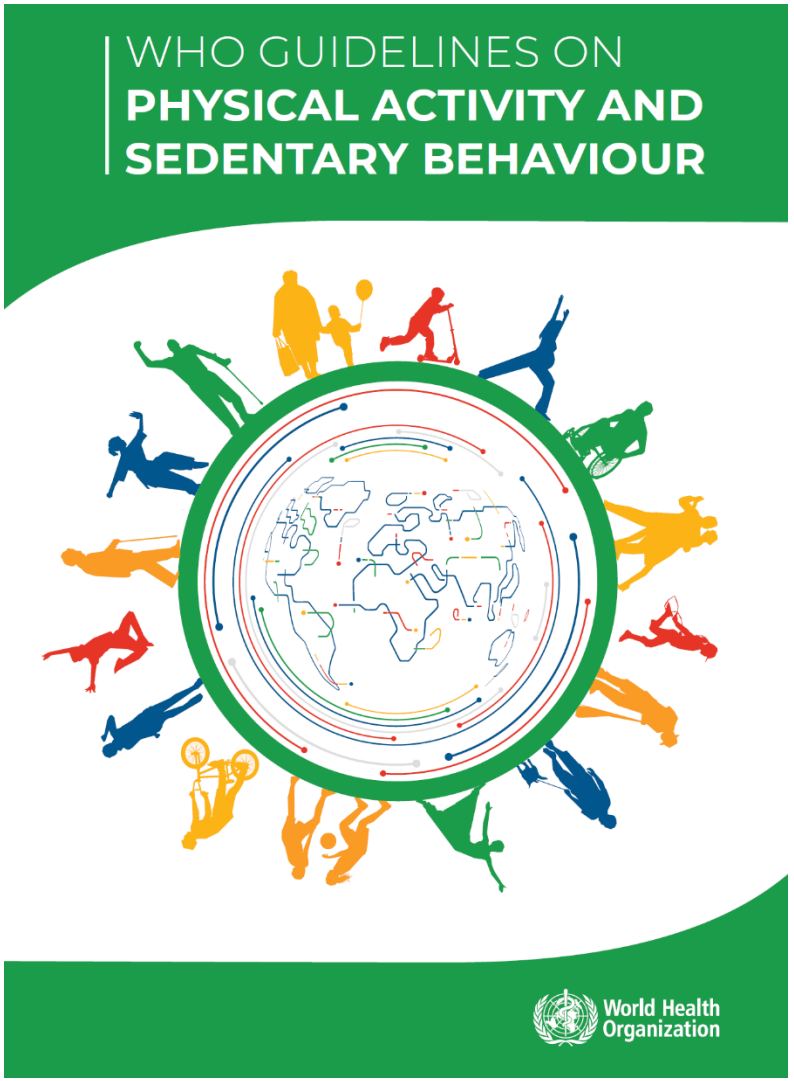
Guidelines by age groups:

- Children and adolescents (aged 5-17 years)
- Adults (aged 18 – 64 years)
- Pregnant and postpartum women
- Adults and older adults with chronic conditions (aged 18 years and older)
- Children and adolescents (aged 5-17 years) and adults (aged 18 years and older) living with disability

Guidelines by behaviour:

- Recommendations on physical activity
- Recommendations on sedentary behaviour

Comprehensive document of 74 pages + references + appendices, detailed description including evidence - documents for recommendations and instructions for implementation. Available for download on the WHO website



https://www.who.int/publications/i/item/9789240015128

WHO Recommendations on Physical Activity and Sedentary Behavior 2020

It was investigated whether the recommended physical activity has a positive effect on health. To assess the effects of physical activity and sedentary behavior, the following health outcomes were determined for evaluation:

- Reduced all-cause and cause-specific mortality (cardiovascular disease and cancer);
- Reduced incidence of cardiovascular disease;
- Cancer (site-specific);
- Type 2 diabetes;
- Improved physical fitness (e.g. cardiorespiratory, motor development, muscular fitness);
- Improved cardiometabolic health (e.g. blood pressure, dyslipidaemia, glucose, insulin resistance);
- Bone health ;
- Mental health (e.g. reduction in depressive symptoms, self-esteem, anxiety symptoms, ADHD);
- Improved cognitive outcomes (e.g. academic performance, executive function);
- Reduced adiposity.
- Adverse effects (e.g. injuries and harms) were also considered

PI/ECO - Population, Intervention/Exposure, Comparison, Outcome

According to the P / ECO system (Population, Intervention / Exposure, Comparison, Outcome) key questions were created. The key issues addressed for each subpopulation are summarized as follows:

For physical activity:

a. What is the association between physical aktivity and health-related outcomes?

b. Is there a dose-response association (volume, duration, frequency, intensity)?

c. Does the association vary by type or domain of physical activity?

For sedentary behaviour:

a. What is the association between sedentary behaviour and health-related outcomes?

b. Is there a dose-response association (total volume, frequency, duration and intensity of interruption)?

c. Does the association vary by type and domain of sedentary behaviour?

d. In adults only: Does physical activity modify the effect of sedentary behaviour on mortality?

WHO Recommendations on Physical Activity and Sedentary Behavior 2020

The GRADE method GRADE (Grading of Recommendations Assessment, Development and Evaluation) was used to rate the certainty of the evidence for each PI/ECO with the following criteria considered: study design; risk of bias; consistency of effect; indirectness; precision of effect; and other limitations, including publication bias and factors for upgrading observational evidence (magnitude of effect, dose-response, and effects of confounders

The GRADE Evidence to Decisions (EtD) Framework was used for generating question-specific recommendations. The EtD framework is a systematic, structured and transparent approach to decision making. The framework uses explicit criteria for generating guideline recommendations considering research evidence, certainty of evidence and, where required, expert opinion and topical knowledge from the perspective of the target audience. The criteria elicit judgments about the balance between the observed evidence of desirable and undesirable outcomes, overall certainty of evidence, relative values of patients for desirable and undesirable outcomes, resource use (cost considerations) where applicable, potential impact on inequities in health, acceptability and feasibility of recommendations.

Confidence of evidence for each result:

(respectively for each recommendation)

High	Very confident that the true effect lies close to that of the estimate of the effect.
Moderate	Moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very low	Very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

Total strength of the recommendation:

Strong	The panel is confident that the desirable effects of adherence to a recommendation outweigh the undesirable effects.
Conditional	The panel concludes that the desirable effects of adherence to a recommendation **probably** outweigh the undesirable effects, but is not confident.

- For each set, the introduction summarizes the health consequences associated with physical activity and sedentary behavior.
- A set of good practice statements is provided to further clarify how the target population can safely comply with the recommendations. They are not in themselves "graded recommendations", but are derived from scientific evidence and practical considerations.
- For each set of recommendations, a summary of supporting scientific evidence is provided, structured according to three PI / ECO questions; 1) evidence of links to health outcomes, 2) summary of evidence of dose-response, 3) summary of evidence of relationships between different types or domains of exposure and health outcomes.

Physical activity and sedentary behavior - selected basic terms and categories

Metabolic equivalent (MET)

The metabolic equivalent is a physiological measure of the intensity of physical activity. One MET is the energy equivalent expended by an individual **at rest**.

Light-intensity physical activity:

Is between **1.5 and 3 METs**, i.e. activities with energy cost less than 3 times the energy expenditure at rest for that person. This can include slow walking, bathing, or other incidental activities that do not result in a substantial increase in heart rate or breathing rate

Moderate-intensity physical activity:

On an absolute scale, moderate-intensity refers to the physical activity that is performed between **3 and less than 6 times the intensity of rest**. On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0–10.

Vigorous-intensity physical activity:

On an absolute scale, vigorous-intensity refers to physical activity that is performed at **6.0 or more METS**. On a scale relative to an individual's personal capacity, vigorous-intensity physical activity is usually a 7 or 8 on a scale of 0–10.

Muscle-strengthening activity

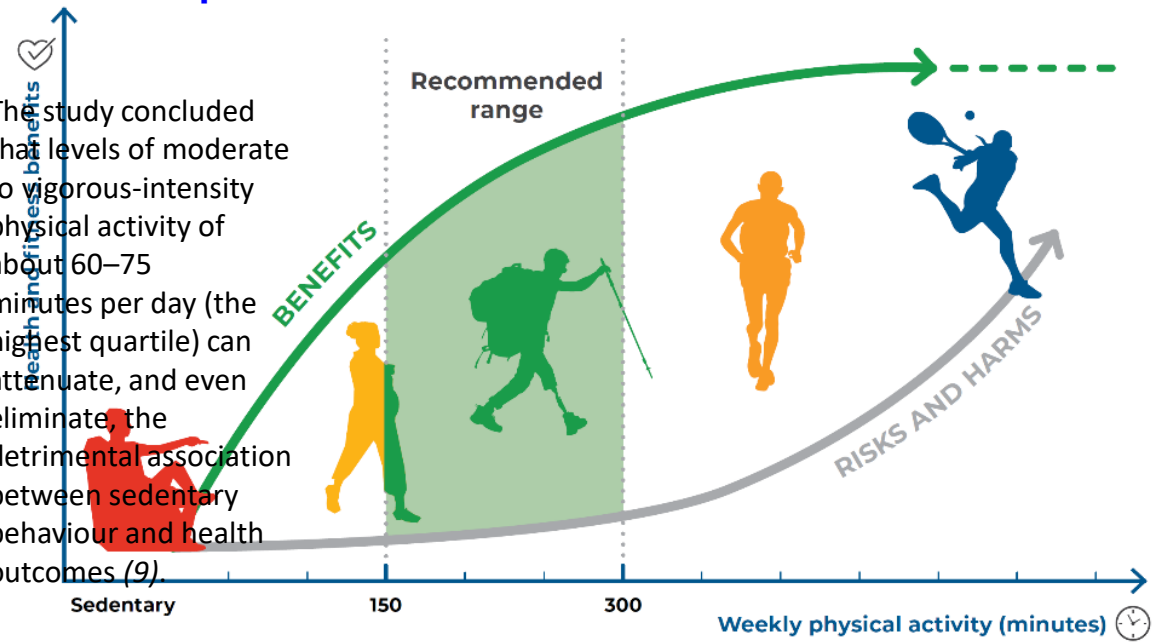
Physical activity and exercise that increase skeletal muscle strength, power, endurance, and mass (e.g. strength training, resistance training, or muscular strength and endurance exercises).

Sedentary behaviour

Any waking behaviour characterized by an energy expenditure of 1.5 METS or lower while sitting, reclining, or lying. Most desk-based office work, driving a car, and watching television are examples of sedentary behaviours; these can also apply to those unable to stand, such as wheelchair users.

WHO Recommendations on Physical Activity and Sedentary Behavior 2020

Dose response curve

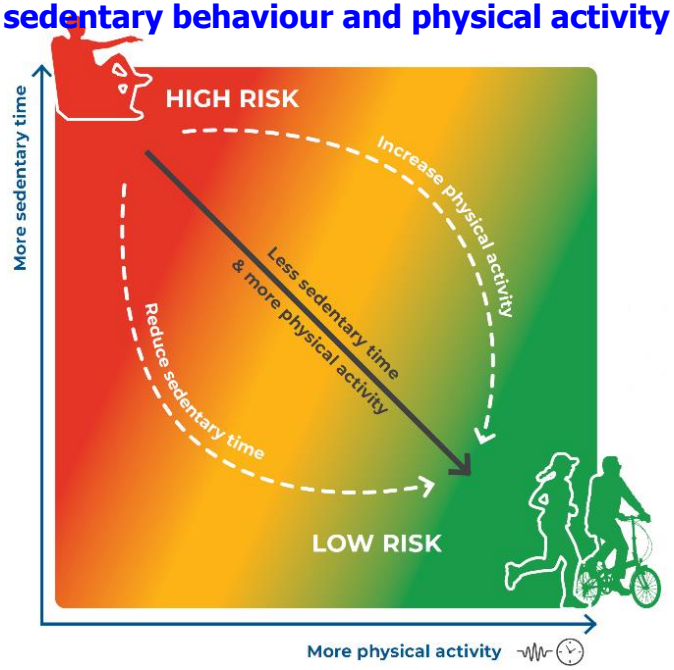


The study concluded that levels of moderate to vigorous-intensity physical activity of about 60–75 minutes per day (the highest quartile) can attenuate, and even eliminate, the detrimental association between sedentary behaviour and health outcomes *(9)*.

The shape of the dose-response curve indicates that there is no lower threshold for benefit, and the greatest benefits are seen at the lower end of the dose-response curve. The curvilinear inverse association is consistently reported and across studies using different measures of physical activity.

- There is moderate certainty evidence that the relationship between sedentary behaviour and all-cause mortality, cardiovascular disease and cancer mortality varies by amount of moderate- to vigorous-intensity physical activity.
- Higher amounts of moderate- to vigorous-intensity physical activity can attenuate the detrimental association between sedentary behaviour and health outcomes.

The relationship between levels of sedentary behaviour and physical activity



Based on this evidence, it was agreed that higher levels of moderate- to vigorous-intensity physical activity should be recommended for those individuals who undertake high levels of sedentary behaviour and that the benefits would outweigh the risks.

Children and adolescents (aged 5-17 years.)

In children and adolescents, physical activity confers benefits for the following health outcomes: improved physical fitness (cardiorespiratory and muscular fitness), cardiometabolic health (blood pressure, dyslipidaemia, glucose, and insulin resistance), bone health, cognitive outcomes (academic performance, executive function), mental health (reduced symptoms of depression); and reduced adiposity.

It is recommended that:

Children and adolescents should do at least an average of 60 minutes per day of moderate to vigorous-intensity, mostly aerobic, physical activity, across the week.

Strong recommendation, moderate certainty evidence

IVigorous-intensity aerobic activities, as well as those that strengthen muscle and bone, should be incorporated at least 3 days a week.

Strong recommendation, moderate certainty evidence

- Doing some physical activity is better than doing none.
- If children and adolescents are not meeting the recommendations, doing some physical activity will benefit their health.
- Children and adolescents should start by doing small amounts of physical activity, and gradually increase the frequency,
- intensity and duration over time.
- It is important to provide all children and adolescents with safe and equitable opportunities, and encouragement,

In children and adolescents, higher amounts of sedentary behaviour are associated with the following poor health outcomes: increased adiposity; poorer cardiometabolic health, fitness, behavioural conduct/pro-social behaviour; and reduced sleep duration.

It is recommended that:

Children and adolescents should limit the amount of time spent being sedentary, particularly the amount of recreational screen time.

Strong recommendation, low certainty evidence

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Adults (aged 18-64 years)

UIn adults, physical activity confers benefits for the following health outcomes: improved all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers, 2 incident type-2 diabetes, mental health (reduced symptoms of anxiety and depression); cognitive health, and sleep; measures of adiposity may also improve.

[1]Site-specific cancers of: bladder, breast, colon, endometrial, oesophageal adenocarcinoma, gastric, and renal..

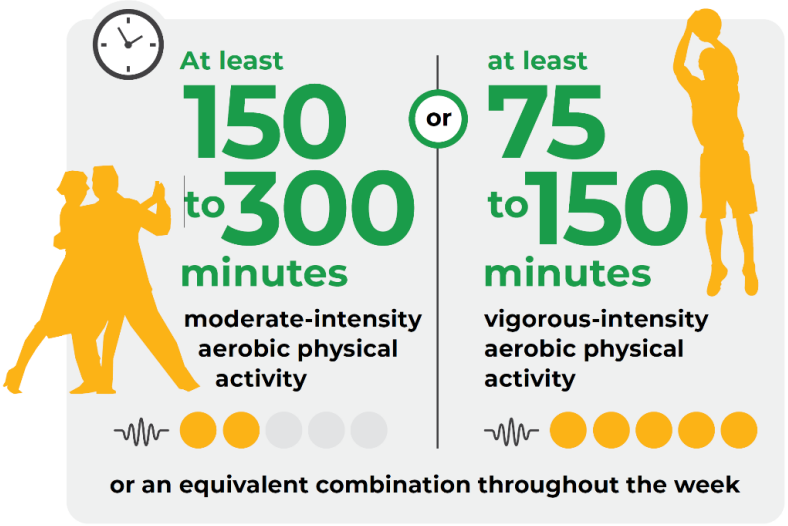
It is recommended that:

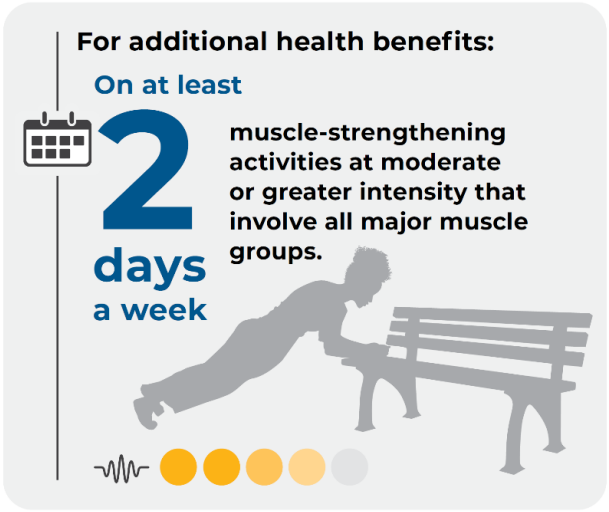
All adults should undertake regular physical activity

Strong recommendation, moderate certainty evidence

Adults should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits.í

Strong recommendation, moderate certainty evidence

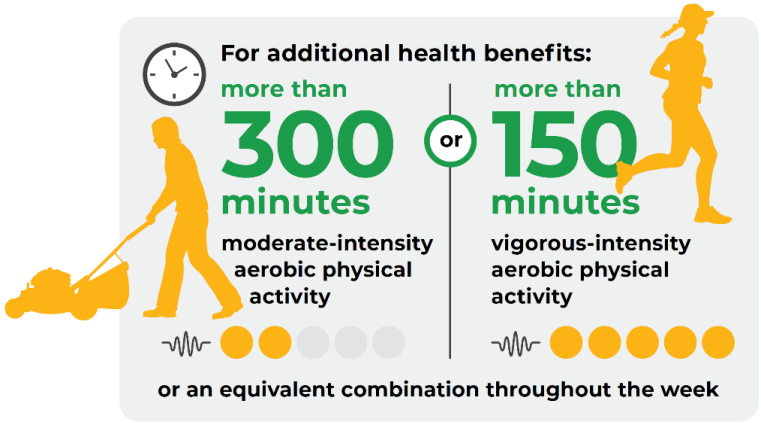




Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.

Strong recommendation, moderate certainty evidence

Adults (aged 18-64 years)



➢ **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.**

Conditional recommendation, moderate certainty evidence

- Doing some physical activity is better than doing none.
- If adults are not meeting these recommendations, doing some physical activity will benefit their health.
- Adults should start by

In adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality and incidence of cardiovascular disease, cancer and type-2 diabetes.

It is recommended that:

➢ **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.** *Strong recommendation, moderate certainty evidence*

➢ **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.**

Strong recommendation, moderate certainty evidence

Older adults (aged 65 years and older)

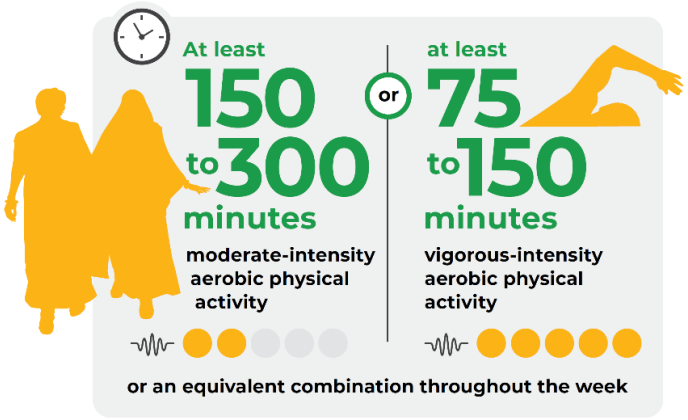
In older adults, physical activity confers benefits for the following health outcomes: improved all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers, incident type-2 diabetes, mental health (reduced symptoms of anxiety and depression), cognitive health, and sleep; measures of adiposity may also improve. In older adults, physical activity helps prevent falls and falls-related injuries and declines in bone health and functional ability.

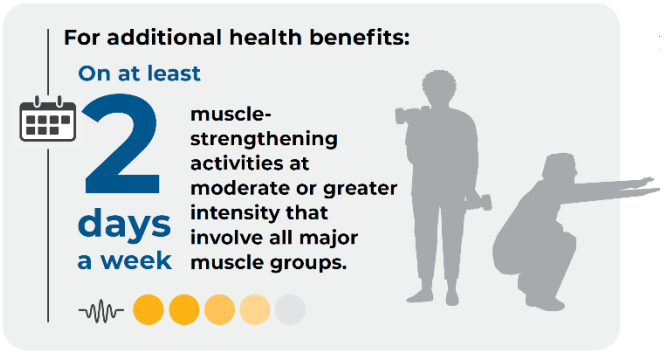
It is recommended that: All older adults should undertake regular physical aktivity.

Strong recommendation, moderate certainty evidence

Older adults should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits.

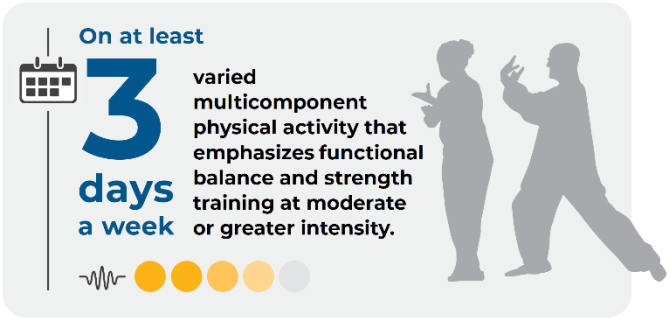
Strong recommendation, moderate certainty evidence





Older adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.

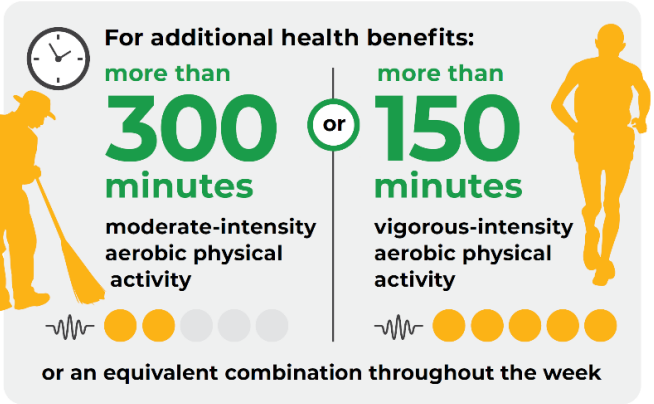
Strong recommendation, moderate certainty evidence



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.

Strong recommendation, moderate certainty evidence

Older adults (aged 65 years and older)



Older 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.

Conditional recommendation, moderate certainty evidence

- Doing some physical activity is better than doing none.
- If older adults are not meeting the recommendations, doing some physical activity will bring benefits to health.
- Older adults should start by doing small amounts of physical activity, and gradually increase the frequency, intensity and duration over time.
- Older adults should be as physically active as their functional ability allows, and adjust their level of effort for physical activity relative to their level of fitness.

In older adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality, and incidence of cardiovascular disease, cancer and incidence of type-2 diabetes.

It is recommended that:

Older 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.

Strong recommendation, moderate certainty evidence

To help reduce the detrimental effects of high levels of sedentary behaviour on health, older adults should aim to do more than the recommended levels of moderate- to vigorous intensity physical activity.

Strong recommendation, moderate certainty evidence

Pregnant and postpartum women

In pregnant and postpartum women, physical activity during pregnancy and postpartum confers benefits on the following maternal and fetal health benefits: decreased risk of pre-eclampsia, gestational hypertension, gestational diabetes, excessive gestational weight gain, delivery complications and postpartum depression, and fewer newborn complications, no adverse effects on birthweight; and no increase in risk of stillbirth.

It is recommended that all pregnant and postpartum women without contraindication should:

Undertake regular physical activity throughout pregnancy and postpartum.

Strong recommendation, moderate certainty evidence

Do at least 150 minutes of moderate intensity aerobic physical activity throughout the week for substantial health benefits.

Strong recommendation, moderate certainty evidence

Incorporate a variety of aerobic and muscle strengthening activities. Adding gentle stretching may also be beneficial.

Strong recommendation, moderate certainty evidence

In addition:

Women who, before pregnancy, habitually engaged in vigorous intensity aerobic activity, or who were physically active, can continue these activities during pregnancy and the postpartum period.

Strong recommendation, moderate certainty evidence

Department of Public Health
Author: Jindřich Fiala

Pregnant and postpartum women

- Doing some physical activity is better than doing none.
- If pregnant and postpartum women are not meeting the recommendations, doing some physical activity will benefit their health.
- Pregnant and postpartum women should start by doing small amounts of physical activity, and gradually increase frequency, intensity and duration over time.
- Pelvic floor muscle training may be performed on a daily basis to reduce the risk of urinary incontinence.

Additional safety considerations for pregnant women when undertaking physical activity are:

- Avoid physical activity during excessive heat, especially with high humidity.
- Stay hydrated by drinking water before, during, and after physical activity.
- Avoid participating in activities which involve physical contact; pose a high risk of falling; or might limit oxygenation (such as activities at high altitude, when not normally living at high altitude).
- Avoid activities in supine position after the first trimester of pregnancy.
- When considering athletic competition, or exercising significantly above the recommended guidelines pregnant women should seek supervision from a specialist health-care provider.
- Pregnant women should be informed by their health-care provider of the danger signs alerting them as to when to stop; or to limit physical activity and consult a qualified health-care provider immediately should they occur.
- Return to physical activity gradually after delivery, and in consultation with a health-care provider, in the case of delivery by Caesarean section.

In pregnant and postpartum women, as in all adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality and incidence of cardiovascular disease, cancer and incidence of type-2 diabetes.

It is recommended that:

Pregnant and postpartum women should limit the amount of time spent being sedentary. Replacing sedentary time with physical aktivity of any intensity (including light intensity) provides health benefits.

Strong recommendation, low certainty evidence

Department of Public Health
Author: Jindřich Fiala

ADULTS AND OLDER ADULTS WITH CHRONIC CONDITIONS (aged 18 years and older)

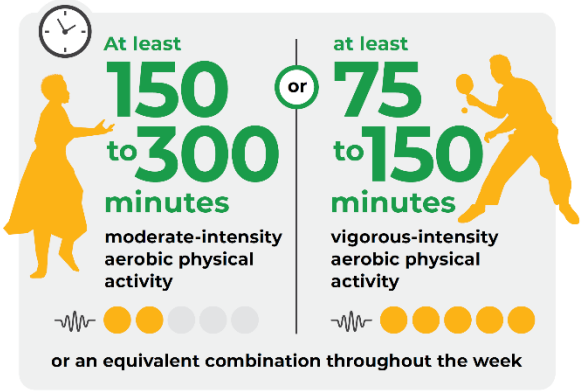
Physical activity can confer health benefits for adults and older adults living with the following chronic conditions: **for cancer survivors** – physical activity improves all-cause mortality, cancer-specific mortality, and risk of cancer recurrence or second primary cancer; **for people living with hypertension** – physical activity improves cardiovascular disease mortality, disease progression, physical function, health-related quality of life; **for people living with type-2 diabetes** – physical activity reduces rates of mortality from cardiovascular disease and indicators disease progression; and **for people living with HIV** – physical activity can improve physical fitness and mental health (reduced symptoms of anxiety and depression), and does not adversely affect disease progression (CD4 count and viral load) or body composition.

[1]Auxiliary T lymphocytes

It is recommended that:

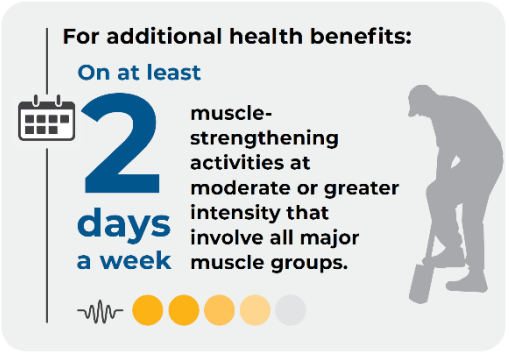
All adults and older adults with the above chronic conditions should undertake regular physical activity..

Strong recommendation, moderate certainty evidence



Adults and older adults with these chronic conditions should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for substantial health benefits.

Strong recommendation, moderate certainty evidence



Adults and older adults with these chronic conditions should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional benefits.

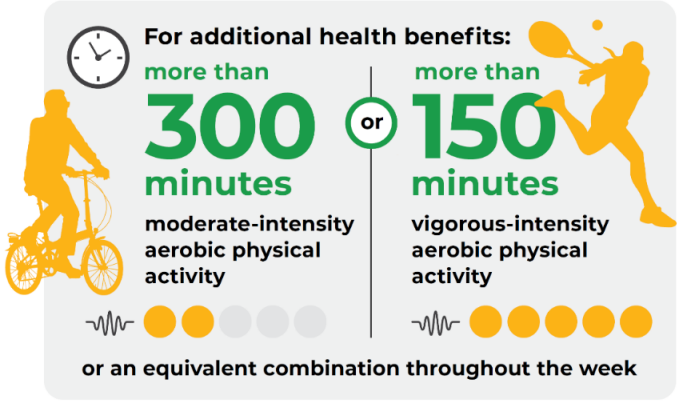
Strong recommendation, moderate certainty evidence

As part of their weekly physical activity, older adults with these chronic conditions 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 prevent falls.

Strong recommendation, moderate certainty evidence

Department of Public Health
Author: Jindřich Fiala
MUNI MED

ADULTS AND OLDER ADULTS WITH CHRONIC CONDITIONS (aged 18 years and older)



When not contraindicated, adults and older adults with these chronic conditions 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.

Conditional recommendation, moderate certainty evidence

- When not able to meet the above recommendations, adults with these chronic conditions should aim to engage in physical activity according to their abilities.Adults with these chronic conditions should start by doing small amounts of physical activity and gradually increase the frequency, intensity and duration over time.
- Adults with these chronic conditions may wish to consult with a physical activity specialist or health-care professional for advice on the types and amounts of activity appropriate for their individual needs, abilities, functional limitations/complications, medications, and overall treatment plan.
- Pre-exercise medical clearance is generally unnecessary for individuals without contraindications prior to beginning light- or moderate-intensity physical activity not exceeding the demands of brisk walking or everyday living.

In adults, including cancer survivors and people living with hypertension, type-2 diabetes and HIV, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality, and incidence of cardiovascular disease, cancer and incidence of type-2 diabetes.

For cancer survivors, and adults living with hypertension, type-2 diabetes and HIV,it is recommended that:

Adults and older adults with chronic conditions should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.

Strong recommendation, low certainty evidence

To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults and older adults with chronic conditions should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity.

Strong recommendation, low certainty evidence

CHILDREN AND ADOLESCENTS (aged 5–17 years) LIVING WITH DISABILITY

Many of the health benefits of physical activity for children and adolescents, as set out in the section above, also relate to those children and adolescents living with disability. Additional benefits of physical activity to health outcomes for those living with disability include: improved cognition in individuals with diseases or disorders that impair cognitive function, including attention-deficit/hyperactivity disorder (ADHD); improvements in physical function may occur in children with intellectual disability.

It is recommended that:

Children and adolescents living with disability should do at least an average of 60 minutes per day of moderate- to vigorous-intensity, mostly aerobic, physical activity, across the week.

Strong recommendation, moderate certainty evidence

Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone should be incorporated at least 3 days a week.

Strong recommendation, moderate certainty evidence

CHILDREN AND ADOLESCENTS (aged 5–17 years) LIVING WITH DISABILITY

- Doing some physical activity is better than doing none.
- If children and adolescents living with disability are not meeting these recommendations, doing some physical activity will bring benefits to health.
- Children and adolescents living with disability should start by doing small amounts of physical activity and gradually increase the frequency, intensity and duration over time.
- There are no major risks for children and adolescents living with disability engaging in physical activity when it is appropriate to an individual's current activity level, health status and physical function; and the health benefits accrued outweigh the risks.
- Children and adolescents living with disability may need to consult a health-care professional or other physical activity and disability specialist to help determine the type and amount of activity appropriate for them.

In children and adolescents, higher amounts of sedentary behaviour are associated with the following poor health outcomes: increased adiposity; poorer cardiometabolic health, fitness, and behavioural conduct/pro-social behaviour; and reduced sleep duration.

It is recommended that:

Children and adolescents living with disability should limit the amount of time spent being sedentary, particularly the amount of recreational screen time.

Strong recommendation, low certainty evidence

Department of Public Health
Author: Jindřich Fiala

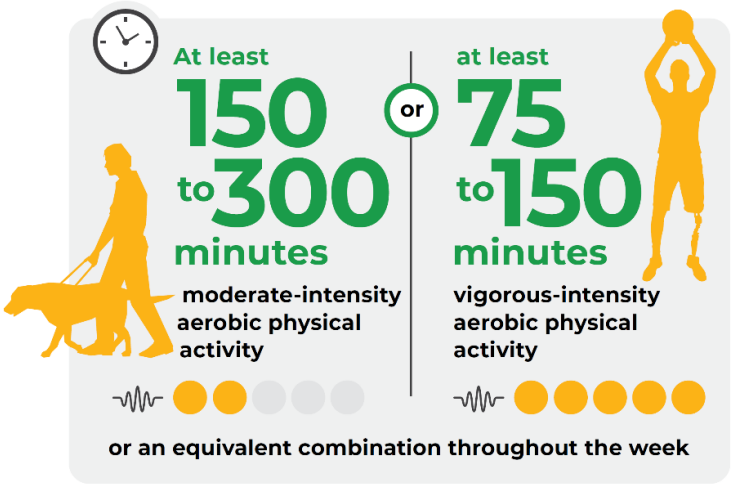
ADULTS (aged 18 years and older) LIVING WITH DISABILITY

Many of the health benefits of physical activity for adults, as set out in the section above, also relate to adults living with disability. Additional benefits of physical activity to health outcomes for those living with disability include the following: **for adults with multiple sclerosis** – improved physical function, and physical, mental, and social domains of health-related quality of life; **for individuals with spinal cord injury** – improved walking function, muscular strength, and upper extremity function; and enhanced health-related quality of life; **for individuals with diseases or disorders that impair cognitive function** – improved physical function and cognition (in individuals with Parkinson's disease and those with a history of stroke); beneficial effects on cognition; and may improve quality of life (in adults with schizophrenia); and may improve physical function (in adults with intellectual disability); and improves quality of life (in adults with major clinical depression).

It is recommended that:

All adults living with disability should undertake regular physical activity.

Strong recommendation, moderate certainty evidence

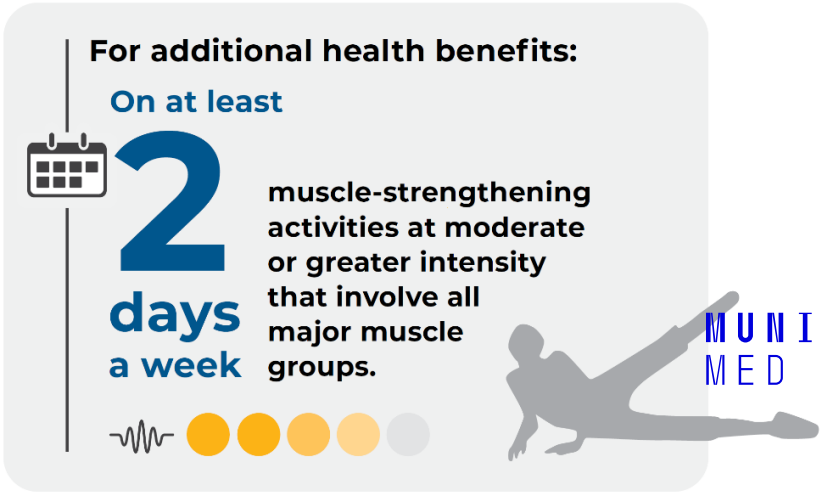


Adults living with disability should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for substantial health benefits.

Strong recommendation, moderate certainty evidence

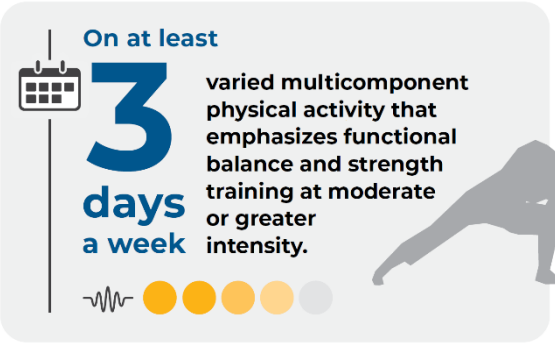
Adults living with disability should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.

Strong recommendation, moderate certainty evidence



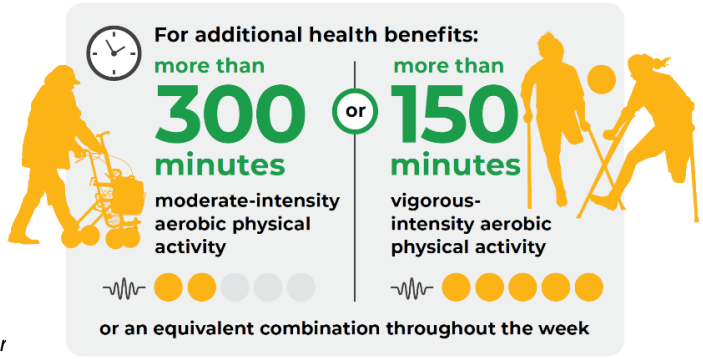
Department of Public Health
Author: Jindřich Fiala

ADULTS (aged 18 years and older) LIVING WITH DISABILITY



As part of their weekly physical activity, older adults living with disability 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 prevent falls.

Strong recommendation, moderate certainty evidence



Adults living with disability 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.

Conditional recommendation, moderate certainty evider

- Doing some physical activity is better than doing none.
- If adults living with disability are not meeting these recommendations, doing some physical activity will bring benefits to health.
- Adults living with disability should start by doing small amounts of physical activity, and gradually increase the frequency, intensity and duration over time.
- There are no major risks to adults living with disability engaging in physical activity when it is appropriate to the individual's current activity level, health status and physical function; and when the health benefits accrued outweigh the risks.
- Adults living with disability may need to consult a healthcare professional or other physical activity and disability specialist to help determine the type and amount of activity appropriate for them.

In adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality and incidence of cardiovascular disease, cancer and type-2 diabetes.

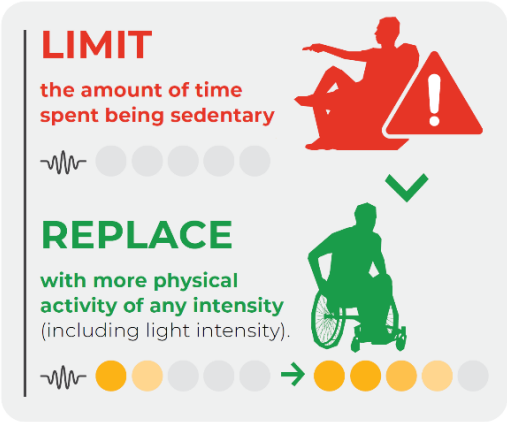
It is recommended that:

Adults living with disability should limit the amount of time spent being sedentary. Replacing sedentary time with physical aktivity of any intensity (including light intensity) provides health benefits.

Strong recommendation, low certainty evidence

To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults living with disability should aim to do more than the recommended levels of moderate to vigorous-intensity physical activity.

Strong recommendation, low certainty evidence



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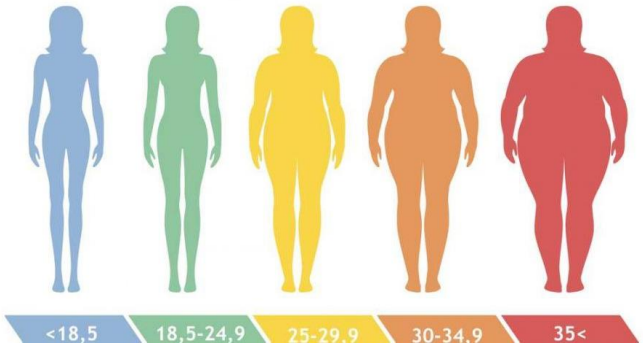
Recommended anthropometric methods

- **Weight, Height → BMI**
- **Abdominal circumference**
- **BFP – body fat percentage (by impedance)**

BMI classification

Classification	BMI (kg/m2)	
	Principal cut-off points	Additional cut-off points
Underweight	**< 18,50**	**< 18,50**
Severe thinness	< 16,00	< 16,00
Moderate thinness	16,00 -16,99	16,00 -16,99
Mild thinness	17,00 – 18,49	17,00 – 18,49
Normal range	**18,50 – 24,99**	**18,50 – 22,99**
		23,00 – 24,99
Overweight	**≥ 25,00**	**≥ 25,00**
Pre-obese	25,00 – 29,99	25,00 – 27,49
		27,50 – 29,99
Obese	**≥ 30,00**	**≥ 30,00**
Obese class I	30,00 – 34,99	30,00 – 32,49
		32,50 – 34,99
Obese class II	35,00 – 39,99	35,00 – 37,99
		37,50 – 39,99
Obese class II	≥ 40,00	≥ 40,00

Source: WHO
1995, 2000, 2009



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Body fat percentage - diagnostic criteria (Cut-offs)

For % of body fat (PBF), the diagnostic criteria are not as clear-cut as BMI. So far, there is no general agreement and there are no binding benchmarks issued by, for example, the WHO. Therefore, different sources and different recommendations may differ.

Below are the values that appear to be most suitable for normal practical use. For comparison, the results show the corresponding PBF values at different BMI values, as well as the reference values as used by Inbody - Biospace. At the very bottom, then, examples of some other reference ranges, by various sources.

- **Diagnostic criteria (cut-offs) for the measured % of body fat (optimal variant to use):**

	Men	Women
Normal (healthy)	< 20	< 30
Increased (Overfat)	20 - 25	30 - 35
Excessive (Obesity)	> 25	> 35

Oliveros E, Somers V, Sochor O, Goel K, Lopez-Jimenez F: The concept of normal weight obesity. Progress in cardiovascular diseases, 2014, 56, 426-433

- **Values as used by Inbody – Biospace:**

Biospace: Recommended range: **men 10 – 20** (standard 15), **women 18 – 28** (standard 23)

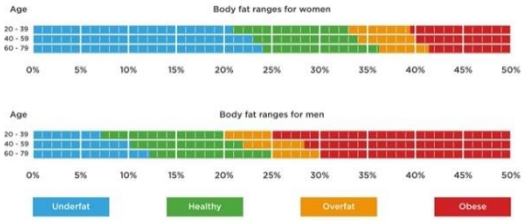
- **Measured % of fat corresponding to BMI values (cutoffs):** (Galagher et al.)

Category:	OK	Overweight	Obesity
BMI	< 25	25 – 30	> 30
% fat men	< 20 %	20 – 25 %	> 25 %
% fat women	< 32 %	32 – 38 %	> 38 %

- **Some other – for comparison:**

ACE -(American Council on Exercise - ACE (2009) What are the guidelines for percentage of body fat loss? American Council on Exercise (ACE). Ask the Expert Blog. December 2, 2009.

	Men	Women
Essential fat	2–5%	10–13%
Athletes	6–13%	14–20%
Fitness	14–17%	21–24%
Average	18–24%	25–31%
Obese	25%+	32%+



Human Kinetics: http://www.humankinetics.com/excerpts/excerpts/normal-ranges-of-body-weight-and-body-fat

This is an excerpt from Sport Nutrition, Second Edition, by Asker Jeukendrup, PhD, and Michael Gleeson, PhD

Table 13.1 Body fat percentages for males and females and their classification

Males	Females	Rating
5-10	8-15	Athletic
11-14	16-23	Good
15-20	24-30	Acceptable
21-24	31-36	Overweight
>24	>37	Obese

Table 13.2A Body fat percentage for the average population

Age	Up to 30	30-50	50+
Females	14-21%	15-23%	16-25%
Males	9-15%	11-17%	12-19%

Bioimpedance Measurement of Body Composition with Inbody S10 (Biospace)

For measuring body composition, we currently use (in addition to other BIA devices) a high-quality 8-channel (8 measuring points) multifrequency Inbody S10 at the Department of Public Health.

- **Body fat** - %, kg
- **Skeletal muscles** (lean mass) - %, kg
- **Water** - %, L (total, extracellular, intracellular)
- **Mineral mass** (osseus, non-osseus fraction)
- **Abdominal visceral fat**
- **Segmental analysis**

Inbody S10 – result report

Body Composition Analysis

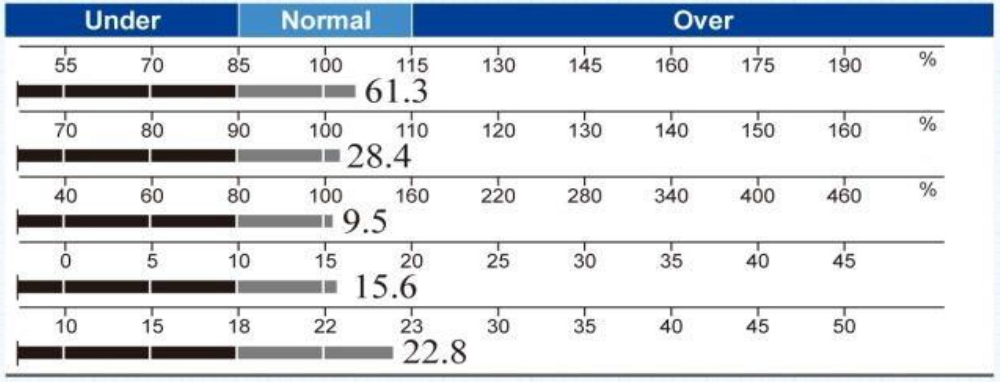
Compartments	Unit	Measured	Normal Range
Intracellular Water	ℓ	23.3	20.6 ~ 25.2
Extracellular Water	ℓ	15.1	12.6 ~ 15.4
Protein Mass	kg	10.1	8.9 ~ 10.9
Mineral Mass	kg	3.29	3.10 ~ 3.80
Body Fat Mass	kg	9.5	7.1 ~ 14.2

※Mineral Mass is estimated.

Values	Total Body Water	Soft Lean Mass	Fat Free Mass	Weight
23.3	38.4	49.1	51.8	61.3
15.1				
10.1				
3.29	non-osseous osseous : 2.67			
9.5				

Muscle-Fat Analysis

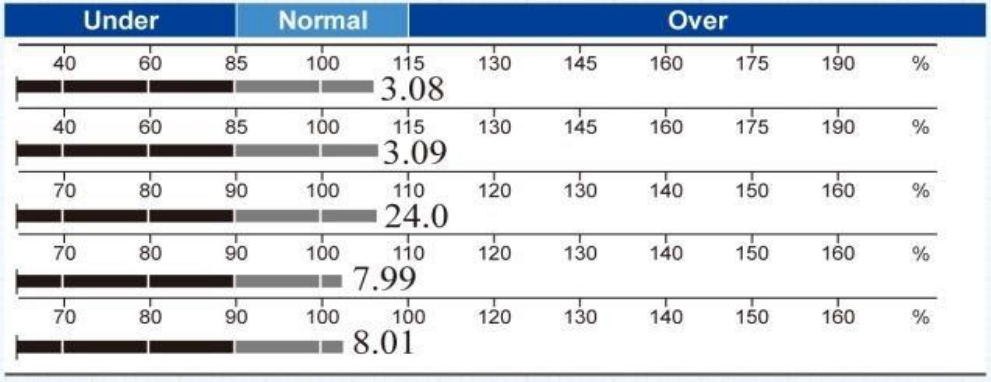
Index	Unit	Measured	Normal Range
Weight	kg	61.3	50.3 ~ 68.1
Skeletal Muscle Mass	kg	28.4	25.1 ~ 30.7
Body Fat Mass	kg	9.5	7.1 ~ 14.2
Percent Body Fat	%	15.6	10.0 ~ 20.0
BMI	kg/m²	22.8	18.5 ~ 23.0



Segmental Lean Analysis

★ : Access Location
• : Location of Paralysis

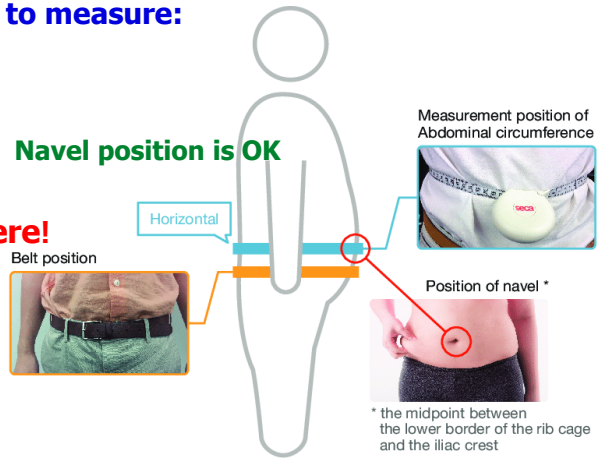
Segment	Unit	Measured	Normal Range
Right Arm	kg	3.08	2.38 ~ 3.22
Left Arm★	kg	3.09	2.38 ~ 3.22
Trunk	kg	24.0	20.3 ~ 24.8
Right Leg•	kg	7.99	7.02 ~ 8.58
Left Leg	kg	8.01	7.02 ~ 8.58

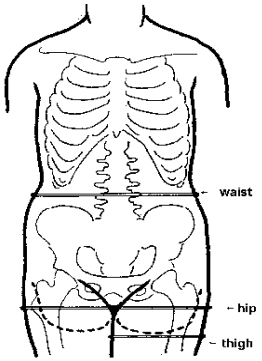


Abdominal circumference

Risk:	OK	Increased	Substantially increased
Men	< 94	94 - 102	> 102
Women	< 80	80 - 88	> 88

Where to measure:





Where to measure:

Waist – taken in level of the umbilicus (navel)

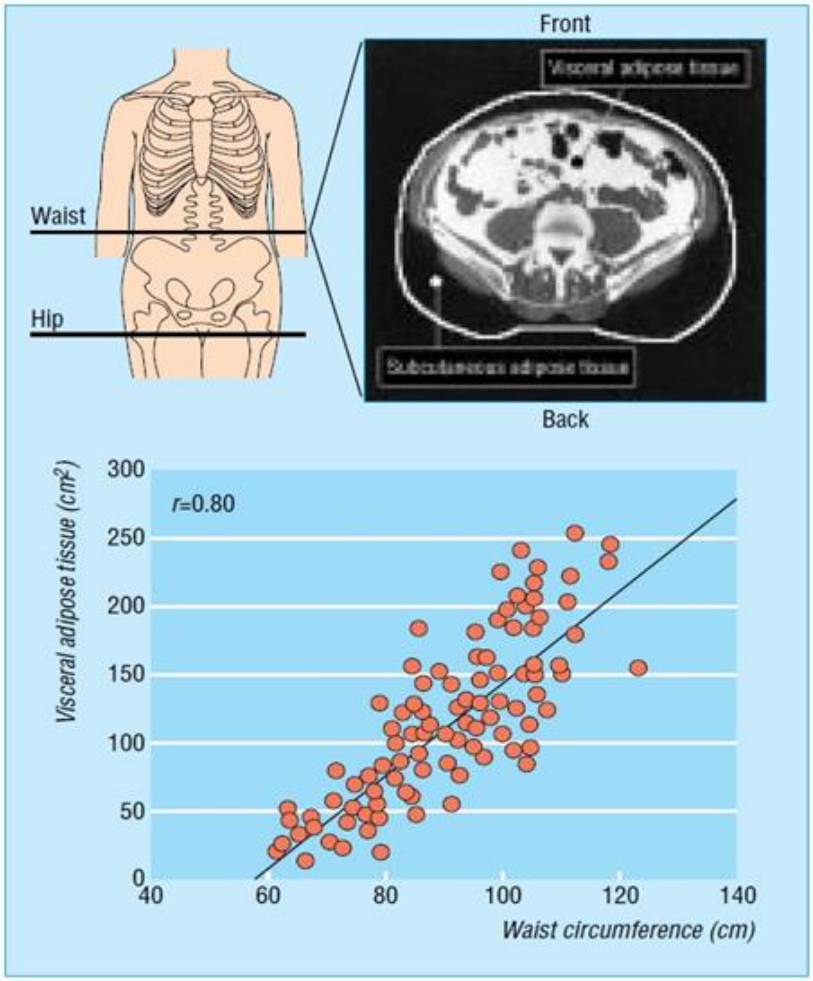
WHO: Midpoint between the last palpable rib and top of the iliac crest

Ethnic specific values for waist circumference

Country / Ethnic group		Waist circumference
Europids* In the **USA**, the ATP III values (**102** cm male; **88** cm female) are likely to continue to be used for clinical purposes	**Male** **Female**	**94 cm** **80 cm**
South Asians Based on a Chinese , Malay and Asian-Indian population	**Male** **Female**	**90 cm** **80 cm**
Chinese	**Male** **Female**	90 cm 80 cm
Japanese**	**Male** **Female**	90 cm 80 cm
Ethnic South and Central Americans	Use South Asian recommendations until more specific data are available	
Sub-Saharan Africans	Use European data until more specific data are available	
EMME (Arab) populations	**Use South Asian recommendations until more specific data are available**	

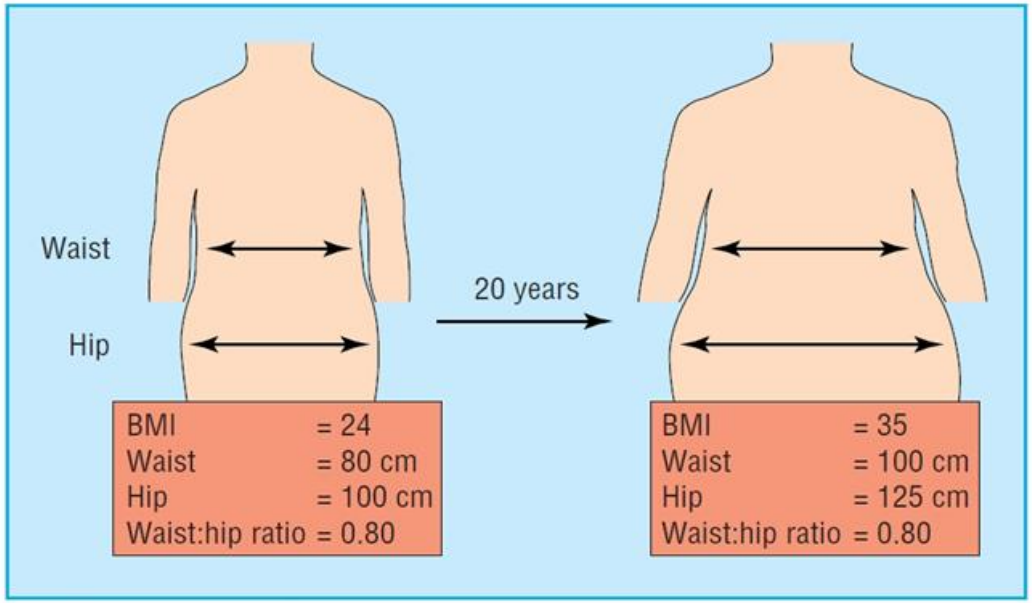
Abdominal circumference

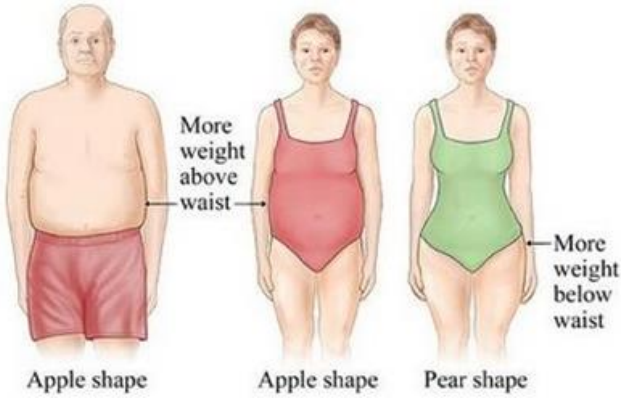
AC correlation with abdominal fat (and metabolic risk):



WHR interpretation pitfalls

Misleading information provided by follow up of changes in waist hip in women followed over 20 years.





Després J P, Lemieux I, Prud'homme D: Treatment of obesity: need to focus on high risk abdominally obese patients. BMJ. 2001 Mar 24;322(7288):716-20

Metabolic syndrome

- Metabolic syndrome is a clustering of at least three of the five following medical conditions: abdominal obesity, high blood pressure, high blood sugar, high serum triglycerides and low high-density lipoprotein (HDL) levels.
- Metabolic syndrome is associated with the risk of developing cardiovascular disease and type 2 diabetes.

The new International Diabetes Federation (IDF) definition

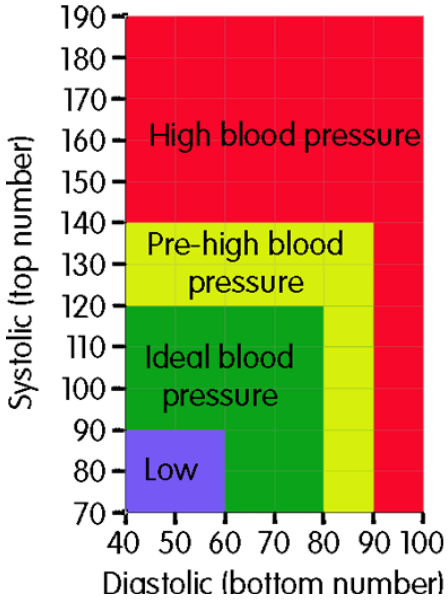
According to the new IDF definition, for a person to be defined as having the metabolic syndrome they must have: **Central obesity** (defined as waist circumference* with ethnicity specific values) **> 80 / 94 cm** (88/102) **plus any two of the following four factors:**	
Raised triglycerides	≥ 150 mg/dL (1.7 mmol/L) **or specific treatment for this lipid abnormality**
Reduced HDL cholesterol	< 40 mg/dL (1.03 mmol/L) in males < 50 mg/dL (1.29 mmol/L) in females **or specific treatment for this lipid abnormality**
Raised blood pressure	systolic BP ≥ 130 or diastolic BP ≥ 85 mm Hg **or treatment of previously diagnosed hypertension**
Raised fasting plasma glucose	(FPG) ≥ 100 mg/dL (5.6 mmol/L), **or previously diagnosed type 2 diabetes** If above 5.6 mmol/L or 100 mg/dL, OGTT is strongly recommended but is not necessary to define presence of the syndrome.

If BMI is >30 kg/m^2, central obesity can be assumed and waist circumference does not need to be measured

Blood Pressure

Definition and classification of blood pressure levels:

Category	Systolic BP (mmHg)		Diastolic BP (mmHg)
Optimal	<120	and	<80
Normal	120–129	and/or	80–84
High-normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension	≥140	and	<90



BP thresholds for definition of hypertension with different types of BP measurement

	SBP (mmHg)	DBP (mmHg)
Office or clinic	140	90
24-hour	125–130	80
Day	130–135	85
Night	120	70
Home	130–135	85

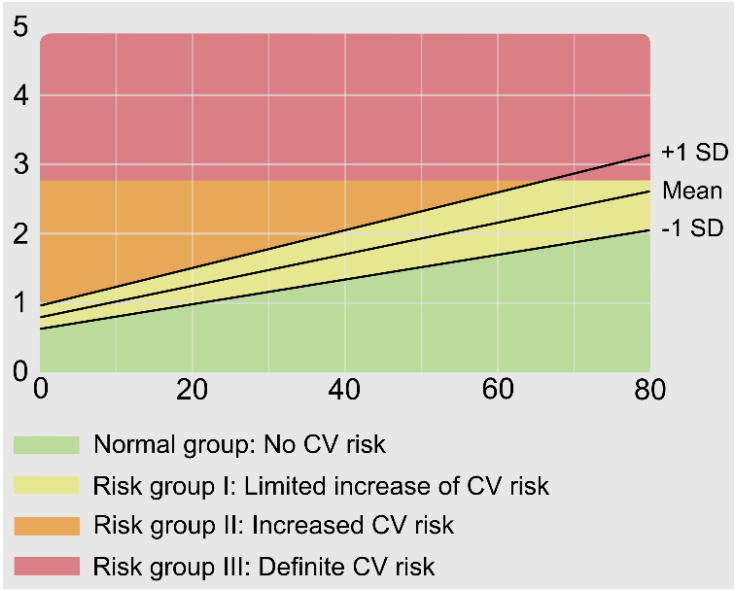
Age reader

Principle:

The AGE Reader is a non-invasive monitoring device that uses ultra-violet light to excite autofluorescence in human skin tissue. The autofluorescence is from the level of **Advanced Glycation End products** (AGEs). The measurement of AGEs provides an immediate cardiovascular risk prediction in 12 seconds

Age Reader Identifies:

- Individuals with increased CV risk
- Individuals with an increased risk of diabetes and additionally the metabolic syndrome
- Early detection of (diabetes) patients at risk of developing cardiovascular complications
- Identify people with increased levels of AGEs to improve skin care and reduce aging



Department of Public Health
Author: Jindřich Fiala

Age reader report

Name: Josef Novák
Date of birth: 01.01.1959
Age: 60

Patient ID: 001

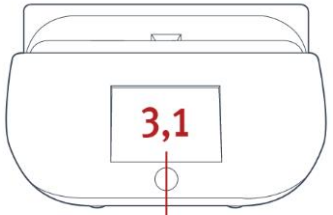
AGE READER mu
Know their risk.

Exam date: 23.10.2019

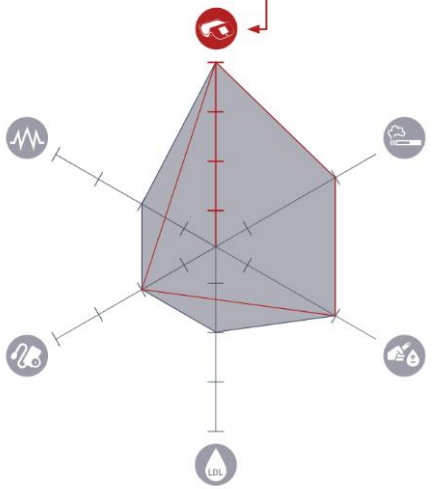
Cardiovascular Risk Report

Cardiovascular Risk Report

Cardiovascular risk factors are conditions or habits that raise your risk of cardiovascular disease and events. There are traditional and innovative cardiovascular risk factors known. This cardiovascular risk report provides an overview of selected cardiovascular risk factors with special attention for the AGE Reader measurement result.



Risk Factor	Measurement results	
	Previous 23.10.2019	Current 23.10.2019
AGE	3,1	3,1
Smoker	Yes	Yes
Diabetes	Yes	Yes
LDL cholesterol	-	4,0
Systolic blood pressure	140	140
Pulse wave velocity	-	9,1



Excellent | Very good | Good | Fair | Poor

Previous results | Current results

AGE Reader result

The AGE Reader measurement result is 2,9 or above. This indicates a definitely high cardiovascular risk. It is recommended that other cardiovascular risk factors should be assessed and treated, with low threshold and target values for starting or intensifying treatment.

Notes

-

Reflotron™:

- Possibility of immediate evaluation of plasmatic parameters directly in medical office during examination and counselling:
  - T-Chol
  - HDL-Chol
  - Triglycerides
  - Glycaemia

Standardized tests to assess the nutritional status of seniors (detect malnutrition)

These test are very suitable for use in seniors, where the risk of malnutrition is generally greatly increased.

Here are several tests that have been tested and validated for sensitivity and specificity, and are standardized and recommended for worldwide use in these indications.

- **NRS 2002** - Nutritional Risk Screening
- **SGA** - Subjective Global Assessment
- **MUST** – Malnutrition Universal Screening Tool
- **MNA** - Mini Nutritional Assessment

MNA Tests for Malnutrition detection in elderly

MNA

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe decrease in food intake
1 = moderate decrease in food intake
2 = no decrease in food intake

B Weight loss during the last 3 months
0 = weight loss greater than 3kg (6.6lbs)
1 = does not know
2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs)
3 = no weight loss

C Mobility
0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out

D Has suffered psychological stress or acute disease in the past 3 months?
0 = yes 2 = no

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems

F Body Mass Index (BMI) = weight in kg / (height in m)^2
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater

Screening score (subtotal max. 14 points)
12-14 points: Normal nutritional status
8-11 points: At risk of malnutrition
0-7 points: Malnourished

For a more in-depth assessment, continue with questions G-R

Assessment

G Lives independently (not in nursing home or hospital)
1 = yes 0 = no

H Takes more than 3 prescription drugs per day
0 = yes 1 = no

I Pressure sores or skin ulcers
0 = yes 1 = no

J How many full meals does the patient eat daily?
0 = 1 meal
1 = 2 meals
2 = 3 meals

K Selected consumption markers for protein intake
- At least one serving of dairy products (milk, cheese, yoghurt) per day — yes no
- Two or more servings of legumes or eggs per week — yes no
- Meat, fish or poultry every day — yes no

0.0 = if 0 or 1 yes
0.5 = if 2 yes
1.0 = if 3 yes

L Consumes two or more servings of fruit or vegetables per day?
0 = no 1 = yes

M How much fluid (water, juice, coffee, tea, milk...) is consumed per day?
0.0 = less than 3 cups
0.5 = 3 to 5 cups
1.0 = more than 5 cups

N Mode of feeding
0 = unable to eat without assistance
1 = self-fed with some difficulty
2 = self-fed without any problem

O Self view of nutritional status
0 = views self as being malnourished
1 = is uncertain of nutritional state
2 = views self as having no nutritional problem

P In comparison with other people of the same age, how does the patient consider his / her health status?
0.0 = not as good
0.5 = does not know
1.0 = as good
2.0 = better

Q Mid-arm circumference (MAC) in cm
0.0 = MAC less than 21
0.5 = MAC 21 to 22
1.0 = MAC greater than 22

R Calf circumference (CC) in cm
0 = CC less than 31
1 = CC 31 or greater

Assessment (max. 16 points)
Screening score
Total Assessment (max. 30 points)

Malnutrition Indicator Score

24 to 30 points	Normal nutritional status
17 to 23.5 points	At risk of malnutrition
Less than 17 points	Malnourished

References
1. Vellas B, Villars H, Abellan G, *et al.* Overview of the MNA® - Its History and Challenges. *J Nutr Health Aging.* 2006; 10:456-465.
2. Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF). *J. Geront.* 2001; 56A: M366-377
3. Guigoz Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What

How to intervene at the individual level: risk factor intervention - behavior change

Ten strategic steps to facilitate behavior change:

1.	Develop a therapeutic alliance.
2.	Counsel all individuals at risk of or with manifest cardiovascular disease..
3.	Assist individuals to understand the relationship between their behaviour and health.
4.	Help individuals assess the barriers to behaviour change.
5.	Gain commitments from individuals to own their behaviour change.
6.	Involve individuals in identifying and selecting the risk factors to change.
7.	Use a combination of strategies including reinforcement of the individual's capacity for change.
8.	Design a lifestyle-modification plan.
9.	Involve other healthcare staff whenever possible.
10.	Monitor progress through follow-up contact.

Principles of effective communication to facilitate behavioural change:

- Spend enough time with the individual to create a therapeutic relationship – even a few more minutes can make a difference.
- Acknowledge the individual's personal view of his/her disease and contributing factors.
- Encourage expression of worries and anxieties, concerns and self-evaluation of motivation for behaviour change and chances of success.
- Speak to the individual in his/her own language and be supportive of every improvement in lifestyle.
- Ask questions to check that the individual has understood the advice and has any support he or she requires to follow it.
- Acknowledge that changing life-long habits can be difficult and that sustained gradual change is often more permanent than a rapid change.
- Accept that individuals may need support for a long time and that repeated efforts to encourage and maintain lifestyle change may be necessary in many individuals.
- Make sure that all health professionals involved provide consistent information.

Recommendations for facilitating changes in behavior:

Recommendations	Class[a]	Level[b]	Ref[c]
Established cognitive-behavioural strategies (e.g. motivational interviewing) to facilitate lifestyle change are recommended.	I	A	231
Involvement of multidisciplinary healthcare professionals (e.g. nurses, dieticians, psychologists) is recommended.	I	A	232, 233
In individuals at very high CVD risk, multimodal interventions integrating medical resources with education on healthy lifestyle, physical activity, stress management and counselling on psychosocial risk factors, are recommended.	I	A	233, 234

(2016 European guidelines on CVD prevention in clinical practice)

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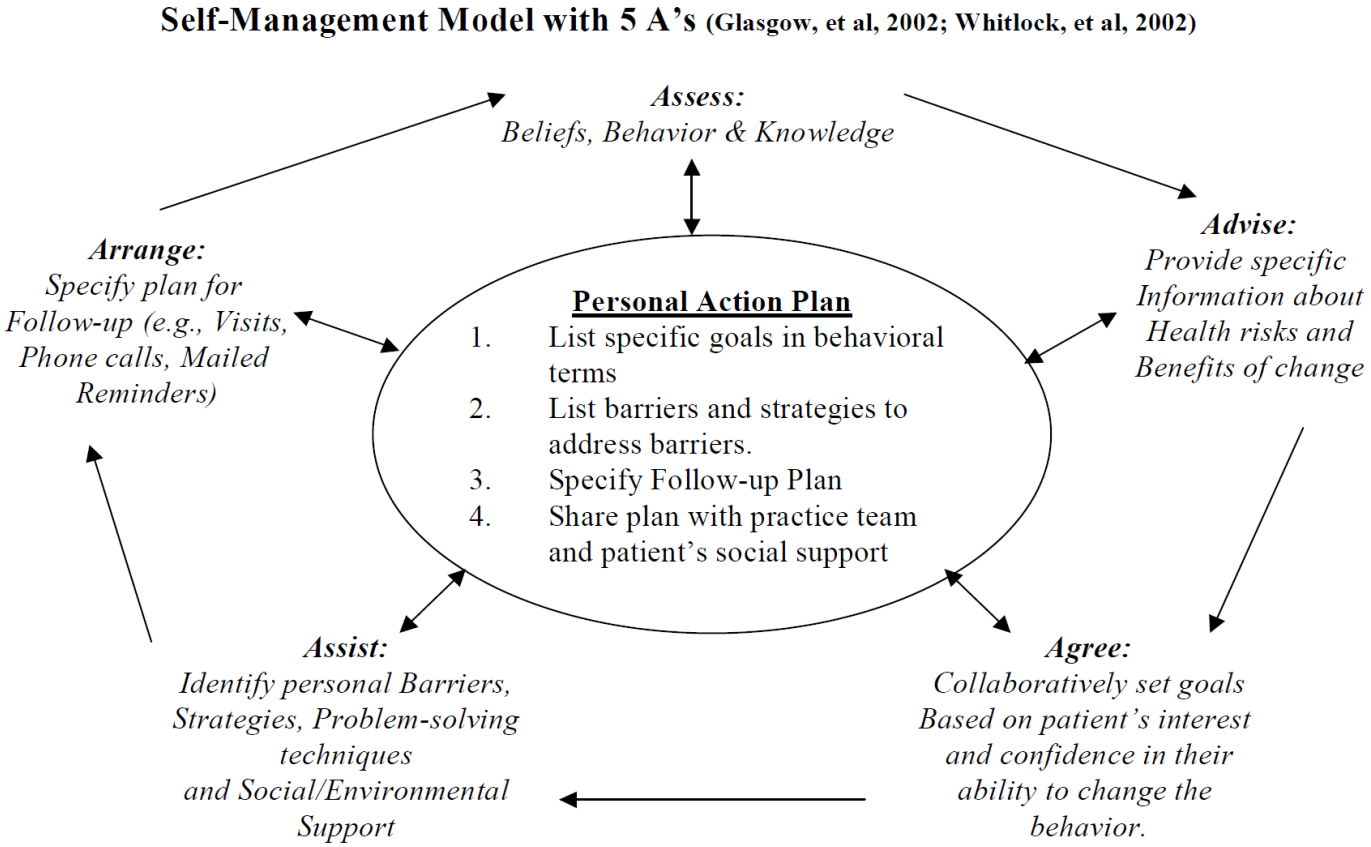
Intervention



Improvement Goal: All chronic illness patients will have a Self-Management (SM) Action Plan informed by and including all the 5 A's elements (Assess, Advise, Agree, Assist, Arrange). The 5 A's Behavior Change Model is intended for use with the Improving Chronic Illness Care Chronic Care Model (CCM).