Prevention and screening in oncology

Cancer is the second most common cause of death in the Czech Republic after cardiovascular diseases. It is a very heterogenous group of several dozen of different types of tumors. We distinguish *primordial, primary, secondary and tertiary prevention* in cancer.

Primordial and primary prevention

Primary and primordial prevention aim to reduce cancer development. Target is the society and its living environment. The principle lies in influencing risk factors leading in a change of cancer *incidence* .

Each tumor type has its own specific risk factors. Generally the risk factors can be divided into modifiable and non-modifiable.[1]

Non-modifiable risk factors

- In genetics:
  - Some neoplasms result from **familial mutation transfer** tumor suppressor genes and/or genes that maintain genome stability (retinoblastoma, xeroderma pigmentosum, Wilms tumor, von Hippel-Lindau syndrome etc.).[2]

Modifiable risk factors

- Diet (36 %),
- Tobacco (31 %):
  - Smoking is the most significantly preventable cause of death worldwide. Active and passive smoking greatly increases the risk of some tumors (lung cancer, oral cancer, laryngeal cancer, esophageal cancer, urinary bladder cancer, renal cancer, stomach cancer, pancreatic cancer, cervical cancer). Smoking also increases the risk of acute myeloid leukemia, cardiovascular diseases or chronic pulmonary diseases.

Cigarette smoke contains at least 100 carcinogens

- Infection (11 %):
  - Infections due to some viruses and bacteria have shown to increase the risk of some tumor typers.[3]
  - Hepatitis B and C (HCV, HBV) – hepatocellular carcinoma,
  - Human papillomavirus (HPV) – cervical cancer, penile cancer, oropharyngeal cancer,
  - *Helicobater pylori* – gastric cancer,
  - Epstein-Barr virus (EBV) – lymphoma,
  - Human herpesvirus 8 – Kaposi sarcoma,
  - *Human T-lymphotropic virus* (HTLV) – T-cell leukemia, T-cell lymphoma,
  - Human immunodeficiency virus (HIV) – immunosuppression caused by the virus increases the risk for lymphoma and Kaposi sarcoma,
- Sexual behaviour (7 %),
- Occupational environment (4 %),
- Alcohol:
  - The maximum recommended dose of alcohol is 20 g/day. Prolonged increased intake of alcohol increases the risk for cancers of liver, the oral cavity, pharynx, larynx and esophagus.
- Air pollution,
- Medicine,
- Others.

We mainly intervene with the lifestyle. The aim is **risk factor avoidance**, which can be achieved in 3 mechanisms:

1. **appropriate diet, sufficient physical activity, mental balance**;
2. **elimination of carcinogens**;
3. **vaccination**.
   - vaccination against **HBV** decreases the risk of hepatocellular carcinoma in chronic hepatitis B.
   - vaccination against **HPV** decreases the risk of cervical cancer, penile cacner (and some oropharyngeal cancers).

Secondary prevention

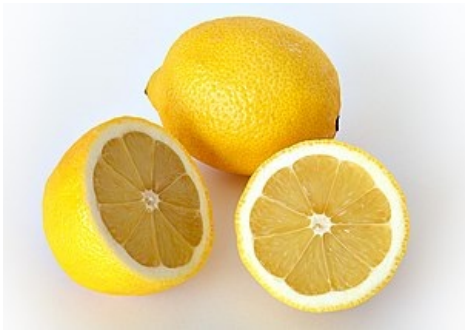
In Secondary prevention we monitor precancerous conditions or try to detect a tumor as soon as possible. In this context its important to:

1. **early doctor visit** in case of problems (eg. coughing up blood) or in case of suspicion (eg. nevus change) –

this is also related to increased medical education of the population;
2. **self-examination** (eg.self-examination of breast in women, testicular self-examination in men);
3. **cancer screening**.

The result is *mortality* influence. Not only the doctor but also the public participate (self-examination etc.).

Cancer screening is a **comprehensive** examination of the population, whose goal is early detection of cancer (detection in asymptomatic individuals). After early diagnosis therapy is followed, which reduces morbidity and morality. It is an effective tool of secondary prevention, which is fully covered by the health insurance.



Fruits and vegetables are a source of vitamin C, which is an important antioxidant and therefore a protective factor

Cancer screening requirements

- the tumor must be relatively common in the population (having a relatively high morbidity);
- there is a simple and inexpensive test for cancer detection;
- if caught early the tumor has to be treatable.

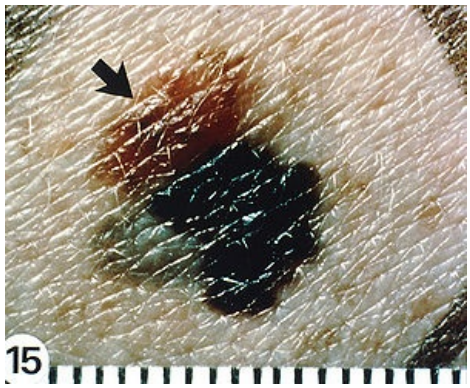
There currently are **3 cancer screening programs** in the Czech Republic. Which are:

1. **colorectal cancer screening**;
2. **breast cancer screening**;
3. **cervical cancer screening**.

Colorectal cancer screening

Every person aged **50–54 years** should do the **fecal occult blood test** (FOBT) once per year. People **over 55 years** have 2 options:

1. either continue regular **fecal occult blood tests** – once every 2 years,
2. or undergo **colonoscopy examination** – once every 10 years.



Cutaneous melanoma caused by dysplastic nevus

Breast cancer screening

Every woman from the age of 45 has the right to a **mammography** once every 2 years. (In the period between the two mammographies, an ultrasound examination of the breast is recommended. However, the woman pays for this herself.)

Cervical cancer screening

Every year, as part of the regular preventive gynecological examination, the gynecologist performs a **cervical smear** which is sent for a cytological examination to the accredited laboratory.

Mammographic screening

Tertiary prevention

Goal of tertiary prevention is to prevent the progression of disease, loss of self-sufficiency and the associated reduction in quality of life.

Links

Related articles

- Tumor epidemiology
- Tumor registries
- Tumor incidence
- Pre-symptomatic diagnosis and prevention of tumors

External sources

- Cervical cancer screening [1] (http://www.cervix.cz)
- Colorectal cancer screening [2] (http://www.kolorektum.cz/)
- Breast cancer screening [3] (http://www.mamo.cz/)

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- HOLCÁTOVÁ, Ivana. *Epidemiologie nádorových onemocnění*. Přednáška pro studenty 1. LF UK. Ústav hygieny a epidemiologie 1. LF UK. Praha, 2011.

1. New Jersey Departement of Health and Senior Services. *Cancer Risk Factors* [online]. The last revision 2002, [cit. 2011-04-28]. <https://www.state.nj.us/health/cancer/cariskfactorsfsfinal02.htm>.
2. ŠÍPEK, Antonín. *Geneticky podmíněná nádorová onemocnění* [online]. ©2007. [cit. 2011-04-28]. <http://www.genetika-biologie.cz/hereditarni-nadorove-syndromy>.
3. BENEŠ, Jiří, et al. *Infectious medicine.* 1. edition. Galén, 2009. 651 pp. ISBN 978-80-7262-644-1.