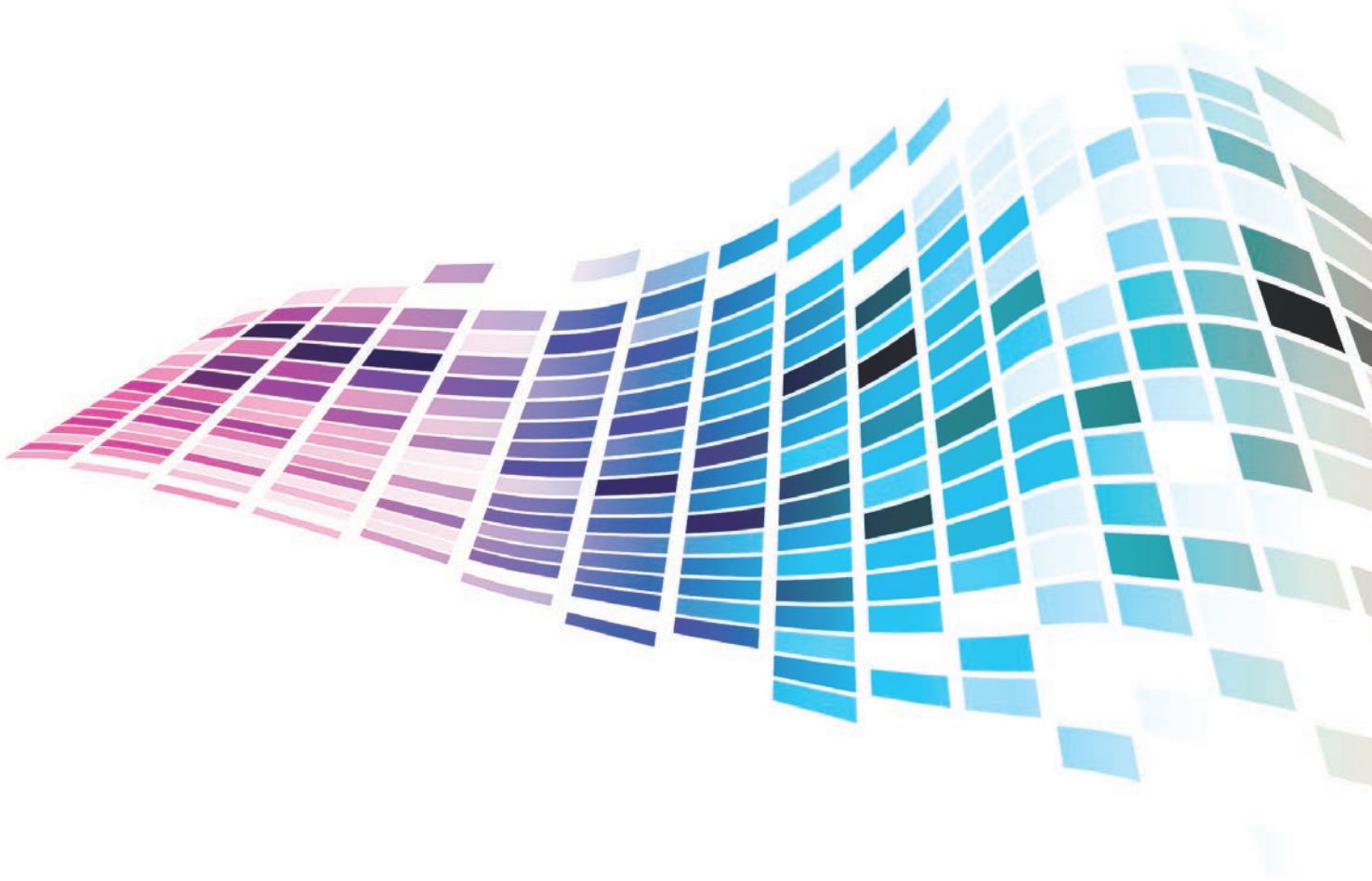
NATIONAL ONCOLOGY INSTITUTE

State of Cancer Screening Programs in Slovakia

Annual Report for 2023



NATIONAL ONCOLOGY INSTITUTE

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Annexes

List of abbreviations

AVLS	Alliance of General Practitioners, Slovakia
CPO	Centro di Prevenzione Oncologica, Italy
CT	Computed tomography
EU	European Union
GE	gastroenterologist
hrHPV	high-risk human papillomavirus
IARC	International Agency for Research on Cancer
IBA	Institute of Biostatistics and Analyses, Faculty of Medicine of the Masaryk University in Brno, Czech Republic
ICCCS	Improving Cancer Care Coordination and Screening
ISPRO	Institute for the Study and Prevention of Cancer
CC	cervical cancer
BC	breast cancer
CRC	colorectal cancer
LDCT	low-dose CT
MR	medical radiation
MUNI	Masaryk University, Brno, Czech Republic
MOÚ	Masaryk Memorial Cancer Institute, Brno, Czech Republic
NHIC	National Health Information Center
NSC CZ	National Screening Centre, Brno, Czech Republic
MoH SR	Ministry of Health of the Slovak Republic
NOI	National Oncology Institute
NOP	National Oncology Program
NCI	National Cancer Institute
ONS	Osservatorio Nazionale Screening, Italy
SGPS	Slovak Society of Gynecology and Obstetrics
SGS	Slovak Society of Gastroenterology
SOS	Slovak Oncology Society
SRS	Slovak Radiological Society
SRSS	Structural Reform Support Service
SSP	Slovak Society of Pathologists
SkSGP	Slovak Society of General Practice
SVLS	Slovak Society of General Practitioners
SOP	Standard operating procedure
HCSA	Healthcare Surveillance Authority, Slovakia
PHA SR	Public Health Authority of the Slovak Republic
FOBT	fecal occult blood test
ÚZIS	Institute of Health Information and Statistics of the Czech Republic
GP	General practitioner
VšZP	Všeobecná zdravotná poisťovňa, state health insurance company
WHO	World Health Organization

Screenings

Breast cancer

Colorectal cancer

Cervical cancer

Lung cancer

Prostate cancer

Introduction

Dear readers, we are happy to introduce our assessment report about the quality of cancer screening programs in Slovakia in 2023 which will inform you about their progress as well as give an outlook to the near future, the current possibilities and implementation conditions for new screening programs, plans and perspectives.

Cancer screening programs in Slovakia follow Europe's Beating Cancer Plan, based on which the Government of the Slovak Republic approved the National Oncology Program (NOP) of the SR with Action Plans (AP) for 2019 – 2020 in August 2018. Updated APs for 2021 – 2025 which focus particularly on reducing incidence and mortality and improving quality of life of cancer patients were approved in July 2021 in accordance with European trends. The Action Plans for 2021 – 2025 define the implementation of NOP and are divided into 5 areas.

The **Action Plan 2 – Secondary Prevention, Screening** focuses on increasing quality, development and updates of evidence-based cancer screening programs in Slovakia. Screening in asymptomatic population has the objective of early detection of oncological diseases which are one of the main causes of death not only in Slovakia, but all over Europe. Screening therefore helps detect cancer in an early stage, eventually in precancer stage, and improve the prospects of a successful treatment. In 2023, National Oncology Institute in cooperation with the Ministry of Health of the SR and expert working groups for selected cancer screenings worked on tasks leading to the fulfillment of the NOP.

There are three active organized cancer screening programs in Slovakia at the moment: breast cancer screening, cervical cancer screening and colorectal cancer screening, with lung cancer screening in preparation and first discussions opened about prostate cancer screening. Within the framework of population-based screening programs coordination, NOI closely cooperates with the Department of Public Health, Screening and Prevention of the MoH SR (DPHSP MoH SR) as well as other important entities such as health insurance companies, expert societies, National Health Information Center (NHIC) and patients' organizations. MoH SR is the state managing authority for the screening programs and NOI serves as an expert platform for the preparation and updates of expert methodologies used in the screenings. We also participate in the creation and updates of standard procedures for individual screenings in general and high-risk populations and expert revision of public awareness materials.

We will try to summarize the results of our efforts in this report.

Brief overview

2023 marked the culmination of a two-year ICCCS project (Improving Cancer Care Coordination and Screening in Latvia and Slovakia) **in cooperation with international organization IARC** (International Agency for Research on Cancer), which is part of WHO (World Health Organization). The project was carried out in two countries based on their interest, in Latvia as well as Slovakia, and funded by the European Commission.

The ICCCS project had three key objectives:

1. Implement a strategic plan to improve the quality of screening programs.
2. Introduce an information system focused on the collection of screening program data.
3. Prepare and implement a communication strategy for individual target groups so that the people concerned fully realize the benefits of the screening of selected oncological diseases.

IARC experts have used these two years to acquaint themselves thoroughly with the Slovak screening environment. They visited Slovakia several times, met with organizations involved and had online meetings. After the completion of many tasks laid out in the project, **IARC experts drafted and presented recommendations for 8 areas in January 2024:** Management and legislation, Screening test and diagnostics, guidance and protocols, Organization, funding and staffing, Invitations and communication with screening participants, Data and IT system, Quality assurance, Awareness raising, Research. **The majority of the recommendations goes beyond all the screening programs,** especially regarding the management structure of the screening programs, quality assurance and assessment, modification of legislation, data collection and making data available in order to evaluate the quality of the screening.
Some recommendations are related to a specific screening program and will be described in detail in later chapters.

The project assumes that MoH SR and relevant authorities will view these recommendations as binding and in doing so, the actual results of this exceptional project will help increase the quality of screening programs in Slovakia in order to reduce mortality of selected oncological diseases. Another important goal is to be included among the countries where long-running population-based screening for selected oncological diseases has already brought positive results.

Based on legislative changes, NOI experts in cooperation with the MoH SR and members of working groups for individual cancer screenings **started working on an update of the Law No. 577/2004 Coll.** at the end of 2021/beginning of 2022 in order to define and align sections on secondary prevention more clearly with evidence-based medicine. The adoption of the law in the National Council of the SR, which is preceded by internal consultations and then interdepartmental consultations, was affected by pre-election activities and parliamentary elections themselves in 2023 and put on hold since the elections postponed the need to amend this crucial legislation. After incorporation of the recommended changes and subsequent adoption of the law, it will be possible to continue updating the existing or newly created standard procedures and expert methodologies and follow European evidence-based recommendations with respect to the current possibilities in Slovakia.

In order to raise awareness about secondary prevention and improve screening participation rate, the working group for screening media coverage prepared a new communication strategy which was presented to the public at large via media campaign in autumn 2023. The name "screening" was replaced with a more comprehensible term **"onkokontrola"** (onco-check) in communication with lay public, accompanied by a fitting slogan **"Go to ONKOKONTROLA and find out if you are OK"** and presented to the public via various means of communication. Health insurance companies adapted the invitations destined for target groups within the three cancer screening programs based on the new communication strategy. A new website for the lay public was created for this purpose: https://www.onkokontrola.sk which houses regularly updated necessary information in the form of texts, leaflets, brochures and short tutorials with the **specialized contents of the website updated and supervised by NOI.**

The main goal of cancer screenings is to reduce mortality as well as morbidity via early detection of diseases in potentially curable stages in asymptomatic target population. **However, sufficient participation is a precondition,** ideally over 75% of the target population, **as well as good organization of the screening, quality screening processes according to European guidelines, data collection and evaluation and subsequent regular evaluation** and quality assessment and then efficient **screening program updates.**

In order to fulfil all conditions of a quality cancer screening, **NOI under the auspices of the MoH SR joins a three-year international project EUCanScreen in 2024.**

Europe's Beating Cancer Plan calls for the creation of new cancer screening schemes supported by the EU and ensuring high quality performance of cancer screening programs in all Member States. **The goal of the EUCanScreen project is to ensure updates and sustainable implementation of high-quality breast cancer, cervical cancer and colorectal cancer screenings based on the most recent medical evidence and start creating standard recommendations for other cancer screening programs with sufficient existing evidence of their medical benefit, such as lung cancer and prostate cancer screening as well as stomach screening in some areas of Europe. Implementation of the EUCanScreen objectives will lead to reduced cancer burden and equality in the EU.**

Details about individual screenings can be found in the following chapters.

Cooperation in 2023

PARTICIPATING SLOVAK ORGANIZATIONS

- **MoH SR** Cancer Screening Commission of the MoH SR (hereinafter referred to as "the Commission") and expert working groups for individual screenings
- **NOI**
- **NHIC**
- **PHA SR**
- **HCSA**
- **DPHSP**
- **Health insurance companies:** VšZP, Dôvera, Union
- **Expert societies:** SOS, SGS, SGPS, SRS, SSP, SSVPL, SVLS, AVLS
- **Patients' organizations:** League Against Cancer, No to Cancer, Pink Ribbon, The Amazons, Slovak Patient, Yes Prevention

COOPERATION WITH INTERNATIONAL ORGANIZATIONS

- **IBA, Masaryk University, National Screening Centre, Brno** Czech Republic – preparation and adjustment of screening program evaluations
- **Onkološki Inštitut Ljubljana,** Slovenia, exchange of knowledge and practical experience in screening facilities
- **EU-TOPIA** https://eu-topia.org/ - quality improvement of health results and assurance of equality of breast cancer, cervical cancer and colorectal cancer screening programs in a way that fully takes into account different demographic, medical, political, economic and cultural aspects throughout Europe.
- **IARC** - *International Agency for Research on Cancer* - ICCCS project *(Improving Cancer Care Coordination and Screening in Latvia and Slovakia), CanScreen ECIS* – project focused on creation and pilot phases of a new approach to data collection management and evaluation https://canscreen-ecis.iarc.who.int/
- **Indiana University Simon Comprehensive Cancer Center, Indianapolis, USA** – exchange of experiences and participation in the "End Lung Cancer Now" movement

CANCER SCREENING COMMISSION OF THE MOH SR

The Cancer Screening Commission was established and appointed by the MoH SR in 2018. Its main purpose is to create conditions to ensure a continuous implementation of national cancer screening programs in Slovakia according to the European Council recommendation of 2 December 2003 on cancer screening (2003/878/EC). The updated statutes of the MoH SR Commission are available now. https://www.health.gov.sk/?vestniky-mz-sr

Committee members in 2023:

Prof. **Stanislav Špánik**, M.D., PhD., president of the Commission

Dr. **Jana Trautenberger Ricová**, NOI, vice president of the Commission

Associate Prof. Dr. **Daniela Kállayová**, PhD., MPH, MoH SR, secretary

Oliver Sadovský, M.D., PhD., head of the working group for cervical cancer screening

h. Prof. **Jana Slobodníková**, M.D., PhD., head of the working group for breast cancer screening

Prof. **Tibor Hlavatý**, M.D., PhD., head of the working group for colorectal cancer screening

Miroslav Staník, MSc., press department of the MoH SR, head of the working group for screening media coverage

Peter Lukáč, MSc., PhD., NHIC

Pavol Macho, M.D., PhD., MHA, MPH, MoH SR

Mária Rečková, M.D., PhD., NOI

Eva Sladká, M.D., HCSA SR

Jana Bendová, M.D., PhD., GP for adults

Miroslava Jurčáková, MSc., Union health insurance company

František Podivinský, M.D., Dôvera health insurance company

Lucia Vitárius, M.D., VšZP health insurance company

The MoH SR Cancer Screening Commission oversees the work of individual working groups.

WORKING GROUPS FOR INDIVIDUAL SCREENINGS

BREAST CANCER SCREENING
- head of the working group: Prof. **Jana Slobodníková**, M.D., PhD.

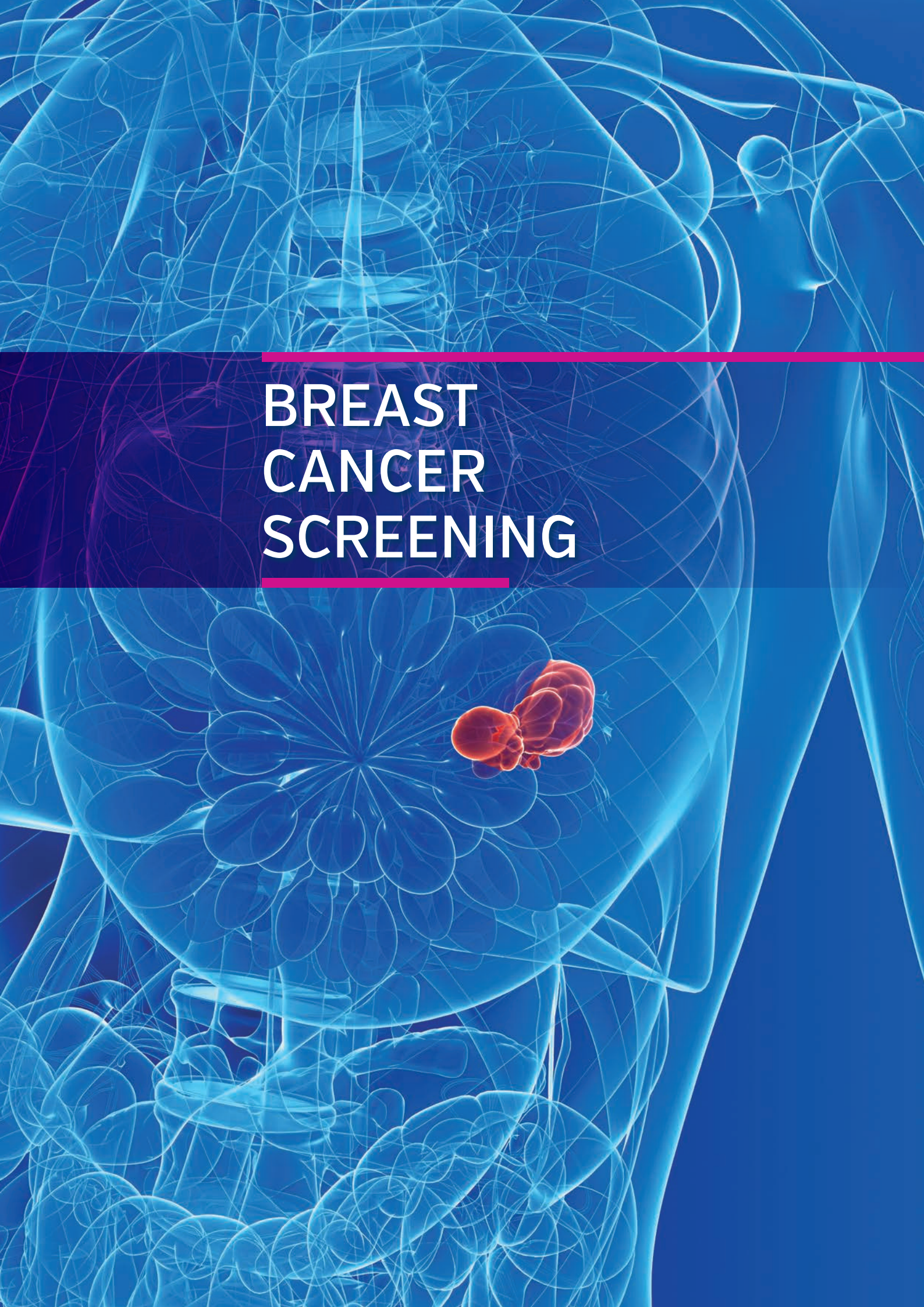
COLORECTAL CANCER SCREENING
- head of the working group: Prof. **Tibor Hlavatý**, M.D., PhD.

CERVICAL CANCER SCREENING
- head of the working group: **Oliver Sadovský**, M.D., PhD.

LUNG CANCER SCREENING
- head of the working group: **Dominik Juskanič**, M.D.

WORKING GROUP FOR SCREENING MEDIA COVERAGE
- head of the working group: **Miroslav Staník**, MSc., by proxy Dr. **Tatiana Kmecová**

WORKING GROUP FOR DATA
- head of the working group: NHIC representative



BREAST CANCER SCREENING

Breast cancer screening

https://www.noisk.sk/screening/professionals/breast-cancer-screening

General organized breast cancer screening program *(so-called mammography screening) started in September 2019 by active invitation of asymptomatic women aged 50 – 69 who belong to the target group according to inclusion and exclusion criteria of screening invitations.*

Breast cancer screening can be **performed only in certified mammography screening facilities** which provide high-quality and effective comprehensive procedure for screened women at a high level of expertise and organization, including management of detected pathologies according to the valid Standard Procedure for Medical Radiation and Prevention – Screening Mammography.

Breast Cancer Screening Statistical Assessment for 2023

Mammography Screening Assessment Report for 2023 is found in Annex 1

- **In the age group 50 – 69, 164,484 women (45.65%)** from the target population **underwent a mammography exam** (screening, preventive or diagnostic mammography).
- **Out of this number and based on data from certified mammography screening facilities, 55,874 women underwent screening mammography in a certified mammography screening facility** (mammography screening coverage when adhering to screening interval was 15.5%).
- **137,997 women were invited** to screening mammography by health insurance companies in 2023 **(invitation coverage was 38.3%)**.
- **25,406 invited women underwent the screening mammography exam (18.4%).**

Target population for breast cancer screening is calculated according to data from the Statistical Office of the SR as the number of people in the age group 50 – 69 + 365 days divided by 2 because women are entitled to the screening exam once in two years. According to the Statistical Office of the SR, **there were approximately 720,618 women aged 50 – 69 years in Slovakia in 2023.**

As of December 31, 2023, there were 22 certified mammography screening facilities in Slovakia assessed by the working group charged by the MoH SR Committee for Quality Assurance in Radiodiagnostics, Radiation Oncology and Nuclear Medicine led by Assoc. Prof. Dr. Martina Horváthová,

PhD., MPH. Working group members performed 19 audits of the facilities with two new facilities being added to the network in 2023 and the status of certified mammography facility revoked in one case.

The list of mammography facilities evaluated by the temporary expert working group and recommended to be included in the mammography screening **is regularly updated by the MoH SR and available at NOI website:** *https://www.noisk.sk/mamografickepracoviska*

Collection and evaluation of mammography screening data in a binding structure is another part of mammography screening, which is not only a precondition of self-check of individual screening mammography facilities, but also a precondition of statistical data collection about screening participants. Screening mammography facilities provide statistical data for evaluation to NOI while adhering to all agreed conditions of personal data protection and the course of mammography screening is evaluated once a year based on processing and analysis in a detailed assessment report.

The certified facilities record their results monthly via **MamoLight** and **MamoNet.** This is a software program tailor-made in 2022 for the purposes of record-keeping and statistical collection of selected data about the screening mammography exams performed in certified mammography screening facilities in the SR. The software makes it easier for the facilities to collect and analyze data and allows complex data audit management regarding mammography screening in the facility. MamoLight, first in its trial version and then "live" version since June 2023, provides screening facilities with simpler and more efficient statistical data collection and temporarily replaces a screening register which is still absent.
An **update of mammography screening procedure codes and diagnosis codes reporting methodology** for healthcare providers is in preparation for the purpose of harmonization and correct reporting, which is essential for a high-quality analysis and evaluation of the screening.

Based on medical evidence and within the amendment of the Law No. 577/2004 Coll., the working group for breast cancer screening agreed to propose a change of the age range for the mammography screening target group from the current 50 – 69 to 45 – 75, which is in accordance with the valid European recommendations, and proposed to remove breast ultrasound once in 2 years from gynecology check-ups given that it is a medically redundant exam in population-based screening of women who are not at high risk of breast cancer, unless it is a follow-up exam to screening mammography. This procedure is not recommended by EUSOBI (European Society of Breast Imaging) because it might lead to iatrogenesis of women (cf. https://www.noisk.sk/screening/professionals/breast-cancer-screening, section Specialized literature).

It should also be underlined that the risk group of women who should be monitored in an individual regime as per the standard procedure "Breast cancer screening in high-risk female population" **still has not been identified properly** (https://www.noisk.sk/files/2022/2022-11-11-standardny-postup-pre-skrining-karcinomu-prsnika-vo-vysokorizikovej-populacii-zien.pdf)

PINK OCTOBER IN SLOVAKIA IN 2023

Just like in the previous years, several certified mammography screening facilities participated in the Pink October campaign in 2023.

In October, the color pink becomes an international symbol of fight against breast cancer and pink ribbon symbolizes solidarity and support for people affected by breast cancer.
Pink October is a month during which we try to raise awareness about the possibilities of prevention of breast cancer via healthy lifestyle and also how to save a life and health by benefiting from screening mammography and breast self-examination.
We thus show our support to all women undergoing or having undergone breast cancer treatment

PREVENTIVE AND PROMOTIONAL ACTIVITIES

- interviews in regional print including press reports and interviews published online
(participating certified mammography screening facilities: Ružomberok – Central Military Hospital Ružomberok – Teaching Hospital; Trenčín – Teaching Hospital Trenčín; Trnava – Teaching Hospital Trnava; Poprad – Hospital Poprad, a.s.; and many others.)

- podcasts and TV interviews
(participating certified mammography screening facilities: Trnava – MRI, s.r.o.; Banská Bystrica – AGEL Mammacenter of St. Agatha (Mammacentrum sv. Agáty); Trnava – Teaching Hospital Trnava; Dolný Kubín – Dr. L. Nádaši Jégé Lower Orava Hospital with Policlinic; and many others)

- media support on social networks
(participating certified mammography screening facilities: Trnava – MRI, s.r.o.; Banská Bystrica – AGEL Mammacenter of St. Agatha (Mammacentrum sv. Agáty); Trnava – Teaching Hospital Trnava; Dolný Kubín – Dr. L. Nádaši Jégé Lower Orava Hospital with Policlinic; and many others)

- organizing public educational events
(participujúce preverené skríningové mamografické pracoviská: Liptovský Hrádok - SVALZY, s.r.o.;
(participating certified mammography screening facilities: Liptovský Hrádok – SVALZY, s.r.o.; Trnava – MRI, s.r.o.; and many others)

- organizing expert seminars within continuous professional development of healthcare professionals
(participating certified mammography screening facilities: Banská Bystrica – AGEL Mammacenter of St. Agatha (Mammacentrum sv. Agáty); and many others)

- other **public events intended to support the fight against breast cancer and show support to women with breast cancer**
(participating certified mammography screening facilities: Banská Bystrica – AGEL Mammacenter of St. Agatha (Mammacentrum sv. Agáty); Trenčín – Teaching Hospital Trenčín; Trenčín – Radiology Clinic, s.r.o.; Dolný Kubín Dr. L. Nádaši Jégé Lower Orava Hospital with Policlinic; and many others)

- awareness raising on the local level in certified mammography screening facilities
by employees wearing pink clothes, giving pink ribbons to employees and patients, handing out leaflets and more (Slovakia-wide event in all certified mammography screening facilities)

- no-appointment mammography (Dolný Kubín – Ladislav Nádaši-Jége Upper Orava Hospital; Poprad – Hospital Poprad, a.s.; and many others.)

- NOI Fórum

- lighting up Slovak landmarks

In October, more specifically on October 15 which is traditionally the international Breast Health Day, different landmarks in cities around the world are lit up in pink. In 2023, in cooperation with certified mammography screening facilities, NOI, patients' organizations and health insurance companies, we have colored some important Slovak buildings pink in order to remind women not to forget breast health prevention.

Lighting up Slovak landmarks:

- Banská Bystrica: Clock tower, Barbican, Town hall

- Bratislava: Presidential palace, Primate's palace, SNP bridge with UFO and square under the SNP bridge, National Bank of Slovakia building, JTRE Bratislava

- Žilina, Budatín: Tinsmith's pavilion of Budatín castle – Považie museum

- Poprad: Hospital Poprad a.s. building

- Ružomberok: Town hall

- Trenčín: Teaching Hospital Trenčín building

- Trnava: University of Trnava rectorate in Trnava

- Zvolen: Old town hall

- other landmarks in other Slovak towns

VISION FOR 2024

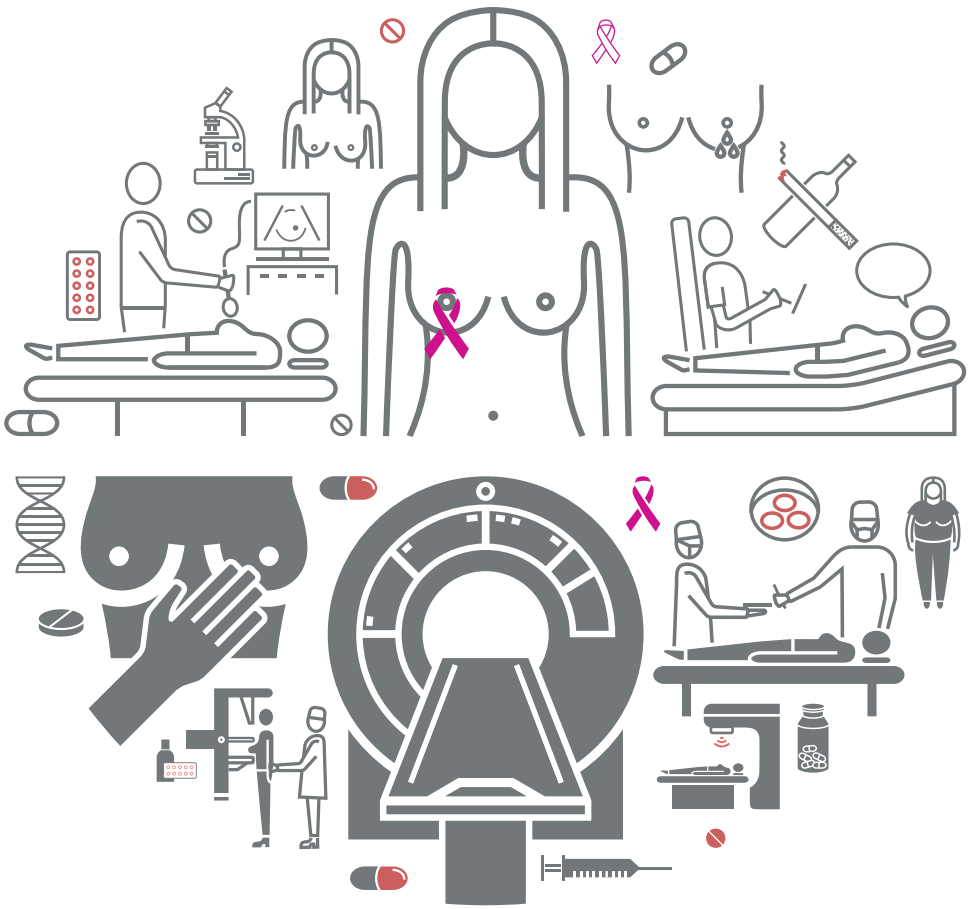
As we have mentioned in the chapter Brief overview, experts from the ICCCS project in cooperation with international organization IARC presented recommendations for 8 areas in January 2024.

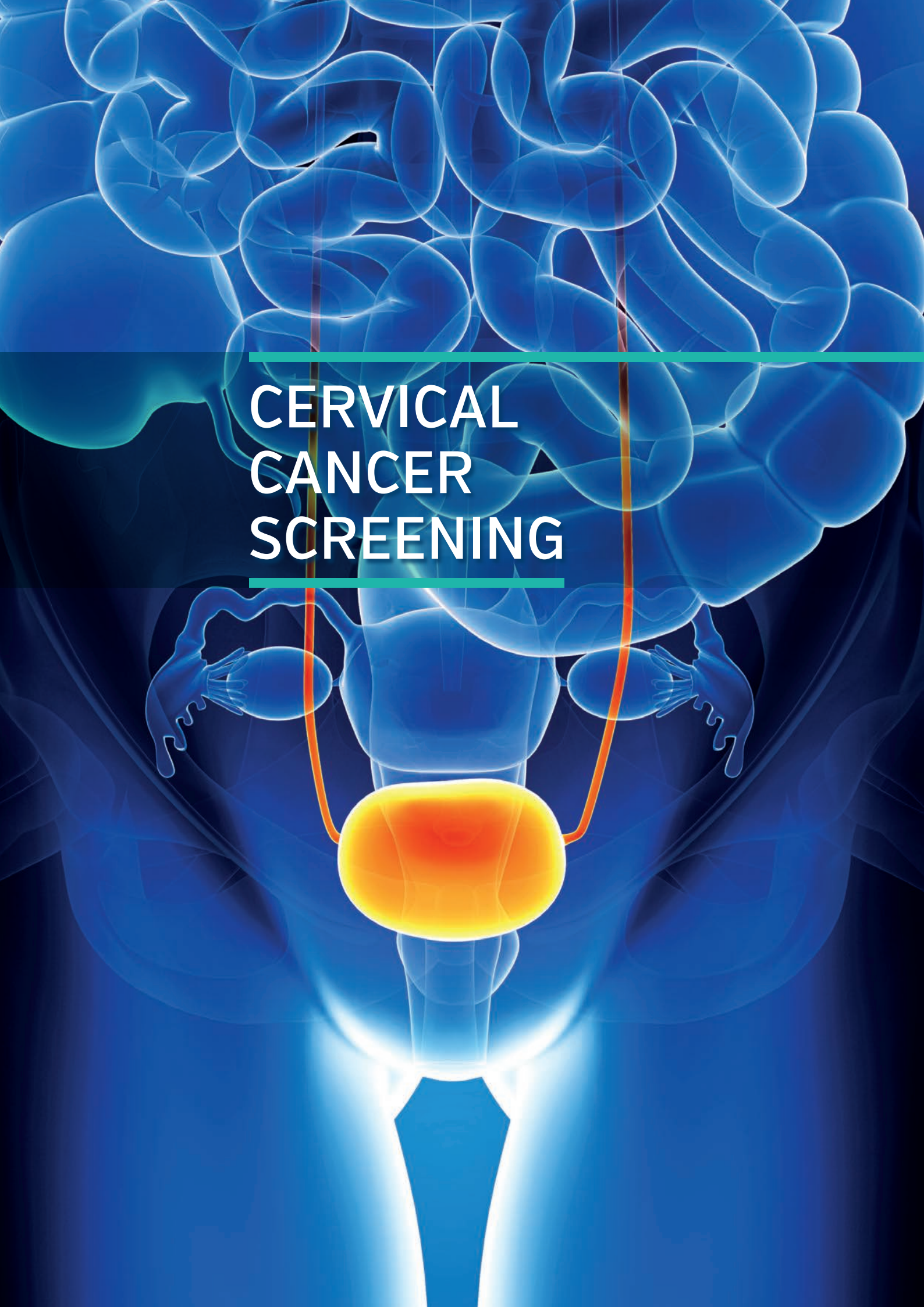
One of the main tasks in order to improve the quality of breast cancer screening program is to **improve the invitation system and minimize errors** with a recommended "call/recall" system of addressing all women in the target population. Ideally, invitations should include the date and place of examination with the possibility to reschedule in case of unsuitable date. Some screening mammography facilities already have their own functioning invitation system. It is necessary to **ensure sufficient number of high-quality certified mammography screening facilities** with even coverage throughout Slovakia in order to make them more accessible. Another important thing is to establish adequate remuneration for screening procedures in certified screening facilities, taking into account ever-increasing expenses related to providing high-quality screening mammography. Correct setup and streamlining of processes within monitored organized screening can lead to higher quality, shorter waiting times and also reduced burden on various levels of the healthcare system.

Another recommendation from the ICCCS project is **following European guidelines and their local implementation.** One of the important basic steps to fulfil the recommendations is adopting the amendment of the Law No. 577/2004 Coll. which is already prepared and adjusts the procedure based on medical evidence and recommendations of the European Commission.

Another topic is **making data collection and evaluation better and more efficient**, which is closely connected to correct procedure code and diagnosis code reporting. **A mammography screening procedure codes and diagnosis codes reporting methodology** for healthcare providers will be the basis for correct reporting. The document will be binding and will facilitate correct evaluation of set screening quality indicators which can be extracted from the reported procedure codes and diagnosis codes. This data allows to partially evaluate and continuously update the mammography screening program and compare the data with other countries in our geographic region and around the world.
Effective collection of all data necessary to evaluate the screening program remains an unfilled and unsolved necessity, including clinical data which is not available to radiologists in their entirety, such as stage of the disease or follow-up treatment, and the data is available in information systems only in the form of unstructured medical records. Another unfulfilled area is recent reporting of the National Oncology Register of the SR.

An important area is quality improvement of breast cancer screening program by ongoing continuous professional development/training for all involved experts and lay public; NOI Forum dedicated to statistical audit of mammography screening is planned again in 2024. Other ongoing planned activities include participation in traditional expert conferences in order to improve education about breast cancer screening, organization and support of awareness activities in order to increase the knowledge and competences of the Slovak population.





CERVICAL CANCER SCREENING

Cervical cancer screening

https://www.noisk.sk/screening/professionals/cervical-cancer-screening

General organized cervical cancer screening program was initiated in August 2021 when health insurance companies started sending the first invitations to asymptomatic women aged 23 – 64 who do not undergo routine check-ups with their gynecologist in regular intervals and are thus part of the target group according to inclusion and exclusion criteria as per the methodology of targeted invitations. Cervical cancer screening is done via Pap smear in women aged over 23 once a year for two years and then once in three years. The screening ends at 64 years of age only if the last three cytology results in a correctly indicated three-year interval are negative. Abnormal cytology results are evaluated by higher-level expert colposcopy facilities which assess the findings via expert examination and determine further therapeutic process.

Cervical Cancer Screening Statistical Assessment for 2023

(complete statistical report is found in Annex 2)

- In the age group of women **23 – 65, 625,020 women (40.12%) underwent the screening exam** (including women with an HIC invitation as well as without).
- Of this number, 522,667 women had a **negative cytology result (93.5%)** and 36,088 women had an **abnormal cytology result (6.5%)**.
- **322,648 women (20.71%) from the target population were invited** to the screening exam by health insurance companies in 2023.
- **59,410 invited women underwent the screening exam (18.41%).**

Target population for cervical cancer screening is calculated according to data from the Statistical Office of the SR as the number of people in the age group 23 – 65. **There were approximately 1,557,851 women aged 23 – 64 years in Slovakia in 2023** according to the Statistical Office of the SR.

Due to its etiopathogenesis with HPV (human papillomavirus) playing the key role and gradual development of invasive cancer through precancers, cervical cancer is one of the few malignancies which can be almost completely prevented via combination of primary (vaccination against HPV) and secondary prevention (cervical cancer screening). **In 2023, the ICCCS project initiated very intense discussions within the working group for cervical cancer screening and SGPS about an adjustment of the current screening method and the periodicity of the exams according to the latest EU recommendations.**

The first change discussed was an adjustment of the original periodicity of the first two cytology samples in a yearly interval, to be replaced by **a periodicity of three years for all cytology samples.** The reason is to simplify the procedure and **align it with the current evidence-based procedures.** The recommended screening interval using Pap smear from the cervix is 3 years.

It has been proven that a well-organized, high-quality screening program (cytology smear) in 3 to 5-year intervals can prevent 80% of cases of cervical cancer and reduce mortality up to 80% *(International Agency for Research on Cancer. Cervix Cancer Screening: IARC Handbooks of Cancer Prevention. Vol. 10, Lyon: IARC, 2005).*

Cervical cancer screening is done mainly within routine gynecological check-ups but may be performed also in another type of gynecological exam. The screening has a specifically determined target population with a set age threshold for the beginning of the screening and the end of the screening if all conditions are met. The age of the beginning and end of the screening as well as the screening interval per type of screening test used and its negative predictive value are set according to evidence-based medicine and taking into account cost-efficiency.

Another proposal suggests an adjustment of the screening method according to the Council recommendation of 9 December 2022 on strengthening prevention through early detection: A new EU approach on cancer screening replacing Council Recommendation 2003/878/EC 2022/C 473/01. https://eur-lex.europa.eu/legal-content/SK/TXT/HTML/?uri=OJ:C:2022:473:FULL&from=EN. It is expected that **introduction of HPV test in the screening in Slovakia** will increase the detection sensitivity for precancers and early stages of cervical cancer.

Within the framework of legislative changes of the Law No. 577/2004 Coll., NOI cooperates with the working group for cervical cancer screening and MoH SR to adjust its wording.

To ensure high quality of the screening, it is necessary to have sufficient number of gynecologists who are able to perform **expert colposcopy** within the screening process in order to achieve high quality of further follow-up of women with abnormal cytology result and HPV-positive women detected during the cervical cancer screening. Performing quality expert colposcopy requires a specialization of the physicians in gynecology and obstetrics. The experts from the MoH SR working group for cervical cancer screening prepared a **Methodical Instruction of the MoH SR for Performing Expert Colposcopy for Cervical Cancer Screening in Slovakia** in 2023 and published it in the MoH SR Journal at the beginning of May 2024. https://health.gov.sk/?vestniky-mz-sr

An up-to-date **list of gynecology-obstetrics offices performing expert colposcopy appointed by expert society for participation in population-based screening** is available at the MoH SR and NOI websites: https://www.health.gov.sk/?rok-prevencie-gynekologicko-porodnicke-ambulancie-pre-ucast-v-populacnom-skriningu

There has been a long-standing discussion about the **lack of relevant data** obtained by NOI from HICs based on signed memoranda on cooperation for the purpose of evaluation of the screenings. To some extent, this is caused by obsolete, unstructured reporting which is done in duplicate by healthcare providers, as well as errors in procedure and diagnosis coding related to the screening sent to HICs by the providers.

The methodical instruction for procedure and diagnosis code reporting (coding) for healthcare professionals and outpatient facilities participating in cervical cancer screening was published in the MoH SR Journal on December 16, 2019 *(https://www.health.gov.sk/?vestniky-mz-sr)* and resent to healthcare providers – gynecologists, consulting colposcopy facilities, cytology, histopathology and HPV labs – by health insurance companies. An ideal solution would consist of a structured record which would be generated as a report and sent to HICs and NHIC and would allow to collect **data in an NHIC screening register** in real time, which would consequently be anonymized and provided **for evaluation to NOI.**

Another important aspect besides the screening program is general **vaccination against HPV** that is generally recommended to both sexes aged 9 – 45. The effect of vaccination decreases with age *(Arbyn M, Xu L, Simoens C, Martin-Hirsch PPl. Prophylactic vaccination against human papillomaviruses to prevent cervical cancer and its precursors. Cochrane Database Syst Rev. 2018(5): CD009069).*

Vaccination against HPV prevents new HPV infections but does not treat existing infections or HPV-related conditions. The vaccine works best if administered in adolescence, before exposure to the

virus by sexual activity. **Since December 2023, free vaccination by state-of-the-art nanovalent vaccine against HPV virus in a two-dose vaccination scheme is available to girls and boys aged 13 to 15 (from the day of the 12th birthday to 14 years and 364 days).**

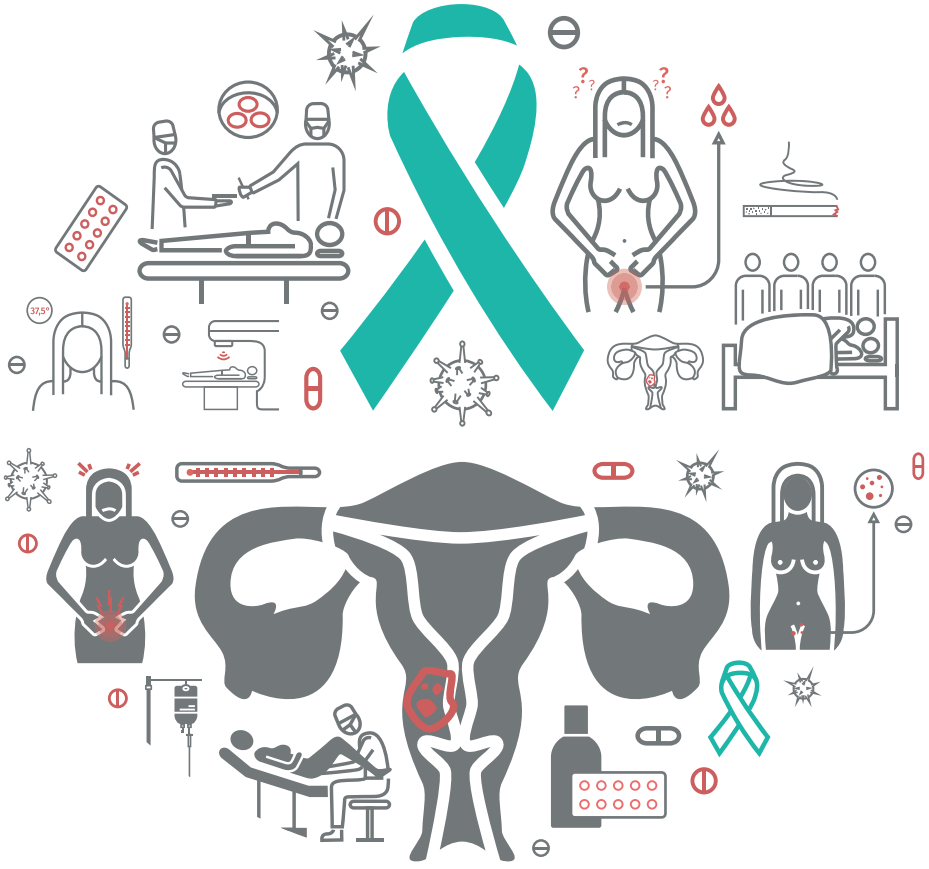
VISION FOR 2024

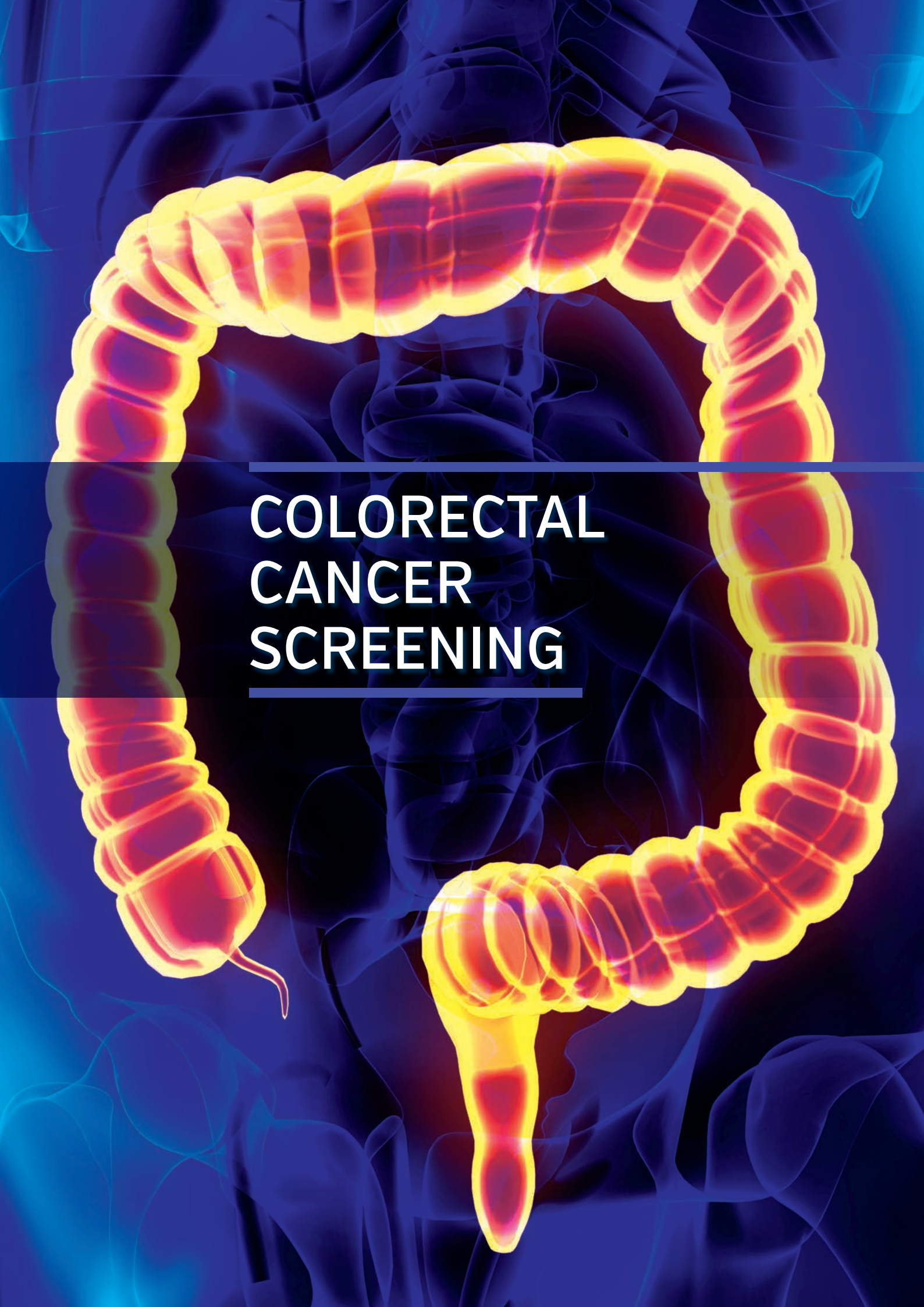
Based on recommendations from the **ICCCS project in cooperation with the international organization IARC,** an adjustment of the screening program was proposed according to currently valid European guidelines. The current EU recommendation for cervical cancer screening prefers human papillomavirus (HPV) testing in women aged 30 – 65 in a five-year interval or longer *Publications Office (*europa.eu*)* and suggests considering an adjustment of the ages and intervals to individual risk based on history of HPV vaccination. It is recommended to **prefer HPV screening in women aged 30 – 65 instead of cytology screening** and consider the possibility of offering kits that could help women take their own sample, especially in case of women who do not respond to the invitations.

Therefore, the next objective of the working group is to present and defend the proposed changes in the Law No. 577/2004 Coll., including the updated screening program scheme which would incorporate an hrHPV DNA test. In relation to the planned change, it is **necessary to introduce new procedure codes for the screening and triage HPV test** (specific procedure codes for negative and positive result of both screening HPV test and triage HPV test) which would be reported to laboratories performing the HPV testing. **It must also be determined which HPV tests will be used.** If the integration of primary HPV testing in the existing population-based cervical cancer screening program is approved, comprehensive planning, feasibility testing or eventually a pilot program should be done before routine implementation in order to ensure that an adequate cost-benefit balance is in place after the change to primary HPV screening, including effective and efficient use of resources *[Karsa L, Arbyn M, De Vuyst H, et al. European guidelines for quality assurance in colorectal cancer screening and diagnosis. Summary of the supplements on HPV screening and vaccination. Papillomavirus Res. 2015 Jun 30;1:22–31. doi: 10.1016/j.pvr.2015.06.006. PMCID: PMC5886856].*

To reduce mortality and incidence of cervical cancer, we must focus on primary prevention, i.e., HPV vaccination, as well, and take steps to increase the number of vaccinated girls and boys; the vaccination rate according to the latest data published by NHIC in December 2022 is 21.7%.

An important area is quality improvement of the cervical cancer screening program by ongoing continuous professional development/training for all involved experts and lay public. Other ongoing planned activities in this regard include participation of NOI experts in traditional expert conferences in order to improve education about cervical cancer screening, and organization and support of awareness activities in order to increase the knowledge and competences of the Slovak population.




COLORECTAL
CANCER
SCREENING

Colorectal cancer screening

https://www.noisk.sk/screening/professionals/colorectal-cancer-screening

General organized colorectal cancer (CRC) **screening program** *was initiated in Slovakia by its first phase (January 2019 – October 2019) on a sample of 20,000 people aged 50 – 75. Since September 2021, a second phase under the auspices of MoH SR and coordinated by NOI has been continuing with health insurance companies sending invitations and a fecal occult blood screening test (FOBT) to their insured persons based on inclusion and exclusion criteria of the targeted invitation methodology for CRC screening.* In Slovakia, CRC screening in normal-risk population is performed via **FOBT at GPs' offices** with subsequent **screening colonoscopy** in case of a positive result. **Primary screening colonoscopy** (without previous FOBT) is indicated as a primary screening exam for high-risk population but may also be indicated for normal population after 50 years of age. This type of screening is stipulated in the Law No. 577/2004 Coll.

Colorectal Cancer Screening Statistical Assessment for 2023
(complete statistical report is found in Annex 3)

- **435,744 persons underwent the screening FOBT exam** in the age group 50 – 75 **(52.20%)**.
- Of this number, **37,877 people had a positive FOBT (8.69%)** and 8,608 had an inconclusive result (1.98%).
- In 2023, **21,269 people in the age group 50 – 75 underwent colonoscopy by 365 days after FOBT, with 10,523 going after a positive FOBT result**.
- **331,011 people (39.65%) from the target population were invited** to the screening exam in 2023.
- **105,332 invited people underwent the screening exam (31.82%).**

Target population for colorectal cancer screening is calculated according to data from the Statistical Office of the SR as the number of people in the age group 50 – 75 divided by 2 because the population of this age is entitled to the screening exam once in two years. According to the Statistical Office of the SR, **the target population in Slovakia consisted of 1,669,564 men and women aged 50 – 75 in 2023.**

Clinical data about performed colonoscopy exams for statistical evaluation by gastroenterology facilities which perform screening colonoscopy is collected and published on the website www.krca.sk. **At the moment, this data is secured by the newly appointed head of the working group for colorectal cancer screening at the SGS, Andrej Orságh, M.D., who also works as an expert consultant for NOI.** He has taken over the role from Rudolf Hrčka, M.D., PhD.

In the recent years, the numbers are accompanied by data from health insurance companies (HICs) which makes it possible to evaluate some key performance indicators (KPIs). In order to increase screening participation rate and based on recommendations by the European Commission, HICs invite the part of the target population that does not regularly go to routine check-ups at their general practitioner's office and thus has not had a fecal occult blood test in the last two years or a colonoscopy in the last 10 years. This group of insured persons receives an invitation from their HIC which includes an FOBT to be handed over to their general practitioner for evaluation.

There are several reasons for low screening participation rate based on invitation from HIC:

1. The invited people ignore the invitation for various reasons (general fear of examination, fear of the result, not understanding the point...).

2. The invited people do not get an appointment with their GP to deliver the finished test during the period of evaluation of the participation rate.

3. The invited people do the test, self-evaluate it at home and do not notify their general practitioner in case of a negative result, which is why they are not included in the participation rate statistics based on invitation.

Another problem is that some general practitioners use their own test during routine check-ups even if the person comes with a finished FOBT sent by their HIC.

IARC experts have confirmed several shortcomings of the colorectal cancer screening in their assessment report. One of them is **lack of high-quality data** necessary for its evaluation. **We have identified several reasons:** there is no screening register and the data can only be extracted from the reported healthcare data so far, i.e., by procedure codes and diagnosis codes from HICs; however, these are primarily intended for their reimbursement and thus cannot offer a relevant evaluation of qualitative and clinical parameters and information obtained can only be used for gross quantitative statistics, or quantitative estimates.
We can see imprecise reporting by healthcare providers – coding errors (imprecise screening codes for colonoscopy by gastroenterologists, incorrect codes for test results by GPs) or codes which do not reflect reality because only a certain code determined by HIC can be reimbursed and it is not always possible to be flexible in healthcare reporting based on different clinical situations which can arise in real practice. Another cause of the shortage of data is the fact that clinical data is currently available only from CRC forms which show a relatively high level of imprecision with no means to validate them.

Another issue which hinders high-quality and medically correct setup of the population-based screening program are flaws and imprecisions in the Law No. 577/2004 Coll., more specifically using an undefined, **not unified test type with no set cut-off** and lack of unambiguous definition of cases when it is useless to repeat the FOBT after two years, i.e., if the CRC screening participant has undergone CRC screening via full colonoscopy in the last 10 years and is asymptomatic. Another issue is expected **low willingness to undergo colonoscopy after a positive result, for example due to fear of pain or of positive result** or due to shame, but a problem can arise also due to complicated appointment system or long waiting times. It must be underlined that it is currently impossible to determine information about performed colonoscopies after a positive FOBT in a relevant manner and the data is only a gross estimate, since, as stated before, qualitative parameters are hard to obtain only from HIC data. Therefore, it is not possible to definitely determine how many FOBTs were positive in reality only based on codes reported to health insurance companies. The causes of non-participation are also just hypotheses based on feedback by the screening participants which is sent to NOI and on a questionnaire survey within the ICCCS project. Some regions in Slovakia are also affected by shortage of gastroenterology facilities where a person could go after a positive test and undergo a quality colonoscopy by 4 weeks at the latest (as per EU recommendations). **There is an insufficiently identified group of people at increased risk of CRC by GPs;** these people should be under a special follow-up regime by a GE as per the Standard procedure for Colorectal Cancer Prevention via Population-Based Screening in Population with Higher Risk of Colorectal Cancer: 2022-02-06-standardny-postup-pre-vykon-prevencie-skrining-kk-high-risk.pdf (noisk.sk).

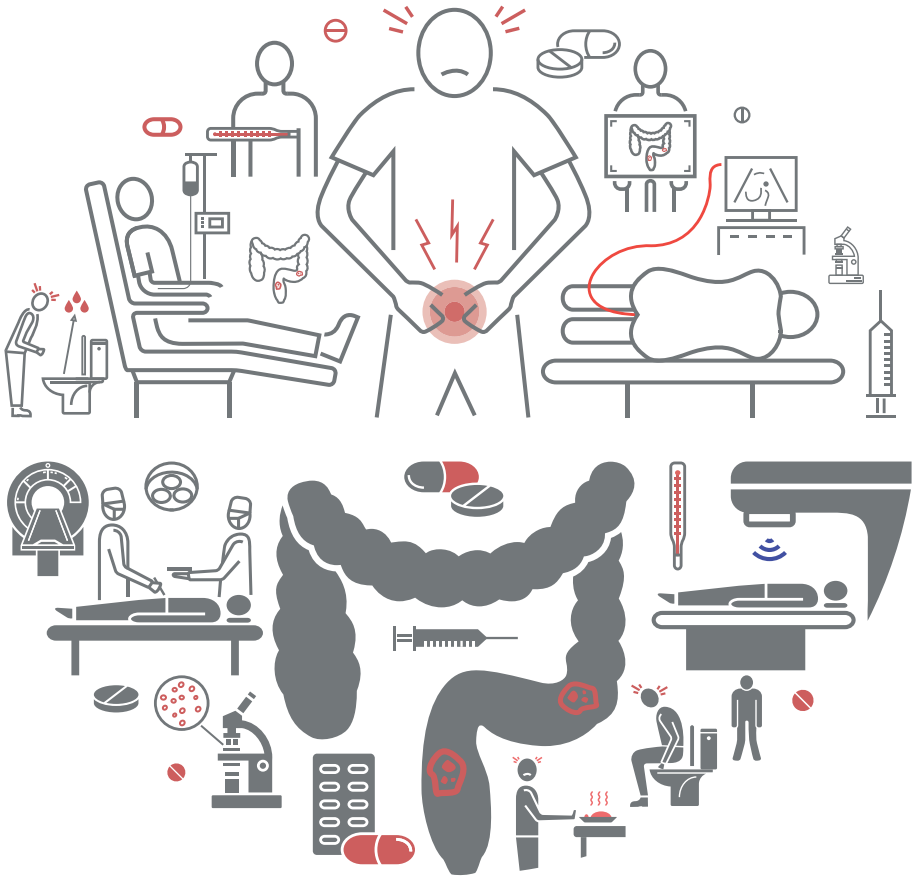
VISION FOR 2024

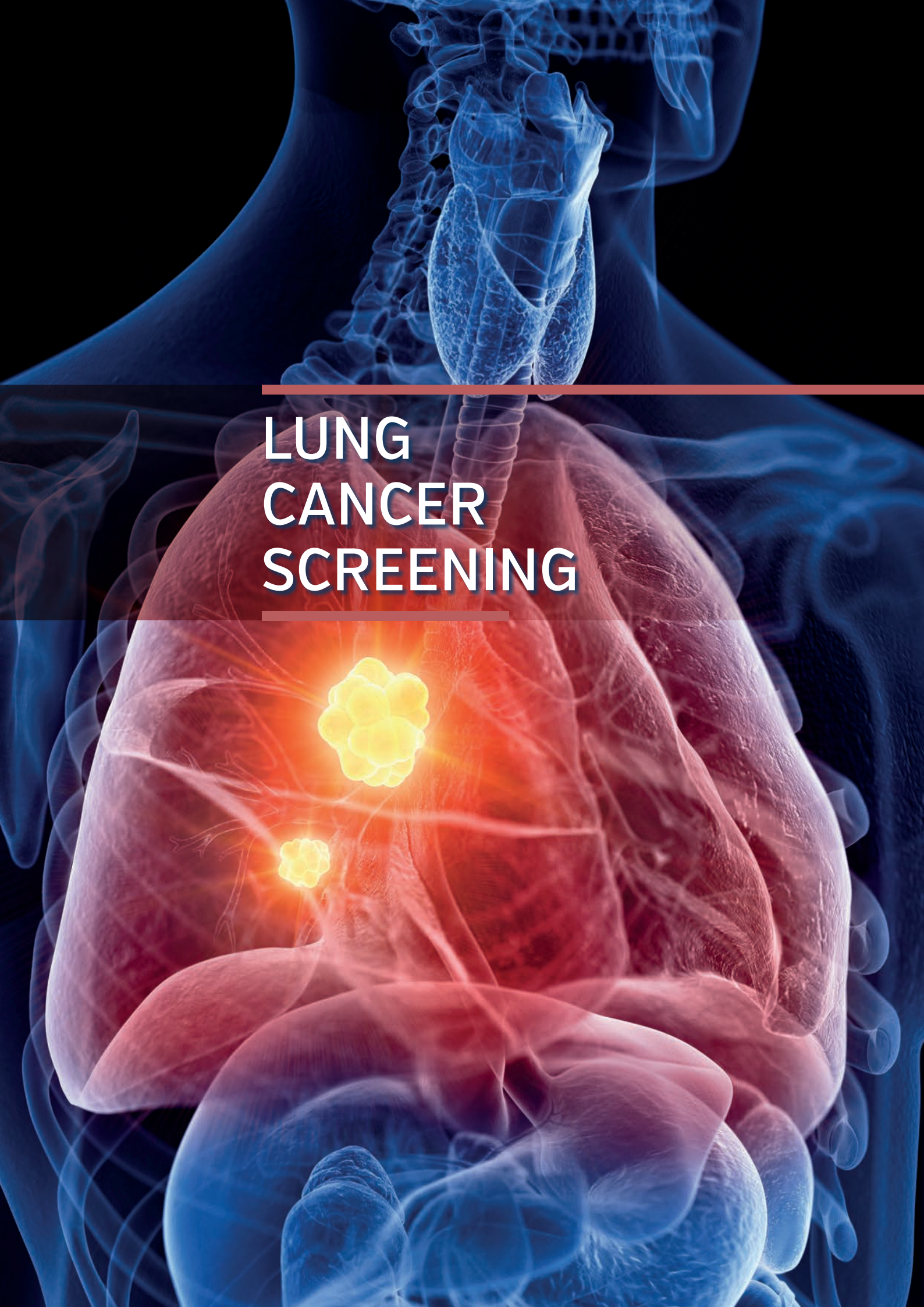
The important thing for the colorectal cancer screening is to harmonize screening exams within routine check-ups at GP's offices and subsequent management of patients with a positive test result, including correct referrals to screening colonoscopy. This definitely includes **raising awareness about screening colonoscopy** which seems to be the most effective way to truly prevent oncological diseases of the large intestine and colon also thanks to removing the obstacles which lower the participation rate of this examination, for example by introducing reimbursement of analgosedation during colonoscopy.

One recommendation from the ICCCS project is to **adjust the existing screening program according to currently valid European guidelines:** https://cancer-screening-and-care.jrc.ec.europa.eu/en/ecicc, including a **unified quantitative FIT test** with a precisely determined cut-off for greater value of proof as a test of choice (higher sensitivity and specificity, lower false positivity and thus cost efficiency). This would allow to monitor the dynamic of an eventual disease and not to burden the screening GE network with false positives, eventually updating the cut-off based on the possibilities of colonoscopy exams.

Another objective is **automated collection of qualitative colonoscopy data** via structured reports for the purpose of certification and audit as well as repeated training and checks of data reporting by GPs, and last but not least, the up-to-dateness of the data provided by NOR including the stage of the disease. A modification of the **CRC register** is underway because clinical data is collected in an obsolete and imprecise manner.

As is the case with all screening programs, quality improvement of the colorectal cancer screening program by ongoing continuous professional development/training for all involved experts and lay public is an important aspect. Other ongoing planned activities in this regard include participation of NOI experts in traditional expert conferences in order to improve education about CRC screening, and organization and support of awareness activities in order to increase the knowledge and competences of the Slovak population.





LUNG CANCER SCREENING

Lung cancer screening

https://www.noisk.sk/skrining/odborna-verejnost/skrining-rakoviny-pluc

In 2023, the entire MoH SR working group for lung cancer screening implemented several activities within the preparatory phase of pilot implementation of lung cancer screening for risk groups.

This year was a success thanks to the **adoption of the Standard Procedure for Lung Cancer Prevention via Risk Group Screening – Lung Cancer Screening by a collective of authors led by prof. Viera Lehotská**, M.D., PhD., in effect since November 15, 2023. This is another standard procedure within preventive medicine with the potential to save public resources and primarily to reduce mortality and morbidity of oncological diseases. We also believe that it will be an important basis for the implementation of lung cancer screening in Slovakia.

A **Standard Procedure for Nicotine Addiction Management** by a collective of authors led by **Ľubomír Okruhlica**, M.D., PhD., was adopted and is in effect since November 15, 2023, as a part of comprehensive approach to smoking prevention and nicotine addiction treatment, which is an integral part of the effort to implement lung cancer screening.

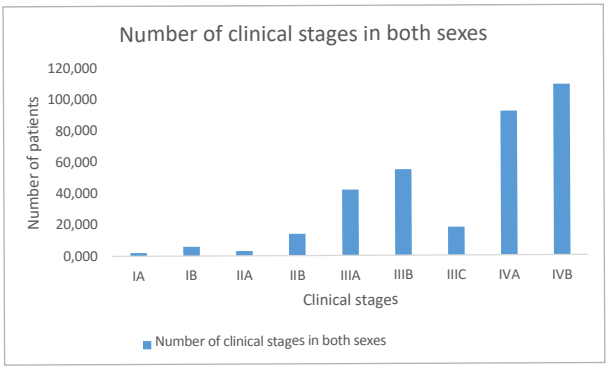
The working group for lung cancer screening has formalized a **pilot implementation project proposal** with the suggestion to include first centers in Bratislava and Nitra. The pilot project includes gradual scaling by including thoracic surgery centers outside Bratislava in the University Hospital in Martin, National Institute for Tuberculosis, Lung Diseases and Thoracic Surgery Vyšné Hágy, and then in Košice. The key long-term intention is to automate the collection of data in NHIC, with the option of sharing aggregated data for a performance and quality audit of the screening program with NHIC and NOI analysts as well as with the Committee for Quality Assurance in Radiodiagnostics, Radiation Oncology and Nuclear Medicine. Data supervision is a vital part of the pilot program since it will allow a continuous monitoring and improvement of the screening program. It might also serve as a valuable data input for a screening register.

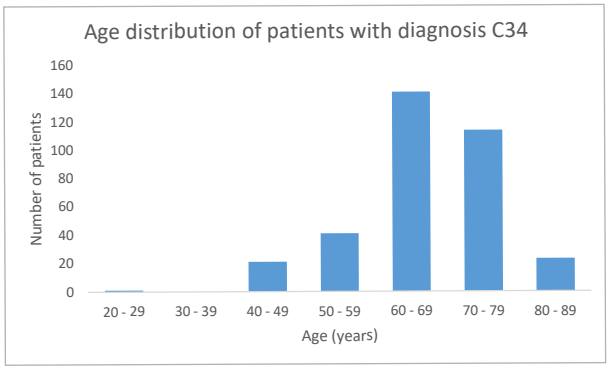
In 2023, we also managed to start a cooperation with the Institute of Economic and Social Studies (INESS) which included a presentation of the **analysis of the current state of lung cancer in Slovakia.** This included the analysis of incidence, mortality, socio-economic burden and availability of innovative treatment for patients with the disease. Its outputs are an important supporting material to define the current situation of patients with the lung cancer diagnosis. **A reflection on the analysis outputs led to processing Slovak data about the stages of the disease in histologically verified patients coded C34.**

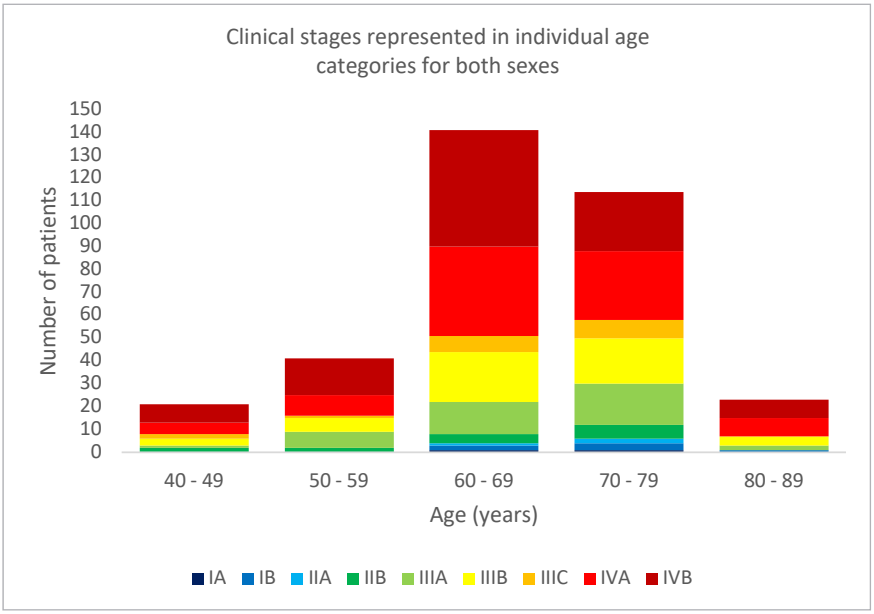
Under the leadership of Dominik Juskanič, M.D., EDiNR, the experts analyzed existing CT exams and medical reports of 334 patients in the Nitra region in 2020 – 2021.

The lung cancer set included 69% of men and 31% women. **The majority of patients with lung cancer was diagnosed at the age of 50 – 80,** which serves as the basis for the planned screening population and expects the most positive effect of the screening in this part of the population. The most patients were in disseminated clinical stages IVA and IVB (59% of patients from the entire set). The next ranks belonged to clinical stages IIIA, IIIB and IIIC with 34% of patient. **Only a very small share of patients was in stages IA – IIB (less than 10%), which is alarmingly low** and confirms the latest data from NOR SR. The most common lung comorbidity was lung emphysema which represented 43% cases.

Distribution of results according to age and clinical stage and the ratio of clinical stages in individual decades of age for both sexes can be found in the following charts.





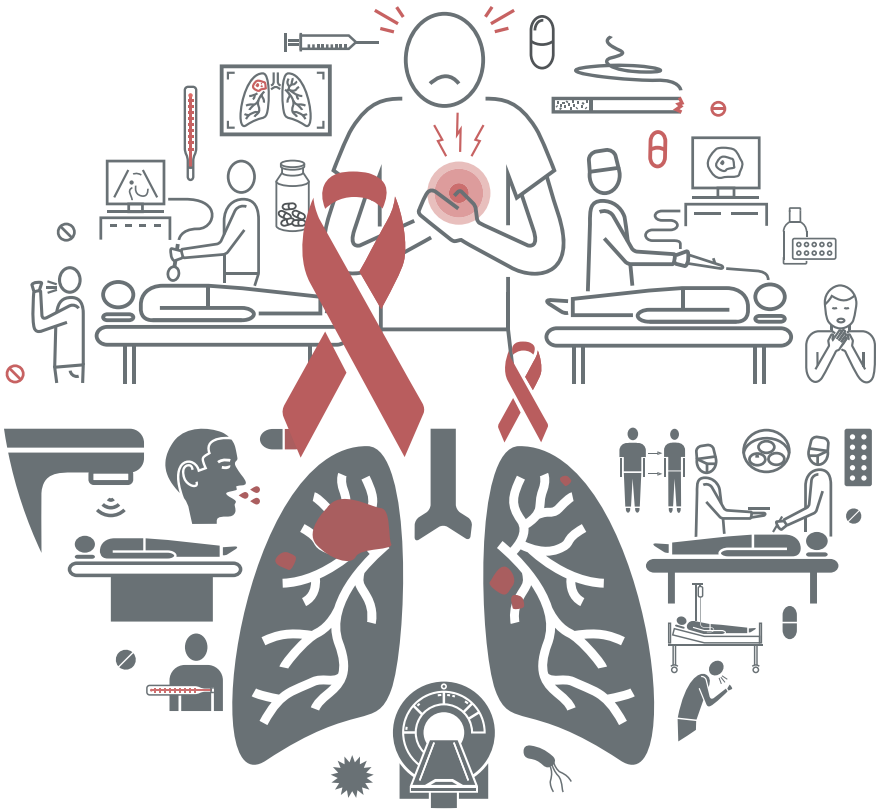


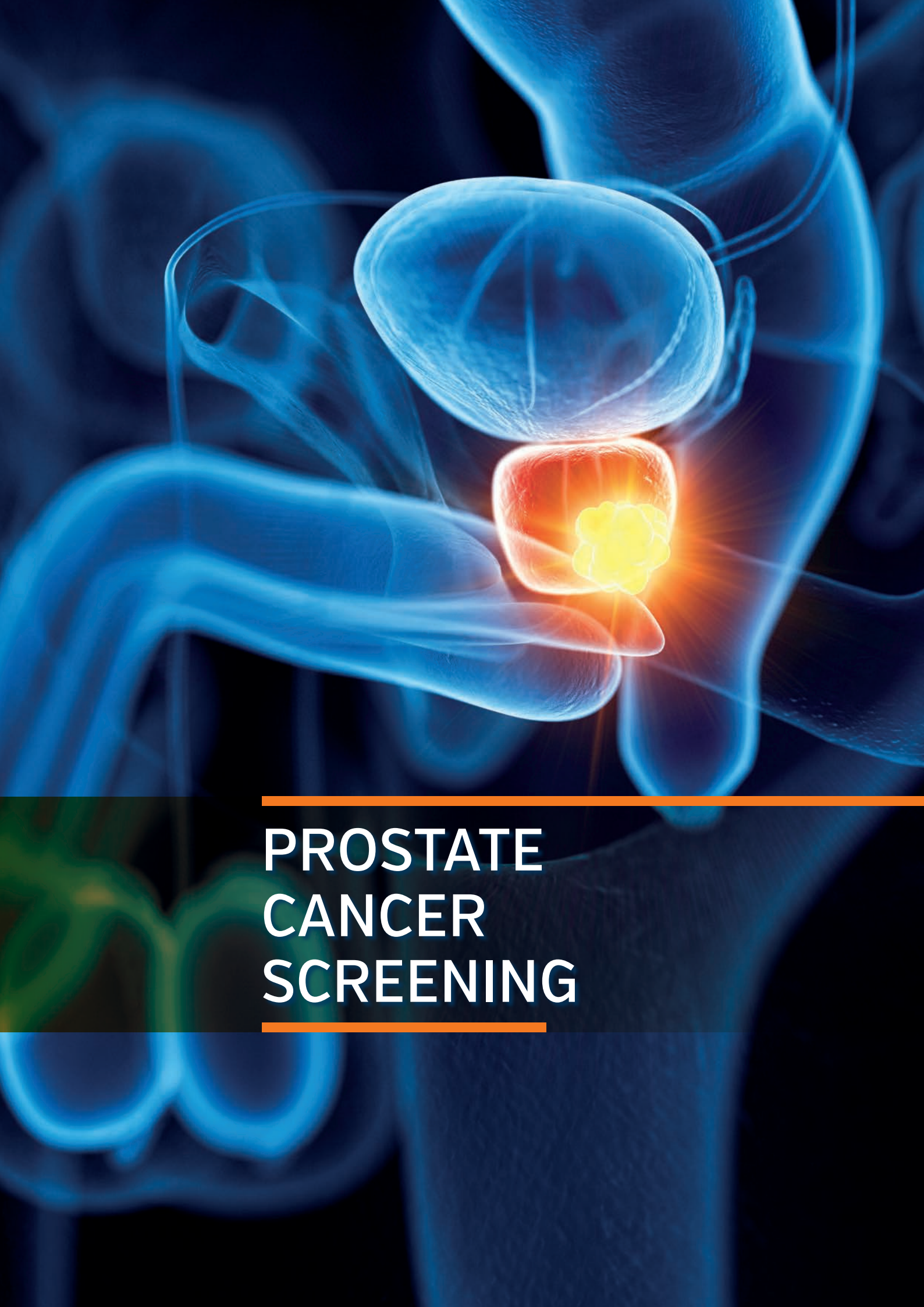
VISION FOR 2024

In 2024, we are planning to continue the supporting activities for implementation of the pilot lung cancer screening project based on the EUCanScreen project with Slovak participation of MoH SR and NOI. We will continue our cooperation with MoH SR to define the methodical instruction and timeframe for the pilot initiation of the lung cancer screening program.

A cooperation between the Department of Thoracic Radiology and Department of Radiation Protection and Medical Physics in Radiology was initiated within the Slovak Radiological Society to integrate procedures specific to screening exams by low-dose chest CT. This project will help standardize audit processes regarding reference levels defined in the Standard Procedure for Lung Cancer Screening and will offer good grounds for the MoH SR Committee for Quality Assurance in Radiodiagnostics, Radiation Oncology and Nuclear Medicine regarding the screening.
We plan to intensify awareness campaigns about lung cancer with the support of relevant professional and patients' organizations and the OnkoKontrola initiative, including possibilities of prevention, early diagnostics and treatment.

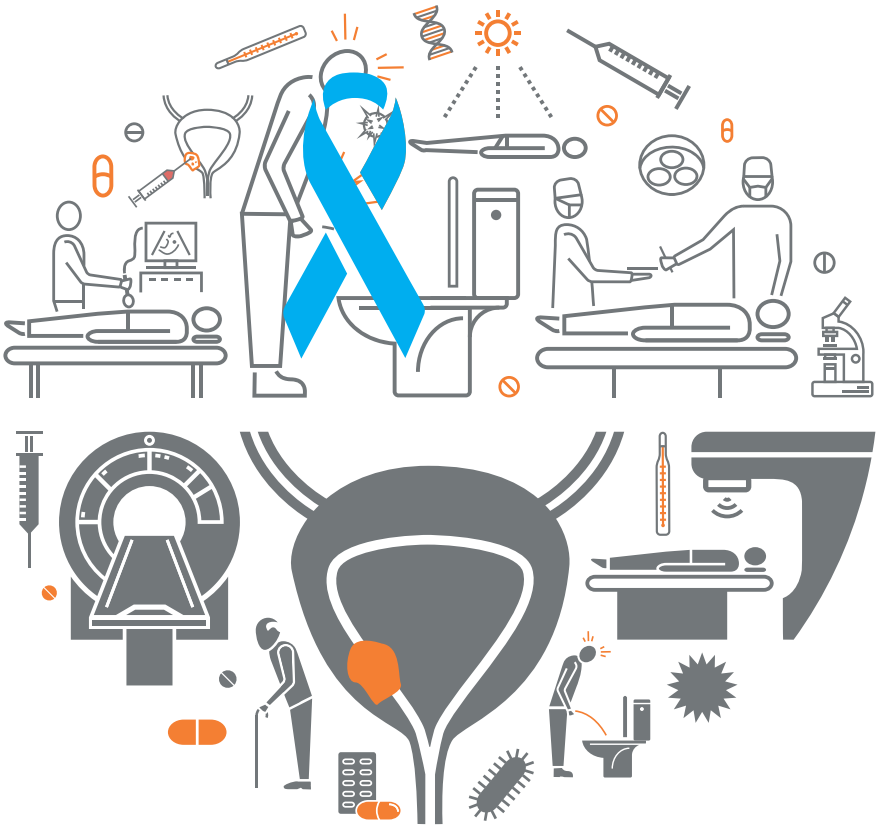
The plan is to develop more activities to raise awareness among the lay public and experts, especially indicating physicians and radiologists, and to promote awareness raising about the topic by media activities to inform about the social need for prevention of serious diseases with high mortality in our population.





PROSTATE CANCER SCREENING

Prostate cancer is the third most commonly diagnosed malignant oncological disease in men in Slovakia. Prostate cancer screening is currently defined within routine urology check-ups (Law No. 577/2004 Coll.) and done on an opportunistic basis. An initial discussion about the implementation of organized prostate cancer screening took place at the end of 2022 among NOI representatives and the president of the Slovak Urological Society, Assoc. Prof. **Ivan Minčík**, M.D., PhD. The MoH SR Cancer Screening Committee will appoint a committee member for this screening program, as is the case with other screenings, then create a working group whose role will be to prepare a proposal for a pilot phase of prostate cancer screening according to the EUCanScreen project with a careful appreciation of all possible risks and a Standard Procedure for Prostate Cancer Prevention.



Conclusion

Prevention is an inherent part of citizen care in developed societies. Its role is to prevent diseases in case of primary prevention, detect diseases in an early stage in case of secondary prevention (screening) or reduce the impact of an already developed disease in case of tertiary prevention.
By introducing organized cancer screening programs, Slovakia has become one of the countries which implement preventive cancer programs beneficial for the entire society and recommended by the European Commission. However, there is still room for improvement, adjustment and enhancement of the ongoing screening programs to promote health and reduce mortality of oncological diseases. That is why Slovakia takes part in important international projects which can help us do just that, with the help of government representatives led by the MoH SR.
However, every Slovak citizen should be more aware about the price of health and take greater responsibility for it, know and use free state-provided preventive and screening programs and thus contribute to their own health.
Cooperation of all professional stakeholders is necessary, with the well-being of the patient at the forefront.

PRIMUM NON NOCERE, SECUNDUM CAVERE, TERTIUM SANARE.

ACKNOWLEDGMENTS

We want to thank state organizations and institutions, health insurance companies, expert societies, experts, patients' organizations, coworkers, colleagues and everyone who has contributed to the publication and continues helping the very important issue of cancer screenings; MoH SR, NCI, PHA, NHIC, HCSA, health insurance companies VšZP, Dôvera, Union, SOS, SGS, SGPS, SRS, SSP, SkSGP, SVLS, AVLS, ÚZIS, League Against Cancer, No to Cancer, The Amazons, Pink Ribbon, Slovak Patient, IARC, ISPRO, WHO, Erasmus MC, Syreon Research Institute, IACR, ONS, CPO, Erasmus MC Cancer Institute Nederland, Onkološki Inštitut Ljubljana, MUNI, MOÚ, ÚZIS.

Information about screenings for professional public is available at the NOI website:
https://www.noisk.sk/screening/professionals
Information about screenings for lay public is available at the NOI website:
https://www.onkokontrola.sk

Annex 1 Mammography Screening Assessment Report for 2023
Annex 2 Cervical Cancer Screening Statistical Assessment for 2023
Annex 3 Colorectal Cancer Screening Statistical Assessment for 2023

Annexes

MAMMOGRAPHY SCREENING SR

Assessment Report for 2023

Statistical outputs from anonymized data provided by certified mammography screening facilities and health insurance companies in 2023

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National Oncology Institute would like to thank all physicians, radiology assistants, nurses as well as other healthcare professionals who contribute to breast cancer mammography screening by their daily work. We thank the Ministry of Health of the SR, the Cancer Screening Committee of the MoH SR, health insurance companies and National Health Information Center for their support and cooperation. We are also particularly grateful for the support and cooperation of gynecologists and general practitioners for adults, as well as all other experts participating in the management of women with diseases of the breast, patients' organizations, volunteers and the public. Only a well-rounded, high-quality and long-term cooperation in mammography screening can bring excellent results and save lives and health of Slovak women.

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LIST OF CHARTS AND TABLES

LIST OF ABBREVIATIONS

CH	chart
MMG	mammography exam
MoH SR	Ministry of Health of the Slovak Republic
NHIC	National Health Information Center
NOI	National Oncology Institute established under National Cancer Institute
NOR	National Oncology Register
NUTS 2	Area (in European texts denoted as “region” (in a narrower sense of the word) or a group of regions) is a second order statistical territorial unit on a regional level (NUTS 2 in European terminology) in Slovakia
SR	Slovak Republic
T	table
HIC	health insurance company

FOREWORD

Breast cancer mammography screening program is a long-term, systematic, monitored, state-supported and guaranteed detection of early stages of breast cancer in asymptomatic women from the target population. Its main objective is to reduce mortality, prolong the lives of women and improve their quality of life thanks to a more effective treatment of early stages of the disease. After implementation of general mammography screening and increasing participation rate of women, there is a transitory period of higher incidence in the target female population followed by an increased detection of early stages and a long-term drop in mortality.

These indicators are influenced by other independent factors, such as risk factors of the participating population, development of diagnostic methods and their implementation, development of treatment methods, awareness and education of the population as well as, very importantly, the quality and up-to-dateness of the data collected in National Screening and Oncology Register. Precise impact of mammography screening on the population can be assessed only after these factors are quantified.

That is why long-term, regular statistical evaluation of changes in the spectrum of detected malignancies and screening outcomes validation are a crucial process in order to ensure quality of individual facilities as well as general mammography screening.

In Slovakia, screening mammography can be performed only in certified mammography screening facilities which work effectively, promptly and with a high level of professionalism, ensuring immediate and efficient management of detected malignancies according to requirements laid out in the valid *Standard Procedure for Medical Radiation and Prevention – Screening Mammography*.

It has also been possible for radiologists in certified mammography screening facilities to transform preventive mammography referrals to screening mammography since May 15, 2021 if the woman belongs to the age interval, i.e., 50 – 69 years, and fulfils all inclusion criteria.

Another part of mammography screening is the collection and evaluation of statistical results in a binding structure, which is not only a precondition of self-check of individual screening mammography facilities, but also a precondition of statistical data collection about screening participants and its evaluation.

From January 1, 2023, to December 31, 2023, statistical data was collected by National Oncology Institute (NOI) according to the approved design of data collection based on the valid *Standard Procedure for Medical Radiation and Prevention – Screening Mammography* (hereinafter referred to as standard procedure) in order to adhere to all legislation regarding data protection.

Mammography screening currently takes place in 22 certified mammography screening facilities which have fulfilled the conditions of participation in mammography screening according to the valid standard procedure. Their activities must be regularly checked and monitored according to transparent rules laid out in the standard procedure.

The course of the program, adherence to set rules as well as scientific development of the project are supervised by NOI and Cancer Screening Committee of the MoH SR whose working group for breast cancer screening unites radiologists – mammography diagnosticians, representatives of all medical specialties involved in diagnostics and treatment of breast diseases as well as representatives of other stakeholders including MoH SR, NOI, health insurance companies, National Health Information Center (NHIC) and Healthcare Surveillance Authority. The breast cancer screening program is supervised by the MoH SR and fully reimbursed by health insurance companies. The MoH SR also guides the methodology and legislation associated with the screening program. NOI coordinates and evaluates the program, which is important in order to determine the effectiveness of the mammography screening and adjust future processes.

Expert Working Group for Quality Assurance of Mammography Facilities of the MoH SR Committee for Quality Assurance in Radiodiagnostics, Radiation Oncology and Nuclear Medicine is an integral part of mutual cooperation in terms of quality assurance and increasing the number of certified mammography screening facilities, long-term regular checks and quality assurance of certified mammography screening facilities as well as precise collection of statistical data about performed examinations.

Data audit and statistical processing of data is in the authority of National Oncology Institute in close cooperation with MoH SR, Slovak Radiological Society and mainly health insurance companies with the objective to develop a

cooperation with NHIC in order to collect all necessary data from the screening program efficiently as well as adjust the flow of data between health insurance providers involved in the screening program, NHIC and NOI. A binding parametric structure of information about the participants in mammography screening and their examinations is in preparation to ensure the quality of data collection by NOI. This data will be a requirement and part of re-assessment of mammography screening facilities involved in the screening and, as such, a precondition for further participation in the mammography screening. The parametric structure of data collection by NOI will be regularly updated according to the development of the screening process.

Total participation rate of women in the mammography screening is still relatively low. This is due to several factors:

a) The COVID-19 pandemic stopped or reduced the number of people coming to facilities in 2021.
b) There is no general system of targeted invitations in Slovakia. Health insurance companies envisage a preparation of targeted invitations sent to all screening participants, also repeatedly in case of non-participation. Another option to increase the participation rate of women throughout Slovakia is to consider using another, more active way of inviting the target population. Since May 15, 2021, repeated invitations have been sent by certified mammography screening facilities where the woman had undergone the screening.
c) An estimated 20% of women in Slovakia undergo preventive mammography examinations in other than certified diagnostic-preventive mammography facilities, which is called opportunistic screening. It is necessary to transfer these examinations to high-quality certified mammography screening facilities.
d) The network of 22 certified mammography screening facilities is insufficient and there are regional disparities regarding their availability, which is why it is necessary to ensure continuous activity of the Expert Working Group for Quality Assurance of Mammography Facilities in order to continue certifying other registered mammography facilities interested in the mammography screening. Continuous education of healthcare professionals about screening mammography is equally important. Another vital activity is increasing the possibilities of education in mammography diagnostics in radiology as a certified work activity.
e) It is also necessary to increase the participation rate of women in the mammography screening by educational campaigns repeated several times per year with unified communication from all stakeholders – MoH SR, NOI, health insurance companies, expert societies and patients' organizations.

METHODOLOGY

The presented data is based on the collection and processing of anonymized data provided by all health insurance companies (HICs) (based on NOI's request from March 27, 2024) and certified mammography screening facilities to the National Oncology Institute.

Mammography examinations all around Slovakia in 2023 were categorized as follows:

a) **Screening mammography** (organized mammography screening), i.e., mammography of asymptomatic women aged 50 – 69 + 364 days performed in a certified mammography screening facility.

The list of mammography facilities evaluated by the expert working group and recommended to be included in the mammography screening by the committee is regularly updated by the MoH SR and published at its website.[1]

b) **Preventive mammography** (opportunistic mammography screening), i.e., mammography of asymptomatic women aged 40 – 69 performed in a preventive-diagnostic (i.e., other than certified screening) mammography facility. Preventive mammography is also a mammography exam of an asymptomatic woman aged 40 – 49 performed in a certified mammography screening facility.

c) **Diagnostic mammography**, i.e., mammography of women with symptoms of breast disease. Diagnostic mammography is performed in all mammography facilities regardless of whether it is a certified mammography screening facility or other, i.e. preventive-diagnostic mammography facility.

A specific type of mammography screening is **screening mammography in high-risk female population** for which a new standard procedure *Breast Cancer Screening in High-Risk Female Population* was approved in November 2022.[2] This standard diagnostic procedure adjusts the course of breast cancer screening in case of asymptomatic women at high risk of development of the disease via complex radiology imaging diagnostics in order to detect suspect non-palpable breast lesions early. It is based on an SSLG methodical instruction *Standard Diagnostic Procedure for Complex Genetic Laboratory Diagnostics for Hereditary Breast, Ovarian and Pancreatic Cancer Syndrome* and *Standard Procedure for Medical Radiation and Prevention – Screening Mammography / Standard Procedure for Breast Cancer Prevention via Population-Based Screening Method – Screening Mammography.*[3]

However, we do not have any data regarding women in the high-risk population at the moment, which does not allow us to perform statistical evaluation of the group and consequently take it into consideration when assessing and updating mammography screening.

Given that the standard procedure for breast cancer screening in high-risk female population could not be fully implemented in clinical practice in 2023 due to legislative reasons and there are still no specific procedure codes or diagnosis codes for this group of women through which they could be identified, asymptomatic women aged 50 – 69 + 364 days with a positive family history of breast cancer were included in screening mammography in 2023.

Another specific group are women monitored for breast cancer or in situ breast cancer, or in long-term remission. Based on the 3rd revision of the *Standard Procedure for Medical Radiation and Prevention – Screening Mammography / Standard Procedure for Breast Cancer Prevention via Population-Based Screening Method – Screening Mammography*[3] approved in November 2022, the indication for mammography screening covers also asymptomatic women with a personal history of breast cancer who have ended their 10-year follow-up care and currently do not show any signs of activity of the original oncological disease. However, since the standard procedure did not manage to be fully implemented in clinical practice in 2023, this group of women was reported under diagnostic mammography in 2023.

[1]MoH SR. List of mammography facilities evaluated by the expert working group and recommended to be included in the mammography screening by the committee. 2024. Available online: https://www.health.gov.sk/Clanok?dops-zamerana-na-zabezpecenie-kvality-namamografickych-preventivnych-a-diagnostickych-pracoviskach

[2]Lehotská V, Rauová K, Lohajová, Behúlová R, Urbán V, Lauková T et al. 2022. Breast Cancer Screening in High-risk Female Population – Standard Procedure. [online]. Bratislava: Ministry of Health of the Slovak Republic, 2022. 11 pp. Available online: https://www.noisk.sk/files/2022/2022-11-11-standardny-postup-pre-skrining-karcinomu-prsnika-vo-vysokorizikovej-populacii-zien.pdf

[3]Horváthová M, Lehotská V, Nikodemová D, Kállayová A, Slobodníková A. 2021. Standard Procedure for Medical Radiation and Prevention – Screening Mammography. 3rd revision [online]. Bratislava: Ministry of Health of the Slovak Republic, 2021. 50 pp. Available online: https://www.noisk.sk/files/2022/2022-11-11-skriningova-mamografia-3-revizia.pdf

However, we strongly believe that it will be possible to evaluate the aforementioned statistical data regarding specific mammography screening groups properly thanks to an established MoH SR working group for data collection for all cancer screenings (including mammography screening) and thanks to a more intense cooperation with NHIC, including getting more up-to-date information from NOR, which would be one of the key components to help us define these groups.

The 3rd revision of the standard procedure[3] brings other important changes based on recommendations of the European Commission regarding mammography screening, but it will only be possible to implement these in clinical practice in the upcoming period. One of important changes is an adjustment of age group for mammography screening which is now extended to 45 – 75 years. However, it has to be noted that this amendment proposed by NOI and MoH SR (from November 2022) did not enter into application in 2023 because it has not been approved by the parliament. This means that only asymptomatic women aged 50 – 69 + 364 days are considered mammography screening target group in the statistical processing of mammography screening data.

Screening mammography performed in certified mammography screening facilities in 2023 was reported by cumulative screening procedure codes 1301, 1301a, 1301b, 1301c, 1301d, 1301e, 1301f and diagnosis codes Z01.6; Z80.3; Z87.7[4,5] regardless of whether the woman in question received an invitation from her HIC or not. In some specific cases in 2023, women who went to a certified mammography screening facility and underwent screening mammography were still reported by procedure codes 5092 or 5092p with diagnosis codes Z00 – Z80.[4,5]

Demographic statistical data were taken from the Statistical Office of the SR.[6] Data about women with permanent residence in Slovakia as of July 31, 2023, were taken into account.

Relative quantity indicators are recalculated per number of women in the given area aged 50 – 69 who represent the target group of the mammography screening in the SR.

The mammography screening coverage was calculated as a ratio of mammography exams actually carried out (i.e., mammography exams performed in a mammography facility according to its territorial activity) and the number of women entitled to screening mammography (i.e., women entitled to a screening mammography in the given region) while adhering to a 2-year screening interval. All women diagnosed with breast cancer or in palliative care should be subtracted. We should also subtract women at high risk of breast cancer given that a specific screening procedure is indicated for this group (different age, imaging methods and intervals) and these should be evaluated separately. However, due to lack of statistical data regarding the number of women diagnosed with breast cancer as well as lack of data about the number of women in the high-risk group it was not possible to do a precise analysis and use the methodical procedure to evaluate mammography screening statistical data from 2023.

Statistical data about the population incidence of women with breast cancer (C50) including information about the clinical stage on a population-wide level were taken from the most up-to-date available data from the NOR which were published by NHIC in 2024. More specifically, the following sections were used: Reported oncological diseases, selected benign tumors and tumors of uncertain malignant potential in Slovak women according to age group and disease location in 2014; clinical stages of reported oncological diseases in Slovak women according to disease location in 2014.[7] Statistical data about the population mortality of women with breast cancer (C50) were taken from the most up-to-date available data from the Statistical Office of the SR which were published by NHIC in 2024.[8]

Discrepancies between statistical data from mammography screening provided by certified

[4]NOI. Mammography Screening SR: Addendum. Statistical outputs from anonymized data provided by MoH SR and health insurance companies in 2021. 2022. Available online: https://www.noisk.sk/files/2022/2022-11-08-hodnotiaca-sprava-mamograficky-skrining-2021-doplnok-sk.pdf

[5]NOI, Behúnová Z. Methodical instruction for procedure and diagnosis code reporting for healthcare providers and their subsequent reimbursement in relation to population-based breast cancer screening implementation [proposal in preparation].

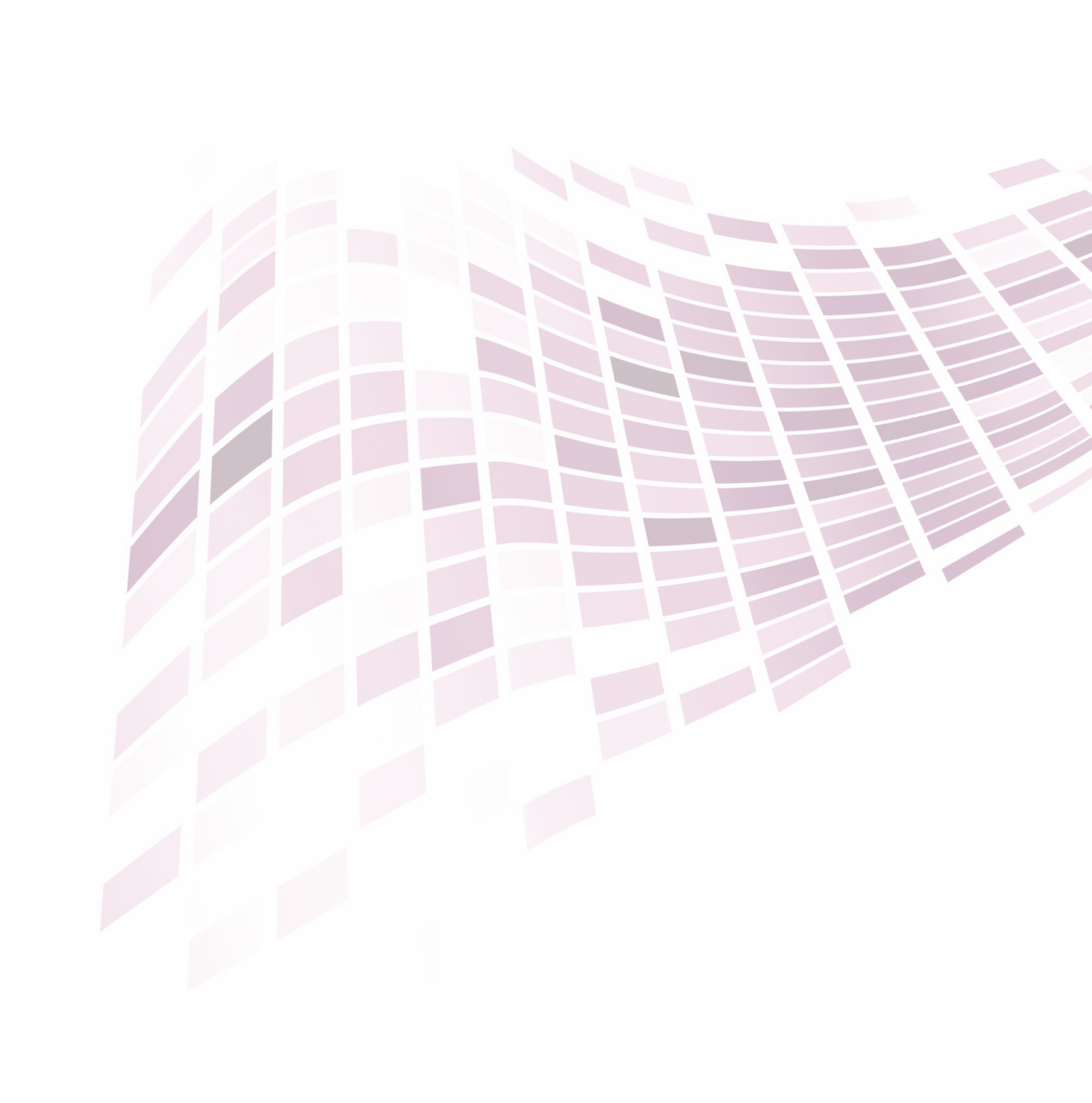
[6]Statistical Office of the SR. STATdat. Demographics and social statistics. 2023. Available at: http://statdat.statistics.sk/cognosext/cgi-bin/cognos.cgi?b_action=cognosViewer&ui.action=run&ui.object=storeID%28%22i40A03AF2150C41DE8BE98D0C0C41A764%22%29&ui.name=Vekov%c3%a9%20zlo%c5%beenie%20-%20SR%2c%20oblasti%2c%20kraje%2c%20okresy%2c%20mesto%2c%20vidiek%20%5bom7009rr%5d&run.outputFormat=&run.prompt=true&cv.header=false&ui.backURL=%2fcognosext%2fcps4%2fportlets%2fcommon%2fclose.html&run.outputLocale=sk

[7] NHIC. Outputs from the National Oncology Register of the SR. Incidence of Malignant Tumors in Slovakia 2014. Available online: https://www.nczisk.sk/Statisticke_vystupy/Tematicke_statisticke_vystupy/Onkologia/Vystupy_NOR_SR/Pages/Incidencia-zhubnych-nadorov.aspx

[8] NHIC. Mortality of Oncological Diseases in Slovakia 2022. Available online: https://app.powerbi.com/view?r=eyJrIjoiMjA3MGI0MTMtOGE4OS00NTFhLThkMmEtYzFhN2ZhYjMwOTdiIiwidCI6IjMxMGJhNTk1LTAxM2MtNDAyZC05ZWYyLWI1N2Q1ZjFkY2Q2MyIsImMiOjl9

mammography screening facilities and health insurance companies were calculated as the difference in percentage between these data.

Due to rounding to one decimal place, the sum of percentages does not have to equal one hundred.



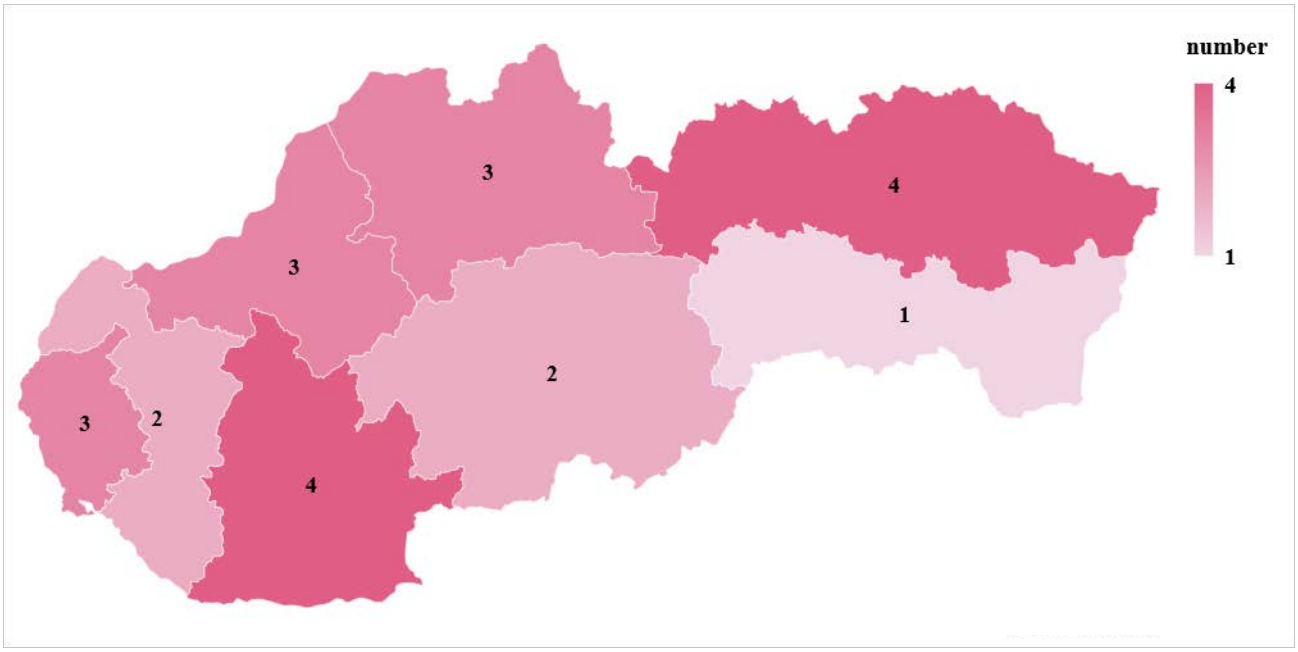
1. NUMBER OF CERTIFIED MAMMOGRAPHY SCREENING FACILITIES IN THE SR

From January 1, 2023, to December 31, 2023, the Expert Working Group for Quality Assurance of Mammography Facilities of the MoH SR Committee for Quality Assurance in Radiodiagnostics, Radiation Oncology and Nuclear Medicine listed 23 certified mammography screening facilities in the List of Mammography Facilities with **22 certified mammography screening facilities in the SR as of December 31, 2023** (CH *1*, T *1*).

In 2023, three new mammography facilities were added to the List of Mammography Facilities certified by the Expert Working Group for Quality Assurance of Mammography Facilities of the MoH SR Committee for Quality Assurance in Radiodiagnostics, Radiation Oncology and Nuclear Medicine. On the other hand, one certified mammography screening facility which was included in the certified mammography screening facility network in 2019 was excluded from the network in 2023. This happened because the facility did not comply with the criteria for the performance of screening mammography according to the Standard Procedure for Breast Cancer Prevention via Population-Based Screening Method – Screening Mammography (3rd review).

Given that one facility was excluded from the screening mammography facilities network and new screening mammography facilities were only certified in the second half of the calendar year, the statistical processing took into account data in the following manner:

- January – June 2023: data from 20 facilities
- July – August 2023: data from 19 facilities *(note: one facility was excluded)*
- September 2023: data from 20 facilities *(note: one facility was newly certified)*
- October – December 2023: data from 21 facilities *(note: second facility was newly certified)*
- Given that the third facility was included in the screening mammography facility network only at the end of November 2023, i.e., started functioning as a certified mammography screening facility only in 2024, the statistical processing did not include data from this facility.



CH 1. Number of certified mammography screening facilities in regions of the SR as of December 31, 2023.

T 1. Number of certified mammography screening facilities in the SR as of December 31, 2023.

Location	Name of the facility	Address of the facility
Banská Bystrica	AGEL Mammacenter of St. Agatha (Mammacentrum sv. Agáty a.s.)	Tibora Andrašovana 46, 974 01 Banská Bystrica
Bardejov	St. Jacob Hospital with Policlinic, n.o. (NsP Sv. Jakuba, n.o.)	Sv. Jakuba 21, 085 01 Bardejov
Bratislava	2nd Radiology Clinic of the Faculty of Medicine of Comenius University and Saint Elizabeth Cancer Institute	Heydukova 10, 812 50 Bratislava
	Ružinov Policlinic (Ružinovská poliklinika, a.s.)	Ružinovská 10, 820 07 Bratislava
Dolný Kubín	Dr. L. Nádaši Jégé Lower Orava Hospital with Policlinic	Nemocničná 1944/10 026 01 Dolný Kubín
Košice	Mammography Diagnostic Center; AGEL Hospital Košice-Šaca a.s.	Lúčna 57 040 15 Košice-Šaca
Liptovský Hrádok	SVALZY, s.r.o.	Ul. J.D. Matejovie 542, 033 80 Liptovský Hrádok
Lučenec	SOMATO s.r.o.	Mammography Facility Q Policlinic Rúbanisko II/77 984 03 Lučenec
Malacky	Nemocničná a.s.	Duklianskych hrdinov 34, 901 22 Malacky
Nové Zámky	Teaching Hospital with Policlinic Nové Zámky	Slovenská 11/A 940 34 Nové Zámky
Nitra	Jessenius – Diagnostic Center a.s.	Špitálska 6, 949 01 Nitra
Poprad	Hospital Poprad a. s.	Banícka 803/28, 058 45 Poprad
Prešov	J. A. Reiman Teaching Hospital with Policlinic Prešov	Hollého 14, 081 81 Prešov
Prievidza	St. Vincent – Radiology, s.r.o.	Hviezdoslavova 3, 971 01 Prievidza
Ružomberok	SNP Central Military Hospital Ružomberok Teaching Hospital	Ul. Generála Miloša Vesela 21, 034 01 Ružomberok
Stará Ľubovňa	Ľubovňa Hospital (Ľubovnianska nemocnica n.o.)	Obrancov mieru 3, 064 01 Stará Ľubovňa
Topoľčany	Mammography and Ultrasound Office Topoľčany, Lisánska, M.D.	Moyzesova 1333/1A, 955 01 Topoľčany
	PentaHospitals Hospital Topoľčany a.s.	Pavlovova 17, 955 20 Topoľčany
Trenčín	Radiology Clinic s.r.o.	K dolnej stanici 18, 911 01 Trenčín
	Teaching Hospital Trenčín	Legionárska 594/28, 911 01 Trenčín
Trnava	MRI, s.r.o. Imaging Diagnostics Institute (Inštitút zobrazovacej diagnostiky)	Družba Policlinic Starohájska 2, 917 01 Trnava
	Teaching Hospital Trnava	A. Žarnova 11, 917 75 Trnava

2. DEMOGRAPHICS AND PARTICIPATION RATE OF WOMEN INVITED BY HEALTH INSURANCE COMPANIES IN 2023

Based on data from the Statistical Office of the Slovak Republic, there were 720,618 women aged 50 to 69 in Slovakia as of July 1, 2023. When taking into account a 2-year screening interval and inclusion and exclusion criteria, **360,309 women should have attended the mammography screening in 2023** (all women diagnosed with breast cancer or in palliative care at that time should be subtracted).

Within mammography screening implementation in Slovakia, health insurance companies (VšZP, Union, Dôvera) send invitations to women aged 50 – 69 who have not attended a mammography exam in more than 2 years and fulfill the precise inclusion and exclusion criteria. The total number of invited women from January to December 2023 was 137,997, i.e., **the invitation coverage was 38.3%** when taking into account the 2-year screening interval (T 2, T 3).

In 2023, 31,915 women underwent the mammography screening based on an invitation from their HIC by 365 days from the invitation (i.e., women who received an invitation from HIC in 2022 – 2023 and subsequently underwent a mammography exam in 2023). Of this number, 25,406 underwent mammography screening based on an invitation from HIC received in 2023 and the rest, i.e., 6,509 women, underwent mammography screening based on an invitation received in the previous year, i.e., in 2022. **The participation rate of women who underwent the mammography screening in 2023 based on an invitation from their HIC by 365 days from the invitation was 23.1%.**

The participation rate of women aged 50 – 69 who received an invitation from their HIC in 2023 and then underwent the mammography exam the same year was 18.4%. This means that out of the total number of invited women who received an invitation that year, 25,406 underwent screening mammography, which corresponds to **7.1% of the target female population**. Of the total number, 15,870 women were examined based on an invitation from their HIC in other than certified mammography screening facility, i.e., **11.5% of the invited women**, which corresponds to 4.4% of the target female population (**opportunistic mammography screening**). 9,536 women were examined by screening mammography in a certified mammography screening facility, i.e., **6.9% of the invited women**, which corresponds to 2.6% of the target female population (**organized mammography screening**).

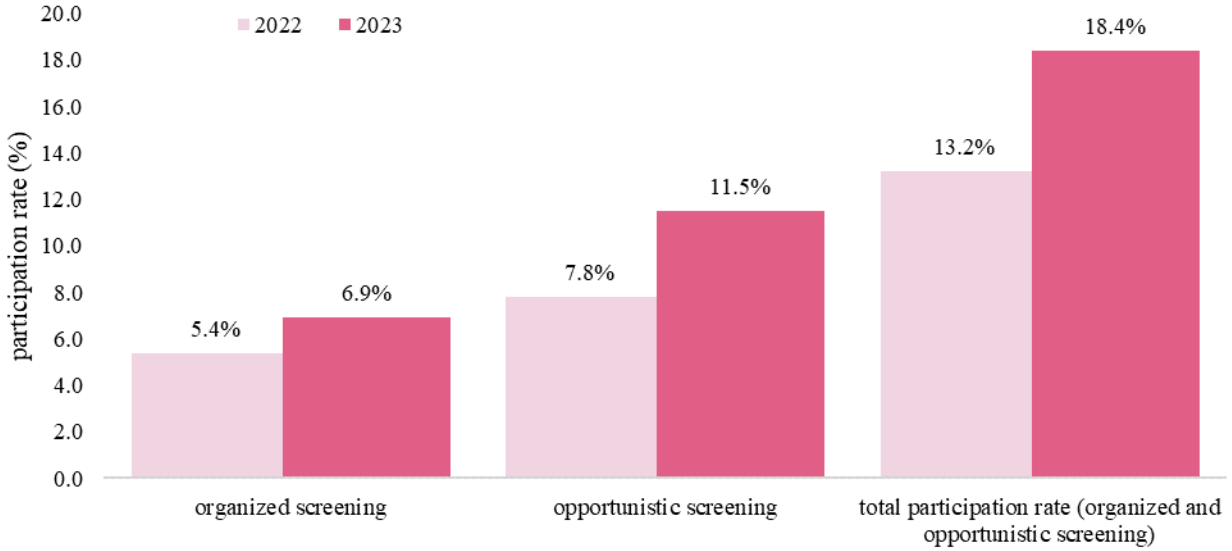
Compared to 2022, we can see an increase of 5.2% of the participation rate of women in mammography screening based on an invitation from HIC received in the same year (CH 2).

T 2. Number of women invited to screening mammography exam by health insurance companies in 2023.

Health insurance company	Number of invited women aged 50 – 69
VšZP	57,600
Dôvera	62,847
Union	17,550
Total invited women	**137,997**
Invitation coverage	**38.3%**

T 3. Share of women aged 50 – 69 who underwent a mammography exam in 2023 based on an invitation from their HIC received that same year.

Participation in mammography screening	Number of women who underwent mammography screening based on HIC invitation	Participation rate of women based on an invitation from HIC
In a certified mammography screening facility (organized screening)	9,536	6.9%
In other than certified mammography screening facility (opportunistic screening)	15,870	11.5%
Total participation rate of women based on an invitation from HIC	**25,406**	**18.4%**



CH 2. Comparison of the participation rate of women aged 50 – 69 who received an invitation from their HIC in 2023 and then underwent the mammography exam.

3. STATE OF ORGANIZED AND OPPORTUNISTIC MAMMOGRAPHY SCREENING IN THE SR ACCORDING TO ANONYMIZED DATA FROM HEALTH INSURANCE COMPANIES IN 2023

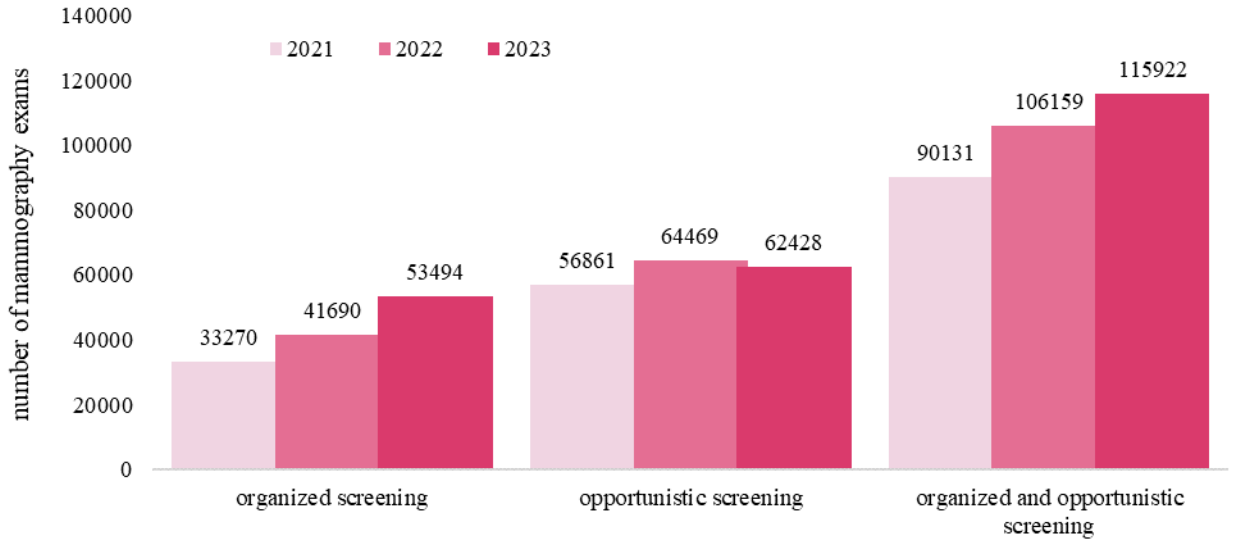
297,186 mammography exams (including preventive, screening and diagnostic mammography in all age groups) were performed in 295,632 women at radiology (mammography) facilities in 2023. Of this number, 63% corresponded to mammography exams of asymptomatic women (i.e., 188,300 mammography exams) and 37% represented mammography exams of women with breast disease symptoms (i.e., 108,886 mammography exams).

Regarding age structure, 165,772 mammography exams were performed in 164,484 women (with or without breast disease symptoms) **aged 50 – 69** (mammography screening target group in the SR) in 2023, which corresponds to mammography exam coverage of 45.7% (including preventive, screening, diagnostic mammography). Of this number, 49,850 mammography exams were performed in women with breast disease symptoms (30% of all mammography exams in women aged 50 – 69) and **115,922 mammography exams in asymptomatic women** (70% of all mammography exams in women aged 50 – 69). Of this number, **53,494 women** were examined by screening mammography within the **organized mammography screening,** which represents **46% of all mammography exams performed in asymptomatic women.** The historically obsolete preventive mammography (i.e., **opportunistic screening**) was undergone by **62,428 asymptomatic women**, which corresponds to **54% of all mammography exams performed in asymptomatic women**.

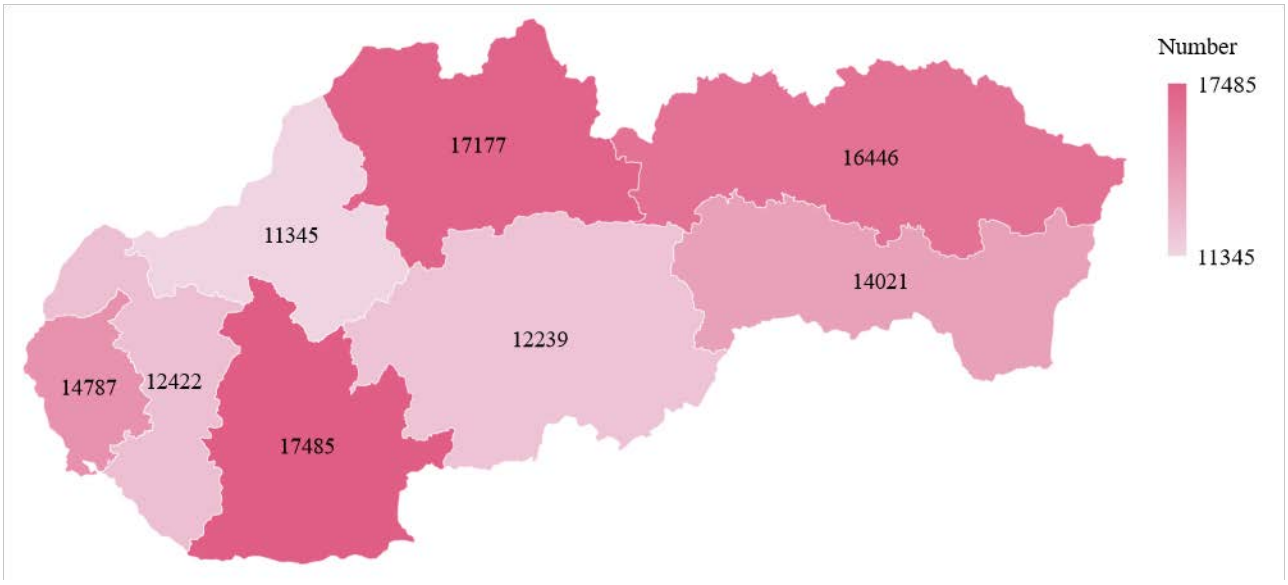
With time, we can see an increase not only in the number of asymptomatic women examined by screening mammography but also an increasing percentage of women examined by screening mammography in certified mammography screening facilities (T *4*, *T 5*, *CH 3*, *CH 4*).

T 4. Comparison of the number of mammography exams in asymptomatic women performed in certified mammography screening facilities and other facilities in 2021 – 2023.

	Number of mammography exams in asymptomatic women aged 50 – 69		
Mammography screening	**2021**	**2022**	**2023**
Organized screening	33,270 (37%)	41,690 (39%)	53,494 (46%)
Opportunistic screening	56,861 (63%)	64,469 (61%)	62,428 (54%)
Organized and opportunistic mammography screening	90,131 (100%)	106,159 (100%)	115,922 (100%)



CH 3. Comparison of the number of mammography exams in asymptomatic women performed in certified mammography screening facilities (organized screening) and other facilities (opportunistic screening) in 2021 – 2023.



CH 4. Number of all mammography exams of asymptomatic women aged 50 – 69 (organized, opportunistic screening) in the SR in 2023 per region of the mammography facility in which the mammography was performed.

T 5. Number of mammography exams in asymptomatic women aged 50 – 69 performed in certified mammography screening facilities (organized screening) and other facilities (opportunistic screening) in 2023.

Territory of activity of mammography facility	Number of all mammography exams of asymptomatic women aged 50 – 69	Number of mammography exams in asymptomatic women aged 50 – 69	
		in a certified mammography screening facility	in other than certified mammography screening facility
Banská Bystrica region	12,239	6,433	5,806
Bratislava region	14,787	9,311	5,476
Košice region	14,021	1,486	12,535
Nitra region	17,485	10,110	7,375
Prešov region	16,446	7,940	8,506
Trenčín region	11,345	5,551	5,794
Trnava region	12,422	7,558	4,864
Žilina region	17,177	5,105	12,072
SLOVAK REPUBLIC	**115,922**	**53,494**	**62,428**

The total mammography screening coverage (i.e., mammography exams of asymptomatic women aged 50 – 69) in 2023 was **32.2%.** Of this number, the **organized mammography screening coverage** (i.e., mammography exams of asymptomatic women aged 50 – 69 performed in a certified mammography screening facility) **was 14.8% and opportunistic mammography screening coverage** (i.e., mammography exams of asymptomatic women aged 50 – 69 performed in other than certified mammography screening facility) **was 17.3%** (T *6*, T *7*, CH *5*).

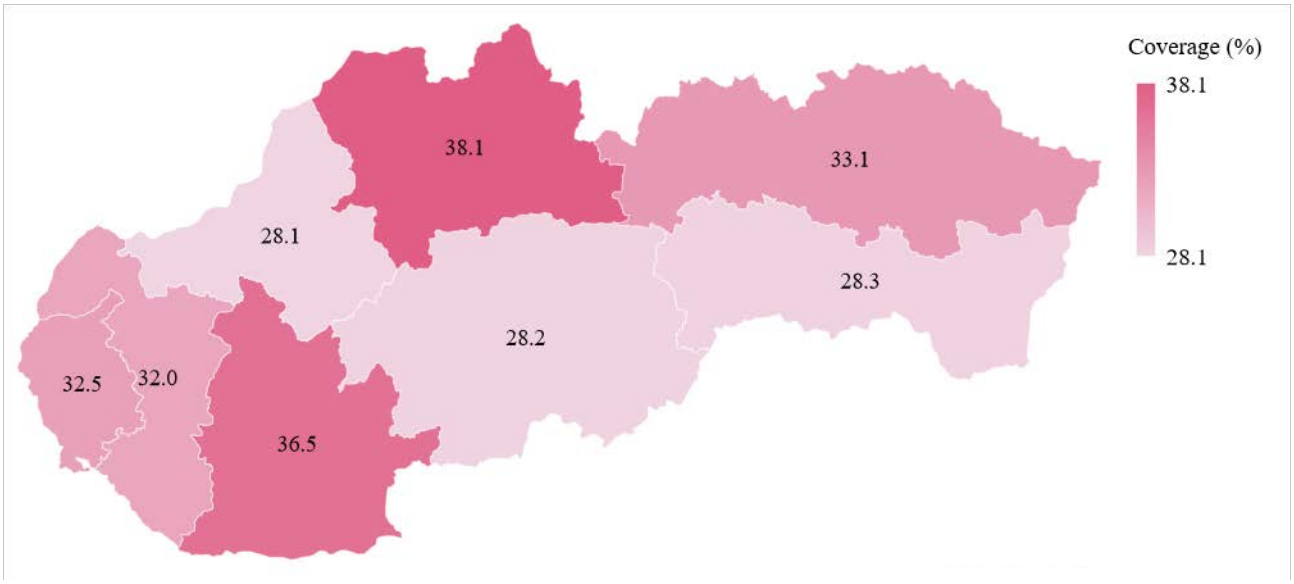
Compared to previous years, we can see a slight increase in the participation rate of women in the mammography screening and a related increase in the total mammography screening coverage in the SR (CH *6*, CH *7*).

T 6. Coverage based on exam (organized, opportunistic screening) in 2023 per territory of activity and type of mammography facility.

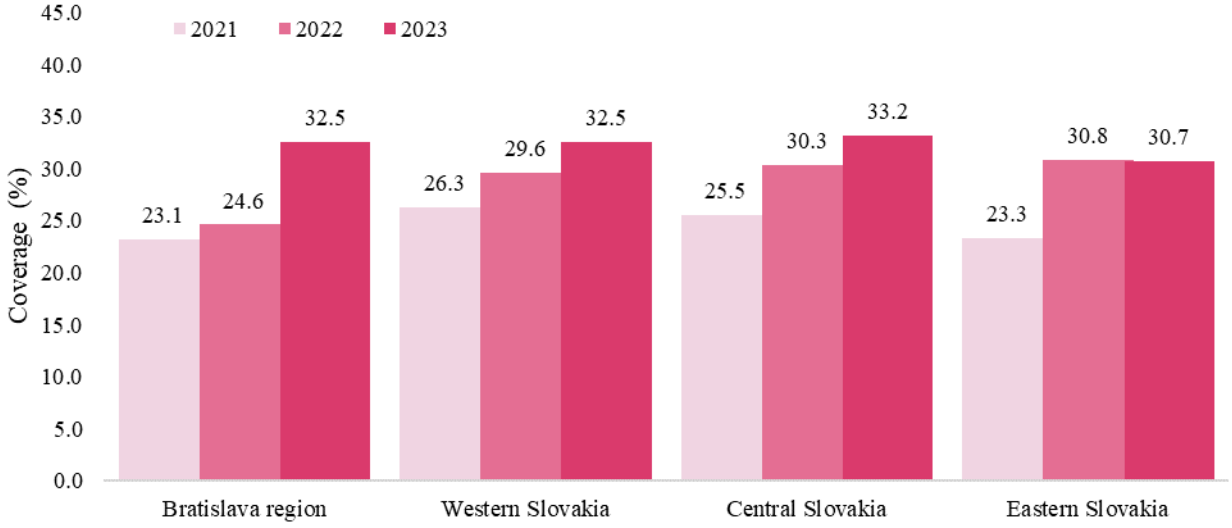
Territory of activity of mammography facility	Coverage based on exam when adhering to screening interval (%)		Total coverage based on exam when adhering to screening interval (%)
	in a certified mammography screening facility	in other than certified mammography screening facility	
Banská Bystrica region	14.8%	13.4%	28.2%
Bratislava region	20.5%	12.0%	32.5%
Košice region	3.0%	25.3%	28.3%
Nitra region	21.1%	15.4%	36.5%
Prešov region	16.0%	17.1%	33.1%
Trenčín region	13.8%	14.4%	28.1%
Trnava region	19.5%	12.5%	32.0%
Žilina region	11.3%	26.8%	38.1%
SLOVAK REPUBLIC	**14.8%**	**17.3%**	**32.2%**

T 7. Coverage based on exam (organized, opportunistic screening) in 2023 per territory of activity of mammography facility according to region (NUTS 2).

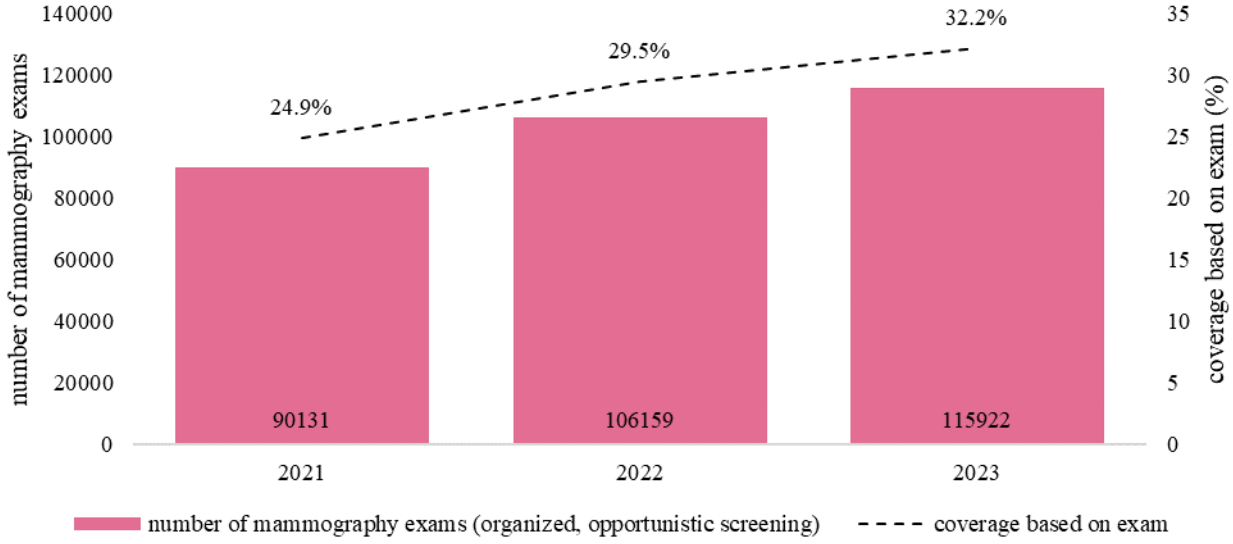
Territory of activity of mammography facility per region (NUTS 2)	Coverage based on exam (%)		
	Organized mammography screening	Opportunistic mammography screening	Organized and opportunistic mammography screening
Bratislava region	20.5%	12.0%	32.5%
Western Slovakia	18.3%	14.2%	32.5%
Central Slovakia	13.0%	20.2%	33.2%
Eastern Slovakia	9.5%	21.2%	30.7%
SLOVAK REPUBLIC	**14.8%**	**17.3%**	**32.2%**



CH 5. Coverage based on exam (organized and opportunistic screening) in the SR in 2023 per region of the mammography facility in which the mammography was performed.



CH 6. Comparison of coverage based on exam (organized, opportunistic screening) in 2021 – 2023 per territory of activity of mammography facility according to region (NUTS 2).



CH 7. Comparison of the coverage based on exam trends (organized, opportunistic screening) in 2021 – 2023.

4. STATE OF ORGANIZED MAMMOGRAPHY SCREENING IN THE SR ACCORDING TO DATA FROM CERTIFIED MAMMOGRAPHY SCREENING FACILITIES

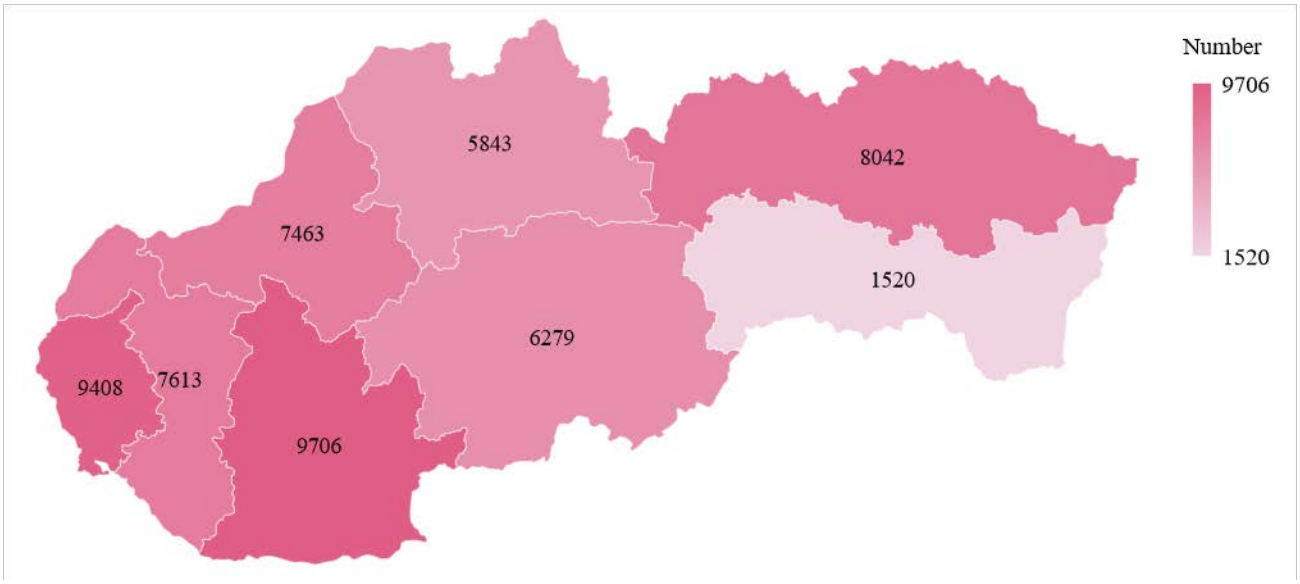
15.5% of the target female population were examined by screening mammography in a certified mammography screening facility in 2023, i.e., **55,874 women participated in the mammography screening.** Compared to 2022, there was an increase in the number of performed screening mammography exams by 18%. We can also see a slight increase in organized mammography screening coverage by 2.8% (T *8*, T *9*, CH *8*, CH *9*, CH *10*, CH *11*, CH *12*, CH *13*). This group included 261 diagnosed cancers, which corresponds to a malignancy rate of **5 cases per 1,000 women**.

T 8. Organized mammography screening coverage in 2023 per territory of activity of certified mammography screening facility according to region (NUTS 2).

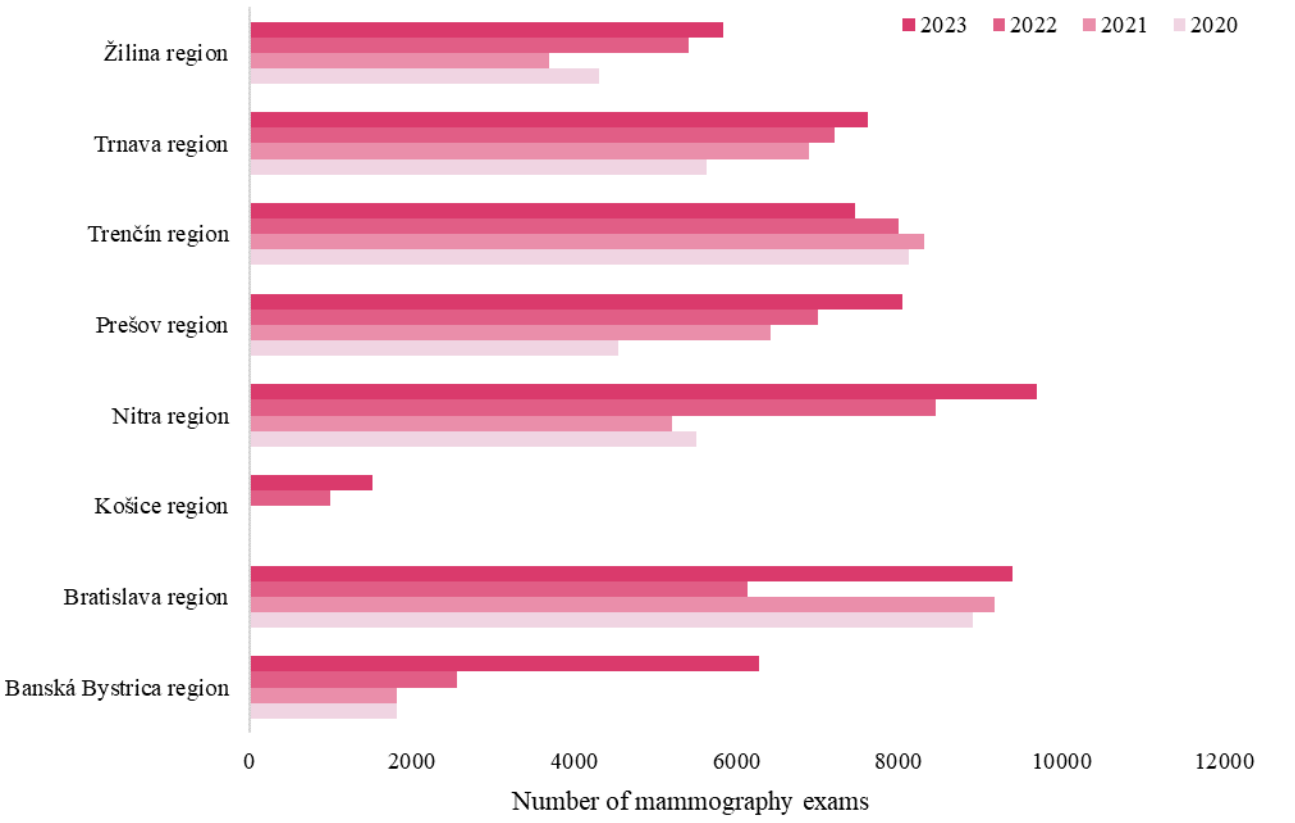
Territory of activity of mammography facility per region (NUTS 2)	Number of performed screening mammography exams of women aged 50 – 69	Mammography screening coverage when adhering to screening interval (%)
Bratislava region	9,408	20.7%
Western Slovakia	24,782	19.5%
Central Slovakia	12,122	13.7%
Eastern Slovakia	9,562	9.6%
SLOVAK REPUBLIC	55,874	15.5%

T 9. Organized mammography screening coverage in 2023 per region with certified mammography screening facility.

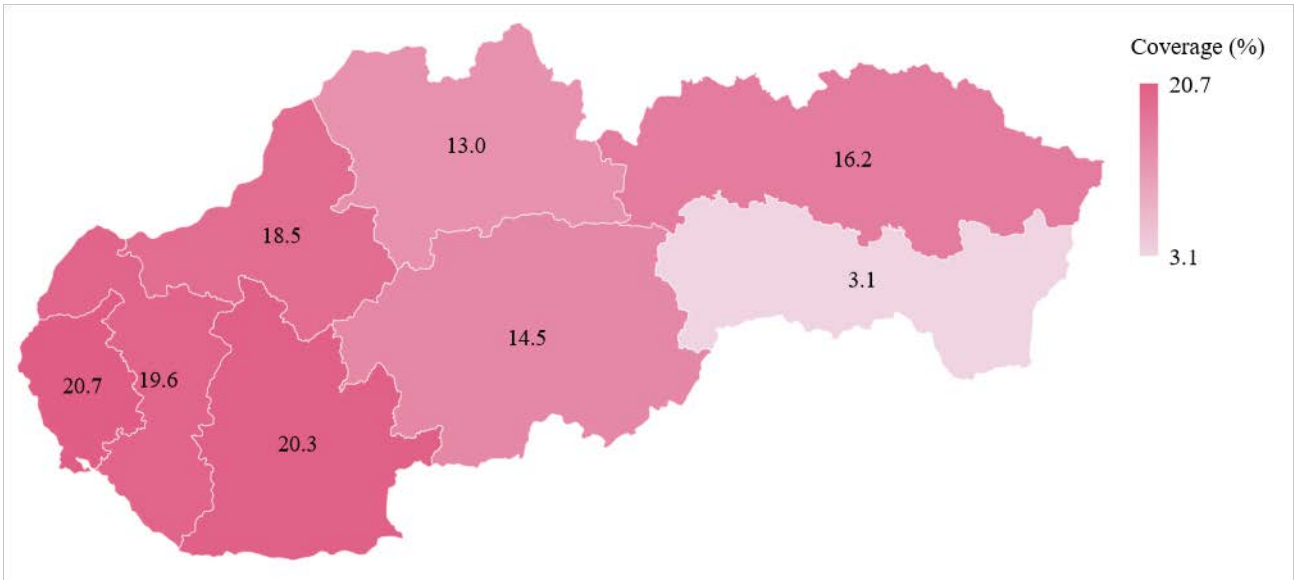
Territory of activity of mammography facility	Number of performed screening mammography exams of women aged 50 – 69	Mammography screening coverage when adhering to screening interval (%)
Banská Bystrica region	6,279	14.5%
Bratislava region	9,408	20.7%
Košice region	1,520	3.1%
Nitra region	9,706	20.3%
Prešov region	8,042	16.2%
Trenčín region	7,463	18.5%
Trnava region	7,613	19.6%
Žilina region	5,843	13.0%
SLOVAK REPUBLIC	55,874	15.5%



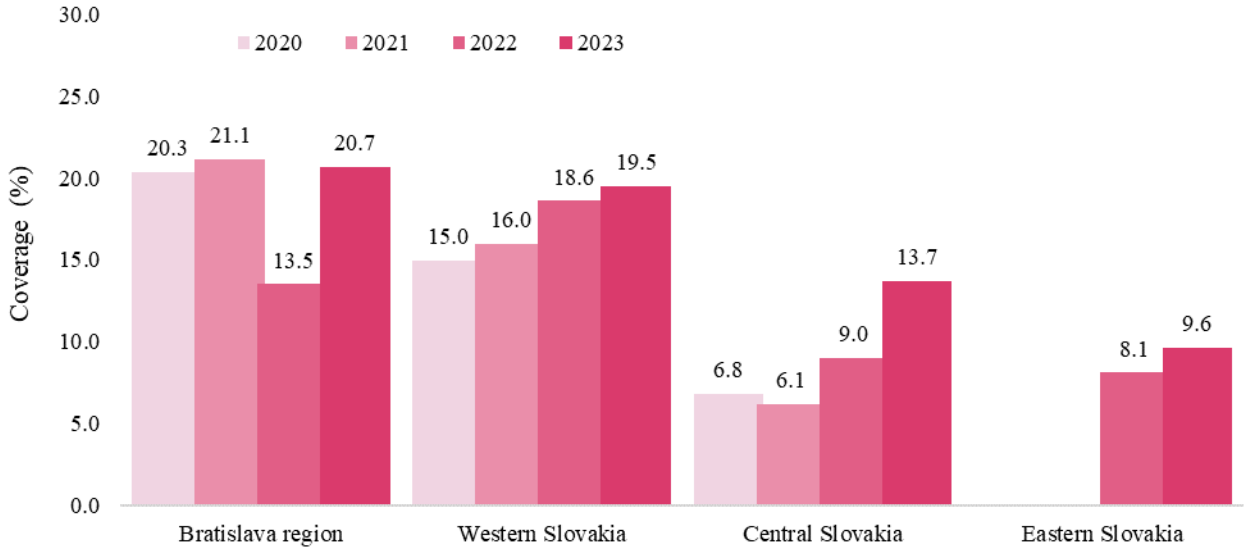
CH 8. Number of all screening mammography exams of asymptomatic women aged 50 – 69 in the SR in 2023 per region of the certified mammography screening facility in which the mammography was performed.



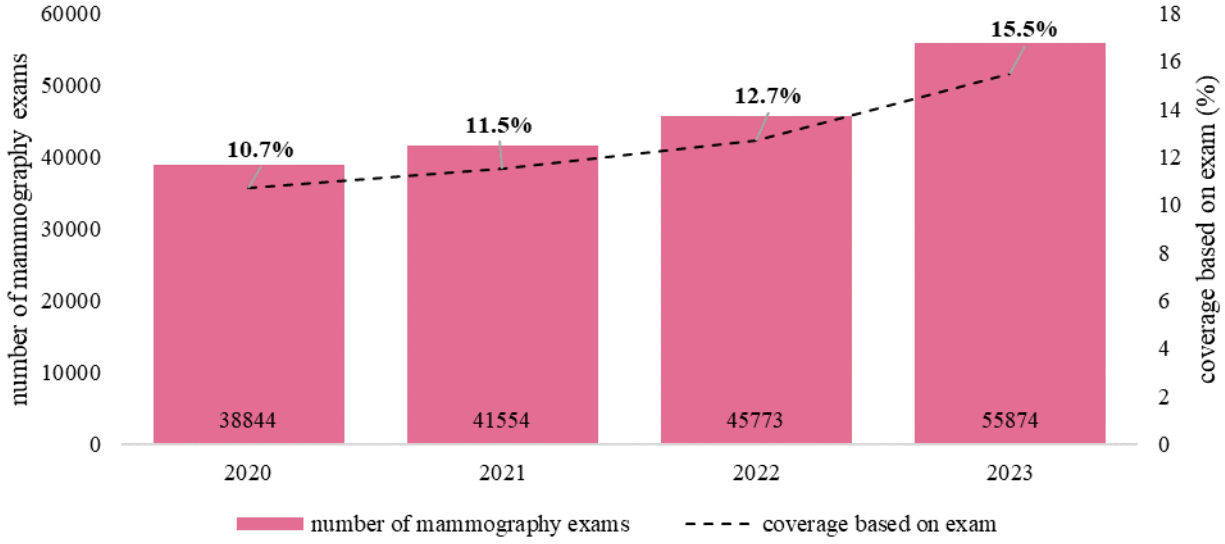
CH 9. Comparison of the number of screening mammography exams performed in certified mammography screening facilities in 2020 – 2023 per region with certified mammography screening facility.



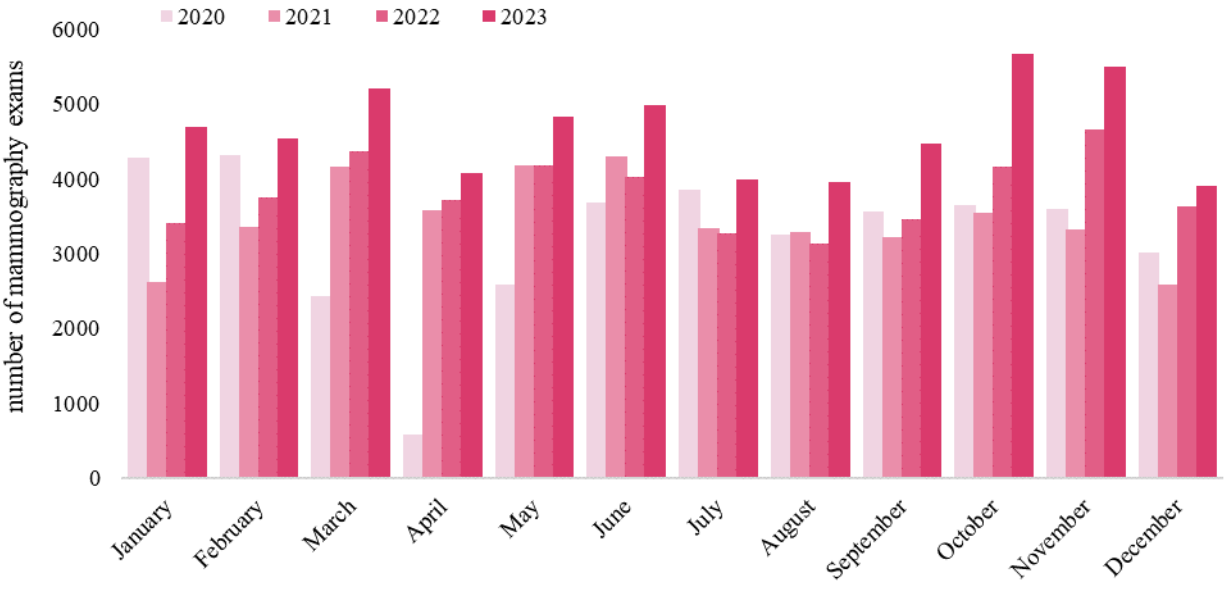
CH 10. Organized mammography screening coverage in the SR in 2023 per region with certified mammography screening facility in which the mammography was performed.



CH 11. Comparison of mammography screening coverage in 2020 – 2023 per territory of activity of mammography facility according to region (NUTS 2).



CH 12. Comparison of the organized mammography screening coverage trends in 2020 – 2023.



CH 13. Comparison of the number of screening mammography exams in certified mammography screening facilities in 2020 – 2023 per month.

4.1. CHARACTERISTICS OF MALIGNANCIES DIAGNOSED WITHIN THE ORGANIZED MAMMOGRAPHY SCREENING

In 2023, 55,874 screening mammography exams were performed in certified mammography screening facilities. **261 malignancies were diagnosed in 2023 within the organized mammography screening, which represents a detection rate of 5 cases per 1,000 exams.**

Since the beginning of the mammography screening, we can see an increasing number of malignancies diagnosed in clinically earlier stages. Compared to 2020, was can see a 7% increase in diagnosed cases of ductal carcinoma in situ and a 5% increase of stage I and II malignancies in 2023. On the contrary, there was a 6% decrease in diagnosed cases of stage III and IV malignancies in this time period. At the same time, the number of malignancies without specified TNM stage decreased by 7% thanks to efficiently managed breast commissions (T *10*, T *11*, CH *14*, CH *15*).

Regarding laterality, 53% of the malignancies were located on the left side and 43% on the right side (CH *16*).

Another monitored indicator is treatment type of women with malignancies diagnosed within the mammography screening. Breast-conserving surgery was performed in 64% of women and mastectomy in 12% of women (CH *17*).

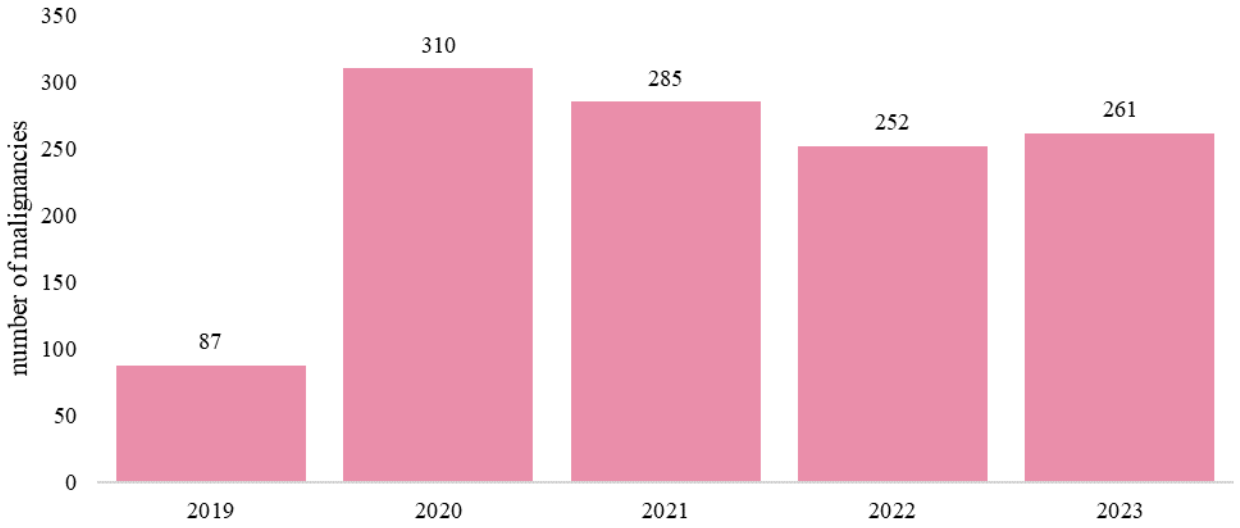
Based on histology type of the malignancy, ductal carcinoma in situ represented 10% (8500/2), invasive ductal carcinoma 72% (8500/3), invasive lobular carcinoma 12% (8520/3) and the remaining 6% were other histology types of invasive carcinomas (CH *18*).

T 10. Number of malignancies diagnosed within organized mammography screening in certified mammography screening facilities and detection rate in 2019 – 2023.

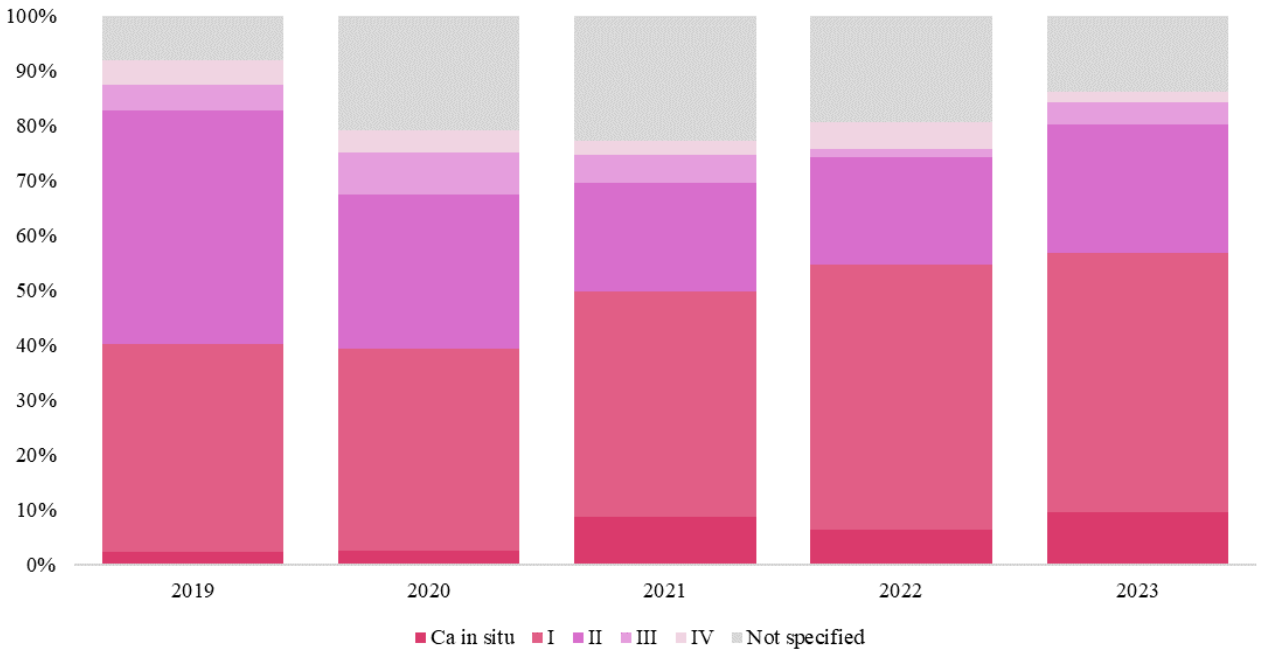
	September 2019	**2020**	**2021**	**2022**	**2023**
Number of screening mammography exams	16,453	38,844	41,554	45,773	**55,874**
Number of diagnosed malignancies	87	310	285	252	**261**
Detection rate (per 1,000 exams)	5 / 1,000	8 / 1,000	7 / 1,000	6 / 1,000	**5 / 1,000**

T 11. Number of malignancies diagnosed within organized mammography screening in certified mammography screening facilities in 2019 – 2023 according to TNM stage.

TNM stage	**September 2019**	**2020**	**2021**	**2022**	**2023**
Ca *in situ*	2 (2.3%)	8 (2.6%)	25 (8.8%)	16 (6.3%)	25 (9.6%)
I	33 (37.9%)	114 (36.8%)	117 (41.1%)	122 (48.4%)	123 (47.1%)
II	37 (42.5%)	87 (36.8%)	56 (19.6%)	49 (19.5%)	61 (23.4%)
III	4 (4.6%)	24 (7.7%)	15 (5.3%)	4 (1.6%)	11 (4.2%)
IV	4 (4.6%)	12 (3.9%)	7 (2.5%)	12 (4.8%)	5 (1.9%)
Not specified	7 (8.1%)	65 (20.9%)	65 (22.8%)	49 (19.4%)	36 (13.8%)
All malignancies	87 (100%)	310 (100%)	285 (100%)	252 (100%)	261 (100%)

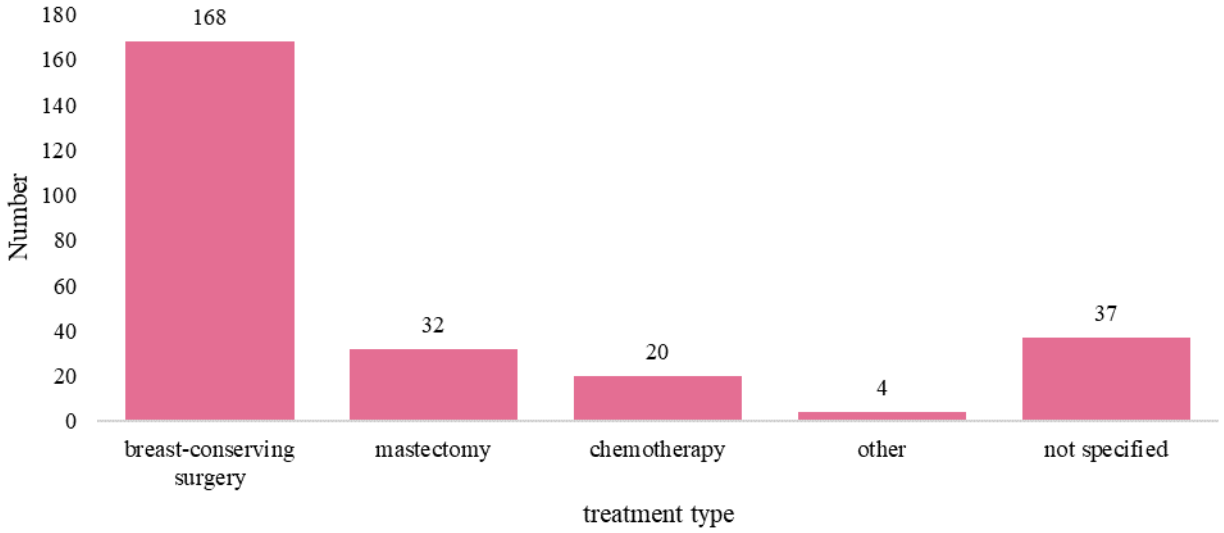


CH 14. Comparison of the number of malignancies diagnosed within organized mammography screening in certified mammography screening facilities in 2019 – 2023.

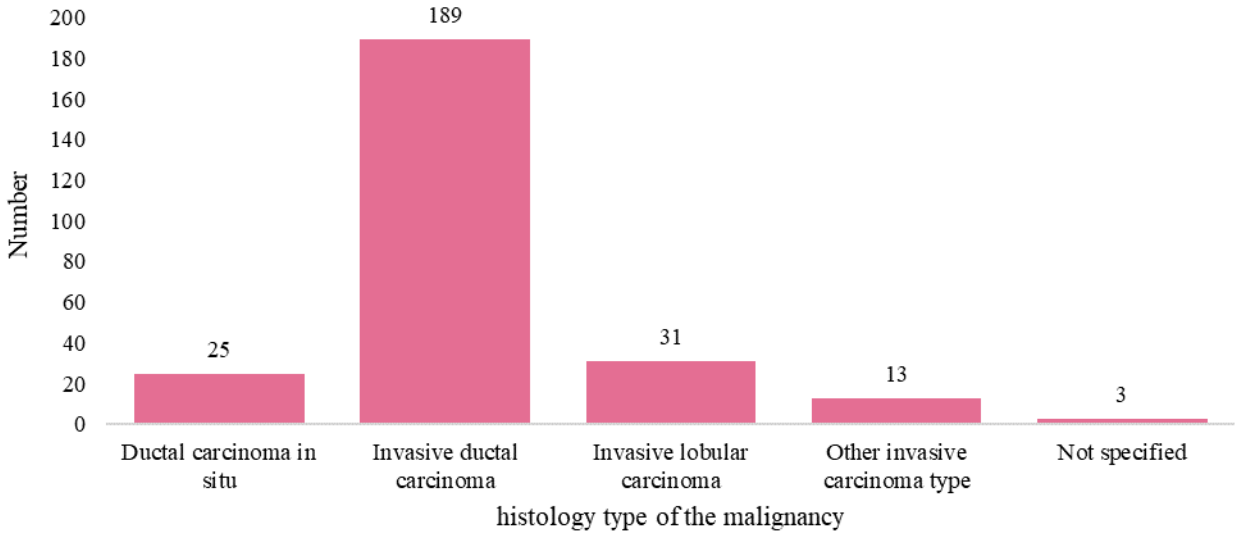


CH 15. Comparison of the number of malignancies diagnosed within organized mammography screening in certified mammography screening facilities in 2019 – 2023 according to TNM stage.

CH 16. Location of malignancies diagnosed within organized mammography screening in certified mammography screening facilities in 2023.



CH 17. Treatment type of malignancies diagnosed within organized mammography screening in certified mammography screening facilities in 2023.



CH 18. Histology type of malignancies diagnosed within organized mammography screening in certified mammography screening facilities in 2023.

4.2. ORGANIZED BREAST CANCER SCREENING EVALUATION: INDICATORS FOR THE SR

T 12. Organized mammography screening evaluation in the SR in 2023 according to Slovak indicators.

ID	Indicator name	Evaluation for 2023
SR1	**Scope of the screening program** *(Number of women in the target population within the organized screening program / Number of women of relevant age in the country)*[9]	**100%**
SR2	**Invitation coverage** *(Number of women invited to the screening in the given time period / Number of women in the target population)*	**38.3%**
SR3.1	**Coverage based on exam of the invited women** *(Number of invited women who underwent the organized screening in the given time period / Number of women in the target population)*	**7.1%**
SR3.2	**Coverage based on exam** *(Number of women who underwent the organized screening in the given time period / Number of women in the target population)*	**15.5%**
SR4	**Participation rate based on invitations** *(Number of invited women who underwent the screening in the given interval / Number of invited women in the given interval)*	**18.4%**
SR5	**Follow-up rate** *(Number of women who underwent the screening and were referred to another exam / Number of women who underwent the screening)*	**Impossible to evaluate at the moment**
SR6	**Follow-up for technical reasons ratio** *(Number of women who were repeatedly invited to the screening exam for technical reasons / Number of women who underwent the screening)*	**Impossible to evaluate at the moment**
SR7	**Interval mammography ratio** *(Number of women who were repeatedly invited to the screening exam due to symptoms / Number of women who underwent the screening)*	**Impossible to evaluate at the moment**
SR8	**Missing (indicators necessary on various degrees)** *(Number of women who underwent the screening but lack a first-degree result / Number of women who underwent the screening)*	**0%**
SR9	**Referral to surgery ratio** *(Number of women who were referred to a surgery or women with inoperable cancer / Number of women who underwent the screening)*	**0.4%**
SR10	**B/M ratio** *(Number of women with benign histology / Number of women with histologically confirmed carcinoma in situ or invasive carcinoma)*	**1.1**
SR11	**Breast cancer detection rate (including carcinoma in situ)** *(Number of women with histologically confirmed carcinoma in situ or cancer / Number of women who underwent the screening)*	**0.5%**
SR12	**DCIS detection rate** *(Number of women with DCIS / Number of women who underwent the screening)*	**0.05%**
SR13	**Invasive breast cancer detection rate** *(Number of women with breast cancer / Number of women who underwent the screening)*	**0.4%**

[9] Number of women of relevant age when adhering to a 2-year time interval in the country.

T 12 (continued). Organized mammography screening evaluation in the SR in 2023 according to Slovak indicators.

ID	Indicator name	Evaluation for 2023
SR14	**Share of biopsies with a benign result** *(Number of women with benign histology / Number of women who underwent the screening)*	**0.5%**
SR15	**Share of small invasive carcinomas out of all invasive carcinomas** *(Number of women with stage pT1A or pT1B breast cancer / Number of women with cancer)*	**63%**
SR16	**Undetected small invasive carcinomas out of all invasive carcinomas** *(Number of women with cancer and missing pT data / Number of women with breast cancer)*	**15%**
SR17	**Share of detected carcinomas with negative result for lymph nodes out of all carcinomas diagnosed within the screening** *(Number of women with negative lymph node result / Number of women with cancer)*	**62%**
SR18	**Share of undetected carcinomas with negative result for lymph nodes out of all carcinomas diagnosed within the screening** *(Number of women with no data about lymph node result / Number of women with cancer)*	**16%**
SR19	**Share of detected II+ breast carcinomas out of all carcinomas diagnosed within the screening** *(Number of women with pTNM stage IIA – IV / Number of women with cancer)*	**33%**
SR20	**Share of undetected II+ breast carcinomas out of all carcinomas diagnosed within the screening** *(Number of women with no pTNM stage data / Number of women with cancer)*	**15%**
SR21	**Share of detected II+ breast carcinomas out of all women who underwent the screening** *(Number of women with pTNM stage IIA – IV / Number of women who underwent the screening)*	**0.1%**
SR22	**Share of undetected II+ breast carcinomas out of all women who underwent the screening** *(Number of women with no pTNM stage data / Number of women who underwent the screening)*	**0.1%**
SR23	**Conservative treatment (DCIS)** *(Number of women with DCIS who underwent breast-conserving surgery / Number of women who underwent surgery for DCIS)*	**40%**
SR24	**Missing data about DCIS conservative treatment** *(Number of women with DCIS and no data on surgery / Number of women with DCIS)*	**20%**
SR25	**Conservative treatment (invasive carcinoma)** *(Number of women with carcinoma who underwent breast-conserving surgery / Number of women with carcinoma)*	**38%**
SR26	**Missing data about conservative treatment (invasive carcinoma)** *(Number of women with carcinoma and no data on surgery / Number of women with carcinoma)*	**15%**
SR27	**Conservative treatment for pT1 stage** *(Number of women with pT1 stage carcinoma who underwent breast-conserving surgery / Number of women with pT1 stage carcinoma)*	**83%**
SR28	**Missing data about conservative treatment for pT1 stage** *(Number of women with pT1 stage carcinoma with no data on surgery / Number of women with pT1 stage carcinoma)*	**5%**

T 12 (continued). Organized mammography screening evaluation in the SR in 2023 according to Slovak indicators.

ID	Indicator name	Evaluation for 2023
SR29.1	**Population incidence of breast cancer C50** *(in women aged 50 – 69)*[10]	**191.4 / 100,000**
SR29.2	**Population incidence of breast cancer C50** *(in women from all age groups)*[10]	**96.7 / 100,000**
SR30	**Share of advanced stages of breast cancer C50** *(in women from all age groups)*[10]	**57%**
SR31.1	**Population mortality of breast cancer C50 – gross mortality** *(in women aged 50 – 69)*[11]	**50.6 / 100,000**
SR31.2	**Population mortality of breast cancer C50 – gross mortality** *(in women from all age groups)*[11]	**36.0 / 100,000**

[10] NHIC. Outputs from the National Oncology Register of the SR. Incidence of Malignant Tumors in Slovakia 2014. (Note: these are the most up-to-date statistical data as of June 1, 2024, which can be used for statistical processing of breast cancer population incidence in the SR). Available online: https://www.nczisk.sk/Statisticke_vystupy/Tematicke_statisticke_vystupy/Onkologia/Vystupy_NOR_SR/Pages/Incidencia-zhubnych-nadorov.aspx

[11] NHIC. Mortality of Oncological Diseases in Slovakia 2022. (Note: these are the most up-to-date statistical data as of June 1, 2024, which can be used for statistical processing of breast cancer mortality in the SR). Available online: https://app.powerbi.com/view?r=eyJrIjoiMjA3MGI0MTMtOGE4OS00NTFhLThkMmEtYzFhN2ZhYjMwOTdiIiwidCI6IjMxMGJhNTk1LTAxM2MtNDAyZC05ZWYyLWI1N2Q1ZjFkY2Q2MyIsImMiOjl9

5. COMPARISON OF STATISTICAL DATA FROM MAMMOGRAPHY SCREENING IN 2023: ANONYMIZED DATA PROVIDED BY CERTIFIED MAMMOGRAPHY SCREENING FACILITIES AND HEALTH INSURANCE COMPANIES

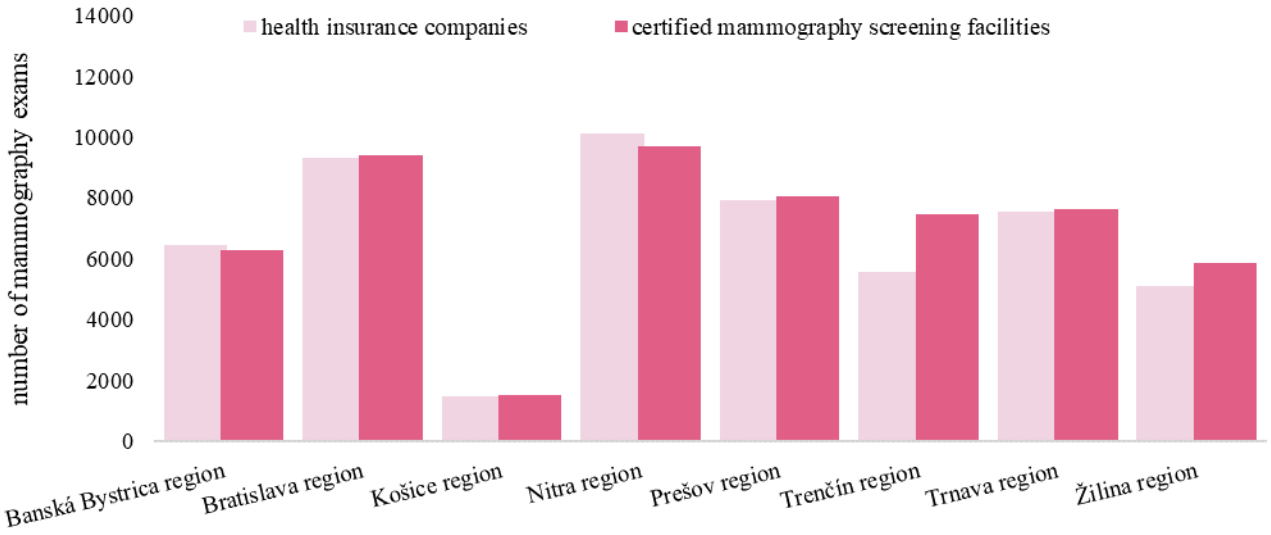
Based on data provided by certified mammography screening facilities and HICs, NOI was able to compare the numbers of performed mammography exams. The final comparison has shown a total **discrepancy of 4.3%.** Compared to 2022, when the discrepancy between the data provided by certified screening facilities and health insurance companies was 8.9%, we can see an improvement of the situation in 2023 and a reduction of the discrepancy by half (*T 13*, *T 14*, *CH 19*, *CH 20*).

T 13. Comparison of the number of screening mammography exams based on anonymized data provided by certified mammography screening facilities and health insurance companies in 2023.

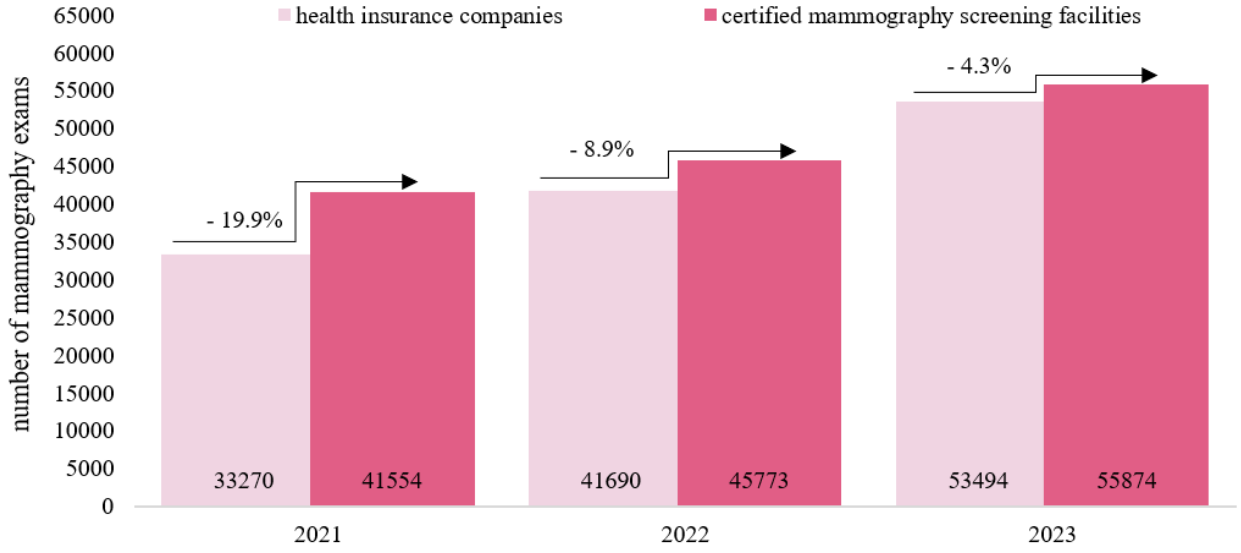
Territory of activity of certified mammography screening facility / Region	Number of screening mammography exams based on anonymized data		Discrepancy
	From certified mammography screening facilities	From health insurance companies	
Banská Bystrica region	6,279	6,433	2.5%
Bratislava region	9,408	9,311	-1.0%
Košice region	1,520	1,486	-2.2%
Nitra region	9,706	10,110	4.2%
Prešov region	8,042	7,940	-1.3%
Trenčín region	7,463	5,551	-25.6%
Trnava region	7,613	7,558	-0.7%
Žilina region	5,843	5,105	-12.6%
SLOVAK REPUBLIC	**55,874**	**53,494**	**-4.3%**

T 14. Comparison of screening mammography coverage based on data provided by certified mammography screening facilities and health insurance companies in 2023.

Territory of activity of certified mammography screening facility	Mammography screening coverage (%)		Discrepancy
	From certified mammography screening facilities	From health insurance companies	
Banská Bystrica region	14.5%	14.8%	0.3%
Bratislava region	20.7%	20.5%	-0.2%
Košice region	3.1%	3.0%	-0.1%
Nitra region	20.3%	21.1%	0.8%
Prešov region	16.2%	16.0%	-0.2%
Trenčín region	18.5%	13.8%	-4.7%
Trnava region	19.6%	19.5%	-0.1%
Žilina region	13.0%	11.3%	-1.7%



CH 19. Comparison of the number of screening mammography exams based on data provided by certified mammography screening facilities and health insurance companies in 2023.



CH 20. Comparison of the difference in percentage in the number of screening mammography exams based on anonymized data provided by certified mammography screening facilities and health insurance companies in 2021 – 2023.

6. FINAL EVALUATION

Based on the analyzed anonymized data provided by certified mammography screening facilities and health insurance companies, it was possible to see matching data in some regions, slight discrepancies in others and more prominent discrepancies in yet others.

This difference can be explained by procedures reported by a certified mammography screening facility not being reimbursed due to incorrect procedure reporting. Due to this, it is appropriate to:

- set and evaluate cumulative screening mammography procedure code reporting in a targeted manner
- set and evaluate diagnosis code reporting related to cumulative screening mammography codes in a targeted manner
- consult and verify error rate in procedure code and diagnosis code reporting related to mammography exams performed in certified mammography screening facilities within internal and external audit
- strictly adhere to contracts and the valid version of the standard procedure when reporting mammography exams to health insurance companies

Based on that, we recommend preparing and publishing a binding guideline in cooperation with health insurance companies' representatives and unifying screening, preventive and diagnostic mammography reporting in certified mammography screening facilities, which will have a positive impact on the reduction of errors in code reporting related to mammography exams.

Another factor that can influence the data might be incorrect and not unified mammography screening data collection by certified mammography screening facilities. This reason needs to be verified via internal and external audit. At the same time, it is necessary to implement a universally used program to collect mammography screening statistical data in certified mammography screening facilities across the board, which is in development by NOI.

A closer cooperation of NHIC and NOI and the establishment of a working group for data collection for all cancer screenings including mammography screening based on a recommendation by the Cancer Screening Commission of the MoH SR is a very helpful factor in the whole process.

Another important step will be to adjust the organized screening program in order to achieve central management and provision of all processes within the program like it was recommended to Slovakia based on a two-year situational analysis by international experts within the ICCCS project (*Improving Cancer Care Coordination and Screening in Latvia and Slovakia*).

ANNEX 2.

Cervical Cancer Screening Statistical Assessment for 2023

Target population for cervical cancer screening is calculated according to data from the Statistical Office of the SR (as of July 1, 2023) as the number of people in the age group 23 – 65. There were approximately 1,557,851 women aged 23 – 64 years in Slovakia in 2023 according to the Statistical Office of the SR.
Tables and charts are drawn up according to selected quality and evaluation indicators of cancer screening programs in Slovakia. Individual indicators are defined and calculated precisely according to set methodology of selection conditions (some are described below in more detail).

Since there is no screening register interconnected with the National Oncology Register, the data can only be extracted from the reported healthcare data, i.e., by procedure codes and diagnosis codes from health insurance companies (HICs); however, these are primarily intended for their reimbursement and thus cannot offer a relevant evaluation of qualitative and clinical parameters. Information obtained can only be used for gross quantitative statistics, or quantitative estimates. The names of indicators which include the phrase “who underwent an exam” do not correspond to reality completely; a more fitting name of the indicators would be “reported exam” since we have used HIC data. However, the indicators have been created within the methodology for NHIC screening register, which is why the names of the indicators are as such.

Used abbreviations:

CC: cervical cancer
P: Procedure
Dg.: Diagnosis
HIC: health insurance company

Source: HIC 2024, processed by NOI

Table 1

INDICATOR ID	INDICATOR NAME	2020	2021	2022	2023
CC_01	Total number of invited women		237,444	324,757	322,648
CC_02	Share of women who underwent the screening based on invitation		4.09%	18.34%	18.41%
CC_03	Share of women invited to the screening	0.00%	14.95%	20.65%	20.71%

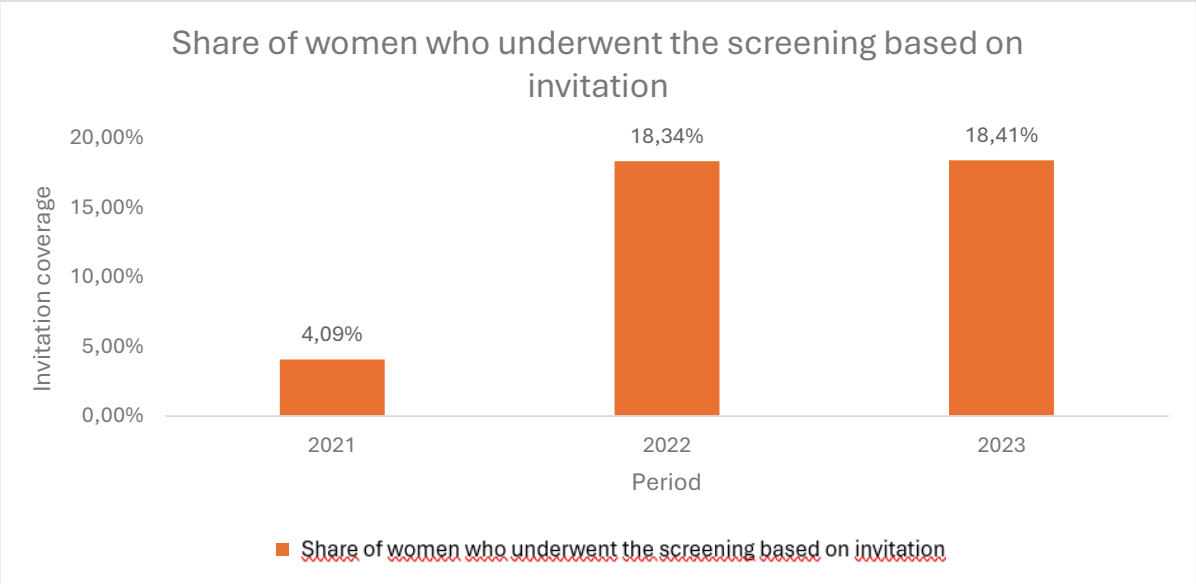
Indicator definitions:

CC_01: Number of women invited to the cervical cancer screening aged 23 – 64 for all health insurance companies

CC_02: Ratio of women who underwent the screening by 365 days since receiving the invitation out of all invited women

CC_03: Ratio of women invited to the cervical cancer screening aged 23 – 64 and the population of people aged 23 – 64 (invitation coverage)

Chart 1



Both Table 1 and Chart 1 show that the share of women with reported screening based on invitation from health insurance companies (invitation coverage) was under 19% in 2023 as well as in 2022.
We can see several reasons for the lower participation rate based on invitation; invitations by HIC* show a certain error rate and are sometimes generated also for women who have already undergone the screening at the time of invitation. Invitations are sent also to women who have undergone hysterectomy in the past (DRG codes for surgeries were implemented only in 2019 and these women thus cannot be identified). **Furthermore, there is a group of women who go to check-ups at their gynecologist's as a private payer and the results of the check-up are not recorded by HICs.**

**Health insurance companies send invitations only to asymptomatic women aged 23 – 64 who do not undergo routine check-ups at their gynecologist's in regular intervals and are thus part of the target group according to inclusion and exclusion criteria laid out in the methodology of targeted invitations. This corresponds to the group of women who have not undergone a screening exam in three or more years.*

Table 2

INDICATOR ID	INDICATOR NAME	2020	2021	2022	2023	2022 – 2023 two-year interval	2021 – 2023 three-year interval
CC_04	Share of women who underwent the screening	29.08%	34.19%	37.62%	40.12%	53.72%	62.59%
CC_05	Number of women who underwent screening cytology	467,687	543,212	591,658	625,020	845,089	979,602
CC_10	Share of normal cytology results	93.1%	92.7%	92.9%	93.5%		
CC_11	Share of abnormal cytology results	6.9%	7.3%	7.1%	6.5%		

Indicator definitions (selection conditions):

CC_04: Ratio of women aged 23 – 64 who underwent a screening exam and the total population of women aged 23 – 64 (Screening coverage) (Number of unique patient IDs aged 23 – 64 who had a reported screening cytology (procedures 157, 155, 297, 167 and diagnoses Z014, Z124) and the number of women in the 23 – 64 age group)

CC_05: Number of women aged 23 – 64 who underwent a screening cytology exam in the given time period regardless of invitation (Number of unique patient IDs aged 23 – 64 who had a reported screening cytology – procedures 157, 155, 297, 167 and diagnoses Z014, Z124)

CC_10: Ratio of women aged 23 – 64 with normal cytology result and the total number of women aged 23 – 64 who had an abnormal or normal cytology result in the given time period

CC_11: Ratio of women aged 23 – 64 with abnormal cytology result and the total number of women aged 23 – 64 who had an abnormal or normal cytology result in the given time period

Chart 2

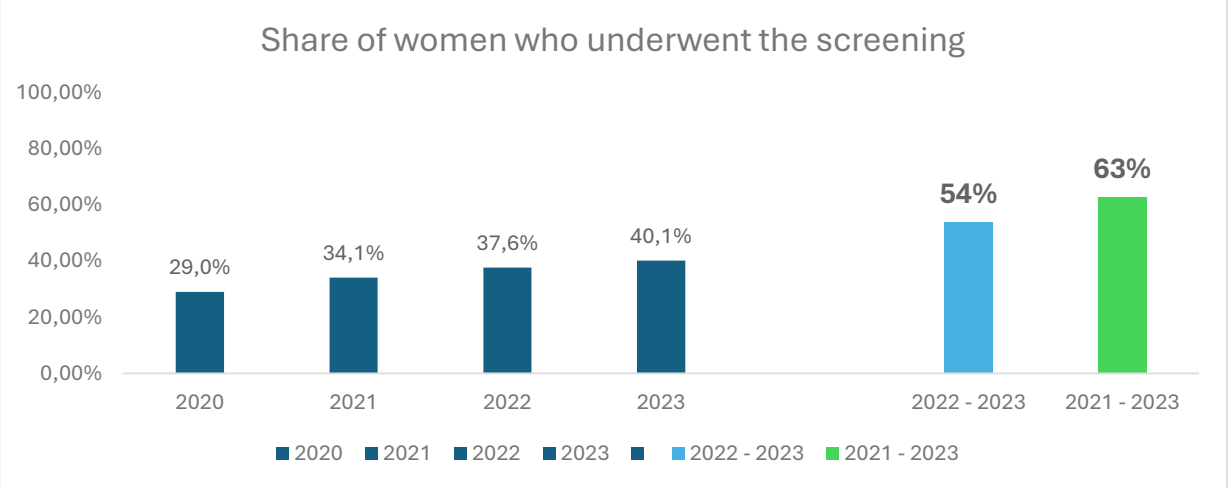


Chart 3

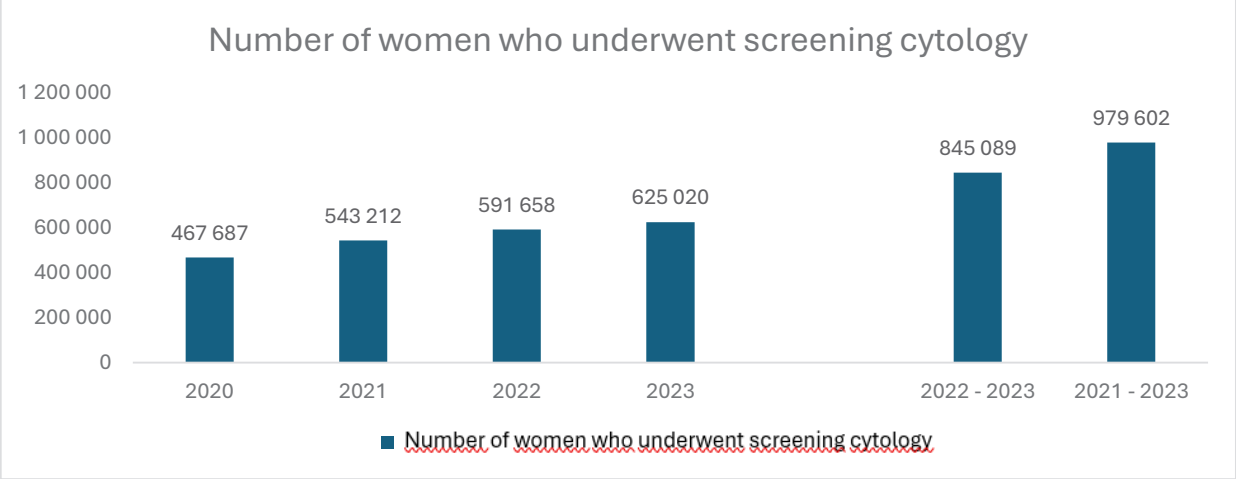


Table 2 (CC_4 and CC_5 indicators) and its graphic representation in Chart 3 show an **increased number of women who underwent screening cytology in 2023 compared to previous years. The ratio of women who underwent the screening in 2023 also increased compared to 2022 from 37.6% to 40.1%** (Chart 2).

It must be taken into consideration that cervical cancer screening is done via cytology smear in women aged over 23 once a year for two years and then once in three years and stops at 64 years of age only if the last three cytology results in a correctly indicated three-year interval are negative. Therefore, we evaluate both the two-year and three-year interval and the share of women who underwent screening cytology. **As much as 63% of women underwent screening cytology in a three-year interval.**

"Once" represents women who underwent the screening once a year, "Twice" the women who underwent the screening once in 2 years and "Three times" those who underwent the screening once in 3 years.

Indicators CC_10 and CC_11 **in Table 2 show the share of women aged 23 – 64 with a normal or abnormal cytology result. The stated percentage of abnormal results (6.5%) for 2023 and the previous years corresponds to data mentioned in European guidelines and depends on HPV prevalence, HPV vaccination rate and other possible factors in the given region.**

Table 3

How many times women had a reported screening in the 2021 – 2023 time period	Number of women	Percentage from whole
Once	349,554	36%
Twice	380,689	39%
Three times	242,260	25%
Total	**972,503**	100%

Table 3 shows that 972,503 women aged 23 – 64 underwent the CC screening exam in 2021 to 2023, with 25% of women doing so every year, 39% in two different years and 36% only once in the monitored period. This may be interpreted that the majority of women who undergo the CC screening exam do not do so annually but a group of women undergoes the exam also outside of the recommended screening interval.

Calculation:
number of unique patient IDs aged 23 – 64 who had a reported screening cytology
procedures: 157, 155, 297, 167
diagnoses: Z014, Z124
Note: There could be a group of women not entitled to the exam in either of the three monitored years.

Annex 3.

Colorectal Cancer Screening Statistical Assessment for 2023

Target population for colorectal cancer screening is calculated according to data from the Statistical Office of the SR (as of July 1, 2023) as the number of people in the age group 50 – 75 divided by 2 because the population of this age is entitled to the screening exam once in two years. There were 1,669,564 men and women aged 50 – 75 in Slovakia in 2023.

Tables and charts are drawn up according to selected quality and evaluation indicators of cancer screening programs in Slovakia. Individual indicators are defined and calculated precisely according to set methodology of selection conditions (some are described below in more detail).

Since there is no screening register interconnected with the National Oncology Register, the data can only be extracted from the reported healthcare data, i.e., by procedure codes and diagnosis codes from health insurance companies (HICs); however, these are primarily intended for their reimbursement and thus cannot offer a relevant evaluation of qualitative and clinical parameters and information obtained can only be used for gross quantitative statistics, or quantitative estimates.

The names of indicators which include the phrase “who underwent an exam” do not correspond to reality completely; a more fitting name of the indicators would be “reported exam” since we have used HIC data. However, the indicators have been created within the methodology for NHIC screening register, which is why the names of the indicators are as such.

Used abbreviations:

FOBT: fecal occult blood test

CRC: colorectal cancer

HIC: health insurance company

Source: HIC 2024, processed by NOI

Table 1

INDICATOR ID	INDICATOR NAME	2019	2020	2021	2022	2023
CRC_01	Total number of people invited to the screening	18,200	14,738	235,320	405,510	331,011
CRC_02	Share of people who underwent the screening based on invitation	31.49%	2.50%	7.57%	27.88%	31.82%
CRC_03	Share of people invited to the screening	2.25%	1.81%	28.54%	48.95%	39.65%

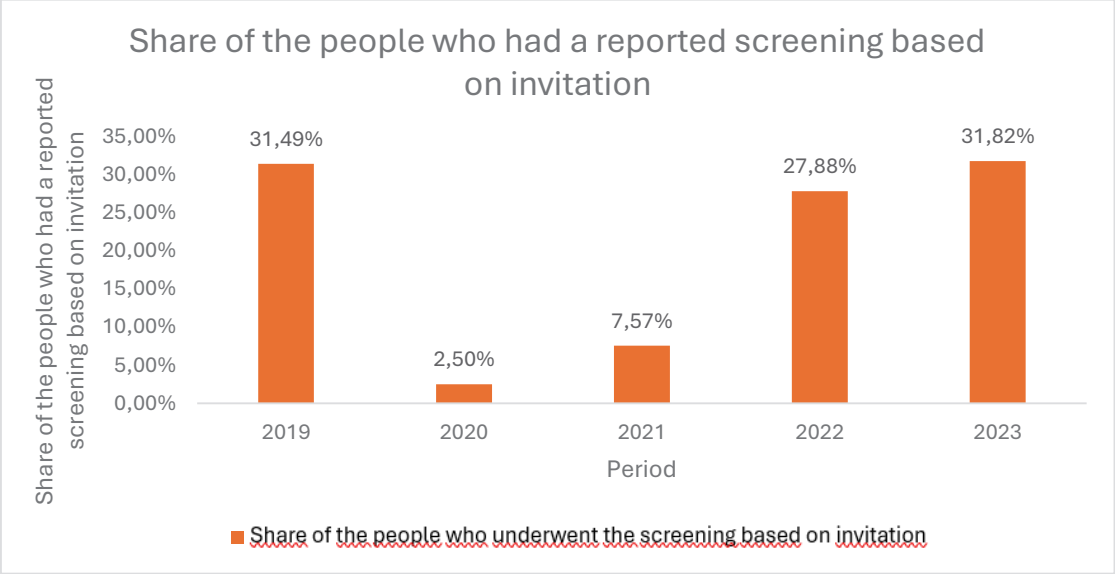
Indicator definitions:

CRC_01: Number of people invited to the colorectal cancer screening aged 50 – 75 for all health insurance companies

CRC_02: Ratio of number of people who underwent an FOBT exam by 365 days since the invitation out of all invited people

CRC_03: Ratio of people invited to colorectal cancer screening aged 50 – 75 out of the total population of people aged 50 – 75 (invitation coverage)

Chart 1



Both Table 1 and Chart 1 show that even in spite of a lower number of people invited to the screening by health insurance companies* in 2023, the share of people with a reported screening based on invitation was higher compared to 2022.

* *Health insurance companies send invitations including the screening test (FOBT)* to the group of people from the target population who do not have a reported routine check-up at their general practitioner's and thus do not have a reported fecal occult blood test in the last two years or a colonoscopy exam in the last 10 years.

Annex 3

Table 2

INDICATOR ID	INDICATOR NAME	2019	2020	2021	2022	2023
CRC_06	Number of people aged 50 – 75 who underwent an FOBT exam	311,970	239,709	304,410	396,702	435,744
	of which: Number of people aged 50 – 75 who underwent an FOBT exam based on invitation	5,731	368	17,803	113,076	105,332
CRC_07	Share of people aged 50 – 75 from the target population who underwent a screening FOBT	38.52%	29.38%	36.92%	47.89%	52.20%
	Number of people aged 50 – 75 who had a positive FOBT result	17,934	15,191	23,714	36,648	37,877
	Number of people aged 50 – 75 who had an inconclusive FOBT result	3,922	3,221	4,359	5,946	8,608
CRC_08	Share of people aged 50 – 75 with a positive FOBT result	5.75%	6.34%	7.79%	9.24%	8.69%
CRC_09	Share of people aged 50 – 75 with an inconclusive FOBT result	1.26%	1.34%	1.43%	1.50%	1.98%

Indicator definitions (selection conditions):

CRC_06: Number of people aged 50 – 75 who underwent an FOBT exam (Number of unique patient IDs in the age group 50 – 75 with a reported procedure code 159, 159a, 159x, 159z, 3557, 4303, 4303a, 4303x, 4303z, 44681)

CRC_07: Ratio of the people aged 50 – 75 who underwent the FOBT exam in a two-year interval and the population of people aged 50 – 75 (screening exam coverage)

CRC_08: Ratio of people aged 50 – 75 with a positive FOBT result and the number of people aged 50 – 75 who underwent an FOBT exam

CRC_9: Ratio of people aged 50 – 75 with an inconclusive FOBT result and the number of people aged 50 – 75 who underwent an FOBT exam

Chart 2

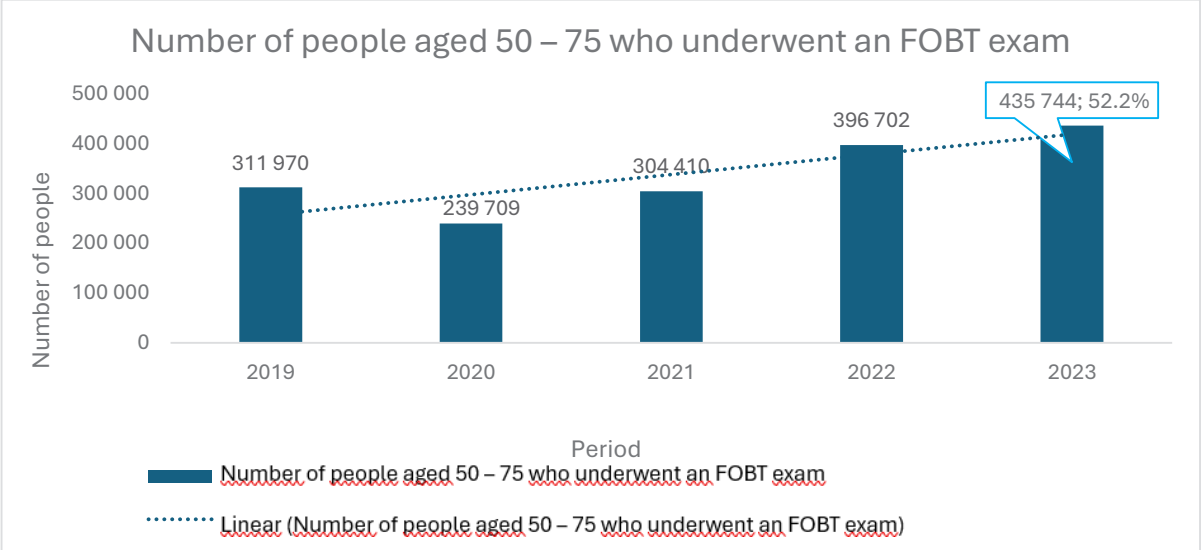


Chart 2 shows a positive trend in the number of people aged 50 – 75 who had a reported fecal occult blood test from 2019 to 2023. The share of people with a reported FOBT in 2023 was over 52% (Table 2, CRC_07).

Chart 3

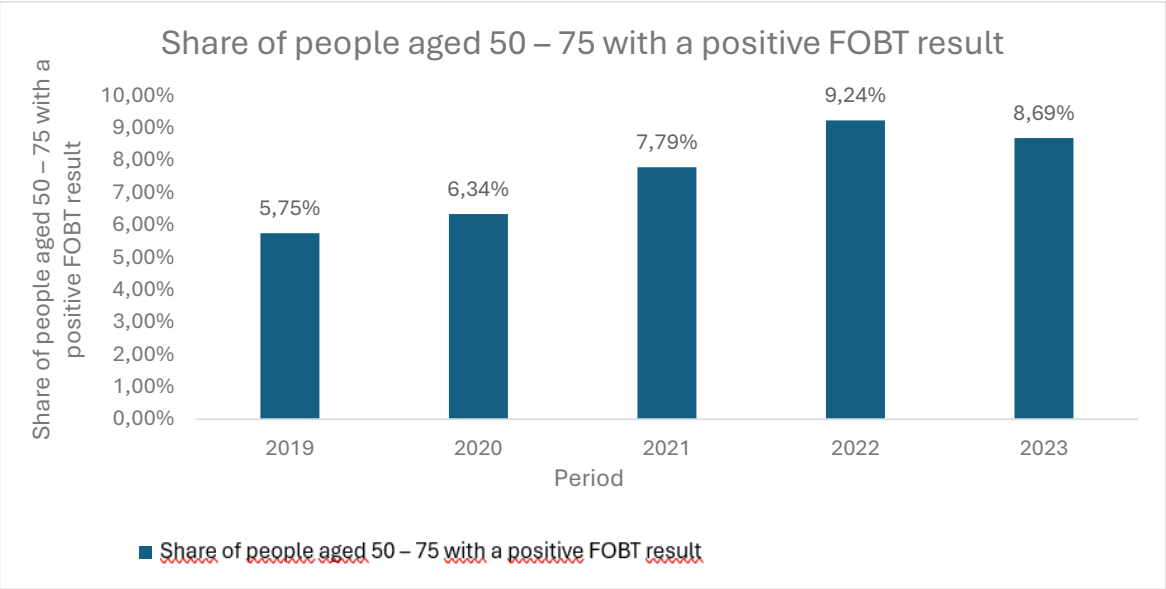


Chart 4

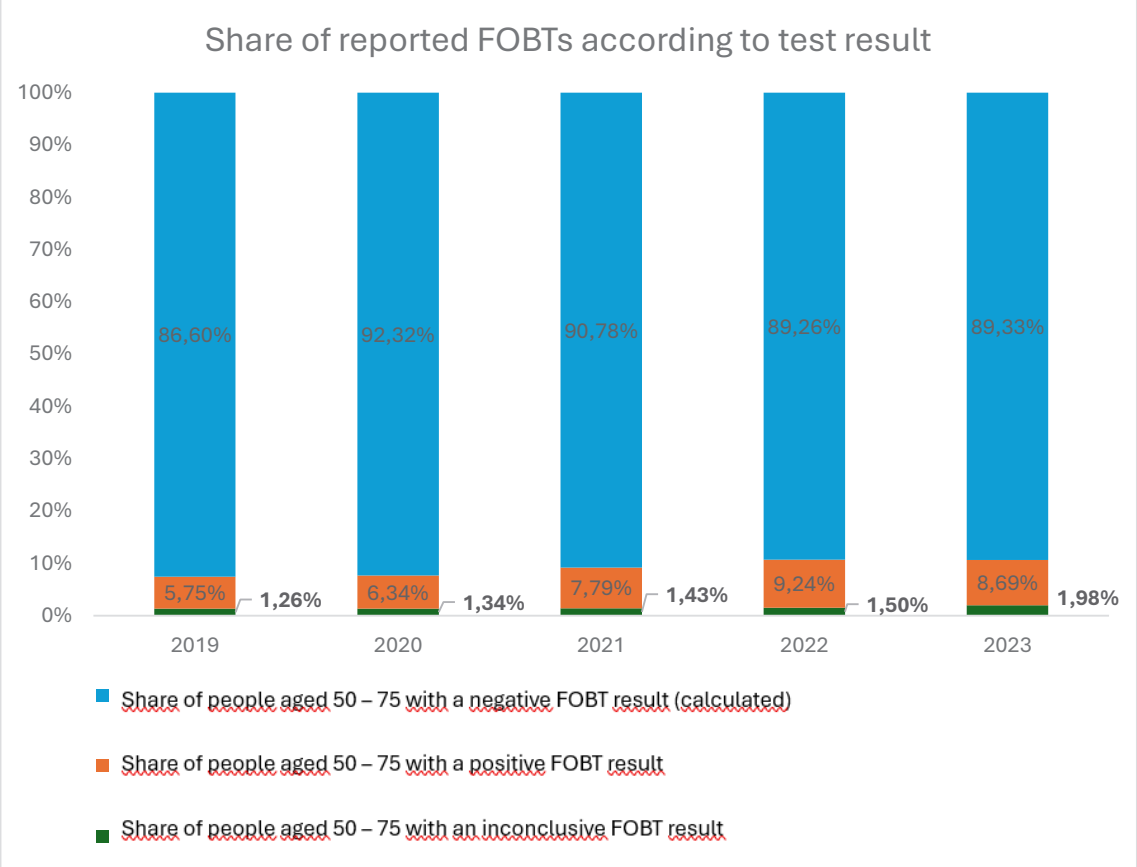


Chart 3 shows the share of people aged 50 – 75 with a positive reported result of the evaluated test. The 8.69% of positive reported FOBT results for 2023 are aligned with the positive detection data by FOBT reported by other countries as well as with European recommendations*.

Chart 4 also shows a certain share of people whose FOBT result was inconclusive. In the vast majority of cases, this may be due to incorrect procedure code and diagnosis code reporting by healthcare providers to health insurance companies during routine check-ups which include the FOBT result.

*European guidelines for quality assurance in colorectal cancer screening and diagnosis – First edition
https://www.cghjournal.org/article/S1542-3565(18)30370-7/fulltext
https://www.asge.org/docs/default-source/education/practice_guidelines/fecal_immunochemical_testing.pdf

Table 3

INDICATOR ID	INDICATOR NAME	2019	2020	2021	2022	2023
CRC_11	Number of people who underwent colonoscopy	71,274	57,342	65,128	75,897	82,788
CRC_11a	Number of people aged 50 – 75 who underwent colonoscopy	45,618	36,381	41,296	49,766	53,434
CRC_11b	Number of people aged 50 – 75 who underwent screening colonoscopy	9,353	7,407	9,416	13,256	14,358
CRC_12	Number of colonoscopies performed by 365 days after the FOBT result in the 50 – 75 age group				20,796	21,269
CRC_13	Share of colonoscopies performed by 90 days after the FOBT result in the 50 – 75 age group				29.35%	27.05%
CRC_14	Number of colonoscopies performed by 365 days after the FOBT result in the 50 – 75 age group				10,523	10,525

Indicator definitions (selection conditions):

CRC_11: Number of people who underwent colonoscopy (Number of unique patient IDs who underwent procedures 760*, 763*)

CRC_11a: Number of people who underwent colonoscopy in the 50 – 75 age group (Number of unique patient IDs aged 50 – 75 who underwent procedures 760*, 763*)

CRC_11b: Number of people who underwent colonoscopy in the 50 – 75 age group (Number of unique patient IDs aged 50 – 75 who underwent procedures 760p*, 763p*, 760s*, 763s*)

CRC_12: Number of people aged 50 – 75 who underwent colonoscopy by 365 days after the FOBT exam (Number of unique patient IDs in the age group 50 – 75 with a reported procedure code 760*, 763* and with a reported procedure 159, 159a, 159x, 159z, 3557, 4303, 4303a, 4303x, 4303z, or 44681 in the previous 365 days)

CRC_13: Ratio of people aged 50 – 75 who underwent colonoscopy by 90 days after FOBT

CRC_14: Number of people aged 50 – 75 who underwent colonoscopy by 365 days after the FOBT exam with a positive result (Number of unique patient IDs in the age group 50 – 75 with a reported procedure code 760*, 763* and with a reported procedure 159a, 4303a in the previous 365 days)

Chart 5

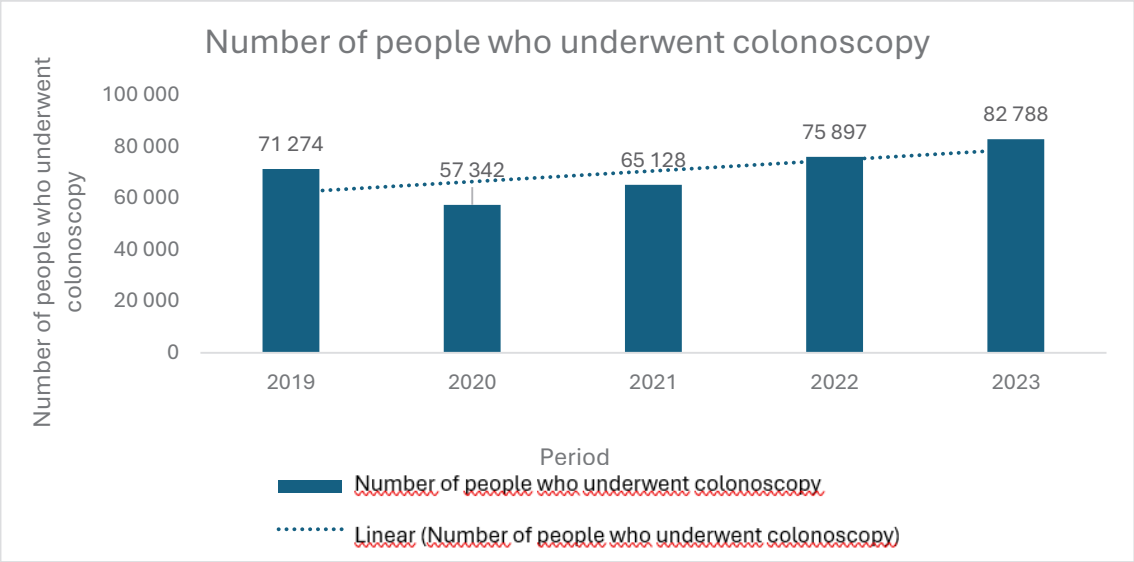
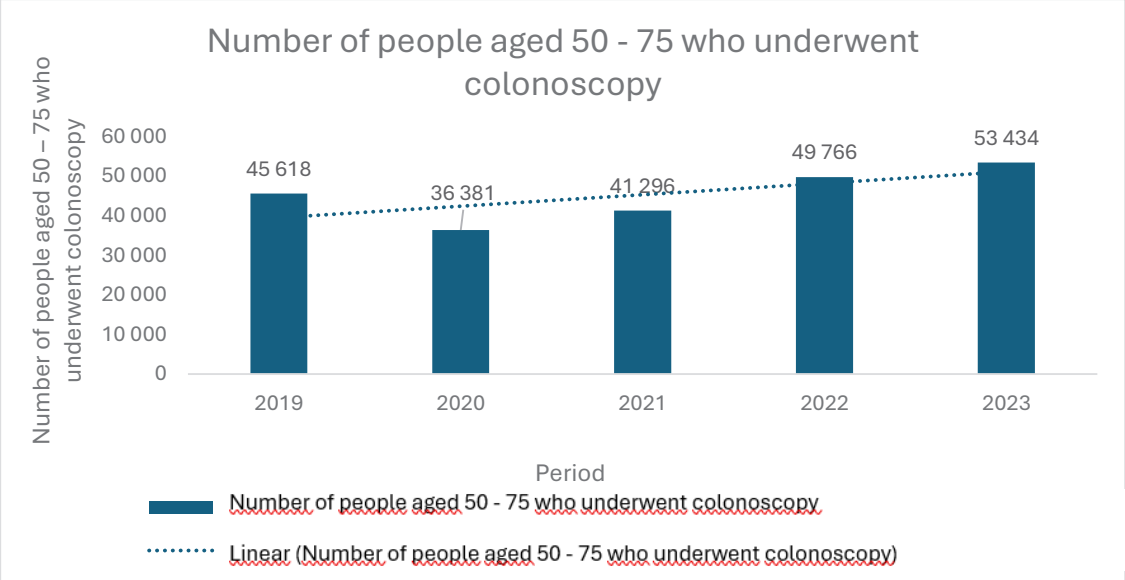


Chart 6



Annex 3

Charts 5 and 6 show an increase in the number of people with reported colonoscopy in 2023, which indicates a predicted positive trend.

The analysis includes an indicator (CRC_12) **which represents the number of people with colonoscopy reported by 365 days after the FOBT exam in the age group 50 – 75, with all FOBT exam results** (negative, positive, inconclusive) and all colonoscopy codes (screening, primary screening and diagnostic) **intentionally taken into consideration because our experience tells us that some FOBT results as well as colonoscopy exams are reported to health insurance companies with incorrect codes.**

The share of people aged 50 – 75 with colonoscopy reported by 90 days after FOBT was only 27.9% in 2023 (CRC_13). This low percentage can once again be caused by incorrect use of procedure codes defined for screening colonoscopy. A patient with a positive test should undergo screening colonoscopy by 31 days after referral.**

** (See Ch. 5, Rec. 5.19, Sect. 5.3.5). (VI – B).

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