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Recommendation 14 for Policy-makers on Organized cancer screening programmes

- **Implement sustainable, organized screening programmes for colorectal (bowel), breast, and cervical cancer:**
 - For colorectal cancer screening, implement quantitative faecal immunochemical test (FIT) every two years for individuals aged 50–74 years. Once-only endoscopy may be considered as an alternative strategy within the same age range.
 - For breast cancer screening, implement digital mammography every two years for women** aged 50–69 years, and consider implementing it for women aged 45–49 years and 70–74 years. Other screening tools or additional examinations should be considered for women with high mammographic density.
 - For cervical cancer screening, implement human papillomavirus (HPV) screening at intervals no shorter than five years for women** aged 30–65 years. Policies can be adapted according to vaccination status and screening history.
- **Implement sustainable, organized screening programmes for lung cancer.* Implement low dose computed tomography every year (preferred) or every two years with integrated smoking cessation interventions for individuals identified as being at increased risk of lung cancer based on criteria of either age and history of smoking or locally validated multivariable risk models.**

* The recommendations are subject to updates to reflect scientific and technological advances as specified in the European Guidelines for Cancer Screening and Diagnosis : <https://cancer-screening-and-care.jrc.ec.europa.eu>

** Includes people assigned female at birth who are eligible for this screening.

Executive summary

At the population level, cancer screening lowers cancer-specific mortality and, if it can detect and treat pre-cancerous lesions, can also lower cancer incidence in asymptomatic people.

Europe's Beating Cancer Plan has set the ambitious goal for European Union (EU) Member States that 90% of the EU population eligible for **breast, cervical, and colorectal cancer** screening are offered high-quality screening linked to a diagnostic and treatment pathway. Although many EU Member States offer population-based cancer screening programmes, coverage varies for these **three** cancer types. As a result, people are dying from cancers that could be prevented or cured if screening were available to them.

Screening for **lung cancer** was recommended in Europe's Beating Cancer Plan according to the priorities of individual EU Member States. With the adoption in 2022 of the EU Council Recommendation on Cancer Screening, the goal was set for countries to pilot the introduction of lung cancer screening. The addition of organised lung cancer screening will prevent deaths from this cancer.

Screening is recommended only when the benefits outweigh the harms and when cost-effective programmes are available to provide high-quality services that follow evidence-based guidelines and provide equitable access. Other factors to consider include the ability to detect the cancer in a pre-clinical stage, the feasibility of identifying at-risk populations, and the incidence of the disease. With advancing knowledge and technology, it is likely that future recommendations will be expanded to include other cancer types and develop risk-stratified programmes for cancer screening.

The decision to start, improve, or stop a screening programme should be evidence-based, adjusted to the local context, led by a multidisciplinary group of experts, and supported by key stakeholders. Implementation should be gradual, starting with pilots before nationwide rollout. If implementing all recommended screening programmes is not feasible, cancer screening should be prioritized according to the country-specific cancer mortality burden, acceptability, and capacity of the health system. Mathematical modelling can be used, together with evidence from comparative effectiveness trials, to support the assessment of benefits, harms, capacity needs, and cost-effectiveness of different screening programmes and screening strategies.

This policy brief describes international policies and guidelines that support policy-makers and other stakeholders to implement the European Code Against Cancer, 5th edition (ECAC5) policy recommendation to address the cancer burden due to colorectal, breast, cervical and lung cancers.

What is cancer screening, and what are its benefits and harms?

- **Cancer screening is an organized, population-based public health intervention** in which healthy individuals in the target group are offered screening at regular intervals, with the aim of early detection and treatment of precancer or cancer before symptoms appear.
- **Cancer screening is a pathway** that begins with identifying individuals in the target group and offering them screening. Individuals with a positive screening test result are at increased risk of cancer and should be offered timely assessment, diagnosis and treatment if pre-cancer or cancer is diagnosed.
- **Cancer screening can detect and treat pre-cancer and/or early-stage cancer in asymptomatic individual.** Cancer detected and treated at an earlier stage (known as downstaging) is more likely to be cured. Treatment of pre-cancer and early-stage cancer is also less burdensome than treatment of advanced cancer, and quality and length of life is better. Cancer screening reduces cancer-specific deaths (mortality) and, where pre-cancer can be detected, reduces new cancer cases (incidence).
- **Cancer screening can also cause harms to those screened.** Physical harms are due to adverse health outcomes across the screening pathway, as well as the detection and treatment of cancers that would never have caused health problems or death (i.e. overdiagnosis and overtreatment). False positive screening results can cause psychological harms such as anxiety. A negative screening test result in individuals with cancer can lead to false reassurance if symptoms occur, leading to late diagnosis with worse prognosis, decrease of public trust, and legal consequences. If individuals are not screened according to evidence-based guidelines, the benefits will not be achieved, harms can increase, and cost-effectiveness may decrease. If individuals are under-screened, the maximal health benefits will also not be reached.

Key policy actions to improve cancer screening

- **Cancer screening should be organized** to maximize its effectiveness and benefits and to minimize harms and inequalities. Only recommended cancer screening programmes, where there is sufficient evidence that benefits outweigh harms, should be implemented. Screening programmes should reach a high coverage of the target population and offer timely and high-quality services. Tailored approaches might be implemented for hard-to-reach populations to decrease health inequalities. Comprehensive information on the process and outcomes of the entire screening process should be accessible to enable individuals to make an informed decision about participation. The health system must offer appropriate management of the individual through the pathway of care and monitor quality assurance efforts.
- **Cancer screening should be sustainable.** EU Member States should ensure sustainable, cost-effective implementation and operation of recommended cancer screening programmes through integration into health systems. Sufficient resources should be allocated for the implementation and operation of population-based organized screening programmes. However, this should not impair the detection and treatment of symptomatic cancers. Legal frameworks should support all elements of screening, including the collection of personalized data, which is crucial for quality assurance and improvement. Effective leadership is needed with the responsibility, and enough decision-making power, to iteratively improve and develop the programme according to the results of monitoring and evaluation and newly emerging changes in science and technology.

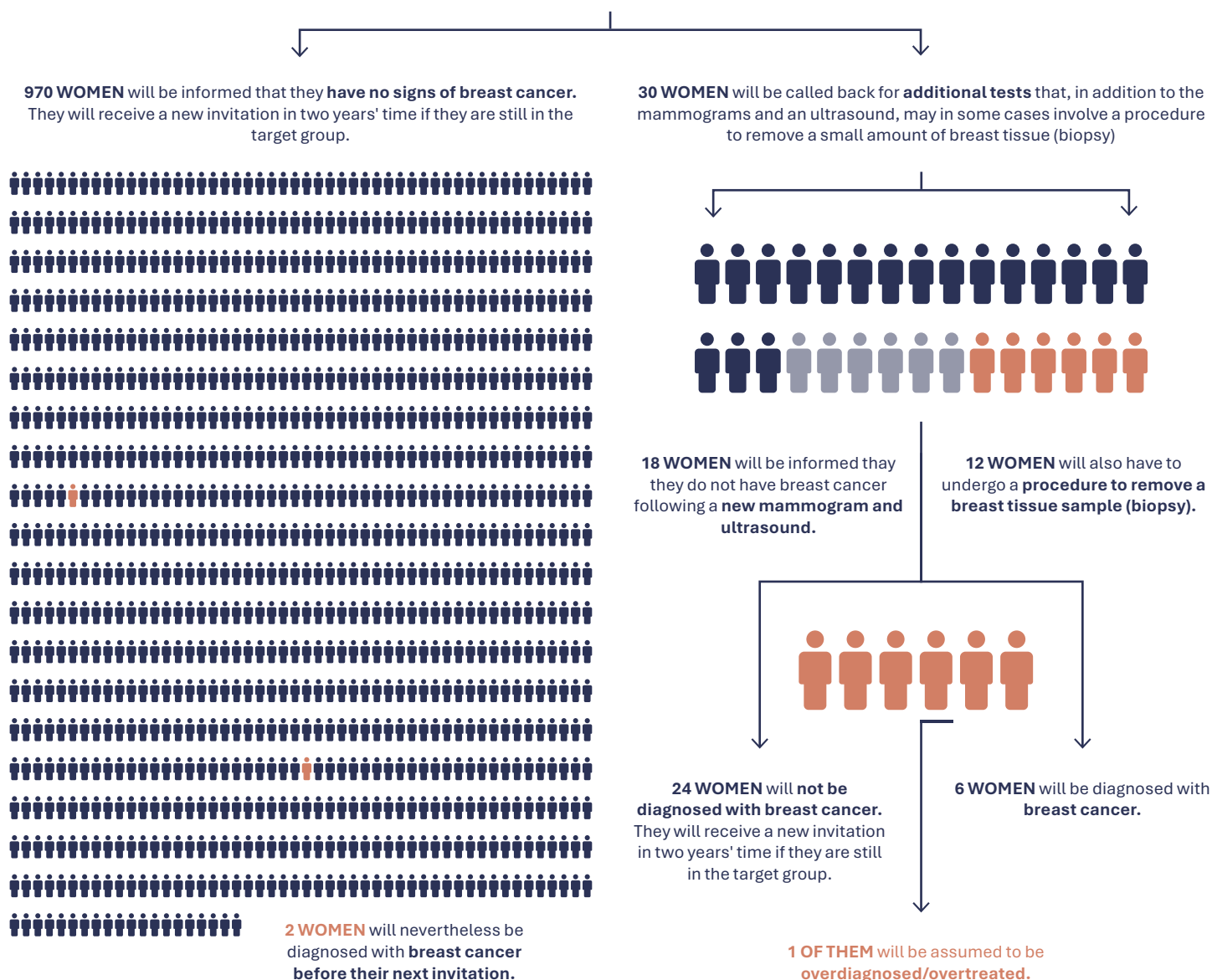
Monitoring progress

Monitoring the performance and the impact of organized screening programmes on population health is crucial to optimize the benefits of screening and eliminate the harms caused by screening. National key performance indicators should be defined and aligned with the European information system for monitoring the quality of cancer screening programmes across the EU. Facilitating the monitoring process will also require a data management system that enables the collection, management, and secure storage of complex data during the end-to-end screening workflow.

Suggested key performance indicators that have significant impact on the benefits and harms to evaluate a screening programme:

- Invitation coverage
- Participation rate
- Quantification of equity
- Referral rate for further assessment (positivity rate)
- Recall rate for additional screening episode
- Screen-detected cancers
- Detection rate of precursor lesions
- Interval cancers
- Stage distribution of screen-detected cancers
- False-positives
- Complications of screening test
- Complications during follow-up procedures
- Non-malignant surgical biopsy/resection rate
- Positive predictive value
- Cancer mortality
- All-cause mortality
- Incidence of incidental findings
- Opportunistic testing
- Radiation exposure (for breast and lung cancer)
- Smoking cessation (for lung cancer)
- Compliance with treatment
- Type of treatment by cancer stage

When 1000 women are screened



Reproduced from https://www.kreftregisteret.no/en/screening/BreastScreen_Norway/Benefits-and-harms/

Figure 1: The figure shows the screening process for 1000 women aged 50-69 years attending biennial screening with digital mammography, which are read independently by two radiologists, and discordant and concordant positive cases are discussed at a consensus meeting. Courtesy of: Cancer Registry of Norway at the Norwegian Institute of Public Health (kreftregisteret.no)

References

- Baldwin et al. (2023). European Respiratory Journal, 61: 2300128, PMID: 37202154
- Council Recommendation on strengthening prevention through early detection: A new EU approach on cancer screening (2022) Dec 9;C473:1–5
- European Commission Initiative on Breast Cancer. European Guidelines on Breast Cancer Screening and Diagnosis. Available from: <https://cancer-screening-and-care.jrc.ec.europa.eu/en/ecibc/european-breast-cancer-guidelines>
- European Commission (2015). European Guidelines for Quality Assurance in Cervical Cancer Screening, 2nd ed.: Supplements
- European Commission (2010). European Guidelines for Quality Assurance in Colorectal Cancer Screening and Diagnosis
- International Agency for Research on Cancer (2019). Colorectal Cancer Screening. IARC Handbooks of Cancer Prevention, Volume 17
- O'Dowd et al. (2023). European Respiratory Journal, 61:2300533, PMID: 38302184
- Sheridan et al. (2025). Public Health, 239: 185-192, PMID: 39869999
- World Health Organization (2021). WHO Guideline for Screening and Treatment of Cervical Pre-Cancer Lesions for Cervical Cancer Prevention, 2nd ed.
- Wilson JMG, Jungner G. (1968). Principles and Practice of Screening for Disease. World Health Organization

Annex 1: Colorectal cancer screening

- Colorectal cancer screening is advised for people aged 50–74 years, who should undergo faecal immunochemical test (FIT) every 2 years. If endoscopy is used for screening, this should be offered once in a lifetime.
- FIT screening, which is now adopted in most population-based programmes, is highly accurate in detecting early-stage colorectal cancers and it can also detect high-risk pre-cursor lesions, with the recommended 2-year interval between tests. Screening can thus lower the risk of dying of colorectal cancer and of getting the disease by identifying early-stage cancers or removing precancerous lesions.
- A single sigmoidoscopy screening showed a 32% reduction in incidence and a 36% reduction in mortality at 21-year follow-up. For a single colonoscopy, the reductions at 10-year follow-up were 31% and 50% respectively. Colorectal cancer screening is cost-effective, and may be cost saving by reducing the occurrence of the disease, thus avoiding the economic costs of health-care and burden of disease for the patients.
- Harms from colorectal cancer screening are due to false-positives and potential complications from endoscopy. These are outweighed by the benefits of early detection and treatment and can be minimised by adherence to recommended screening protocols.

Key policy actions to improve colorectal cancer screening

- **For colorectal cancer screening, implement quantitative FIT every 2 years for individuals aged 50–74 years. Once-only endoscopy may be considered as an alternative strategy within the same age range.**
 - In most EU Member States, it may be feasible to use FIT as a primary screening test. The main barrier is usually the limited availability of endoscopy resources, which are needed to ensure timely assessment of subjects with positive FIT results. Efforts should be made to expand endoscopy capacity, although FIT positivity threshold can also be adjusted to match local colonoscopy capacity. Endoscopy is recommended as a good alternative, which should be implemented in the context of strategies also offering the option of FIT (offering a choice or adopting a sequential approach) to account for the preferences of those individuals who are unwilling to undergo more-invasive tests. Given its long-lasting protective effect, endoscopy can be offered once per lifetime. Because capacity is often limited, the option of offering endoscopy as a primary screening tool (in particular with colonoscopy) may be more challenging.
 - The probability of dying, of getting the disease, or of undergoing surgery for colorectal cancer has been shown to be reduced in settings in which eligible people can all have access to high-quality screening. Non-invasive tests, such as the FIT, are simple to use, especially within organized screening programmes. However, understanding the importance of colorectal cancer screening requires clear and easy-to-access information. In many cases, there is no health-care professional directly involved in the screening process, so providing straightforward instructions for the test is crucial, especially for people with limited health literacy. Decision aids can help people make informed choices, although their impact on increasing screening rates is still uncertain.

Risk of cancer

- Colorectal cancer is a major global health issue, with 2 million new cases and 1 million deaths worldwide in 2022. Globally, it ranks third for cancer incidence and second for cancer mortality. The EU is among the regions with the highest rates of colorectal cancer cases and deaths.
- In 2022, colorectal cancer was the second most commonly diagnosed cancer in the EU (11.9% of all new cases) and the second most common cause of cancer death (12.2% of all cancer deaths).

Specific target groups

Certain groups, such as migrants and people with lower income or lower socioeconomic status, are less likely to participate in colorectal cancer screening. Socioeconomic factors and cultural backgrounds influence people's preferences for different screening methods. Efforts should be made to reduce the impact of economic, organizational, and cultural barriers that limit the access to screening for hard-to-reach subgroups of the target population. Offering alternative screening strategies may be an effective approach to address people's preferences for different methods.



Check out the **Overweight and obesity, Diet, and Physical activity Policy Briefs** to learn more about colorectal cancer.

References

- Council Recommendation on strengthening prevention through early detection: A new EU approach on cancer screening (2022) Dec 9;C473:1–5
- European Commission (2010). European Guidelines for Quality Assurance in Colorectal Cancer Screening and Diagnosis
- Ferlay et al. (2024). Global Cancer Observatory: Cancer Today. Available from: <https://gco.iarc.fr/en>
- Fransen et al. (2017). Patient Education and Counseling, 100(2): 327-336, PMID: 27613567
- International Agency for Research on Cancer (2019). Colorectal Cancer Screening. IARC Handbooks of Cancer Prevention, Volume 17
- Senore et al. (2012). Front Oncol, 2:45, PMID: 22649789
- Smith et al. (2010). BMJ, 341: c5370, PMID: 20978060

Annex 2: Breast cancer screening

- Mammographic screening every 2 years has been shown to be beneficial for women aged 50–69 years, and also for women aged 45–49 years and 70–74 years. Additional examinations or other screening tests may be considered for women with an increased risk of breast cancer.
- Mammographic screening has been shown to reduce breast cancer mortality by 30–40% among women attending screening programmes. The benefits are higher for those who attend regularly than for those who attend irregularly.
- Mammographic screening can detect breast cancer at an early stage and reduce the impact of the disease.
- The reduction in the risk of dying from breast cancer is also greatly influenced by improved treatment, which is increasingly being targeted to the individual woman and the type of breast cancer.

Key policy actions to improve breast cancer screening

- **For breast cancer screening, implement digital mammography (standard 2D mammography or digital breast tomosynthesis) every two years for women aged 50–69 years, and consider implementing it for women aged 45–49 years and 70–74 years. Other screening tools or additional examinations should be considered for women with high mammographic density.**
 - Screening with mammography every two years is recommended based on evidence for a favourable health impact and cost-effectiveness for women aged 50–69 years. For women aged 45–49 years and 70–74 years, evidence also supports the offer of organized screening, but the recommendations are conditional because of limited evidence.
 - Improving the level of knowledge and awareness about breast cancer and screening among women, health-care professionals, and other stakeholders may increase screening participation. At the local, regional, or national level, public health promotion campaigns may increase the uptake in screening programmes. Special efforts are needed to address the inequalities in participation rates between specific target groups.
 - Screening on the basis of risk of breast cancer should be considered with more frequent screening or other tools in high-risk women.
 - The development, evaluation, and use of artificial intelligence (AI) in the reading procedure of screening mammograms could make breast cancer screening more cost-effective. Additional evidence from research and from monitoring data is needed to support evidence-based implementation of the tool.

Risk of cancer

- In 2022, breast cancer was the most commonly diagnosed cancer in the EU (12.5% of all new cases) and the most common cause of cancer death in women (16.5% of all cancer deaths).
- The cause of breast cancer is not known, but risk factors that have been linked to increased risk of breast cancer are known on group level. These include age, mammographic breast density, previous breast disease, hormonal factors, family history of breast cancer, genetics, weight, and alcohol consumption.

Specific target groups

Studies have shown substantially lower attendance rates for mammography screening among immigrants than among non-immigrants. This may be for cultural and religious reasons due to personal discomfort about the screening process. It is important to try to improve equity, by promoting and supporting the implementation of organized screening, especially for non-participating women aged 50–69 years.



A woman undergoing a mammogram as used for mammographic screening
© WHO

Check out the **Overweight and obesity, Diet, Physical activity, Alcohol** and **Breastfeeding Policy Briefs** to learn more breast cancer.

References

Cancer Research UK. Risk factors for breast cancer. Available from: <https://www.cancer-researchuk.org/about-cancer/breast-cancer/risks-causes/risk-factors>

Council Recommendation on strengthening prevention through early detection: A new EU approach on cancer screening (2022) Dec 9;C473:1–5

European Commission Initiative on Colorectal Cancer (ECICC). Available from: <https://cancer-screening-and-care.jrc.ec.europa.eu/en/ecicc>

Ferlay et al. (2024). Global Cancer Observatory: Cancer Today. Available from: <https://gco.iarc.fr/en>

International Agency for Research on Cancer (2016). Breast Cancer Screening. IARC Handbooks of Cancer Prevention, Volume 15

Annex 3: Cervical cancer screening

- In the past few decades, most EU Member States have implemented organized, population-based cervical cancer screening programmes, using cytological examination of Pap smears, which have led to substantial reductions in cervical cancer incidence and mortality up to beginning of the current century. However, since then the incidence did not further decrease or even started increasing, highlighting the limits of cytology-based screening.
- High-quality screening every 3 years, with cytological examination of cervical smears followed by treatment of high-grade precancerous lesions, has reduced cervical cancer disease and death risk substantially. Over the past decade, evidence from large, well-organized randomized trials has shown that HPV-based screening provides stronger protection than cytology. Coverage by screening test varies substantially between EU Member States, ranging from 16% to 79%, with an average of about 54% in 2022.
- High prevalence of human papillomavirus (HPV) infection, and the high regression of cervical pre-cancer in young people, limits the use of HPV screening in women younger than 30 years. Some countries recommend HPV screening, with focus on the most carcinogenic HPV types, for younger women. The start of HPV-based screening could be delayed for those at low risk of infection, such as those vaccinated at a young age, or in communities with high vaccination coverage, in which unvaccinated women benefit from herd immunity.

Key policy actions to improve cervical cancer screening

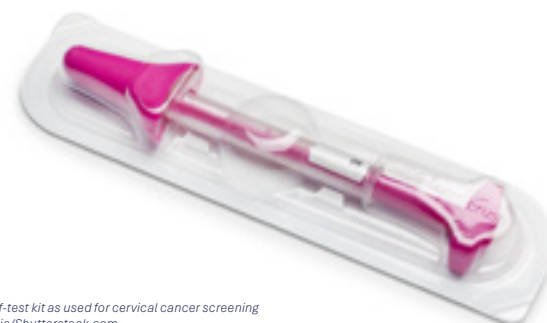
- **For cervical cancer screening, implement HPV screening at intervals no shorter than 5 years for women aged 30–64 years. Policies can be adapted according to vaccination status and screening history.**
 - HPV-based screening is more effective than cytology-based screening in preventing future cervical pre-cancer and cancer. Countries using cytology screening should consider transitioning to HPV-based screening in women aged 30–64 years. HPV screening intervals should not be shorter than 5 years. If cervical cancer screening is not yet implemented in the country, consider implementing a sustainable, organized, population-based, HPV-based screening programme for cervical cancer in women aged 30–64 years.
 - There may be advantages to screening women aged 25–30 years with HPV testing, however careful consideration is needed regarding the harms among young women.
 - Only clinically validated HPV tests should be used.
 - HPV screening yields more positive results than cytology screening, which may increase the harms of screening if HPV tests are used outside organized screening programmes, or with screening intervals that are too short, or if clinically unvalidated HPV tests are used. A positive HPV test result requires further triage and diagnosis before treatment. Younger women are exposed to more harms from screening as HPV infection and associated lesions are more common in young women, but they tend to regress more frequently than in later stages of life. The start age of screening can be delayed if women have been vaccinated by 15 years of age or when they belong to a cohort with high vaccination coverage. If HPV screening is offered before the age of 30, the focus should be on the most cancer-causing HPV types.
 - HPV screening allows self-sampling. Women can take samples at home and send them by post to a laboratory for HPV testing. Women will be referred to a gynaecologist only in the case of a positive screening result from the sample. Offering self-sampling to individuals who do not respond to screening programmes can increase the coverage of the target population. Some countries are offering self-sampling as the first line of screening.

Risk of cancer

- Globally, cervical cancer is the fourth most frequent cause of cancer deaths.
- In the EU, each year approximately 28 000 women are diagnosed with cervical cancer and almost 14 000 women die from the disease. About 30% of women are younger than 45 years when diagnosed with cervical cancer.
- The cervical cancer burden varies a lot across EU Member States, which mostly reflects the differences in the implementation of effective cancer screening programmes in the past and the difference in human HPV prevalence. In countries with high HPV vaccination coverage a decrease in cervical pre-cancer and cancer has been observed in young women.
- Cervical cancer is the first cancer ever that could be eliminated as a public health problem meaning there are fewer than 4 new cases per 100,000 people per year. For it to be eliminated, at least 90% of girls should be vaccinated against HPV by age 15 years, at least 70% of women should be screened with a validated HPV test by age 35 years and again by age 45 years, and at least 90% of women with pre-cancer and cancer should be treated.

Specific target groups

Women with socioeconomic and educational disadvantages are less likely to attend cervical cancer screening and often have higher background rates of cervical cancer. Difficulties in accessing screening, religious beliefs, and cultural barriers can also decrease screening attendance, especially among low-income and migrant populations. These barriers can be addressed by offering screening free of charge to the target population, translating the screening materials into appropriate languages, and offering care by a female clinician. In some EU Member States, screening attendance is decreasing among younger women. It may be useful to find new ways to tailor screening to meet the needs and expectations of younger generations.



A HPV self-test kit as used for cervical cancer screening
RMD Media/Shutterstock.com

Check out the **Cancer-causing infections and related interventions (Annex 1: Vaccination against HPV) Policy Brief** to learn more about cervical cancer.

References

Arbyn et al. (2018). BMJ, 363: k4823, PMID: 30518635

Arbyn et al. (2010). Ann Oncol, 21(3): 448–458, PMID: 20176693

Council Recommendation on strengthening prevention through early detection: A new EU approach on cancer screening (2022) Dec 9;C473:1–5

European Commission (2015). European Guidelines for Quality Assurance in Cervical Cancer Screening, 2nd ed.: Supplements

Ferlay et al. (2024). Global Cancer Observatory: Cancer Today. Available from: <https://gco.iarc.fr/en>

International Agency for Research on Cancer (2022). Cervical Cancer Screening. IARC Handbooks of Cancer Prevention, Volume 18

Jansen et al. (2020). Eur J Cancer, 127: 207–223, PMID: 31980322

Ronco et al. (2014). Lancet, 383(9916): 524–32, PMID: 24192252

von Karsa et al. (2015). Papillomavirus Res, 1: 22–31, doi:10.1016/j.pvr.2015.06.006

World Health Organization (2021). WHO guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention, 2nd ed.

Annex 4: Lung cancer screening

- Lung cancer screening is a targeted programme offered to people who are at higher risk of developing lung cancer, usually people who have ever smoked or continue to smoke tobacco.
- Lung cancer screening uses low-radiation-dose computed tomography (LDCT) as the screening test; it is acceptable, takes 5–10 minutes, and is painless. Scans are recommended every 1 or 2 years for people who have a history of ever having smoked with a high risk of developing lung cancer.
- Several large studies have shown that LDCT screening in the high-risk population is effective for early detection and treatment, preventing death from lung cancer death in about 1 out of 4 people in whom lung cancer was detected early. Meta-analyses have shown that lung cancer screening reduces all-cause mortality by 4 to 5%.
- More than 60% of people who are screened are found to have lung cancer at stage I, when treatment may be curative. Only 25% of participants with lung cancer are diagnosed at stage III and IV on the first screen, and this percentage can be further lowered after subsequent screening rounds. Even people diagnosed at stage III and IV have better results from treatment as they are generally free of symptoms and better able to tolerate treatment.
- The early detection and treatment of other tobacco-related diseases such as coronary heart diseases and chronic lung diseases, identified as incidental findings of LDCT screening, may further improve overall health outcomes.
- Overdiagnosis in LDCT screening is relatively low (around 10% of cancers).
- In many countries, screening for lung cancer is cost-effective. Treatment of early-stage lung cancer provides many more years of good-quality life and is less expensive than for late-stage lung cancer, especially when combined with referral to smoking cessation services.

Key policy actions to improve lung cancer screening

- **Target screening to people aged 55–74 years who are determined to be at higher risk of lung cancer, taking into account at least smoking history and considering other factors, such as family history of lung cancer, exposure to asbestos, and chronic obstructive pulmonary disease (COPD) to improve risk prediction.**
 - Health economic evaluations show that targeted lung cancer screening is cost-effective. Cost-effectiveness is driven mainly by the balance between the cost of LDCT, the lower cost of treatment of early-stage lung cancer and the associated gain in years of good-quality life.
- **Annual screening interval is preferred but extending the screening interval to two years, if the previous scan showed no or only small abnormality, will likely become an option in the near future.**
 - Annual screening for people aged 55–74 years with an approximate risk of developing lung cancer (using the PLCOm2012 model) of 1.5% over 6 years is the most cost-effective approach in most recent studies. Extension to age 80 years or lengthening the screening interval to no more than 2 years are also effective. Screening intervals may be risk-stratified, according to findings on LDCT and ongoing risk.
- **Integrate smoking cessation services into lung cancer screening programmes.**
 - Support for smoking cessation should be integral to lung cancer screening programmes for people who smoke, because research has shown confirmed quit rates of 20–30%. This provides the opportunity to improve health outcomes for all conditions related to tobacco use, thereby reducing all-cause mortality.

- **Adequate preparation, through carefully designed protocols incorporating quality assurance, for stepwise implementation is needed to ensure a high-quality lung cancer screening programme is implemented without overwhelming healthcare systems.**
 - Evidence-based standards should be applied in the stepwise implementation of lung cancer screening. The standards provide guidance on essential parts of a lung cancer screening programme that are required for a high-quality screening programme. It is important to engage relevant stakeholders during the entire implementation and evaluation process. This approach has been shown to be feasible in Croatia, Poland, and England, all of which have national programmes. A phased approach is needed to ensure that healthcare systems can prepare appropriately and are not adversely impacted by the additional workload.
- **Effectively managed incidental findings where there are evidence-based interventions that improve outcomes.**
 - LDCT detects a variety of incidental findings that can be associated with benefit and harm. It is essential that clear protocols are in place for their management.
 - The population at high risk of lung cancer is also at higher risk of cardiovascular diseases and chronic lung disease, both leading causes of mortality, so evidence-based primary prevention interventions such as lifestyle change, and smoking cessation should be offered.

Risk of cancer

- In 2022, lung cancer accounted for 11.6% of all new cancer cases and with 19.5% of cancer-related deaths, lung cancer is the leading cause of cancer deaths in European Union (EU) Member States. Although lung cancer is still slightly more common in men than in women, in some countries the rates are now similar.
- In about two thirds of cases, it is diagnosed at a late stage, when treatment is less effective and has significant side-effects, and cure is uncommon. This is one of the reasons why lung cancer is the most common cause of death from cancer globally, with 1.8 million deaths per year, almost 20% of all deaths from cancer. The 5-year survival rates are poor (generally <5%) when lung cancer is diagnosed at a later stage. Of 100 people diagnosed with early-stage lung cancer (stage I), approximately 68–92 people are still alive 5 years after treatment.
- Although the rates of smoking are decreasing, 24.1% of adults in the EU still smoke either daily or occasionally with prevalence varying from 12% in Sweden to 36.3% in Bulgaria. The health risks of people who previously smoked remain elevated for many years: lung cancer is increasingly being diagnosed in these people.
- Other factors than tobacco smoking that increase the risk of lung cancer are higher age, family history of lung cancer, personal history of cancer, chronic lung diseases and exposure to other harmful agents, and these may be included in the assessment of a person's individual risk.

Case study

Lung cancer screening is already recommended or set to be implemented in several European countries, based on current evidence demonstrating that the benefits reasonably outweigh the harms. England has introduced the Targeted Lung Health Check programme, while Croatia, Czechia, and Poland are advancing initiatives for national lung cancer screening programmes. In Germany, the recommendation for implementing lung cancer screening is expected soon. Two major EU implementation trials (4-IN-THE-LUNG-RUN and Solace) are underway to further guide and improve the implementation of lung cancer screening.

Lung cancer is more common in people with higher levels of socioeconomic deprivation. Well-organized, population- and risk-based screening programmes have the potential to decrease health inequalities. For example, lung cancer screening in England has reduced health inequalities by increasing the rate of early-stage diagnosis among deprived groups.

Important considerations for the gradual implementation of lung cancer screening

- Establish a process for the development, operation, governance and quality control of the programme at national and regional/local level
- Define the target population according to the national or local risk distribution and capacities.
- Define the recruitment strategy or risk-based selection
- Define screening protocols, including:
 - a pulmonary nodule management protocol, based on volume cut-offs
 - stratified screening intervals, based on an individual's risk
 - a protocol for incidental findings.
- Assess/ensure capacity during the process of screening, work-up and diagnosis, and treatment
- Facilitate access to lung cancer screening programmes for people who are considered eligible
- Facilitate access to smoking cessation services within the lung cancer screening programme
- Involve key health-care providers (general practitioners, nurse navigators, pulmonologists, and radiologists) to ensure data safety, quality assurance, and monitoring and evaluation.



A person undergoing a computed tomography (CT) scan as used for lung cancer screening
Image by Peakstock / AdobeStock.com

References

- Baldwin et al. (2023). European Respiratory Journal, 61: 2300128, PMID: 37202154
- Behar Harpaz et al. (2023). Br J Cancer, 128: 91–101, PMID: 36323879
- Bonney et al. (2022). Cochrane Database Syst Rev, 8: CD013829, PMID: 35921047
- Council Recommendation on strengthening prevention through early detection: A new EU approach on cancer screening (2022) Dec 9;C473:1–5
- Eurostat. Tobacco consumption statistics. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Tobacco_consumption_statistics
- Ferlay et al. (2024). Global Cancer Observatory: Cancer Today. Available from: <https://gco.iarc.fr/en>
- Field et al. (2022). Lancet Reg Health Eur, 10: 100179, PMID: 34806061
- Grover et al. (2022). Lung Cancer, 170: 20–33, PMID: 35700629
- Murray et al. (2024). Eur Respir J, 63(4), PMID: 38636970
- O'Dowd et al. (2023). European Respiratory Journal, 61:2300533, PMID: 38302184
- UK National Screening Committee (2022). Targeted screening for lung cancer in individuals at increased risk: External review against programme appraisal criteria. Solutions for Public Health
- Williams et al. (2024). Thorax, 79(3): 269–273, PMID: 37875371