

## SCREENING FOR CANCER IN HUNGARY

LAJOS DÖBRÖSSY, ATTILA KOVÁCS

Chief Medical Officer's Office, Budapest, Hungary

---

### ABSTRACT

Cancer is a major health problem in the European Union; Hungary is not an exception. Besides primary prevention, early detection by screening and early treatment constitute the most promising strategy to reduce mortality from cancer. For the three screening modalities of proved effectiveness nation-wide screening programmes have been in operation. Those screening modalities for which evidence of epidemiological effectiveness is still missing, screening needs to be carried out as part of medical practice whenever the opportunity arises, linked to any kind of physician-patient encounter. This paper indicates how occupational health specialists should participate in the screening process, taking advantage of their regular encounter with those who regularly present themselves for aptitude test in their office. Particularly, screening for oral cancer provides a golden opportunity for such a contribution to the fight against cancer.

---

### INTRODUCTION

Cancer is a major public health problem in the European Union. The 28 Member States of the European Union with a total population of 504 million had 5 million deaths in 2012, of which more than one-fourth were attributable to cancer (EUROSTAT, 2014). Cancer is the second most common cause of death in the Union, next to the cardiovascular system. In the year 2012, 29.9% of deaths among men and 22.5% of deaths among women were caused by cancer alone.

It is widely known that the health status of the Hungarian population is catastrophically bad. Both the overall mortality and cancer mortality are at the leading place in Europe. (*Table I*). Reducing mortality, cancer mortality in particular, is one of the major concerns of the Hungarian government.

---

*Corresponding author: Lajos Döbrössy*

*Chief Medical Officer's Office,  
2-6 Albert Flórián út  
Budapest, Hungary, H-1097  
e-mail: dobrossy@oth.antsz.hu*

Received: 17<sup>th</sup> January 2018

Accepted: 8<sup>th</sup> March 2018

TABLE I.

**Standardized cancer mortality in the countries of the European Union,  
per 100,000 inhabitants, by genders (2010).**

Country	Males	Females	Remark (year)
Cyprus	153,1	99,0	2009
Sweden	168,1	129,5	2009
Finland	174,4	114,4	
Malta	184,3	127,7	
Germany	199,2	128,1	
Ireland	199,9	148,0	
United Kingdom	202,3	147,3	
Austria	203,9	125,5	2009
Greece	207,3	108,9	2009
Luxembourg	211,7	120,0	
Bulgaria	211,9	114,3	
Italy	212,1	122,2	2009
Spain	217,5	101,6	
Denmark	219,4	168,2	2009
Portugal	220,3	108,3	
The Netherlands	226,9	152,0	
Belgium	227,1	129,4	2009
France	228,8	116,1	2009
Romania	248,3	129,5	2009
Czech Republic	263,2	147,5	
Slovenia	270,3	145,8	
Poland	271,1	146,9	
Slovakia	283,9	139,0	
Estonia	286,0	135,7	2009
Latvia	288,0	143,3	2009
Litvania	293,2	132,5	2009
Hungary	333,1	174,9	
EU-27	229,8	131,7	

Source: Eurostat Statistics Database

There are three strategies for reduction of cancer mortality.

- Primary prevention is the first one, meaning prevention of disease from development by elimination of those risk factors which might have a role in the disease development. The disadvantage of prevention is that there is a long “lag time” between the preventive action and its effect. For example, today’s lung cancer mortality reflect the smoking habits before 15-20 years; in case everybody stopped smoking today, the results would manifest themselves 15-20 years later in the decline of lung cancer mortality.
- The other strategy is clinical oncology the result of which is stadium-dependent: only the early stage treatment promises cure from the disease. Unfortunately, today the majority of patients present themselves in an advance stage, in Hungary “the oncological treatment is

not efficient enough: the utilization of interventions what we have at our disposal for early detection and treatment are insufficiently exploited” (Sándor and Ádány, 2011).

- On short and medium term, early detection by screening asymptomatic persons is the most promising way of reducing the burden of cancer that the society has to carry. Screening is expected to reduce mortality, in some cases morbidity, and improve quality of life.

### ***What do we mean by screening?***

According to the generally accepted definition, screening means: examination of symptomless, apparently healthy people applying suitable methods to rule out or to confirm the likelihood of a given target disease. It is noted that screening is not a diagnostic procedure; its aim nothing but reassure that currently there are no signs of any suspicion of illness (negative test), or to bring those suspected to have the disease to medical attention in order to clarify the non-negative test result and to treat them earlier than it would have happened without screening. The non-negative (or positive) test results must be verified by histology.

### ***Criteria of screening***

There are a few preconditions need to be met to carry out screening: (Wilson and Junger, 1968) the target disease has to be of public health importance.

- the patho-biological basis (natural history) of target disease has to be well understood.
- screening tools should be available that are suitable to detect the occult, asymptomatic lesions, are simple to perform, inexpensive, reliable in terms of specificity and sensitivity, make more good than harm, socially accepted for the target population, and cost-effective.
- diagnostic and therapeutic background for the screen-detected cases should be provided; the screen-detected cases have a greater chance to be cured.

### ***Natural history of target disease***

The malignant tumour does not emerge overnight, but it is a long sequence of events a tumour goes through before clinically manifests itself. At the beginning, a normal tissue is exposed to several risk factors, and it might result in the “*biological initiation*” of the tumour.

Another milestone is the appearance of complaints and symptoms when the patient presents himself/herself to a doctor; this is the beginning of the “*clinical phase*” of the natural history. Between the two milestones there is a period, which may take several years, when there are no complaints and symptoms by which the developing tumour gives a “signal” that can be detected by appropriate method: cells of malignant morphology exfoliate from the cervix, or, there is a suspect shadow on the mammogram, or occult blood in the stool. This period is called “*preclinical detectable phase*” (PCDP) (Figure 1.) (Döbrössy et al., 2012). This later period lends itself

to screening, i.e., as stated above, examination of an asymptomatic person by a proper tool in order to detect a malignant (or premalignant) lesion earlier, and the treatment may start earlier than it would have been without screening. The duration of “preclinical detectable phase” has implications for intervals between repeated screening examinations.

### *Opportunistic and organized screening*

Screening can be carried out in two different ways: opportunistically or as a public measure. Opportunistic screening is carried out as part of medical practice whenever the opportunity arises, linked to any kind of physician-patient encounter. The examination can be initiated by the physician based on his/her medical judgement or on the patient’s request. As a result of the health education of patients at large, more and more patients go to primary care physicians requesting some sort of screening examinations. As a rule, this practice is not accompanied by monitoring and follow-up, thus, no one knows what proportion of the eligible population at risk receives the screening test. Experience shows that educated young persons, particularly young women at low risk who use the health services more intensively are tested with unnecessary frequency, while older persons of lower socioeconomic groups, at high risk, generally miss the opportunity. On the other hand, organized screening is a public health activity, initiated and financed by the provider health care system, and carried out as a screening programme. In order to make the participation optimal, the eligible persons (mainly women) have been individually identified, and using a population or notification list, are personally invited by an invitation letter to attend, indicating the time and site of the screening examination. This makes possible to know who has been screened and who has never been screened. The non-attenders receive reminder letter. In case the test result is negative, the patient is recalled for a repeated screening in two-three year time. In case of non-negative (positive) result, the patient is referred to a specialist for confirmatory diagnostics, and, if necessary.

## Natural history of disease development

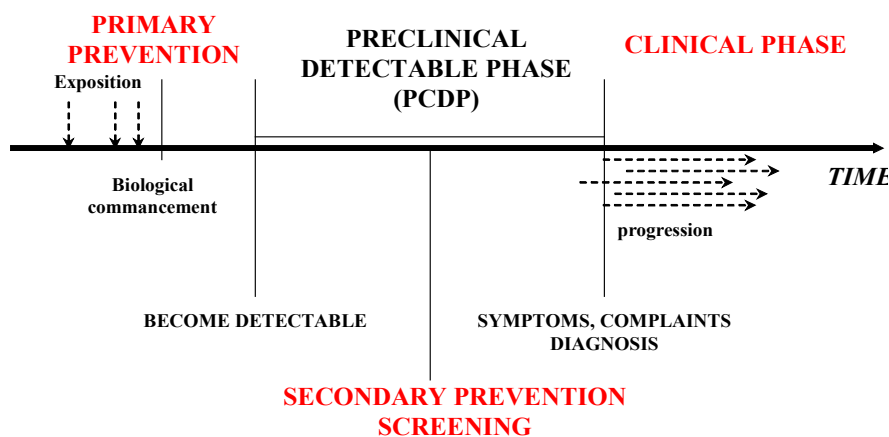


Figure 1. Natural history of disease development

It is an important “rule of game” that an organised screening programme can be initiated only when the screening modality is of proved effectiveness. The evidence of effectiveness is the substantial reduction of mortality from the target disease in the population, attributable to the screening activity. For the time being, there are no more than three screening modalities of epidemiologically proved effectiveness:

- cytology-based cervical screening in women between 25-64 years of age, in every three years (Lara et al., 1987);
- biennial breast screening the call-and-recall screening system by mammography in women between 45-65 years of age (Tabar et al, 1985); and
- biennial colorectal screening of males and females between 50-70 years of age using immunochemical faecal occult blood test (iFOBT, or FIT) (Mandel et al., 1999).

Those screening modalities for which the epidemiological evidence is still missing, biennial colorectal screening should not be applied. These modalities can be encouraged to be applied opportunistically, on the basis of medical judgement, or clinical indications, or on the patient’s request taking advantage of any forms of physician-patient encounter (Döbrössy, 2013).

### ***Organized screening in Hungary***

In Hungary, opportunistic screening for cervical cancer and its precancerous lesions has been in operation since the mid 1950’s. The “gatekeepers” of cervical screening are the gynaecologists, and, according to their protocol, smears-taking for cytology has been embedded in a complex gynaecological examination. Until 1990s, mammography-based breast screening has been sporadically applied where the professional ambitions and logistic conditions were coincided. As to the colorectal screening, there is no past activity to report.

In the 1990s, in the frame of the “Close the gap” programme co-sponsored by the World Bank, pilot programmes for all the three screening modalities of proved effectiveness had been completed with the aim of adapting the “state-of-the-art” protocols of cancer screening to the local needs and opportunities. Making use of experiences of the pilot programmes, in 2000, the health authority of Hungary has decided to incorporate of organised screening programmes into the health care system on service basis. In 2001, as a component of the National Public Health Programme, a country-wide National Cancer Screening Programme has been established, to implement cervical, breast and colorectal cancer.

The responsibility for organization, management, co-ordination, monitoring and evaluation has been delegated by the health authority to the National Chief Medical Officer’s Office (OTH), where National Screening Coordination Unit, along with National Screening Registry has been established in order to manage the invitation, monitoring and evaluation of the screening activities. In addition, a network of regional screening coordinators has been set up to run the activities country-wide.

First, the breast screening programme has been established. Complex Mammography Centres (44) have been contracted to fight breast cancer which used to be the most common cancer type of women (nowadays, breast cancer is the third most common cancer behind lung and colorectal cancer). The participation rate is about 50% of those invited. This is a bit below the expected attendance; the explanation is there that mammography examination, even if not *lege artis* screening, is offered quite widely in the capital, and the country. (As to the “screening practice” outside the organized programme, there is room for criticism as screening by mammography is like “look for a pin in a haystack”; it means that it requests special proficiency.)

After that, the implementation of cervical screening has begun. It proved to be a very hard task, because “old habits die hard”: contrary to the updated protocol, the gynaecologists seem to insist on their traditional role in “gynaecological screening”, therefore the majority of eligible women avail themselves to the services outside the screening programme, as a result, the cytology services underused: the ratio of those who complied with the invitation (“compliance”) is unacceptably low, in the same time, the “coverage” (i.e. those screened inside and outside the programme) is rather high. It has been realized that the cervical screening programme needs to be reorganised in such a way that – instead of gynaecologist – the smears for cytology examination be taken by the ubiquitous public health nurses, known in Hungarian as “védőnő” (Döbrössy et al., 2013).

The primary aim of colorectal screening is the detection, removal and early treatment of adenomatous polyps which develop in average risk persons, and are considered as premalignant lesions of colorectal cancer. Another aim is to detect asymptomatic colorectal cancer as early as possible. Although the methodological arsenal of colorectal screening seems to be plentiful, to this very day, we do not have such a screening method which would satisfy all the needs, because either sensitivity and specificity are limited, or it is potentially harmful, or uncomfortable, therefore its social acceptance is far from optimal. Currently, several tools are used that can be grouped into two categories: detection of occult blood in stools by chemical (guaiac-based) or immunochemical ways (gFOBT, iFOBT or FIT); and the others are the endoscopic methods: flexible sigmoidoscopy or total colonoscopy. There are a few other tests that are not yet routinely used for screening purposes. There is no question that the sensitivity of endoscopic methods is superior to the detection of occult blood. However, for population screening purposes, the detection of occult blood is more convenient and less time-consuming procedure; on the other hand, the endoscopic methods are invasive ones, therefore are unpleasant, as a result the asymptomatic persons are reluctant to accept them. This is why for mass screening purposes, the detection of occult blood is the preferred method (Döbrössy et al., 2016). In Hungary, colorectal screening has been gradually introduced.

### ***Opportunistic screening***

As it has been pointed out before, those screening modalities not having the evidence of effectiveness can be applied only opportunistically, meaning on the basis of medical judgment, in the frame of physician-patient encounter. This applies to prostate screening by PSA (Moyer, 2012), screening for oral cancer by palpation and inspection (Olson et al., 2013)), selective screening for lung cancer by low-dose helical CT (Kragar et al., 2011).

As to the prostate cancer, evidence from natural history is unhelpful since men are more likely with, rather than from, prostate cancer. The available screening test, the prostate specific antigen (PSA), do not always detect men whose lesions could result in future morbidity or mortality; the specificity of the test is limited, its application in low-risk population might result in extremely high “overdiagnosis” and “overtreatment” rate, therefore not recommended (Frankel et al., 2003). In the same time, PSA-test is essential diagnostic tool for those who see a doctor because of complaints referring to prostate disease.

Chest x-ray and/or cytology examination of sputum proved to be useless in detection of early lung cancer (Prorok et al., 1984). Still, selective screening of men over 40 years of age who are heavy smoker is recommended. Likewise, annual low-dose computed tomography (LDCT) screening for persons at high-risk for lung cancer, based on age and smoking history is also recommended.

Visual inspection and palpation of the *oral cavity* is the main “screening test” in asymptomatic patients. When examining males who are over 40 years of age, heavy smokers and drinkers, or, when patients present themselves with any lesions of oral cavity, and in case of positive findings, the patients need to refer for further investigation to a specialist.

### ***Role of occupational health specialists in prevention and screening***

Occupational health specialists have unlimited opportunities to perform early detection of cancer. In their practice, they have access to a great proportion of population, as they regularly see all those who are applying for a new job, and a compulsory aptitude test is carried out. Their “target population” is not sick, but healthy persons; those conducting health-damaging lifestyle, and apparently healthy persons with asymptomatic preclinical disease might be present. This means that their everyday work present a dozen of opportunities for a large-scale preventive activity. Such activities are: individual risk assessment, health education, personal counselling, and performing some screening tests, and, last but not least, promotion of attendance in organized screening.

The occupational health specialist has plenty of opportunities for individual risk assessment asking questions about smoking habits, hazardous alcohol consumption or unhealthy diet. He/she can conduct health education providing information about the relationship between risk factors and certain diseases. The familiarization with the risk factors might be followed by personal counselling about what can be done to diminish the risk of health damaging. They can deliver advice in a way that the recipients feel it is not intrusive, or authoritative but personally relevant.

In most countries, the duties of occupational health (and primary care) personnel in organized screening are regulated by legislation but the regulations are less than satisfying when it comes to their opportunities in screening for cancer. They can take the role of a “gatekeeper” of population screening. Their role is more than drawing attention to screening, but they are to motivate, stimulate and persuade the people to accept the offered screening modalities. They have an outstanding role in screening for oral cancer.

### *Screening for oral cancer*

In Hungary, oral cancers are getting more common, and their role in increasing cancer mortality is on an increase. Oral screening would, of course, be the task of the dental services; however, with only a few exceptions they ignore it. Likewise, the primary care system, too. Therefore, in screening for oral cancer, the occupational health specialists have a special role to play.

The occupational health services are a well-organized system in Hungary, in which more than 3000 specialists are working full-time (or part time, as general practitioner), and approximately 4 million physician-patient encounters take place, and more than 2 million employees are obliged to turn up in the specialists' office for aptitude test yearly. This regulation provides a golden opportunity for oral screening, which is quite simple to perform (inspection and palpation), and not time-consuming at all. The main obstacle to this is the lack of "oncological alertness" of the providers, and, that the great majority of target population is socially and economically disadvantaged (men over 40 years, heavy smoker, heavy drinker, neglecting the oral hygiene, homeless), therefore difficult to access for screening.

### *Epilogue*

In Hungary, efforts have been made to intensify the fight against cancer. There are still unused reserves in screening for cancer. The further development of organized screening modalities is on the health agenda. To reduce the extremely high cancer mortality, it would be desirable to activate all the health care providers, the occupational health specialists among them, to pay proper attention to the fight against cancer, and to carry out opportunistic screening, oral screening in particular, using their opportunities what their everyday encounter with their target population provides.

### **REFERENCES:**

DÖBRÖSSY, L., KOVÁCS, A., and BUDAI, A., et al. (2013). Screening for cervical cancer in Hungary: new role for health visitors. *J. Clin. Nursing Studies*. 1: 32-38.

DÖBRÖSSY, L., KOVÁCS, A., and BUDAI, A., (2012). The biological basis of screening: natural history of malignant tumours. (In Hungarian) *LAM* 22: 569-574.

DÖBRÖSSY, L., KOVÁCS, A., and BUDAI, A., (2016). Conflicts between clinical and public health viewpoints: colorectal screening. The case of Hungary. *Arch. Clin. Gastroenterol.* 2: 44-49.

DÖBRÖSSY, L., (2013). *Cancer Screening: Manual for quality assurance and methodical guidelines.* (In Hungarian). OTH. Budapest.

EUROSTAT Regional Yearbook (2014). European Union: Brussels.



FRANKEL, S., SMITH, G.D., DONOVAN, J., et al. (2003). Screening for prostate cancer. *Lancet* 361: 1122-1128.

KRAGER, B.S., BERG, C.H.D., ABERLE, D.R., et al. (2011). Lung cancer screening with low-dose helical CT: results from the National Lung Screening Trial (NLST). *J. Med. Screen* 18(3): 109-111.

LARA, E., DAY, N.E., and HAKAMA, M., (1987). Trends in mortality from cervical cancer in the Nordic Countries: association with the organized screening programmes. *Lancet* i: 1247-1249. 1987.

MANDEL, J.S., CHURCH, T.R., and EDERER, J.H., (1999). Colorectal cancer mortality: effectiveness of biennial screening for faecal occult blood test. *J. Natl. Cancer Inst.* 91: 434-437. 1999.

MOYER, V.A., (2012). US. Preventive Services Task Force. Screening for prostate cancer.

USPSTF recommendation statement. *Ann. Int. Med.* 157(2): 120-134.

OLSON, C.M., BURDA, B.U., BEIL, T., et al. (2013). Screening for Oral Cancer. A targeted evidence update for the US Preventive Services Task Force. *Evidence Synthesis*. No102.

PROROK, P.C., CHAMBERLAIN, J., DAY, N.E., et al. (1984). UICC workshop on the evaluation of screening programmes for cancer: Meeting held in Venice, Italy, on November 14-16, 1983. *Int. J. Cancer* 34(1): 1-4.

SÁNDOR, J., and ÁDÁNY, R., (2011). in Kasler M. (ed): *Basics of Oncology*. (In Hungarian). *Medicina*, p. 81.

TABAR, L., FAGENBERG, C.J., GAS, A., et al. (1985). Reduction in mortality from breast cancer after mass screening with mammography. *Lancet* i: 829-832.

WILSON, J.M.G., and JUNGER, G., (1968). *Principles and practice for screening for disease*. *Publ. Health Papers* No. 34. Geneva. WHO.