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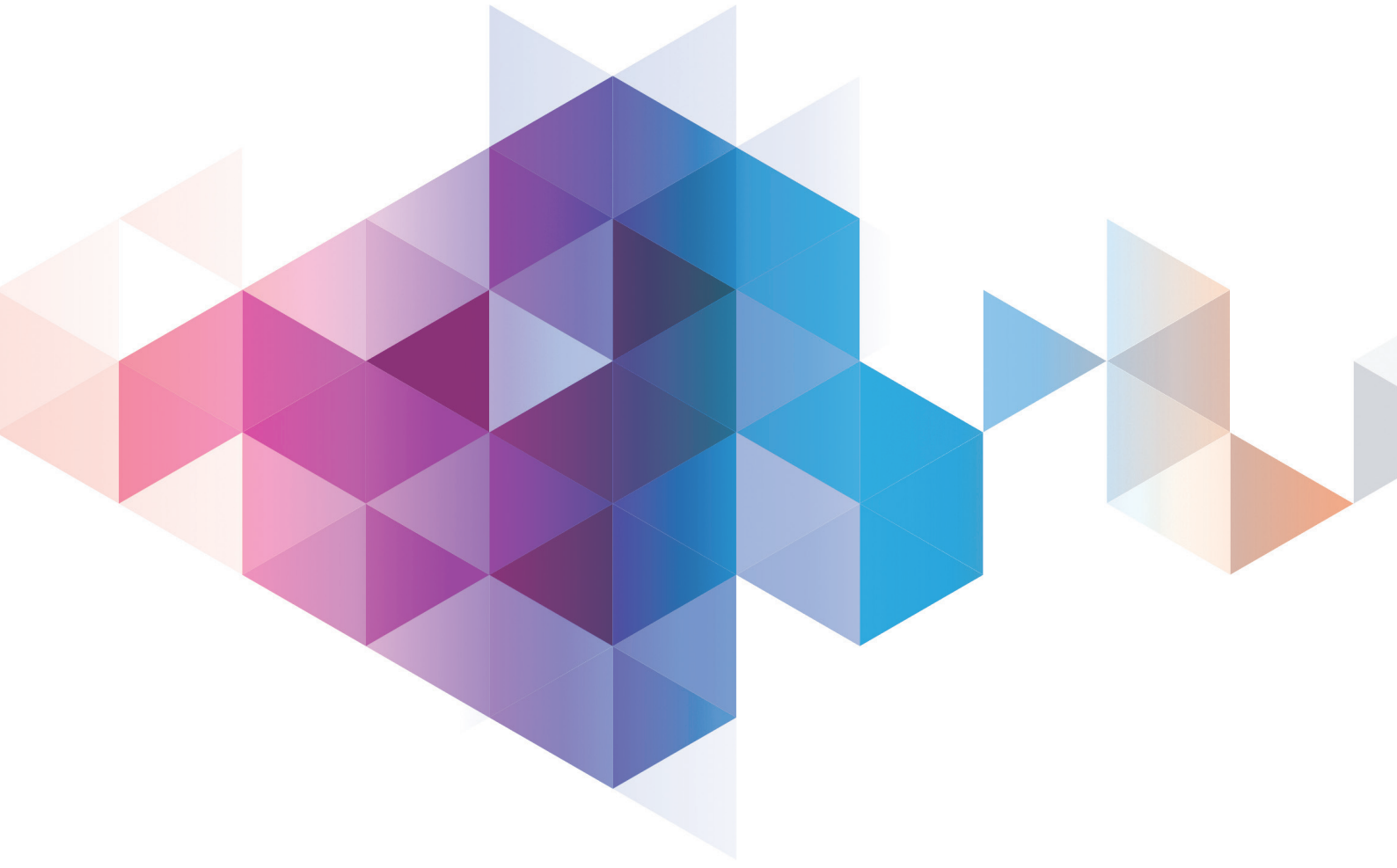
State of Cancer Screening Programs in Slovakia

Annual Report for 2022



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National Oncology Institute | Klenová 1 | 833 01 Bratislava

Compilers:
Dr. Jana Trautenberger Ricová
Mária Rečková, M.D., PhD.

Co-authors:
Dr. Zuzana Bárdyová, PhD.
Rudolf Hrčka, M.D., PhD.
Dominik Juskanič, M.D.
Alena Kallayová, M.D.
Lucia Kocová, M.D.
Michaela Laktišová, MSc.
Andrej Orságh, M.D.
Mária Rečková, M.D., PhD.
Dr. Jana Trautenberger Ricová
Oliver Sadovský, M.D., PhD.
Prof. Stanislav Špánik, M.D., PhD.
Adam Štrbavý, MSc.

Linguistic corrections:
Patrícia Kubicová, MSc.

Translation:
Veronika Maťúšová, MSc.

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List of abbreviations

AVLS	Alliance of General Practitioners, Slovakia
CPO	Centro di Prevenzione Oncologica, Italy
CT	Computed tomography
EU	European Union
EHIS	European Health Interview Survey
GE	Gastroenterologist
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
NHIC	National Health Information Center
MoH SR	Ministry of Health of the Slovak Republic
NOI	National Oncology Institute
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, National Oncology Institute has once again brought to you an assessment report about the quality of cancer screening programs in Slovakia for 2022. The report evaluates individual screening programs with an outlook on the near future, mapping current options and conditions of implementation of new screening programs as well as plans and perspectives from the point of view of NOI.

Slovak cancer screening programs follow Europe's Beating Cancer Action Plan, while their main goal is to reduce mortality as well as morbidity of oncological diagnoses thanks to early detection of diseases in potentially curable stages. There are three cancer screening programs active at the moment: breast cancer screening, cervical cancer screening and colorectal cancer screening, with lung cancer screening in preparation.

Within the framework of population-based screening programs, NOI closely cooperates with the Department of Public Health, Screening and Prevention of the Ministry of Health of the SR (DPHSP MoH SR) as well as other important institutions , such as health insurance companies, expert societies, National Health Information Center (NHIC) and patients' organizations. MoH SR supervises the screening programs and NOI serves as an expert platform for the preparation and updates of expert methodologies used in the screenings. NOI also participates in the creation and updates of standard procedures for individual screenings in general as well as high-risk populations.

In August 2018, the Government of the Slovak Republic approved the National Oncology Program (NOP) of the SR with Action Plans (AP) for 2019 – 2020. **An updated NOP with APs for 2021 – 2025 which focus particularly on reducing incidence and mortality and improving quality of life of cancer patients was 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, one of them being secondary prevention – screening. In 2022, National Oncology Institute worked on tasks laid out in APs for 2021 – 2025 in cooperation with the Ministry of Health of the SR and expert working groups for selected cancer screenings.

Brief overview

The main goal of cancer screenings is to reduce mortality as well as morbidity thanks to early detection of diseases in potentially curable stages. **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 consequent regular assessment and efficient screening program updates.**

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** last year with a fitting slogan **"Go to ONKOKONTROLA and find out if you are OK"**, ONKOKONTROLA being a new term for screening which is more comprehensible to the public. The new unified and comprehensible communication line was presented to the general public at a press conference at the MoH SR on 10 October 2022 by representatives of patients' organizations Pink Ribbon, NO TO CANCER, LEAGUE AGAINST CANCER, representatives of health insurance companies and NOI. The name "screening" was replaced by the word "onkokontrola" in communication intended for lay public. That is why the website www.onkoskriningy.sk was rerouted to a new website www.onkokontrola.sk which offers accessible and regularly updated information in the form of leaflets, brochures and short videos. **Another important task for NOI is regular evaluation of the screening programs and preparation of outputs** for their supervisor, the MoH SR. As before, it is only possible to evaluate the year 2022 based on data available from HICs and clinical data regularly provided by screening mammography centers. That is why it still will not be possible to evaluate even the most basic indicators of screening quality because efficient collection of screening data, which should serve as the basis for a screening register, has long been absent.
MoH SR in cooperation with NOI took the opportunity to remedy this situation, which is reflected in an insufficient participation rate in the screenings and non-existent screening register, by starting a two-year **cooperation with IARC** *(International Agency for Research on Cancer)*, which is part of WHO *(World Health Organization)*, on the ICCCS project (Improving Cancer Care Coordination and Screening) in January 2022. **The ICCCS project** is supported by the EU within the Technical Support Instrument (TSI) which is implemented in cooperation with the Directorate-General for Structural Reform Support (DG REFORM). In Slovakia, the project deals with challenges identified by the MoH SR and NOI and its objective is to reform healthcare infrastructure and services with special focus on improving the information system used to identify and invite population eligible for screening, which will create a framework for regular data collection necessary for monitoring and evaluation of cancer screening programs. This international expert cooperation puts in efforts

to prepare strategic plans which could improve cancer screening participation rate. One of the strategies is a communication campaign to raise awareness about the importance of screening as cancer prevention, which could potentially increase the participation rate.

In 2022, IARC representatives came to Slovakia for two working visits during which they got acquainted in detail with the current situation, overall organization, data collection as well as complex screening evaluation. What is more, several online meetings took place. Within the ICCCS project, NOI participates in the "Training of Trainers" course which provides training for experts on screening on different levels.

Definitions of screening programs according to IARC:

- **non-programed (opportunistic) screening**: examinations for early disease detection are performed within routine clinical practice unrelated to public screening policy (if there is one);

- **programed screening:** screening exams are funded from public resources and implemented according to public screening policy which is documented in laws or other binding regulations which define at least the type of screening test, its interval and target group;

- **organized screening:** takes place based on defined standard procedures, is organized on a national or regional level with precisely set rules, responsible organizing team and continuous quality assessment;

- **population screening:** programed screening which identifies and actively invites all members of the target population

A programed and partially organized screening is ongoing in Slovakia at the moment thanks to our long history of routine check-ups which are also stipulated in Law No. 577/2004 Coll. Details about individual screenings can be found in the following chapters.

Cooperation in 2022

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**
- **Health insurance companies:** VšZP, Dôvera, Union
- **Expert societies**
- **Patients' organizations:** League Against Cancer, No to Cancer, Pink Ribbon, The Amazons, Slovak Patient

COOPERATION WITH INTERNATIONAL ORGANIZATIONS

- **IBA, Masaryk University in Brno,** Czech Republic – preparation and adjustment of screening program evaluations
- **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, WHO**

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).

New Statutes of the MoH SR Cancer Screening Commission entered into application on December 21, 2020, and letters of appointment were given to a newly-elected commission at the beginning of 2021 based on the Statutes. In 2022, these were its members:

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

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

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

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

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

Dominik Juskanič, M.D., head of the working group for lung 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

František Podivinský, M.D., Dôvera

Lucia Vitárius, M.D., VšZP

The MoH SR 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.

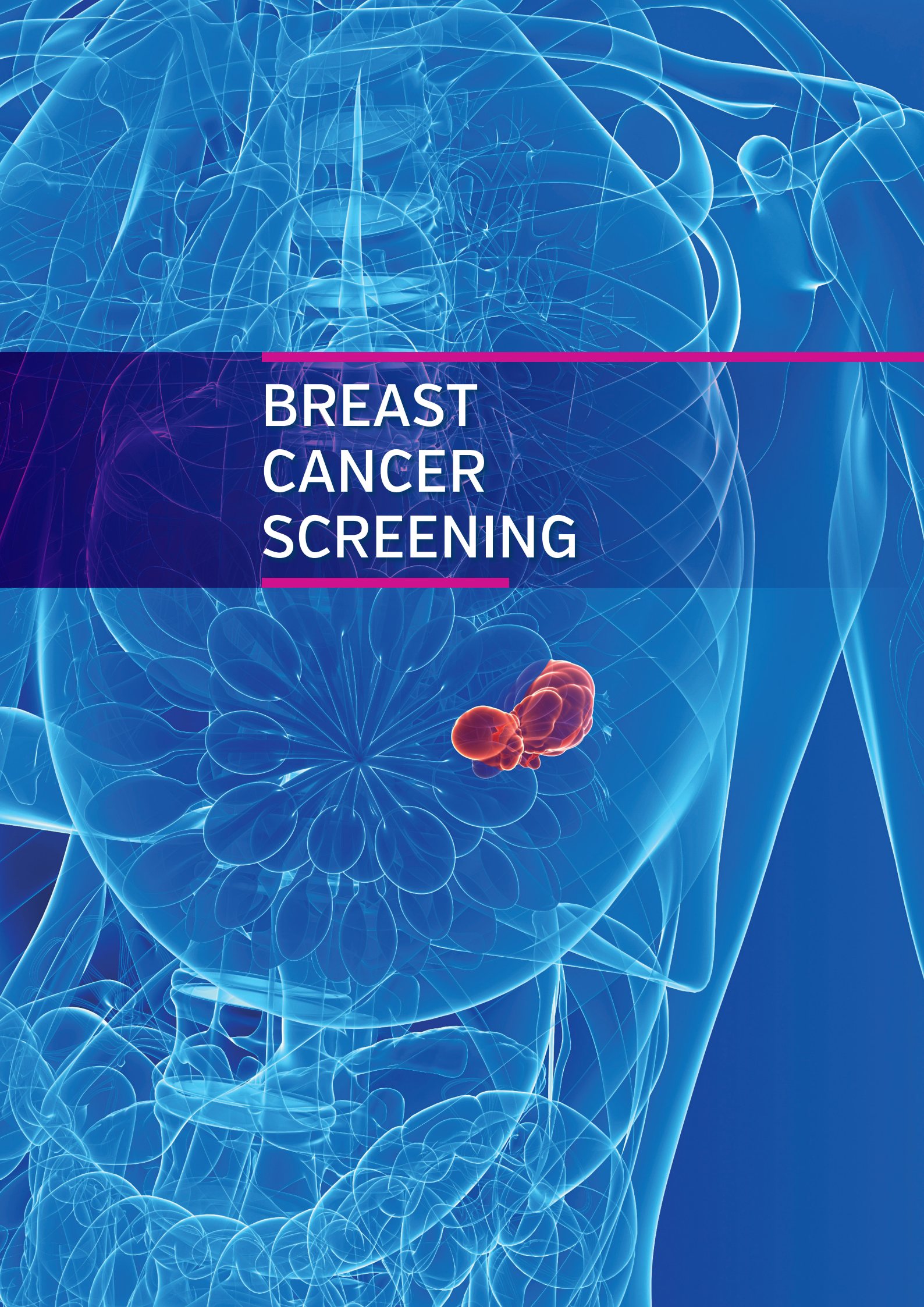
COLORECTAL CANCER SCREENING
– head of the working group: Prof. **Tibor Hlavatý,** M.D., PhD.

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

General organized breast cancer screening program *(so-called mammography screening) started in September 2019 by actively inviting asymptomatic women aged 50 – 69 who belong to the target group according to inclusion and exclusion criteria based on the targeted invitation methodology. This mammography screening continued in 2022 after a three-month break in 2020 (April – June). There were approximately 720,061 women aged 50 – 69 years in Slovakia in 2022, with around 30% undergoing mammography breast examinations regularly.*

Screening mammography can be performed only in certified mammography screening facilities which fulfil the requirements laid out in the valid Standard Procedure for Medical Radiation and Prevention – Screening Mammography https://www.standardnepostupy.sk/prevencia-onkologickych-ochoreni. These are certified facilities recommended 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.**

In 2022, the Expert Working Group checked and added two new mammography facilities to the 18 already functioning mammography screening facilities. **There are currently 20 certified mammography screening facilities in Slovakia.** The group also worked on re-certification of existing screening mammography facilities. Our ambition is to increase the number of mammography screening centers to 30 – 35 and thus improve their coverage and availability to all women in Slovakia. **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 on NOI website: https://www.noisk.sk/mamografickepracoviska

Collection and evaluation of statistic results in a binding structure is also part of mammography screening, which is not only a precondition of self-check of individual mammography screening facilities, but also a precondition of statistic data collection about screening participants and its evaluation. **In 2022, screening mammography facilities agreed on monthly collection of data** which are sent to NOI for evaluation; the course of mammography screening is evaluated once a year based on processing and analysis in a detailed **Assessment Report for 2022**.
Screening mammography data in the assessment report concern exclusively women aged 50 – 69 in Slovakia who have undergone mammography screening in one of the certified mammography screening facilities. It also contains **data about women who have participated in preventive and diagnostic mammography** calculated from anonymized data provided by all health insurance companies.

Complex report: **Mammography Screening Assessment Report for 2022** is available in Annex 1 and also published at NOI's website: *https://www.noisk.sk/screening/professionals/breast-cancer-screening*.

By the end of the year, NOI in cooperation with JD Software company (tender winner) managed to create a trial version of **MamoLight software program** which will automate and simplify the collection of statistical data in screening facilities and make the evaluation of statistical data from mammography screening more efficient.

In November 2022, radiology specialists led by Prof. Viera Lehotská, M.D., PhD., reviewed and published the **3rd revision of the Standard Procedure** for Medical Radiation and Prevention – Screening Mammography as well as **Standard Procedure for Breast Cancer Screening for High-Risk Female Population.** Both standard procedures are published at NOI website: https://www.noisk.sk/screening/professionals/breast-cancer-screening

The Working Group for Mammography Screening has also elaborated a **Methodical instruction for procedure and diagnosis code reporting for healthcare providers** and their subsequent reimbursement in relation to general breast cancer screening implementation. However, it has not been possible to propose and approve this instruction yet since it is not fully in accordance with the current wording of the Law No. 577/2004 Coll. which deals with cancer screenings, among other topics. **A draft amendment of the Law No. 577/2004 Coll.** should bring several useful changes in mammography screening which would make this screening more efficient and especially more harmonized with European guidelines and evidence-based medicine. It deals predominantly with **removing the term "opportunistic screening"** given that mammography screening can only be done in certified mammography screening facilities which were checked and recommended by the aforementioned Expert Working Group for Quality Assurance of Mammography Facilities.

Another change comes in a **proposal to broaden the target age group of women** from current 50 – 69 years to **45 – 75 years**, and in the section **"Routine gynecological check-up"**, it is proposed to remove the words **"Breast ultrasound once in 2 years"** as a preventive examination for breast cancer. This examination in asymptomatic women without increased risk of breast cancer can lead to overexamination due to repeated checks of oncologically non-suspect changes. This includes cysts and other benign non-palpable changes which lead to potential damage and excessive anxiety induced for the women as well as economic burden for healthcare. The majority of expert societies and experts do not recommend routine breast cancer screening in young asymptomatic women with average risk under 40 years of age because it is inefficient, does not lead to a desired reduction in mortality and, on the contrary, leads to excessive iatrogenization of healthy women.

As has already become tradition, October was a breast cancer awareness month. On this occasion, NOI managed to prepare a massive media campaign which resonated throughout October in cooperation with the working groups for breast cancer screening and screening media coverage, health insurance companies and several organizations. Pink October was endorsed also by the President Zuzana Čaputová and the Presidential Palace, along with other important buildings in Slovak cities, was highlighted in pink on October 15, 2022. This important awareness campaign was endorsed also by certified mammography screening facilities themselves, health insurance companies and many patients' organizations.

PINK OCTOBER (RUŽOVÝ OKTÓBER) 2022
BREAST HEALTH DAY (DEŇ ZA ZDRAVÉ PRSIA)

ACTIVITIES IN MAMMOGRAPHY SCREENING FACILITIES
BREAST HEALTH DAY (BHD) - PINK OCTOBER 2022 CAMPAIGN

BRATISLAVA

- October 13 – highlighting Bratislava landmarks: municipal authority, presidential palace and other sites in Bratislava

Radiology Clinic of the Faculty of Medicine of Comenius University and Saint Elizabeth Cancer Institute

– 25 October – co-organizing the 87th exhibition from "Art That Heals" cycle (Umenie, ktoré lieči – photographs by Eva Massar) accompanied by public education about breast cancer prevention, mammography screening including breast self-exam training on a phantom in SECI Preventive Center in Bratislava (co-organizers: Pink Ribbon, Europa Donna Slovakia)

RUŽOMBEROK

– October 15 highlighting the Town Hall of Ružomberok

Central Military Hospital Ružomberok – Teaching Hospital

– increasing awareness about mammography screening and importance of breast cancer prevention on a regional level via regional media

– publishing an educational piece about screening exams in regional papers – Ružomberský hlas and Spoločník

TRNAVA

– October 10 – 24 highlighting the Town Hall of Trnava on Hlavná street

– highlighting the University of Trnava rectorate in Trnava on Hornopotočná street

– highlighting other landmarks in Trnava

Teaching Hospital Trnava; MRI, s.r.o. – Imaging Diagnostics Institute (Inštitút zobrazovacej diagnostiky) Trnava

– October 19 from 1 PM to 3 PM – co-organizing public educational event "Breast Health Day – Invite your mother, aunt, grandmother to mammography" (co-organizers: University of Trnava, Pink Ribbon, Europa Donna Slovakia, The Amazons, NOI, city of Trnava)

Program of the event: educational lecture about breast cancer prevention, healthy lifestyle and diet, mammography screening in Slovakia and mammography diagnostics in certified mammography screening facilities in Trnava. Breast self-exam training on phantoms. Life stories of cancer patients. Ceremonial presentation of a new patient group of women with breast cancer "Pink Ribbon" in Trnava.

– October 19 from 10 AM to 5 PM – presentation of patients' organizations accompanied by breast self-exam training on a phantom, healthy diet degustation and presentation of artworks by cancer patients in Trojičné square in Trnava.

– November 15 – co-organizing scientific and expert conference "Oncology Screening Programs in Slovakia" (co-organizers: University of Trnava, Pink Ribbon, Europa Donna Slovakia, NOI and others)

LIPTOVSKÝ HRÁDOK

– highlighting the "Skalka" vista

SVALZY, s.r.o, - Liptovský Hrádok

– highlighting the "Skalka" vista promoted by an article in the town newspaper of Liptovský Hrádok and a poster in the municipality office, informing about the importance and symbolism of highlighting Slovak landmarks in pink, as well as the international PINK OCTOBER campaign

– October 19 2022, 2 PM organizing "Open Day" in the mammography department with subsequent education and possibility of discussion

– raising awareness about mammography screening and the importance of breast cancer prevention on a regional level via regional media (cooperation with AVON)

– online blog – interview about breast cancer prevention within the Lean In platform (https://www.leanin.sk/)

PREŠOV

– highlighting Prešov Town Hall and other landmarks

J. A. Reiman Teaching Hospital with Policlinic Prešov

– raising awareness about mammography screening and the importance of breast cancer prevention on a regional level

MALACKY

Nemocničná a.s.

– raising awareness about mammography screening and the importance of breast cancer prevention on social networks (FB, IG, LI) of the facility – "We Are Also Pink" (Aj my sme ružoví) – throughout October

– **October 15** promotion of BHD by handing out pink ribbon pins and materials about oncological diseases and screening exams

TRENČÍN

– highlighting Trenčín castle

– highlighting the Faculty of Healthcare of Alexander Dubček University of Trenčín (ceremonial highlighting in the presence of the rector, Assoc. Prof. J. Habánik, MBA, PhD., the president of Trenčín self-governing region and mayor of Trenčín were also invited)

– October 14 – 15 – highlighting other landmarks in Trenčín

Teaching Hospital Trenčín

– October 21 – organizing a public educational event at the mammography department of the facility focusing on breast self-exam, raising awareness about mammography screening and importance of breast cancer prevention via expert lectures and materials about breast cancer prevention for all participants

– promotion of BHD by all employees who had the symbolic pink ribbon pinned on their clothes

Radiology Clinic, s.r.o.

- October 12 – co-organizing an educational event at the Faculty of Healthcare of Alexander Dubček University of Trenčín for professionals and lay public for the entire faculty, self-governing region and municipality (co-organizers: University of Trenčín, The Amazons) Program of the event: expert lectures about prevention, fight against breast cancer, mammography screening in Slovakia and current situation. Breast self-exam training on phantoms and presentation of videos about these topics.

– lectures within Pink October and Science and Technology Week about oncological diseases prevention and healthy lifestyle
– presentation of results from three screening centers in Trenčín region (Radiology Clinic Trenčín, Teaching Hospital Trenčín, Prievidza) on a regional level
– October 10 – 15 – presentation of videos in the lobby of the Faculty of Healthcare of the University of Trenčín – Tatra Banka Fund – Breast cancer prevention

KOŠICE

Mammography Diagnostic Center, AGEL Hospital Košice-Šaca a.s.
– creation of promo tables with various "slogans" to take photos with in order to promote BHD
– Radiology Clinic physicians wore symbolic pink T-shirts
– the facility website visual was "painted pink" for the time
– raising awareness about mammography screening and the importance of breast cancer prevention via press release

– other mammography facilities of the AGEL company also participated in the Pink October campaign and organized the same activities:

- **– Skalica,** care facility, physician's office, mammography facility
- **– Komárno,** physician's office, department, mammography facility
- **– Zvolen,** physician's office, mammography facility
- **– Levoča,** physician's office, mammography facility
- **– Levice,** physician's office, mammography facility

DOLNÝ KUBÍN

Ladislav Nádaši-Jége Upper Orava Hospital
– raising awareness about mammography screening and the importance of breast cancer prevention on a regional level via regional media (TV)
– screening mammography exams and ultrasound exams for women aged 50 – 69 without appointment in the afternoon on a specific day in October

BANSKÁ BYSTRICA

October 15 – highlighting the Clock Tower and Town Hall in Banská Bystrica

Mammacenter of St. Agatha (Mammacentrum sv. Agáty)

– October 14 – educational stand in Europa Shopping Center in Banská Bystrica – educating visitors not to be afraid of mammography and breast ultrasound

– October 4 – educational interview with Mammacenter's senior doctor Mr. Ivan Turčan, M.D., PhD. in Banská Bystrica radio BBFM

– lecture for students about the importance of prevention regarding breast health at the Slovak Medical University

ZVOLEN

October 15 – highlighting the Old Town Hall in Zvolen

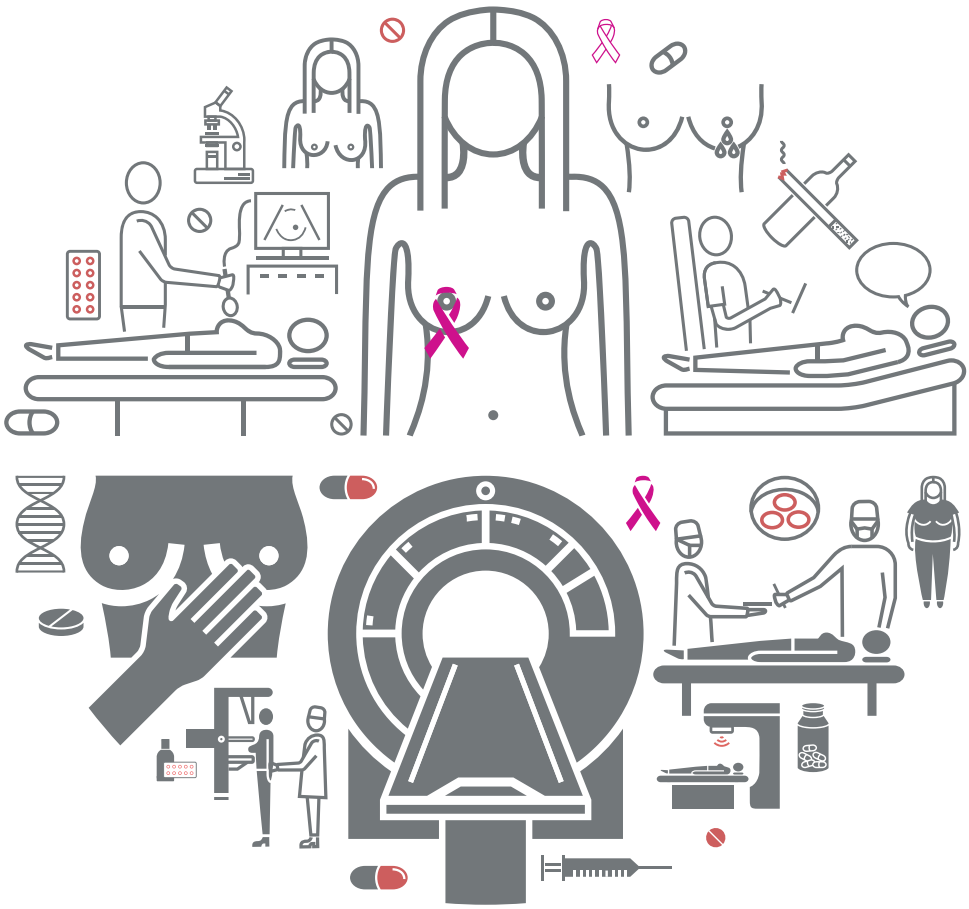
Mammacenter of St. Agatha (Mammacentrum sv. Agáty)

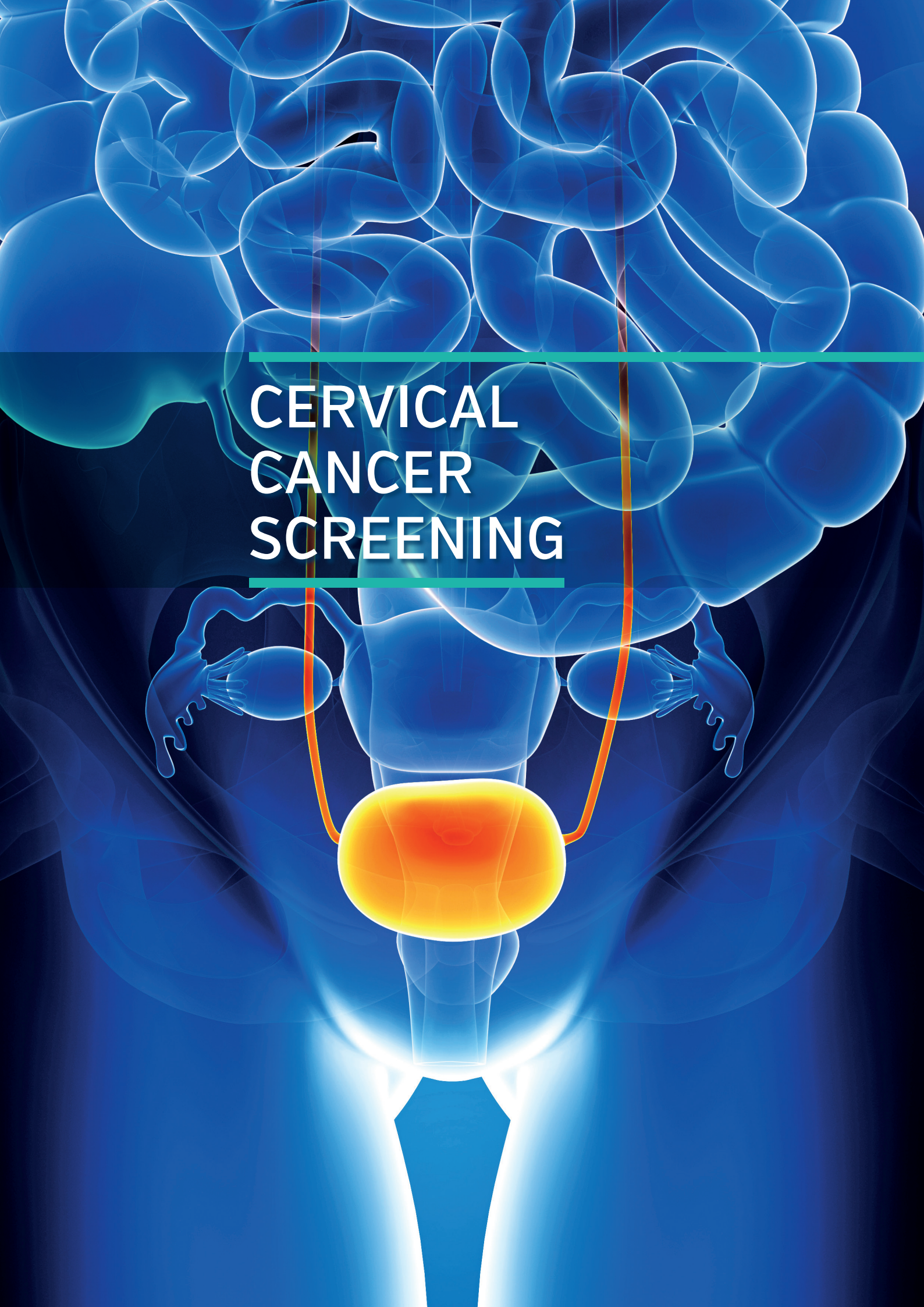
– October 15 at 9 AM – Pink Trip to Pustý Hrad castle (cooperation of ProCare Zvolen policlinic, Mammacenter of St. Agatha, Nordic Walking Zvolen organization and town of Zvolen)

VISION FOR 2023

One of the main tasks designed to improve the quality of the breast cancer screening program is to improve the overall conditions which would lead to a higher quality program and higher participation in the screening mammography exam. This is directly related to sufficient number and equal coverage of high-quality certified screening mammography facilities all around Slovakia and their better availability. However, this would **require appealing to mammography facilities which have not yet been certified by examples of best practices and showing them that it is important to perform high-quality screening on a European level.** They must be motivated to establish high-quality conditions in their facilities so that the Expert Working Group for Quality Assurance of Mammography Facilities can include them among screening facilities. Improvement of the conditions will definitely be supported when the amendment of the Law No. 577/2004 Coll. is approved, which could lead to more efficient work in mammography facilities, shorter waiting times for mammography and reduced workload of our already overburdened healthcare. Because organized mammography screening is running in Slovakia fourth year, **NOI will hold the first screening conference dedicated to mammography screening 19th of October 2023 entitled: "NOI FORUM, Statistical audit of mammographic screening in practice per year 2022"**, where there will be space for a detailed analysis of the entire issue. Experts from Czechia also accepted the invitation.

In order to increase participation rate in a high-quality screening program, it is necessary to improve the correct system of invitations sent to the target population by HICs, ensure data collection by NHIC and their evaluation by NOI and, last but not least, lead continuous and effective awareness campaigns. Screening program evaluation based on relevant information is a basic precondition for correct updates, subsequent functioning of the screening and possibility to compare the situation in Slovakia with other countries in our geographical region and in the world. The new **MamoLight software** is going to play an important role in data collection. Its trial version and “live” version **(from June 2023)** is going to **provide screening facilities with simpler and more efficient statistical data collection and temporarily replace a screening register which is still absent.**




CERVICAL
CANCER
SCREENING

General organized cervical cancer screening *was initiated in August 2021 when health insurance companies first started sending invitations to asymptomatic women aged 23 – 64 who do not undergo routine check-ups at their gynecologist's and are thus part of the target group according to inclusion and exclusion criteria according to 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 cytological results are evaluated by higher-level expert colposcopy facilities which assess the findings via expert examination and determine further therapeutic process. There were approximately 1,565,008 women aged 23 – 64 years in Slovakia in 2022 (source: Statistical Office of the SR). According to currently available data from HICs, **596,113 women aged 23 – 64** underwent routine gynecological check-ups **in 2022. This meant an increase compared to 2021 when 547,627 women participated** *(Chart 1)*. **In 2022, there was a slight reduction in the number of reported abnormal findings from 45,254 (7%) in 2021 to 43,532 (6.3%) in 2022** *(Chart 2)*.

However, it should be noted that it is impossible to evaluate the screening per participation rate with currently available data from HICs and to identify a screening interval in which the women were examined. In EU Country Cancer Profile 2023 OECD report (OECD 2023, *EU Country Cancer Profile: Slovak Republic 2023, EU Country Cancer Profiles, OECD Publishing, Paris,* https://doi.org/10.1787/01a8d361-en), the cervical cancer screening participation rate with a three-year interval equals 64% (calculations based on interviews within European Health Interview Survey – EHIS from 2019). However, we assume that the screening participation rate with a three-year interval in Slovakia is lower compared to the OECD report, given that practical experience at the moment shows that the majority of women undergo cervical cancer screening in a yearly interval within their routine gynecological check-ups, not in the approved 1-1-3 screening interval.

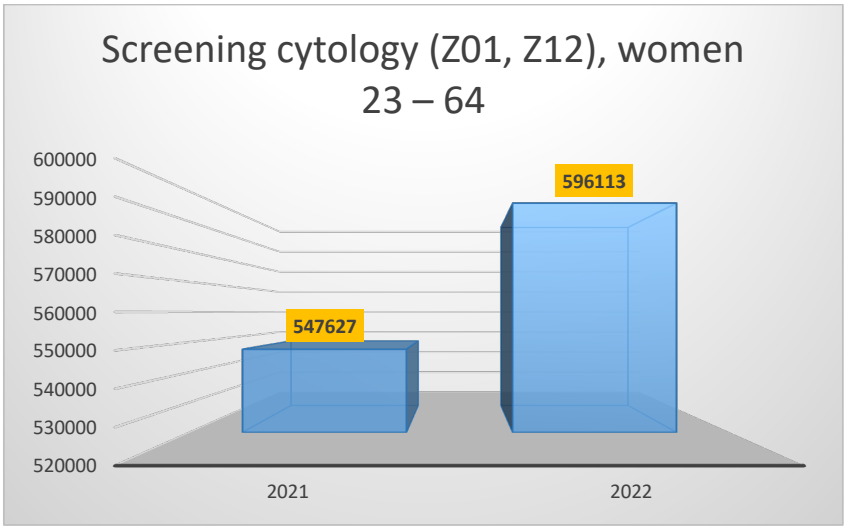


Chart 1 (source: NOI processing of data from insurance account)

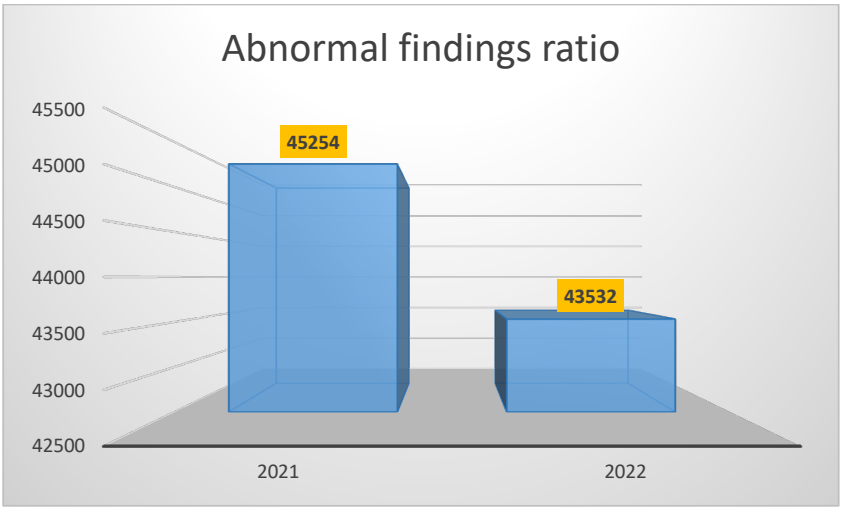


Chart 2 (source: NOI processing of data from insurance account)

Chart 3 below shows a slightly increasing tendency in the ratio of reported precancers and cancers in comparison between 2021 and 2022.

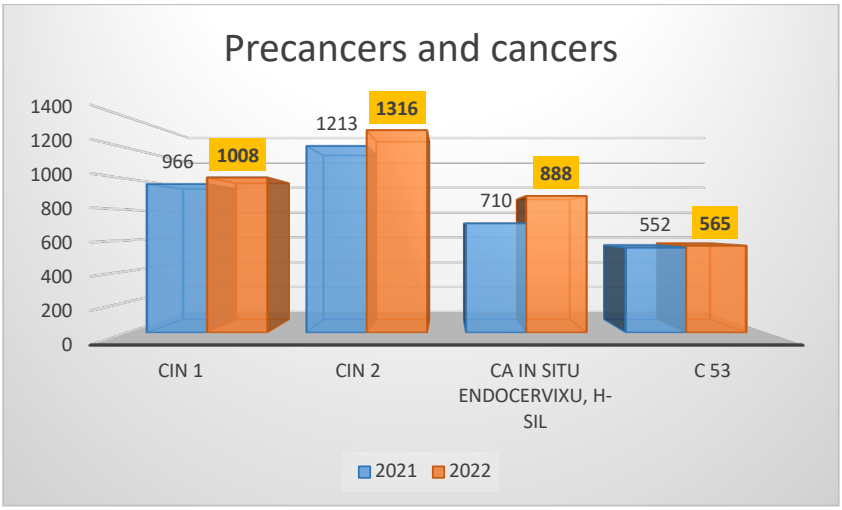


Chart 3 (source: NOI processing of data from insurance account, NHIC based on information about reimbursed healthcare from health insurance companies)

Due to its etiopathogenesis and gradual development of invasive cancer through precancers, cervical cancer is one of the few malignancies which can be almost completely prevented via secondary prevention. A screening program can significantly reduce mortality and incidence of cervical cancer. **Ensuring high quality of the screenings requires adequate education of gynecologists** who perform expert colposcopy as a solution for abnormal cytology findings within the cervical cancer screening process. **It is also necessary to establish a sufficient network of healthcare facilities where expert colposcopy can be performed.** That is why, in 2022, the working group prepared a methodical instruction of the MoH SR for performing expert colposcopy for cervical cancer screening in Slovakia which is waiting for approval and publication in the MoH SR Journal. 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 and www.onkoskriningy.sk.

Within the framework of legislative **changes of the Law No. 577/2004 Coll.,** NOI prepared adjustments of its wording in cooperation with the working group for cervical cancer screening and MoH SR. The goal of this adjustment is to **define the cervical cancer screening program more clearly** and separate it from common formulation with breast cancer screening. According to European and WHO guidelines, the proposal also includes a **recommendation to introduce a screening hrHPV DNA test which would be done simultaneously with the cytology exam in specific age groups, more specifically in women aged 36 and 45.** NOI presented the screening program update proposal at a meeting of MoH SR Cancer Screening Commission at the end of 2022.

We can see several aspects which can skew the outcome of this screening program as well. **One of them are invitations sent to women after hysterectomy.** This is because DRG codes for surgeries were implemented only in 2019 and thus cannot be identified. **Another issue is lack of relevant data.** To some extent, this is caused by errors in procedure and diagnosis coding related to the screening. It is thus very important to correctly report the procedure and diagnosis codes sent to health insurance companies for as precise an assessment of the screening program as possible. 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 a currently non-existent NHIC screening register,** which would consequently be anonymized and provided for evaluation to NOI. It is true here as well that a coordinated, monitored and continuously evaluated screening program accompanied by higher participation rate of women in the screening can achieve a reduction of mortality of this serious disease and lead to a lower incidence of advanced stages of the disease. It can also help achieve a lower incidence of invasive lesions via detection of early preinvasive changes and lower morbidity, and thus higher quality of life for women.

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]. **Since May 1, 2022, Slovak Republic has become one of the developed countries which provide free vaccination with state-of-the-art nanovalent vaccine against HPV to girls and boys aged 12 – 13. HPV vaccination with both bivalent and nanovalent vaccines is currently fully reimbursed from public health insurance in this specific year of age.**

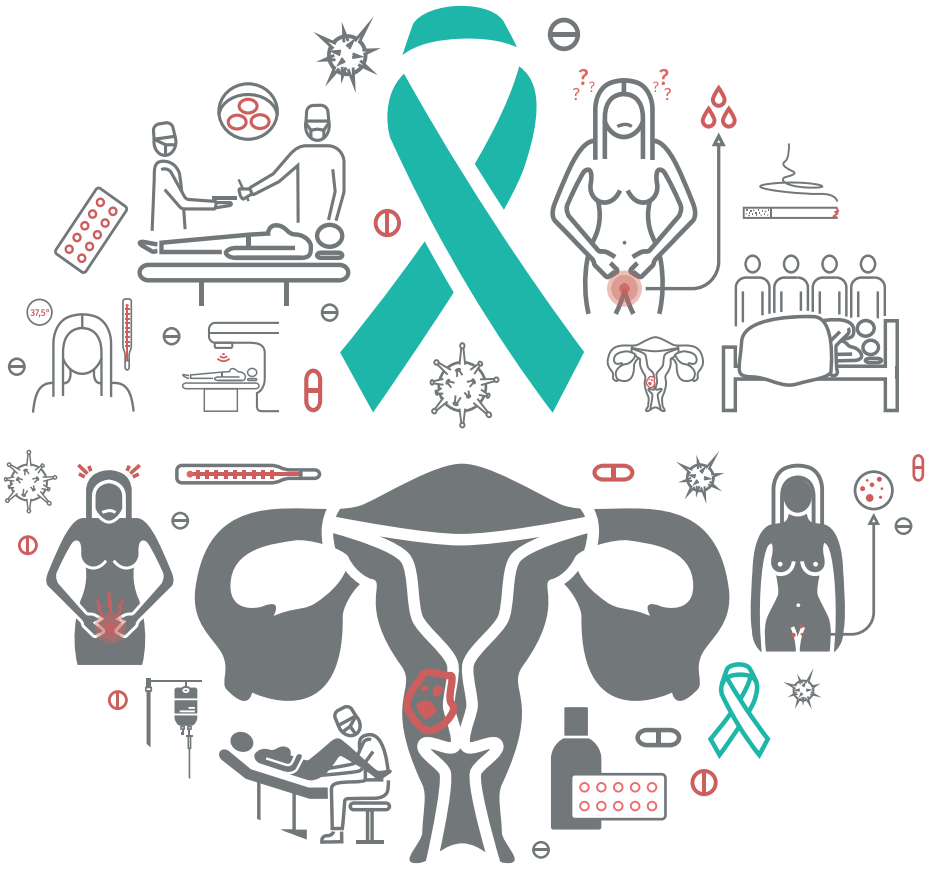
Complex report: **The Cervical Cancer Screening Program Update, Report for 2022** is found in Annex 2.

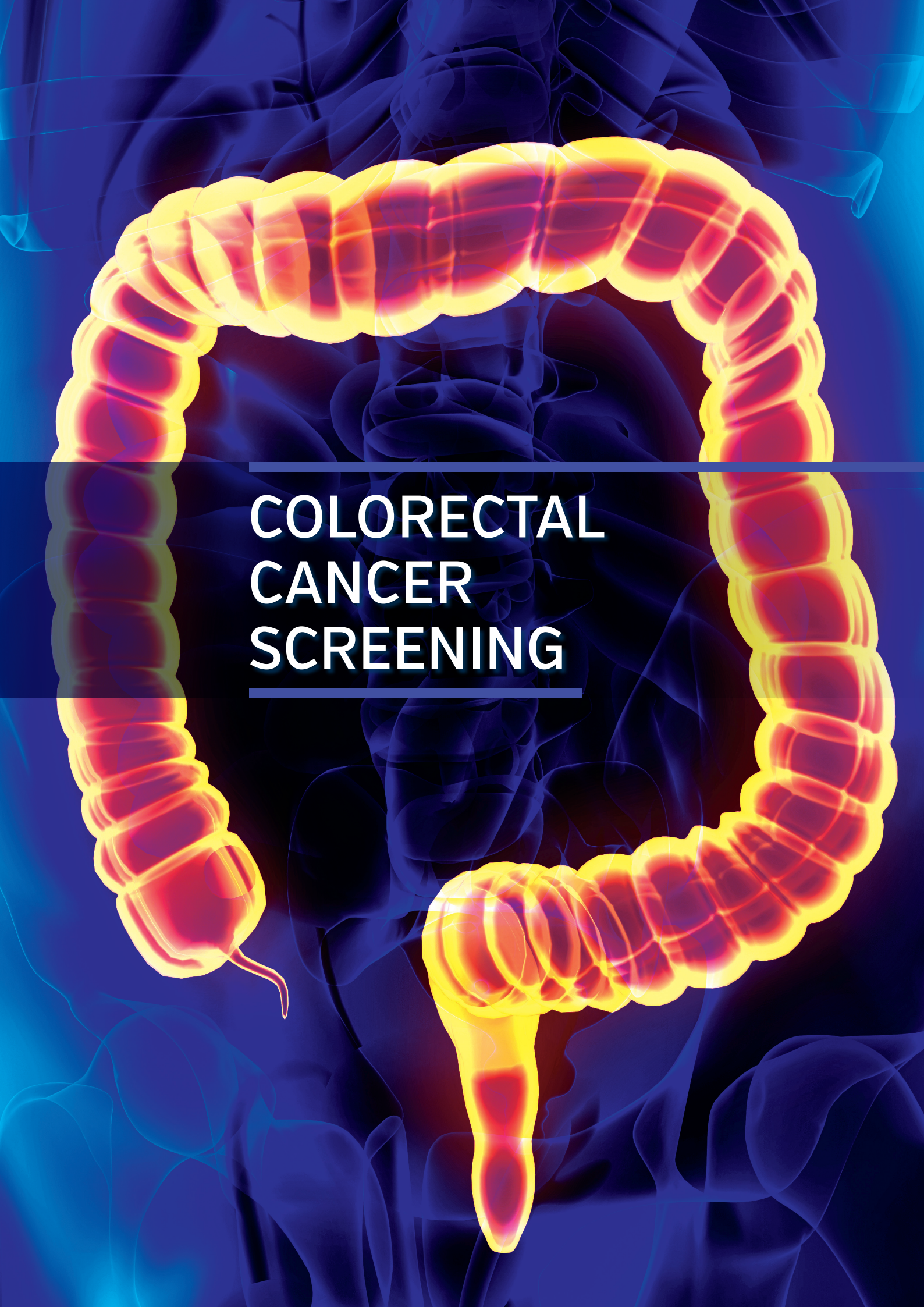
VISION FOR 2023

Due to proven benefit of implementation of the hrHPV DNA testing, it is necessary to adjust the screening program in Slovakia. **The most immediate objective of the working group is to introduce a screening hrHPV DNA test which would be done simultaneously with the cytology exam in specific age groups, more specifically in women aged 36 (+364 days) and 45 (+364 days).** These age groups were selected according to WHO recommendations and the example of Czechia where the benefit of implementing HPV co-testing with the cytology exams for ages 35 and 45 has already been confirmed. The age groups have been adjusted to preexisting cytology screening intervals in Slovakia. With a yearly interval at the beginning of the screening and a three-year interval after the first two negative cytology findings and the beginning of the screening at 23, the screening also takes place at 36 and 45. The screening hrHPV DNA co-test should be performed at the same time. **HPV test will continue to be performed as a triage test in case of an inconclusive cytology result.**

In relation to the aforementioned 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 screening HPV test and negative and positive result of 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 and pilot programs 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 not only on screening but also on primary prevention, i.e., HPV vaccination, and take steps to broaden the age group for which the vaccination is reimbursed by health insurance companies because this option is currently available only for girls and boys aged 12 – 13.




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 who do not go to routine check-ups at their GPs' at all. The second phase has continued since September 2021. HICs send a screening fecal occult blood test (FOBT) kit to the insured persons who fulfil inclusion criteria to be invited to the screening by their health insurance company.* **The target population in Slovakia consisted of 1,688,804 men and women aged 50 – 75 in 2022** *(source: Statistical Office of the SR).*

CRC screening in normal-risk population has been performed in Slovakia for over 10 years via opportunistic screening by FOBT at GPs' offices with subsequent colonoscopy in case of a positive result. Primary screening colonoscopy (without previous FOBT) is an alternate process and it is also indicated as a screening exam for high-risk population. This type of screening is stipulated in the Law No. 577/2004 Coll.

Data about performed colonoscopy exams are collected and evaluated via web interface www.krca.sk which is supervised by the head of the working group for colorectal cancer screening at the Slovak Society of Gastroenterology (SGS), Mr. Rudolf Hrčka, M.D., PhD. Data from HICs have been added in the recent years. Organized invitation screening under the auspices of the MoH SR coordinated by NOI was implemented in Slovakia in order to increase screening participation rate and according to European Commission recommendations.

34% of invited insured persons used the received FOBT and handed it over for evaluation within a pilot project in 2019. Actual sending of the invitations by HICs, including a qualitative FOBT, only started in the second half of 2021 after the pilot project in 2019, mainly due to the COVID-19 pandemic.

In comparison with previous years and taking into account the COVID-19 pandemic, it can be said that 2022 was a successful year with a constantly rising trend of the number of people who underwent the screening FOBT. Before the pandemic in 2019, the participation rate in the FOBT screening was 38.7% according to available data from HICs, whereas it reached almost 50% (49.5%) in 2022.

Based on available data from HICs and reported healthcare codes, 313,309 and 410,967 FOBTs were evaluated in 2021 and 2022 respectively – this constitutes a year-on-year increase of 31% *(Chart 4).* If this also translated into the number of examined people, it would correspond to a participation rate of **37.9% in 2021 and 49.5% in 2022** (counting half of the population aged 50 – 75, but without subtracting CRC prevalence or high-risk patient groups). However, this is

the absolute number of all reported FOBT procedures (i.e., if a patient was examined and reported to an HIC repeatedly, they are in the system several times), which is why the percentual participation rates based on this data are not precise.

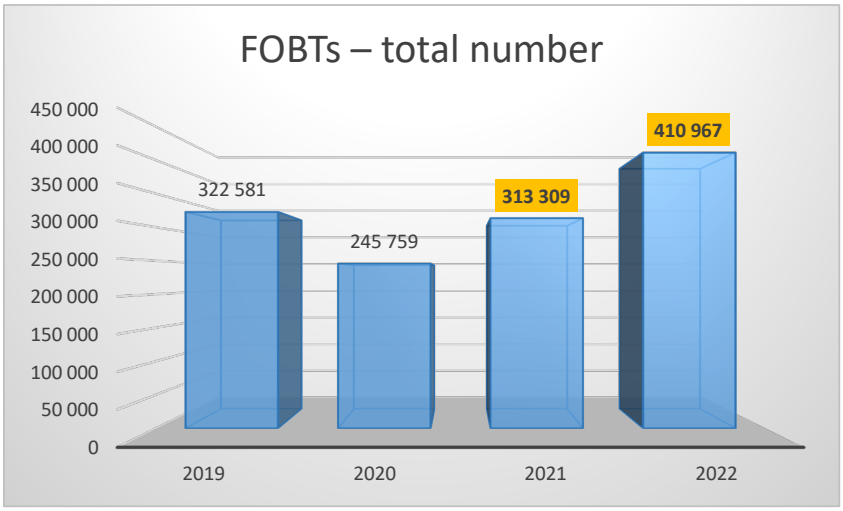


Chart 4 (source: NOI processing of data from insurance account)

Chart 5 shows the number of reported positive and negative FOBTs, where **positivity % in 2022 was 10.9%, in comparison with 2021, when positivity % was 9.3% with the same input parameters.**

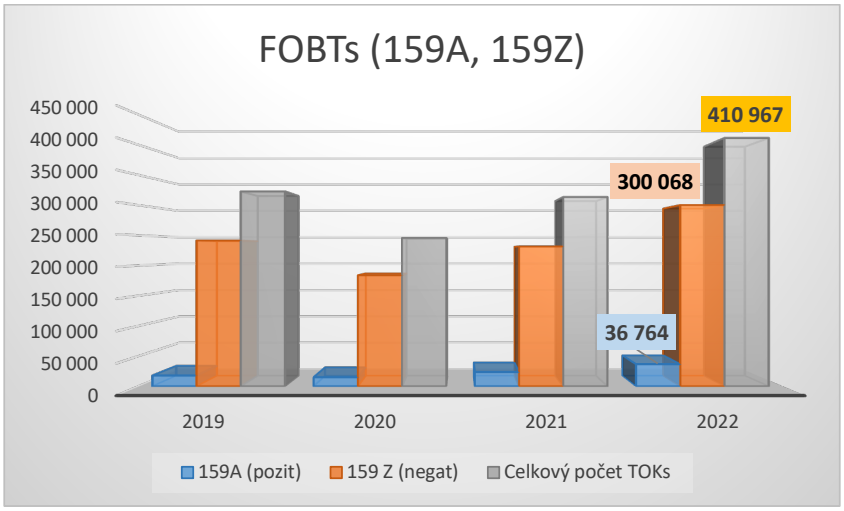


Chart 5 (source: NOI processing of data from insurance account)

39,400 and 47,572 pancolonoscopies were reported in the age group 50 – 75 **in 2021 and 2022 respectively** *(chart 6),* of which **8,445 and 11,804 pancolonoscopies had screening codes** *(chart 7),* which represented a year-on-year increase by 39.8%. 8,315 and 11,186 valid forms were sent via the KRCA system, respectively.

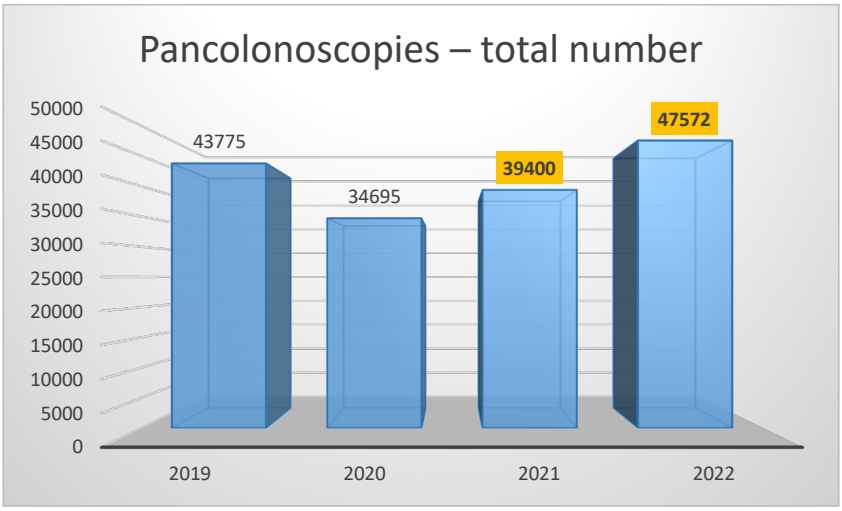


Chart 6 (source: NOI processing of data from insurance account)

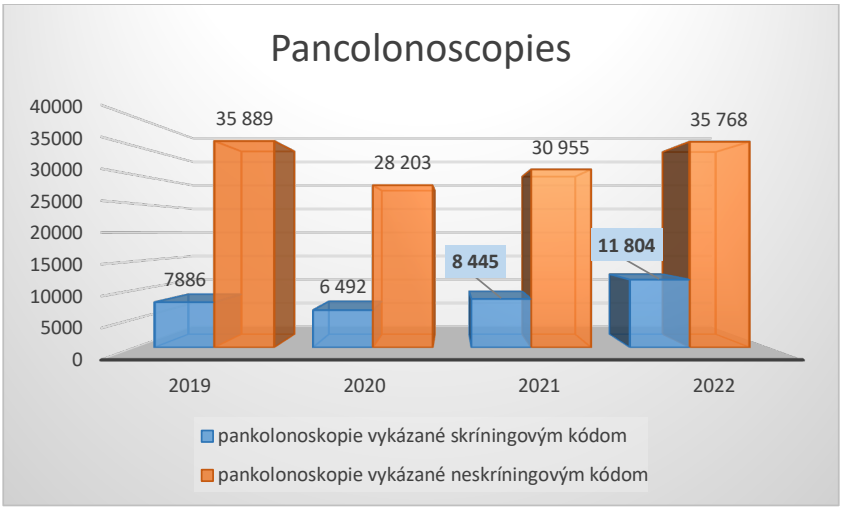


Chart 7 (source: NOI processing of data from insurance account)

The aforementioned increase in the number of performed exams is probably a response to the implementation of active sending of invitations to the target population by health insurance companies. However, we currently do not have complete data from HICs about precise numbers of insured persons who have responded to the invitation with the test since the beginning of the invitation screening in 2021 and handed it over for evaluation to their GP or not, due to various reasons.

This report also includes a description of the current issues of the CRC screening program and suggestions for their solutions including amendments.

1. Screening data collection and evaluation
2. Population participation rate and screening organization
3. Procedure and diagnosis codes reporting and reimbursement

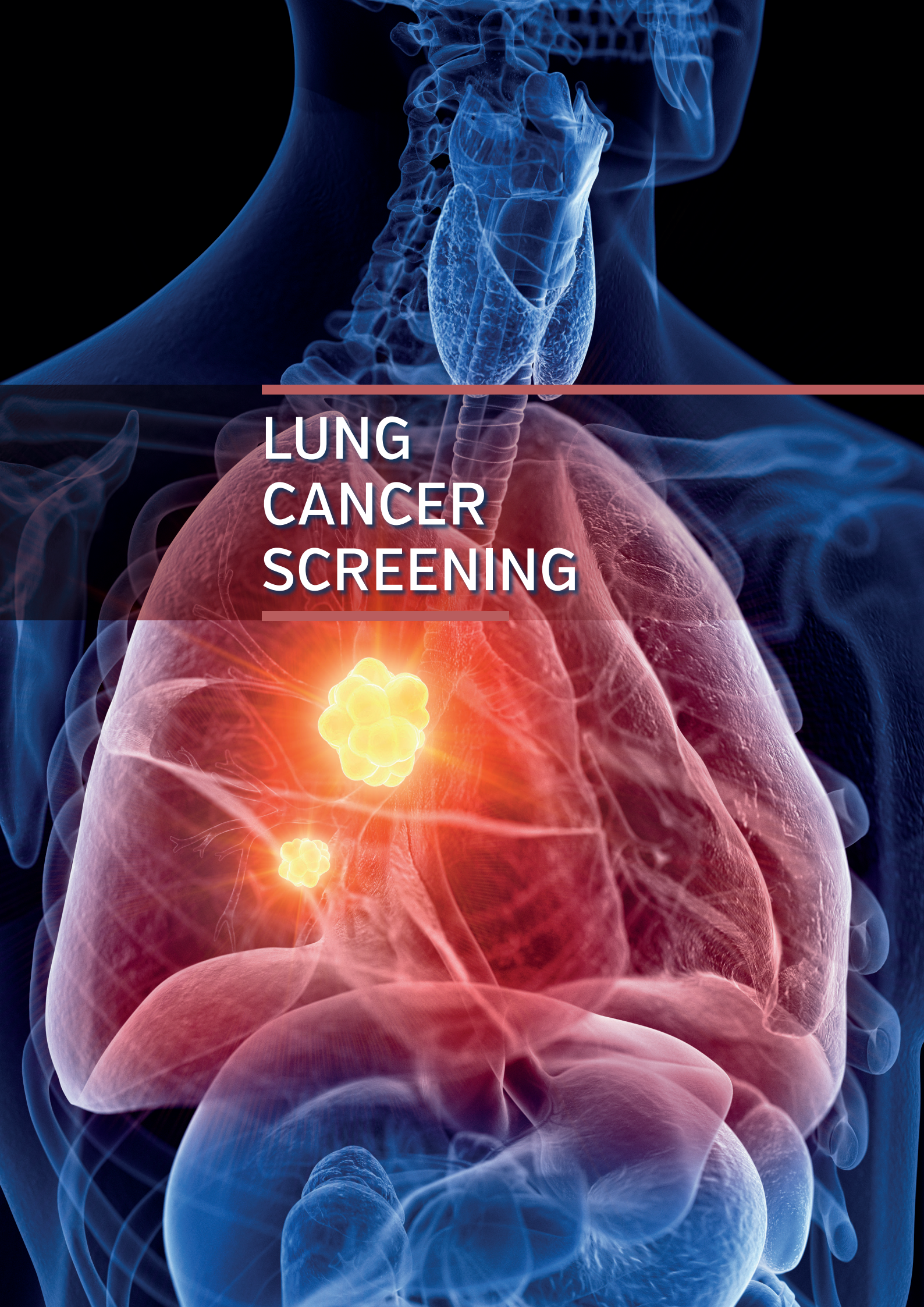
Complex report: **The Colorectal Cancer Screening Program Update, Report for 2022** is found in Annex 3.

VISION FOR 2023

Colorectal cancer screening is based on opportunistic screening within preventive care of adults in first point-of-contact physicians' offices, which is an inherent and important part of this preventive program. It is still most important to harmonize colorectal cancer screening exams with routine check-ups at GPs' offices, primary screening colonoscopy at GEs' and correct invitations by HICs according to Methodical instruction of the MoH SR for procedure and diagnosis code reporting for healthcare professionals and outpatient facilities participating in colorectal cancer screening https://www.noisk.sk/files/2020/2020-09-15-krca-vestnik-2020-01-06.pdf.

Within e-Health, it would be beneficial to streamline and interconnect information systems and thus ensure a higher level of mutual awareness about invitation and participation in screening either via FOBT or primary screening colonoscopy. Another topic for discussion is the possibility to introduce a quantitative FOBT test with a precisely determined cut off and 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. Yet another issue is repeated FOBTs during routine check-ups at GP's even if the patient has already undergone primary screening colonoscopy at GE's in the last 10 years, regardless of the result. This would be solved by the amendment of the Law No. 577/2004 Coll.

We are currently looking for options to raise awareness about primary screening colonoscopy (as a diagnostic as well as treatment method) which seems to be the most effective way to truly prevent oncological diseases of the large intestine and colon. However, reducing the dominant incidence and mortality of this disease requires raising overall awareness about the importance of screening as such, which is intensely worked on by the working group for screening media coverage, with the important participation of MoH SR, NOI and particularly patients' organizations with their relentless activities. Slovaks do not want to undergo colonoscopy or they postpone it because they are afraid of pain and discomfort. Slovak patients have to pay extra for a comfortable, painless colonoscopy exam, whereas free analgosedation is a standard around the world. Approval of this procedure by the MoH SR commission for the healthcare procedures catalog will be an important step towards improvement of CRC prevention and treatment.



LUNG CANCER SCREENING

Lung cancer is the leading cause of death of cancer in Slovakia and EU. According to data from National Oncology Register, lung cancer was the third most commonly diagnosed malignant disease in men and fourth most commonly diagnosed malignant disease in women in Slovakia in 20 14 (Incidence of malignant tumors in the SR 2014. That year, gross incidence of lung cancer in men was 67.7 per 100,000 and gross incidence for women was 24.1 per 100,000. https://www.nczisk.sk/Statisticke_vystupy/Tematicke_statisticke_vystupy/Onkologia/Vystupy_NOR_SR/Pages/Incidencia-zhubnych-nadorov.aspx*).*

A model projection for 2022 in Slovakia is 3,154 new cases of lung cancer, of which 2,191 cases in men and 963 cases in women. For men, lung cancer had the highest mortality of all malignant tumors in Slovakia in 2021, for women, it was the second highest after breast cancer. 1,957 people died of lung cancer in Slovakia that year, of which 1,359 men and 598 women. Standardized male mortality for global population was 27.12 per 100,000 people and standardized female mortality for global population was 8.93 per 100,000 people. Lung cancer mortality prediction for 2022 is 1,405 men and 641 women. Experience and data from countries with implemented early-detection lung cancer screening in connection with quitting smoking programs show that implementing these processes in Slovakia would be meaningful.

In December 2022, an important European Commission document called "Council Recommendation on Strengthening Prevention through Early Detection: A New EU Approach on Cancer Screening" was approved and replaced the previous EC recommendation 2003/878/EC. This document includes an explicit recommendation to implement an early-detection lung cancer screening program and it was included in the Standard procedure for lung cancer prevention via risk group screening – lung cancer screening.

Working group for lung cancer screening met several times throughout 2022 under the auspices of NOI and MoH SR, as well as MoH SR screening commission with NHIC and health insurance companies' representatives. Specifying and standardizing patient journey through the screening program was an important step preceded by a fruitful and thought-provoking discussion.

Following the specification of patient journey, **a pilot grant project to support the creation of software screening module for outpatient and inpatient information systems was initiated** in order to help automate the collection and sending of data to a future screening register. It is expected that this project will create solid foundations for significant simplification of data surveillance of the screening program in the future, which will make the screening program sustainable in the long term with a possibility of continuous improvement.

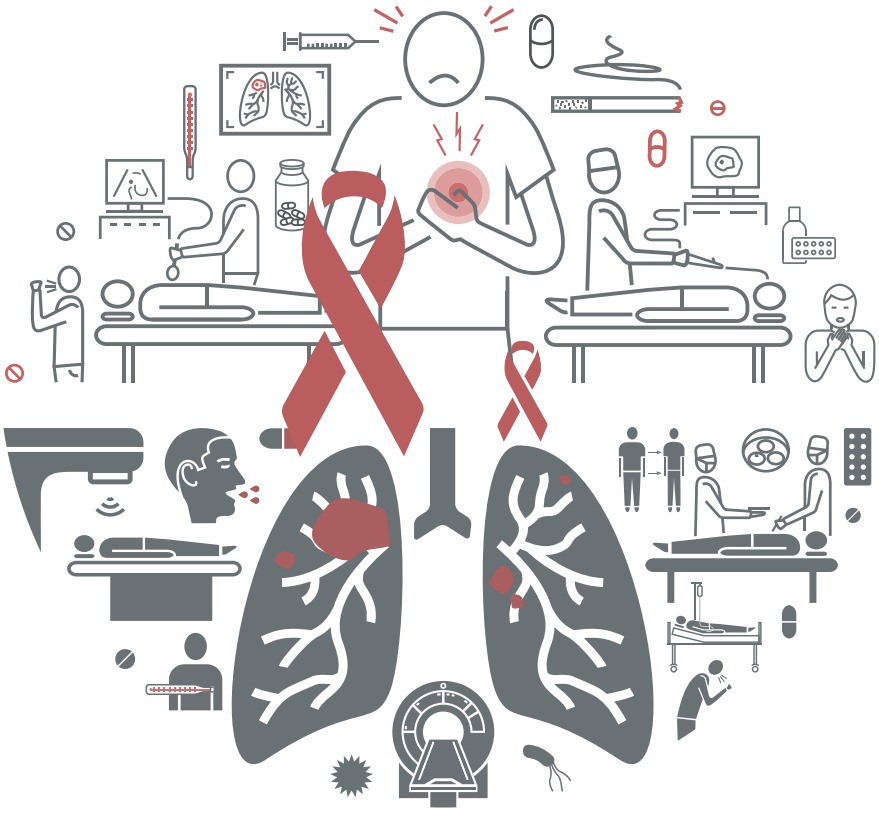
The preparation of Standard procedure for lung cancer prevention via risk group screening – lung cancer screening finished in 2022 under the guidance of Prof. Viera Lehotská, M.D., PhD., MoH SR chief expert for radiology. The document is currently in consultation. Apart from that, the working group carried out an important amendment to the healthcare procedures catalog related to screening. This change of procedures reflects the needs of the outpatient sector as well as CT facilities which are going to be included in the certified network.

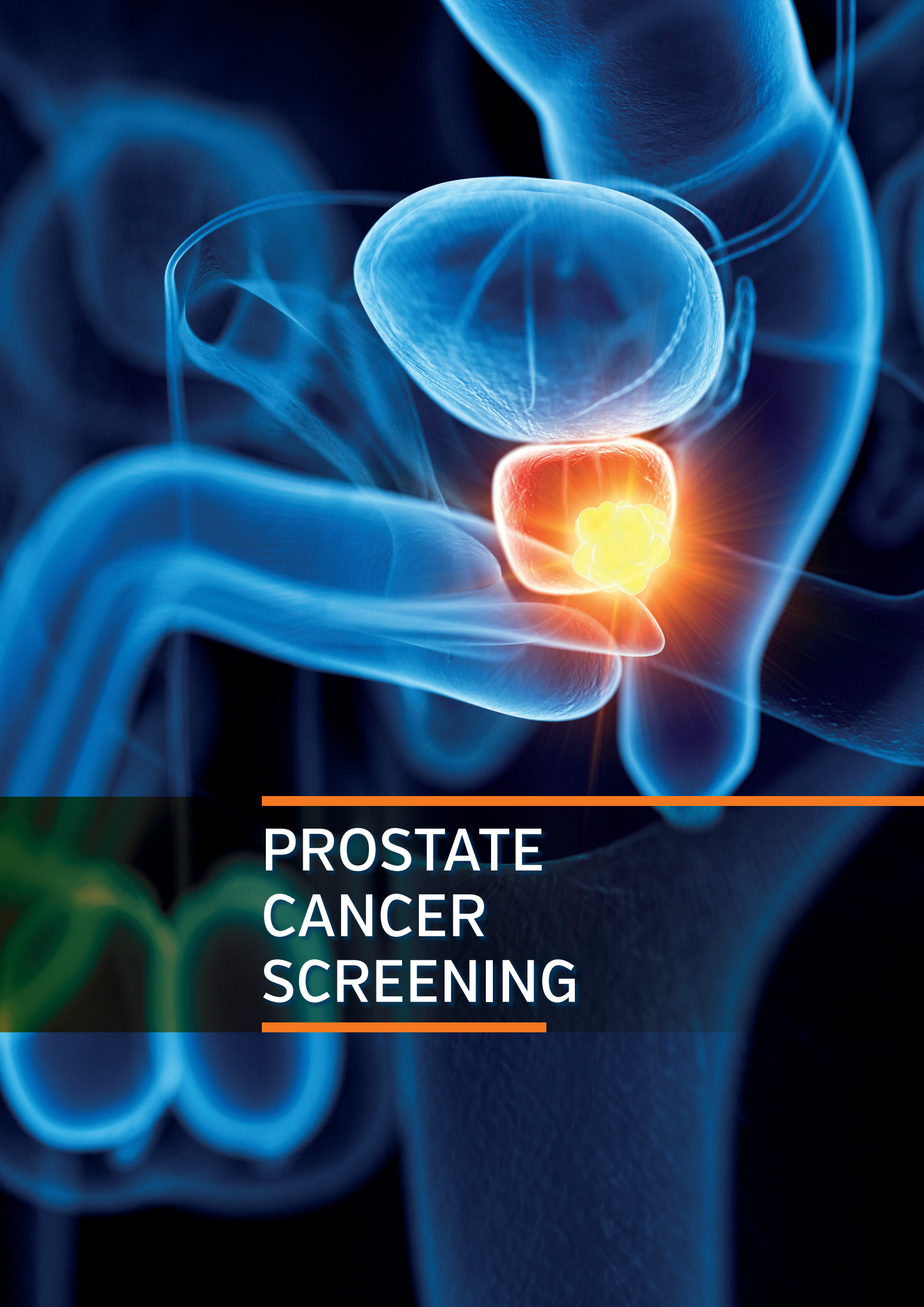
VISION FOR 2023

The amendment to the Law No. 577/2004 Coll. on the scope of healthcare reimbursed from public health insurance and payments for services related to healthcare provision is expected in 2023. It should include preconditions for the implementation of lung cancer screening, but this needs to be preceded by a preparation of an expert methodical instruction for lung cancer screening.
We also expect the approval of the Standard procedure for lung cancer prevention via risk group screening – lung cancer screening via low-dose CT exam.

In case of successful completion of all legislative steps, it will be possible to begin adding the first centers in the screening network according to the rules and conditions defined in the standard procedure.
It is also necessary to keep making efforts to make the screening register functional and to teach facilities to report background data necessary for a screening data audit in the future. Simultaneously, it will be important to automatize the collection of such data in NHIC as much as possible, with the option of sharing aggregated data for a performance and quality audit by NHIC and NOI analysts. Without doing so, continuous improvement of the screening program will not be possible.

It is necessary to intensify awareness campaigns about lung cancer with the support of relevant professional and patients' organizations, including the harmful effects of smoking and possibilities of prevention, early diagnostics and treatment.





PROSTATE CANCER SCREENING

Prostate cancer is the third most commonly diagnosed malignant oncological disease in men in Slovakia. An initial discussion about the initiation of 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. Ideally, a working group should be created, as is the case with other screenings, whose role would be, first and foremost, to prepare a pilot phase of prostate cancer screening with a careful appreciation of all possible risks and a Standard procedure for prevention of prostate cancer. The preparatory activities are planned to start in 2023.

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), reduce the impact of an already developed disease in case of tertiary prevention and reduce overdiagnostics and overtreatment in case of quaternary 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, we must be aware that only high-quality, monitored and evaluated programs with ensured continuity and continuous updates will guarantee the desired benefit. Screening programs are supervised by the state, but every citizen of the Slovak Republic should be more aware of the value of health and take bigger responsibility for it. 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, MUNI, League Against Cancer, No to Cancer, The Amazons, Pink Ribbon, Slovak Patient, IARC.

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 2022
Annex 2 Cervical Cancer Screening Program Update, Report for 2022
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Annexes

Annex 1

MAMMOGRAPHY SCREENING SR

Assessment Report for 2022

Statistical outputs from anonymized data provided by certified mammography screening facilities and health insurance companies in 2022

National Oncology Institute

National Oncology Institute
Klenová 1, 833 10 Bratislava
Slovak Republic

+421 2 59 378 429
noi@noisk.sk
www.noisk.sk

NATIONAL ONCOLOGY INSTITUTE

Authors:
Dr. Bárdyová Zuzana, PhD., MPH
Kállayová Alena, M.D.
Štrbavý Adam, MSc.
Dr. Trautenberger Ricová Jana
Rečková Mária, M.D., PhD.

Annex 1

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LIST OF ABBREVIATIONS

HIC	health insurance company
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

FOREWORD

Breast cancer mammography screening is a long-term, systematic, state-supported and guaranteed detection of early stages of breast cancer in asymptomatic women aged 50 – 69 from the entire population. Its main objective is to reduce mortality, prolong the lives of women thanks to a more effective treatment of early stages of the disease and improve quality of life. After implementation of general mammography screening and increasing participation rate of women, there is a transient 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 a very important factor – high-quality and up-to-date 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 validation of screening outcomes is a crucial process in order to ensure quality of individual facilities as well as of general mammography screening.

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 is possible for radiologists in a certified mammography screening facility to transform preventive mammography referrals to screening mammography since May 15, 2021 if the woman fulfills the age interval, i.e., 50 – 69 years, and all inclusion criteria.

Collection and evaluation of statistical results in a binding structure is also 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 and its evaluation.

From January 1, 2022, to December 31, 2022, statistical data was collected by National Oncology Institute (NOI) according to an approved design of data collection based on the valid *Standard Procedure for Medical Radiation and Prevention – Screening Mammography* in order to adhere to all legislation regarding data protection.

Mammography screening currently takes place at 20 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 Health Care Surveillance Authority. The screening program is supervised by the MoH SR which also guides the methodology and legislation associated with the program. NOI coordinates and evaluates the program.

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 quality data collection by NOI. This data will be a requirement and part of re-assessment for mammography screening facilities involved in the screening and, as such, a precondition of 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 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 at non-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 20 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 important activity is increasing the possibilities of education in mammography diagnostics in radiology as a certified work activity. Several other radiology facilities are registered for certification at the moment.
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 are based on the collection and processing of anonymized data provided by all health insurance companies (HICs) and certified mammography screening facilities to the National Oncology Institute.

Mammography examinations all around Slovakia in 2022 were categorized as follows:

a) **Screening mammography (organized mammography screening)**, i.e., mammography of asymptomatic women aged 50 – 69 performed at 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 at 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 at a certified mammography screening facility.
c) **Diagnostic mammography**, i.e., mammography of women with symptoms of breast disease. Diagnostic mammography is performed at 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 a 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 mammography screening.

Given that the standard procedure for breast cancer screening in high-risk female population only entered into application at the end of 2022 and there are currently no specific procedure codes or diagnosis codes for this group of women through which they could be identified, asymptomatic women aged 50 – 69 with a positive family history of breast cancer were integrated in screening mammography in 2022.

Another specific group are women monitored for breast cancer of breast cancer in situ, or in 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*

[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. 2022. 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

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 2022, this group of women was reported under diagnostic mammography in 2022.

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 after improvement of our cooperation with NHIC, including getting data from NOR, which would help us precisely define these groups.

The 3rd revision of the standard procedure[3] brings other important changes 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 broadened 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 2022 because it has not been approved by the parliament. This means that only asymptomatic women aged 50 – 69 are considered mammography screening target group in the statistical processing of mammography screening data.

Screening mammography codes are currently reported via cumulative screening procedure codes 1301, 1301a, 1301b, 1301c, 1301d, 1301e, 1301f and diagnosis codes Z01.6; Z80.3; Z87.7.[4,5]

Three types of screening mammography reporting could be identified in certified mammography screening facilities according to whether the asymptomatic woman in question (when adhering to inclusion and exclusion criteria) received an invitation from her HIC.

a) If the woman received an invitation from her HIC to undergo a screening mammography exam, went to a certified mammography screening facility and underwent screening mammography, it was reported by procedure codes 1301 or 1301a-f.
b) If the woman did not receive an invitation from her HIC to undergo a screening mammography exam but went to a certified mammography screening facility and underwent screening mammography, it was reported by procedure codes 5092 or 5092p with diagnosis codes Z00 – Z80.[4,5]
c) Since entry into application of the 2nd revision of *Standard procedure for medical radiation and prevention – screening mammography / Standard procedure for breast cancer prevention via population-based screening method – screening mammography*[6] (May 2021), all women, regardless of whether they received an invitation from HIC or not, who were examined by screening mammography at a certified mammography screening facility, were reported under one of the screening mammography procedure codes (i.e., procedure codes 1301, 1301a-f).

Because of this, the following terms were used for statistical processing of data regarding mammography exam of women aged 50 – 69:

a) **screening mammography** (organized mammography screening), i.e., mammography of an asymptomatic woman aged 50 – 69 performed at a certified mammography screening facility
b) obsolete **preventive mammography** (opportunistic mammography screening), i.e., mammography of an asymptomatic woman aged 50 – 69 performed at other than certified mammography screening facility

[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 general breast cancer screening implementation [proposal in preparation].

[6] Horváthová M, Lehotská V, Nikodemová D, Kállayová A, Slobodníková A. 2021. Standard Procedure for Medical Radiation and Prevention – Screening Mammography. 2nd revision. [online]. Bratislava: Ministry of Health of the Slovak Republic, 2021. 50 pp. Available online: https://www.standardnepostupy.sk/standardy-skriningove/.

c) **diagnostic mammography**, i.e., mammography of a woman with symptoms of breast disease examined at a certified mammography screening facility, but also at other than certified mammography screening facility

Demographic statistical data were taken from the Statistical Office of the SR.[7] Data about the resident citizens as of December 31, 2022 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 participation rate of women 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 a screening mammography (i.e., women entitled to a screening mammography in the given region/district) while adhering to a 2-year screening interval (all women currently undergoing treatment for breast cancer or in palliative care should be subtracted).

Discrepancies between statistical data from mammography screening provided by certified mammography screening facilities and health insurance companies were calculated as a difference in percentage between these data.

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

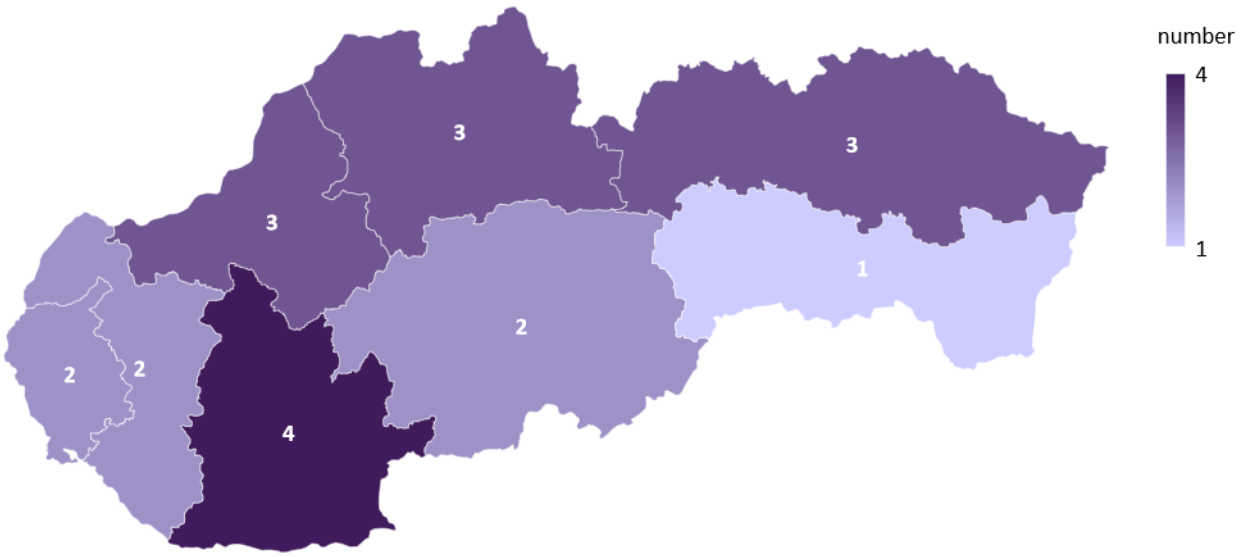
[7] Statistical Office of the SR. STATdat. Demographics and social statistics. 2023. Available at: http://statdat.statistics.sk/cognosext/cgi-bin/cognos.cgi?b_action=cognosViewer&ui.action=run&ui.object=storeID%28%22i40A03AF2150C41DE8BE98D0C0C41A764%22%29&ui.name=Vekov%c3%a9%20zlo%c5%beenie%20-%20SR%2c%20oblasti%2c%20kraje%2c%20okresy%2c%20mesto%2c%20vidiek%20%5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

1 NUMBER OF CERTIFIED MAMMOGRAPHY SCREENING FACILITIES IN THE SR

From January 1, 2022, to December 31, 2022, 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 added **20 certified mammography screening facilities** to the List of Mammography Facilities (CH 1, T 1).

In 2022, two 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.

Given that one of the newly certified mammography screening facilities was included among the certified screening facilities in June 2022, the statistical evaluation processed data from 18 certified mammography screening facilities until June 2022 and 19 certified mammography screening facilities since June 2022. Moreover, the second of the newly certified mammography screening facilities was included in the List of screening mammography facilities at the end of 2022, i.e., started functioning as a certified mammography screening facility only in 2023 and 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, 2022.

T 1. Number of certified mammography screening facilities in the SR as of December 31, 2022.

Location	Name of the facility	Address of the facility
Banská Bystrica	Mammacenter of St. Agatha (Mammacentrum sv. Agáty) SVLZ rádiológia	T. Andrašovana 46, 974 01 Banská Bystrica
Bratislava	2nd Radiology Clinic of the Faculty of Medicine of Comenius University and Saint Elizabeth Cancer Institute Mammography Facility 1	SECI Heydukova 10, 812 50 Bratislava
	2nd Radiology Clinic of the Faculty of Medicine of Comenius University and Saint Elizabeth Cancer Institute Mammography Facility 2	
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	X-ray ward 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	Hospital 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
	Medical Center Nitra	Fatranská 5, 949 01 Nitra
Poprad	Hospital Poprad a. s. Department of Diagnostic and Interventional Radiology	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	Central Military Hospital Ružomberok Teaching Hospital	Ul. Generála Miloša Vesela 21, 034 01 Ružomberok
Stará Ľubovňa	Mammography Facility, Department of Radiology, Ľubovnianska nemocnica n.o.	Obrancov mieru 3, 064 01 Stará Ľubovňa
Topoľčany	Mammography and Ultrasound Office Topoľčany, Skladaná Lisánska, M.D.	Moyzesova 1333/1A, 955 01 Topoľčany
Trenčín	Radiology Clinic s.r.o.	K dolnej stanici 18, 911 01 Trenčín
	Mammography facility of Department of Imaging, Teaching Hospital TN	Legionárska 594/28, 911 01 Trenčín
Trnava	MRI, s.r.o. Imaging Diagnostics Institute (Inštitút zobrazovacej diagnostiky)	Družba Policlinic (pediatric pavilion – basement) Starohájska 2, 917 01 Trnava
	Radiology clinic, Teaching Hospital in Trnava	A. Žarnova 11, 917 75 Trnava

2 DEMOGRAPHICS

Based on data from the Statistical Office of the Slovak Republic, there were 720,061 women aged 50 to 69 in Slovakia as of December 31, 2022. When taking into account a 2-year screening interval and inclusion and exclusion criteria, **360,031 women should have attended the mammography screening in 2022** (all women treated for breast cancer or in palliative care at that time should be subtracted). Approximately 30% of women, i.e., approximately 100,000 women, attend a preventive mammography, so-called opportunistic screening, based on a referral from their gynecologist, general practitioner or other specialist every year.

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 for more than 2 years and fulfill the precise inclusion and exclusion criteria. The total number of invited women from January 2022 to December 2022 was 132,477 (T 2, T 3).

Of all invited women, 17,555 were examined by screening mammography, i.e., 13.2% of the invited women, which corresponds to 4.9% of the target female population. Of the total number, 10,370 women were examined by screening mammography based on an invitation from their HIC at other than certified mammography screening facility (opportunistic mammography screening), i.e., 7.8% of the invited women, which corresponds to 2.9% of the target female population. 7,185 women were examined by screening mammography at a certified mammography screening facility (organized mammography screening), i.e., 5.4% of the invited women, which corresponds to 2% of the target female population.

T 2. Number of women invited to screening mammography exam by health insurance companies in 2022.

Health insurance company	Number of invited women
VšZP	57,600
Dôvera	15,634
Union	59,243
INVITED WOMEN TOTAL	**132,477**

T 3. Participation rate of women aged 50 – 69 in a mammography screening in 2022 based on an invitation from HIC.

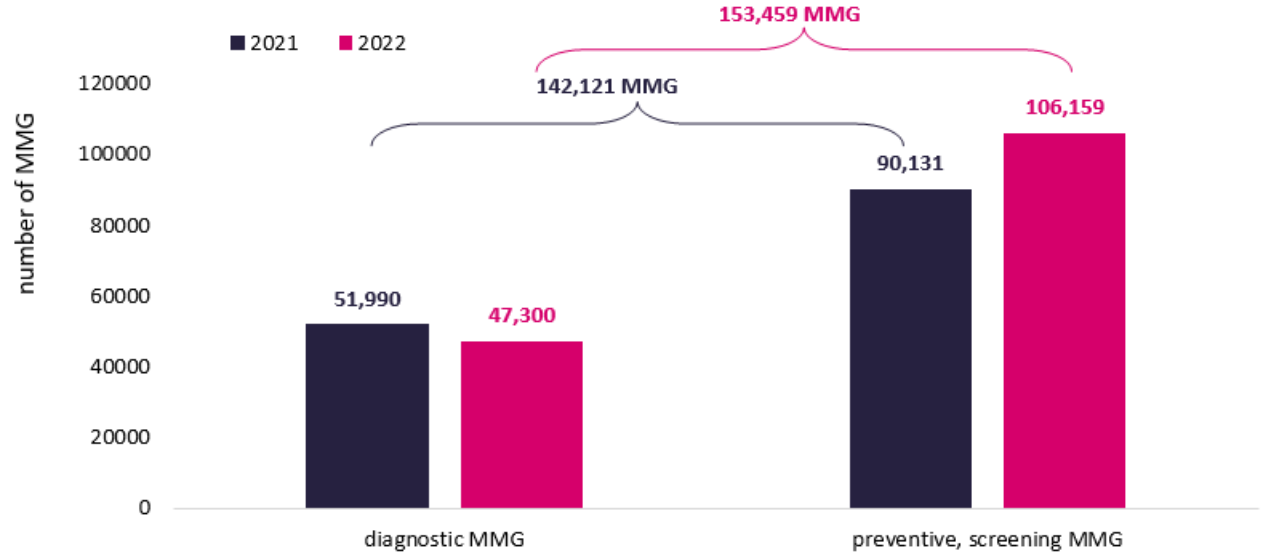
Participation in mammography screening	Number of women who underwent mammography screening	Participation rate of women in mammography screening based on an invitation from HIC
At a certified mammography screening facility	7,185	5.4%
At other than certified mammography screening facility	10,370	7.8%
Participation rate in mammography screening at certified or other than certified mammography screening facility	**17,555**	**13.2%**

3 STATE OF MAMMOGRAPHY IN THE SR ACCORDING TO ANONYMIZED DATA FROM HEALTH INSURANCE COMPANIES IN 2022

The COVID-19 pandemic was the main reason for a decrease in female participation rate in the mammography screening in 2020 and 2021. While 274,491 mammography exams (including preventive, screening and diagnostic mammography in all age groups) were performed in 2019 (i.e., before the COVID-19 pandemic), this number dropped by 16% in 2020 (number from 2020: 230,458 mammography exams). Afterward, after the epidemiology situation stabilized, we could see a slight increase in the number of mammography exams by approximately 10% in 2021 (number from 2021: 253,989 mammography exams), however, this increase did not achieve a minimal required number of performed mammography exams from 2019. The results only reached this level again in 2022. **274,462 mammography exams** (including preventive, screening and diagnostic mammography in all age groups) were performed at radiology (mammography) facilities **in 2022**. Of this number, **64%** corresponded to **mammography exams of asymptomatic women** (i.e., 176,174 mammography exams) and 36% represented mammography exams of women with breast disease symptoms (i.e., 98,288 mammography exams).

Regarding age structure, **153,459 mammography exams** (including preventive, screening, diagnostic mammography) were performed in women **aged 50 – 69** (mammography screening target group in the SR) in 2022. Of this number, **47,300 mammography exams were performed in women with breast disease symptoms** (31% of all mammography exams in women aged 50 – 69) and **106,159 mammography exams in asymptomatic women** (69% of all mammography exams in women aged 50 – 69). Compared to 2021, we can see an approximately 15% increase in the number of mammography exams of asymptomatic women and an approximately 9% decrease in the number of mammography exams of women with breast disease symptoms in the mammography screening target group (i.e., women aged 50 – 69) (CH 2).

Tables T 4, T 5, T 6 show the numbers of mammography exams per age group (under 50, 50 – 69, over 70), type of mammography (preventive, screening, diagnostic) and territory of activity of a mammography facility (district, region) when the mammography took place.



CH 2. Comparison of the number of all mammography exams of women aged 50 – 69 in 2021 and 2022.

T 4. Number of diagnostic and preventive mammography exams of women aged under 50 in the SR in 2022 per territory of activity of a mammography facility.

Territory of activity of a mammography facility	Total number of all mammography exams (preventive, diagnostic)	Number of mammography exams of women aged under 50	
		without breast disease symptoms (preventive mammography)	with breast disease symptoms (diagnostic mammography)
Banská Bystrica region	**9,292**	**6,021**	**3,271**
of which			
Banská Bystrica	4,963	3,323	1,640
Brezno	508	375	133
Lučenec	1,748	848	900
Rimavská Sobota	1,198	641	557
Zvolen	862	821	41
Žiar nad Hronom	13	13	-
Bratislava region	**17,868**	**8,854**	**9,014**
of which			
Bratislava I-V	15,289	6,657	8,632
Malacky	1,718	1,572	146
Pezinok	861	625	236
Košice region	**10,965**	**8,956**	**2,009**
of which			
Košice I-IV, okolie	6,263	5,166	1,097
Michalovce	1,707	1,383	324
Rožňava	561	539	22
Spišská Nová Ves	1,067	980	87
Trebišov	1,367	888	479
Nitra region	**11,032**	**8,322**	**2,710**
of which			
Komárno	1,606	678	928
Levice	1,402	1,253	149
Nitra	4,102	2,832	1,270
Nové Zámky	1,765	1,649	116
Topoľčany	2,157	1,910	247
Prešov region	**11,812**	**9,771**	**2,041**
of which			
Bardejov	1,901	1,191	710
Humenné	1,360	1,008	352
Levoča	622	559	63
Poprad	2,424	2,335	89
Prešov	2,677	2,053	624
Sabinov	511	498	13
Snina	373	274	99
Stará Ľubovňa	1,030	978	52
Vranov nad Topľou	914	875	39

T 4 (continued). Number of diagnostic and preventive mammography exams of women aged under 50 in the SR in 2022 per territory of activity of a mammography facility.

Territory of activity of a mammography facility	Total number of all mammography exams (preventive, diagnostic)	Number of mammography exams of women aged under 50	
		without breast disease symptoms (preventive mammography)	with breast disease symptoms (diagnostic mammography)
Trenčín region	**10,628**	**6,885**	**3,743**
of which			
Ilava	1,622	10	1,612
Myjava	854	710	144
Nové Mesto nad Váhom	1,307	1,240	67
Považská Bystrica	825	746	79
Prievidza	2,054	1,924	130
Púchov	1,389	927	462
Trenčín	2,577	1,328	1,249
Trnava region	**10,103**	**7,717**	**2,386**
of which			
Dunajská Streda	1,535	1,296	239
Galanta	593	511	82
Hlohovec	383	364	19
Piešťany	308	-	308
Skalica	1,050	946	104
Trnava	6,234	4,600	1,634
Žilina region	**13,125**	**10,680**	**2,445**
of which			
Čadca	1,156	1,150	6
Dolný Kubín	1,243	886	357
Liptovský Mikuláš	1,756	1,564	192
Martin	3,188	1,905	1,283
Ružomberok	1,114	1,043	71
Tvrdošín	1,235	991	244
Žilina	3,433	3,141	292
SLOVAK REPUBLIC	**94,825**	**67,206**	**27,619**

T 5. Number of diagnostic and preventive mammography exams of women aged over 70 in the SR in 2022 per territory of activity of a mammography facility.

Territory of activity of a mammography facility	Total number of all mammography exams (preventive, diagnostic)	Number of mammography exams of women aged over 70	
		without breast disease symptoms (preventive mammography)	with breast disease symptoms (diagnostic mammography)
Banská Bystrica region	**2,544**	**198**	**2,346**
of which			
Banská Bystrica	1,466	139	1,327
Brezno	184	22	162
Lučenec	296	9	287
Rimavská Sobota	312	3	309
Zvolen	282	25	257
Žiar nad Hronom	4	-	4
Bratislava region	**6,801**	**700**	**6,101**
of which			
Bratislava I-V	6,352	543	5,809
Malacky	272	132	140
Pezinok	177	25	152
Košice region	**3,118**	**63**	**3,055**
of which			
Košice I-IV, okolie	2,138	43	2,095
Michalovce	311	4	307
Rožňava	58	4	54
Spišská Nová Ves	256	6	250
Trebišov	355	6	349
Nitra region	**2,636**	**385**	**2,251**
of which			
Komárno	540	1	539
Levice	433	206	227
Nitra	725	10	715
Nové Zámky	329	6	323
Topoľčany	609	162	447
Prešov region	**2,980**	**640**	**2,340**
of which			
Bardejov	572	229	343
Humenné	613	2	611
Levoča	136	16	120
Poprad	265	7	258
Prešov	983	338	645
Sabinov	55	4	51
Snina	46	1	45
Stará Ľubovňa	213	13	200
Vranov nad Topľou	97	30	67

T 5 (continued). Number of diagnostic and preventive mammography exams of women aged over 70 in the SR in 2022 per territory of activity of a mammography facility.

Territory of activity of a mammography facility	Total number of all mammography exams (preventive, diagnostic)	Number of mammography exams of women aged over 70	
		without breast disease symptoms (preventive mammography)	with breast disease symptoms (diagnostic mammography)
Trenčín region	**2,677**	**105**	**2,572**
of which			
Ilava	326	-	326
Myjava	130	31	99
Nové Mesto nad Váhom	379	13	366
Považská Bystrica	211	11	200
Prievidza	361	27	334
Púchov	252	1	251
Trenčín	1,018	22	996
Trnava region	**2,656**	**582**	**2,074**
of which			
Dunajská Streda	386	258	128
Galanta	185	27	158
Hlohovec	61	35	26
Piešťany	143	-	143
Skalica	312	164	148
Trnava	1,569	98	1,471
Žilina region	**2,766**	**136**	**2,630**
of which			
Čadca	151	-	151
Dolný Kubín	423	-	423
Liptovský Mikuláš	321	29	292
Martin	580	-	580
Ružomberok	283	16	267
Tvrdošín	270	10	260
Žilina	738	81	657
SLOVAK REPUBLIC	**26,178**	**2,809**	**23,369**

T 6. Number of diagnostic, preventive and screening mammography exams of women aged 50 – 69 in the SR in 2022 per territory of activity of a mammography facility.

Territory of activity of a mammography facility	Total number of all mammography exams (screening, preventive, diagnostic)	Number of mammography exams of women aged 50 – 69	
		without breast disease symptoms (screening, preventive mammography)	with breast disease symptoms (diagnostic mammography)
Banská Bystrica region	**16,131**	**10,601**	**5,530**
of which			
Banská Bystrica	8,506	5,265	3,241
Brezno	968	677	291
Lučenec	2,731	2,098	633
Rimavská Sobota	2,288	1,219	1,069
Zvolen	1,599	1,304	295
Žiar nad Hronom	39	38	1
Bratislava region	**25,703**	**11,176**	**14,527**
of which			
Bratislava I-V	22,935	8,826	14,109
Malacky	2,009	1,931	78
Pezinok	759	419	340
Košice region	**19,090**	**14,061**	**5,029**
of which			
Košice I-IV, okolie	10,408	7,611	2,797
Michalovce	3,218	2,356	862
Rožňava	1,122	1,055	67
Spišská Nová Ves	2,012	1,761	251
Trebišov	2,330	1,278	1,052
Nitra region	**18,069**	**14,041**	**4,028**
of which			
Komárno	2,533	661	1,872
Levice	2,689	2,221	468
Nitra	7,217	6,412	805
Nové Zámky	2,316	2,062	254
Topoľčany	3,314	2,685	629
Prešov region	**21,636**	**16,472**	**5,164**
of which			
Bardejov	3,433	2,099	1,334
Humenné	2,922	2,106	816
Levoča	1,156	931	225
Poprad	3,989	3,724	265
Prešov	5,458	3,499	1,959
Sabinov	767	733	34
Snina	798	528	270
Stará Ľubovňa	1,399	1,282	117
Vranov nad Topľou	1,714	1,570	144

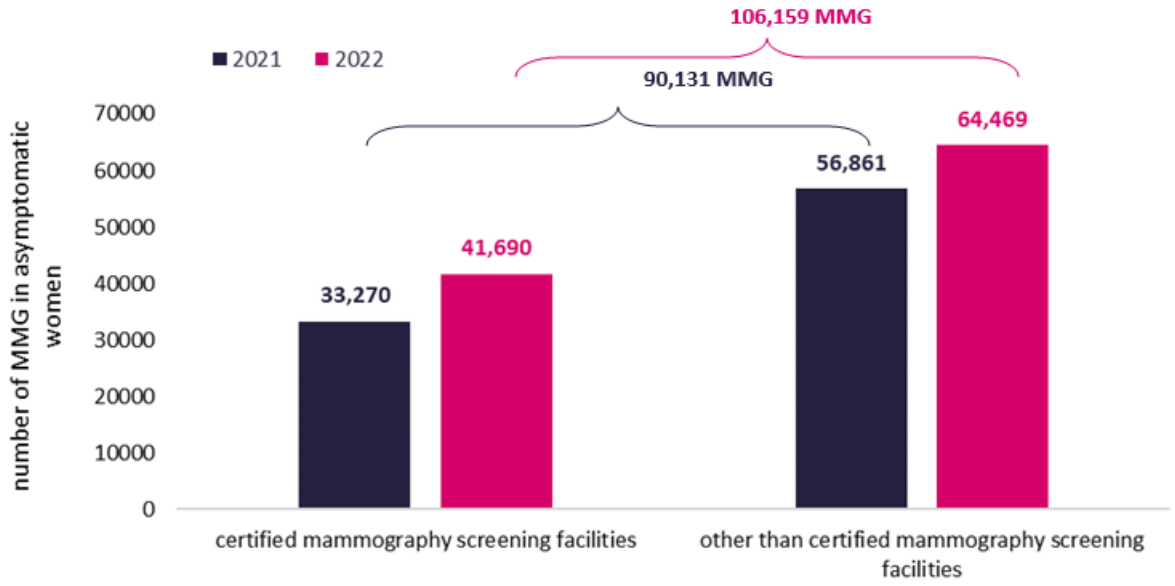
T 6 (continued). Number of diagnostic, preventive and screening mammography exams of women aged 50 – 69 in the SR in 2022 per territory of activity of a mammography facility.

Territory of activity of a mammography facility	Total number of all mammography exams (screening, preventive, diagnostic)	Number of mammography exams of women aged 50 – 69	
		without breast disease symptoms (screening, preventive mammography)	with breast disease symptoms (diagnostic mammography)
Trenčín region	**17,056**	**11,685**	**5,371**
of which			
Ilava	2,482	13	2,469
Myjava	1,229	1,032	197
Nové Mesto nad Váhom	2,133	1,932	201
Považská Bystrica	1,764	1,577	187
Prievidza	4,087	3,716	371
Púchov	1,904	1,349	555
Trenčín	3,457	2,066	1,391
Trnava region	**14,587**	**11,926**	**2,661**
of which			
Dunajská Streda	2,653	2,257	396
Galanta	1,179	710	469
Hlohovec	517	485	32
Piešťany	708	-	708
Skalica	2,005	1,772	233
Trnava	7,525	6,702	823
Žilina region	**21,187**	**16,197**	**4,990**
of which			
Čadca	2,065	2,019	46
Dolný Kubín	2,242	1,483	759
Liptovský Mikuláš	3,049	2,593	456
Martin	4,623	2,320	2,303
Ružomberok	1,704	1,559	145
Tvrdošín	1,669	1,137	532
Žilina	5,835	5,086	749
SLOVAK REPUBLIC	**153,459**	**106,159**	**47,300**

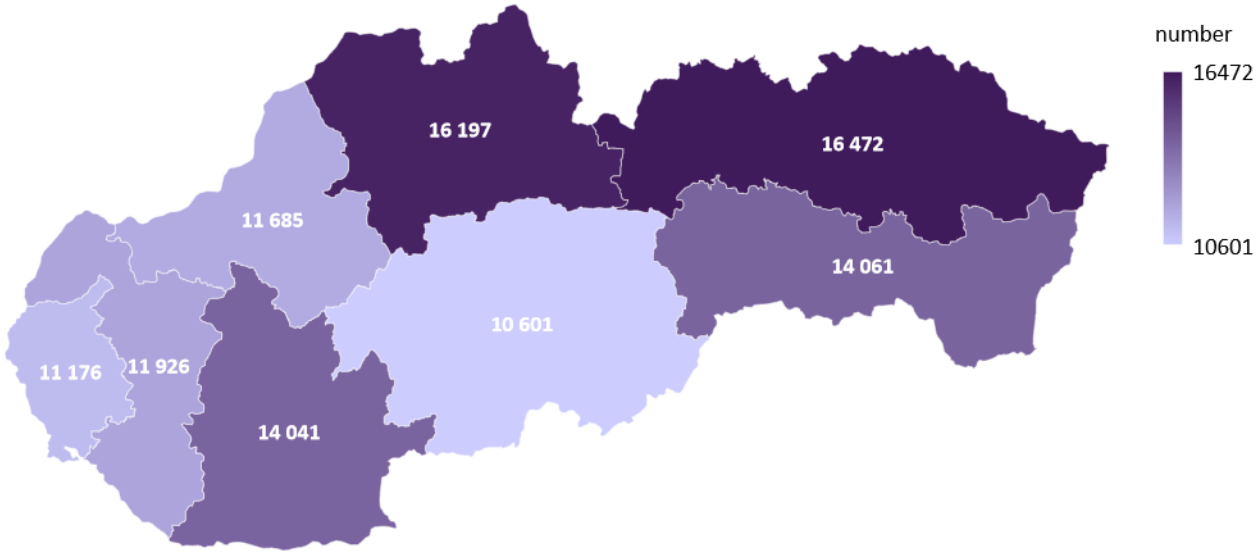
4 STATE OF MAMMOGRAPHY SCREENING IN THE SR ACCORDING TO ANONYMIZED DATA FROM HEALTH INSURANCE COMPANIES IN 2022

Based on statistical data from health insurance companies, 106,159 mammography exams were performed in asymptomatic women aged 50 – 69 in 2022. Of this number, **41,690 women** were examined by screening mammography within the **organized mammography screening,** which represents **39% of all mammography exams performed in asymptomatic women.** The historically obsolete preventive mammography (i.e., **opportunistic screening**) represented **64,469 asymptomatic women**, which corresponds to **61% of all mammography exams performed in asymptomatic women** (CH 3, T 7, T 8).

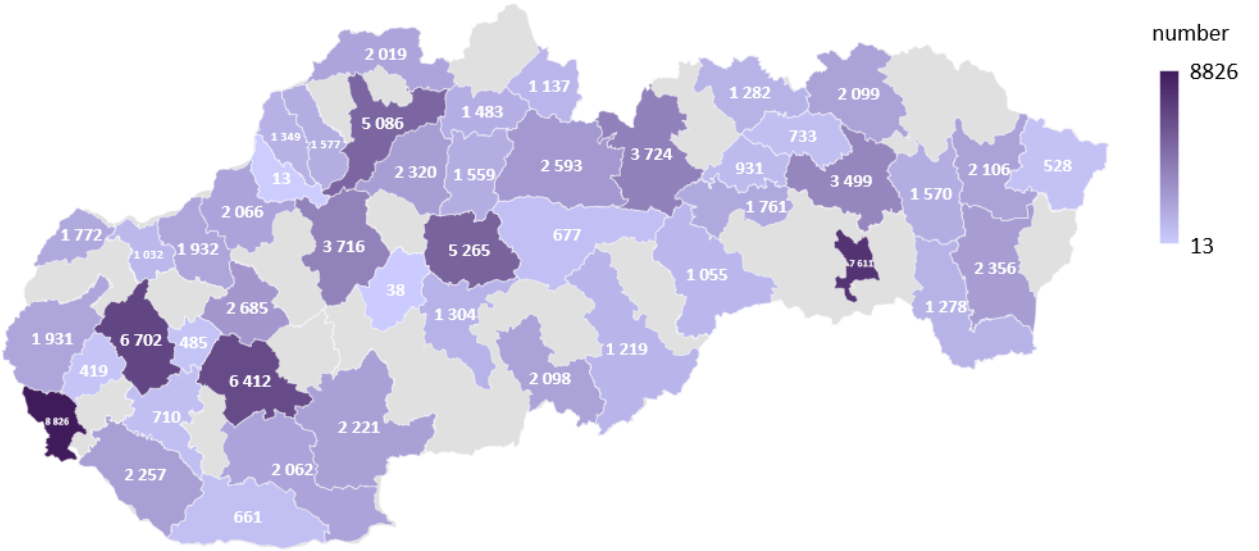
In comparison with 2021, we can see a slight increase not only in the number of women examined by screening mammography but also seemingly increasing percentage of women examined by screening mammography at certified mammography screening facilities. While 37% of all asymptomatic women were examined by screening mammography within the organized mammography screening in 2021, another 2% increase took place in 2022 (i.e., 39%).



CH 3. Comparison of the number of mammography exams in asymptomatic women performed at certified mammography screening facilities and other facilities in 2021 – 2022.



CH 4. Number of all preventive and screening mammography exams of asymptomatic women aged 50 – 69 in the SR in 2022 per region of the mammography facility at which the mammography was performed.



CH 5. Number of all preventive and screening mammography exams of asymptomatic women aged 50 – 69 in the SR in 2022 per district of the mammography facility at which the mammography was performed.

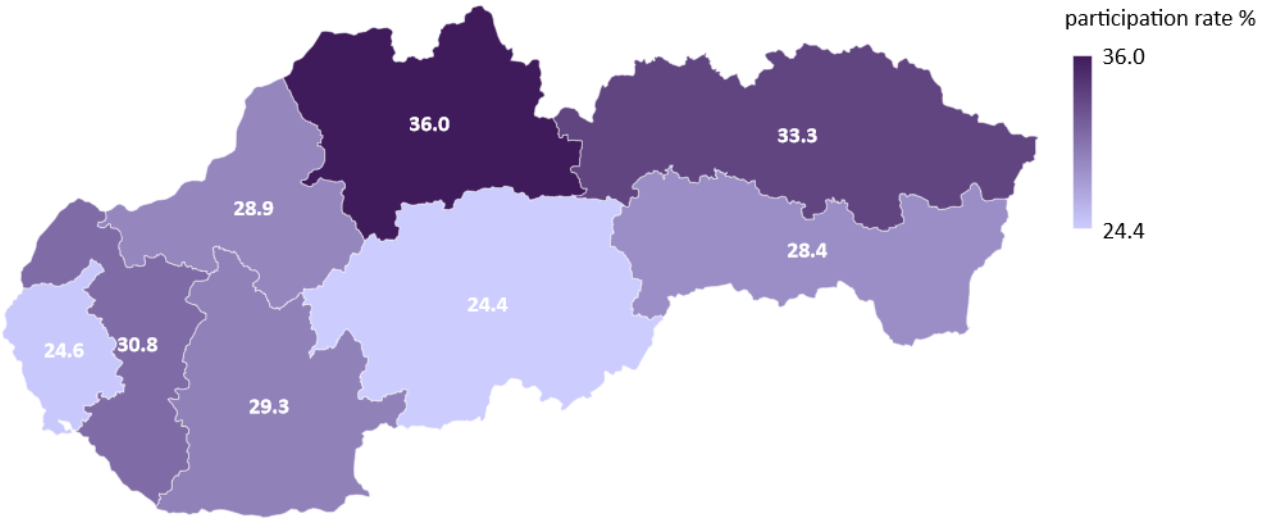
T 7. Number of mammography exams in asymptomatic women aged 50 – 69 performed at certified mammography screening facilities and other facilities in 2022.

Territory of activity of a mammography facility	Number of all mammography exams of asymptomatic women aged 50 – 69	Number of mammography exams of asymptomatic women aged 50 – 69	
		at a certified mammography screening facility	at other than certified mammography screening facility
Banská Bystrica region	10,601 (100%)	2,525 (24%)	8,076 (76%)
Bratislava region	11,176 (100%)	6,401 (57%)	4,775 (43%)
Košice region	14,061 (100%)	1,150 (8%)	12,911 (92%)
Nitra region	14,041 (100%)	8,436 (60%)	5,605 (40%)
Prešov region	16,472 (100%)	6,710 (41%)	9,762 (59%)
Trenčín region	11,685 (100%)	5,317 (46%)	6,368 (54%)
Trnava region	11,926 (100%)	6,702 (56%)	5,224 (44%)
Žilina region	16,197 (100%)	4,449 (27%)	11,748 (73%)
SLOVAK REPUBLIC	**106,159 (100%)**	**41,690 (39%)**	**64,469 (61%)**

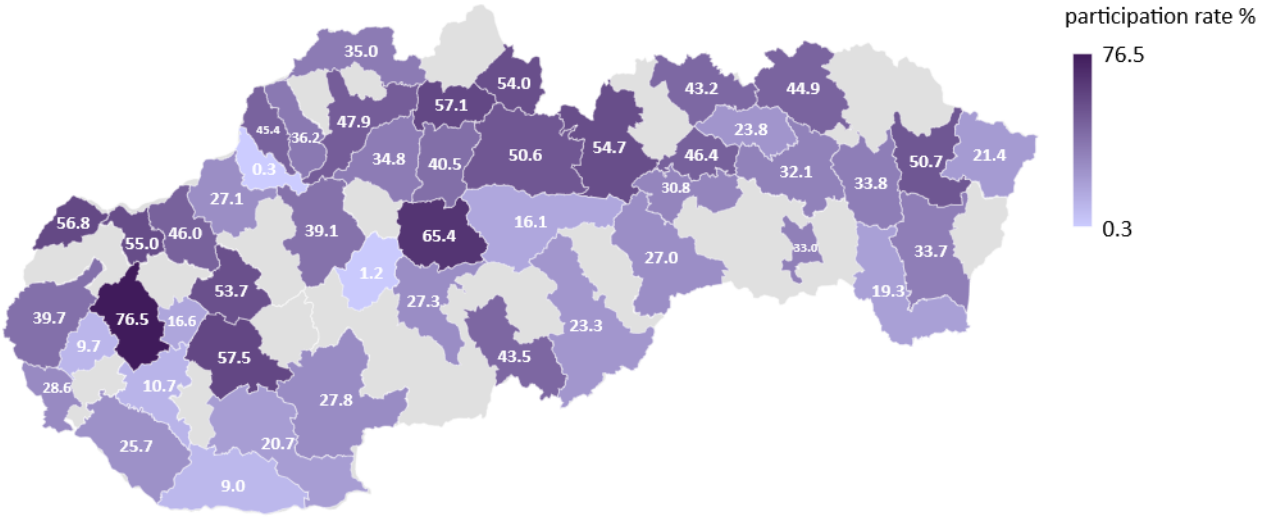
T 8. Number of mammography exams in women aged 50 – 69 with breast disease symptoms performed at certified mammography screening facilities and other facilities in 2022.

Territory of activity of a mammography facility	Number of mammography exams in women with breast disease symptoms aged 50 – 69	Number of mammography exams in women with breast disease symptoms aged 50 – 69	
		at a certified mammography screening facility	at other than certified mammography screening facility
Banská Bystrica region	5,530 (100%)	830 (15%)	4,700 (85%)
Bratislava region	14,527 (100%)	3,189 (22%)	11,338 (78%)
Košice region	5,029 (100%)	341 (7%)	4,688 (93%)
Nitra region	4,028 (100%)	1,173 (29%)	2,855 (71%)
Prešov region	5,164 (100%)	788 (15%)	4,376 (85%)
Trenčín region	5,371 (100%)	1,729 (32%)	3,642 (68%)
Trnava region	2,661 (100%)	823 (31%)	1,838 (69%)
Žilina region	4,990 (100%)	988 (20%)	4,002 (80%)
SLOVAK REPUBLIC	**47,300 (100%)**	**9,861 (21%)**	**37,439 (79%)**

In 2022, the **total participation rate of asymptomatic women aged 50 – 69 was 29.5%** of all women in the SR entitled to screening mammography. **The participation rate of these women in the mammography screening at a certified mammography screening facility was 11.6% and at other than certified mammography screening facility 17.9%** (CH 6, CH 7, T 9, T 10, T 11). In comparison to 2021, we can see an increase in the participation rate in mammography screening, with total participation rate of asymptomatic women aged 50 – 69 amounting to 24.9%; 9.2% at certified mammography screening facilities and 15.7% at other than certified mammography screening facilities (CH 8, CH 9).



CH 6. Participation rate of women in preventive and screening mammography exams of asymptomatic women aged 50 – 69 in the SR in 2022 per region of the mammography facility at which the mammography was performed.



CH 7. Participation rate of women in preventive and screening mammography exams of asymptomatic women aged 50 – 69 in the SR in 2022 per district of the mammography facility at which the mammography was performed.

T 9. Relative participation rate of asymptomatic women in preventive and screening mammography in 2022 per territory of activity of mammography facilities.

Territory of activity of a mammography facility	Number of women aged 50 – 69 / number of women when adhering to screening interval	Number of performed screening and preventive mammography exams of women aged 50 – 69	Relative participation rate when adhering to screening interval (%)
Banská Bystrica region	**87,020 / 43,510**	**10,601**	**24.4%**
of which			
Banská Bystrica	16,107 / 8,054	5,265	65.4%
Brezno	8,388 / 4,194	677	16.1%
Lučenec	9,636 / 4,818	2,098	43.5%
Rimavská Sobota	10,449 / 5,225	1,219	23.3%
Zvolen	9,542 / 4,771	1,304	27.3%
Žiar nad Hronom	6,330 / 3,165	38	1.2%
Bratislava region	**90,848 / 45,424**	**11,176**	**24.6%**
of which			
Bratislava I-IV	61,665 / 30,833	8,826	28.6%
Malacky	9,717 / 4,859	1,931	39.7%
Pezinok	8,660 / 4,330	419	9.7%
Košice region	**98,969 / 49,485**	**14,061**	**28.4%**
of which			
Košice I-IV, okolie	46,061 / 23,031	7,611	33.0%
Michalovce	13,968 / 6,984	2,356	33.7%
Rožňava	7,828 / 3,914	1,055	27.0%
Spišská Nová Ves	11,429 / 5,715	1,761	30.8%
Trebišov	13,232 / 6,616	1,278	19.3%
Nitra region	**95,842 / 47,921**	**14,041**	**29.3%**
of which			
Komárno	14,722 / 7,361	661	9.0%
Levice	15,957 / 7,979	2,221	27.8%
Nitra	22,312 / 11,156	6,412	57.5%
Nové Zámky	19,962 / 9,981	2,062	20.7%
Topoľčany	9,992 / 4,996	2,685	53.7%
Prešov region	**99,062 / 49,531**	**16,472**	**33.3%**
of which			
Bardejov	9,341 / 4,671	2,099	44.9%
Humenné	8,315 / 4,158	2,106	50.7%
Levoča	4,012 / 2,006	931	46.4%
Poprad	13,610 / 6,805	3,724	54.7%
Prešov	21,781 / 10,891	3,499	32.1%
Sabinov	6,156 / 3,078	733	23.8%
Snina	4,931 / 2,466	528	21.4%
Stará Ľubovňa	5,941 / 2,971	1,282	43.2%
Vranov nad Topľou	9,290 / 4,645	1,570	33.8%

T 9 (continued). Relative participation rate of asymptomatic women in preventive and screening mammography in 2022 per territory of activity of mammography facilities.

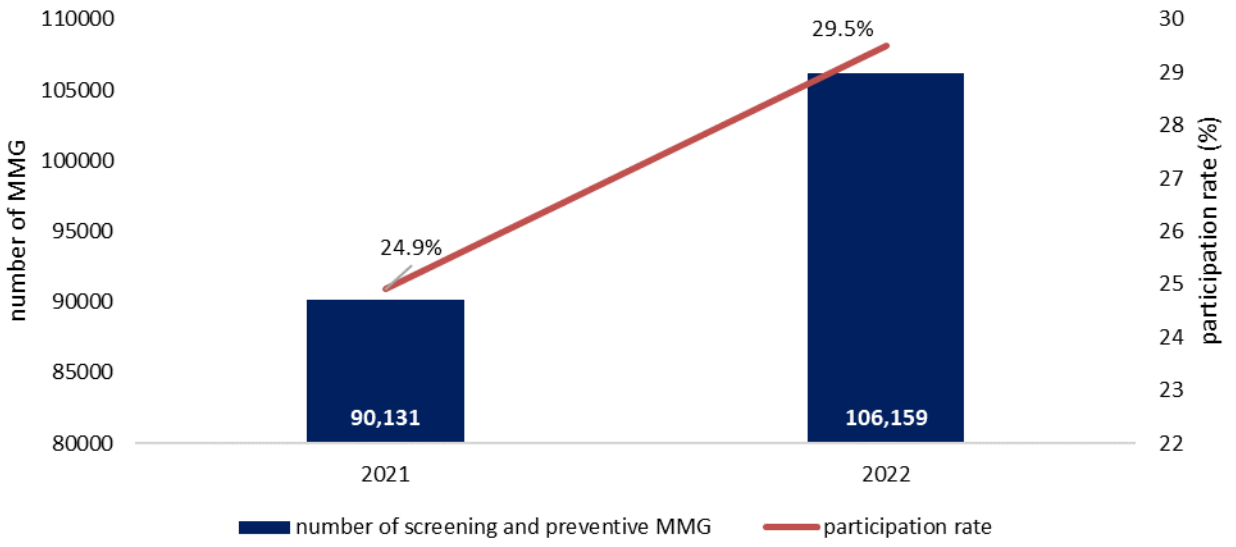
Territory of activity of a mammography facility	Number of women aged 50 – 69 / number of women when adhering to screening interval	Number of performed screening and preventive mammography exams of women aged 50 – 69	Relative participation rate when adhering to screening interval (%)
Trenčín region	**80,750 / 40,375**	**11,685**	**28.9%**
of which			
Ilava	8,414 / 4,207	13	0.3%
Myjava	3,752 / 1,876	1,032	55.0%
Nové Mesto nad Váhom	8,392 / 4,196	1,932	46.0%
Považská Bystrica	8,707 / 4,354	1,577	36.2%
Prievidza	19,016 / 9,508	3,716	39.1%
Púchov	5,940 / 2,970	1,349	45.4%
Trenčín	15,241 / 7,621	2,066	27.1%
Trnava region	**77,536 / 38,768**	**11,926**	**30.8%**
of which			
Dunajská Streda	17,590 / 8,795	2,257	25.7%
Galanta	13,275 / 6,638	710	10.7%
Hlohovec	5,854 / 2,927	485	16.6%
Skalica	6,243 / 3,122	1,772	56.8%
Trnava	17,532 / 8,766	6,702	76.5%
Žilina region	**90,034 / 45,017**	**16,197**	**36.0%**
of which			
Čadca	11,539 / 5,770	2,019	35.0%
Dolný Kubín	5,190 / 2,595	1,483	57.1%
Liptovský Mikuláš	10,248 / 5,124	2,593	50.6%
Martin	13,326 / 6,663	2,320	34.8%
Ružomberok	7,694 / 3,847	1,559	40.5%
Tvrdošín	4,213 / 2,107	1,137	54.0%
Žilina	21,254 / 10,627	5,086	47.9%
SLOVAK REPUBLIC	**720,061 / 360,031**	**106,159**	**29.5%**

T 10. Relative participation rate of asymptomatic women in preventive and screening mammography in 2022 per territory of activity of a mammography facility and region (NUTS 2).

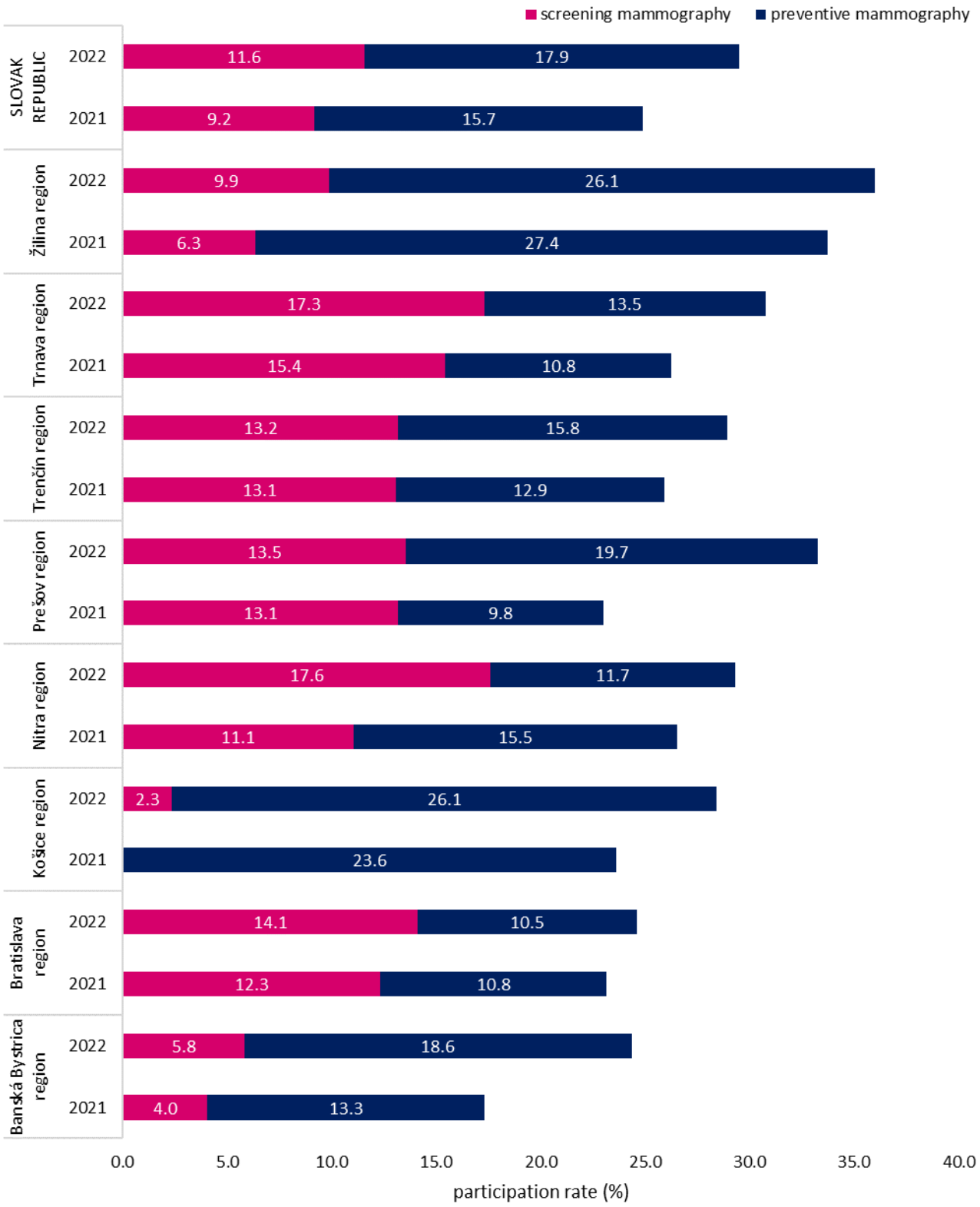
Territory of activity of a mammography facility per region (NUTS 2)	Number of women aged 50 – 69 / number of women when adhering to screening interval	Number of performed screening and preventive mammography exams of women aged 50 – 69	Relative participation rate when adhering to screening interval (%)
Bratislava region	90,848 / 45,424	11,176	24.6%
Western Slovakia	254,128 / 127,064	37,652	29.6%
Central Slovakia	177,054 / 88,527	26,798	30.3%
Eastern Slovakia	198,031 / 99,016	30,533	30.8%
SLOVAK REPUBLIC	**720,061 / 360,031**	**106,159**	**29.5%**

T 11. Relative participation rate of asymptomatic women in preventive and screening mammography in 2022 per territory of activity and type of mammography facility.

Territory of activity of a mammography facility	Number of performed screening and preventive mammography exams of women aged 50 – 69		Relative participation rate when adhering to screening interval (%)	
	at a certified mammography screening facility	at other than certified mammography screening facility	at a certified mammography screening facility	at other than certified mammography screening facility
Banská Bystrica region	2,525	8,076	5.8%	18.6%
Bratislava region	6,401	4,775	14.1%	10.5%
Košice region	1,150	12,911	2.3%	26.1%
Nitra region	8,436	5,605	17.6%	11.7%
Prešov region	6,710	9,762	13.5%	19.7%
Trenčín region	5,317	6,368	13.2%	15.8%
Trnava region	6,702	5,224	17.3%	13.5%
Žilina region	4,449	11,748	9.9%	26.1%
SLOVAK REPUBLIC	**41,690**	**64,469**	**11.6%**	**17.9%**



CH 8. Comparison of trends in mammography screening participation rate (organized, opportunistic) in 2021 – 2022.



CH 9. Comparison of participation rate in mammography screening at certified or other than certified mammography screening facilities in 2021 and 2022.

5 STATE OF MAMMOGRAPHY SCREENING IN THE SR ACCORDING TO DATA FROM CERTIFIED MAMMOGRAPHY SCREENING FACILITIES

12.7% of the target female population were examined by screening mammography at a certified mammography screening facility in 2022, i.e., **45,773 women participated in the mammography screening.** Compared to 2021, it meant an increase in the number of performed screening mammography exams by 9.2% (i.e., 41,554 screening mammography exams in 2021). Moreover, we can see a slight increase in the relative participation rate of asymptomatic women aged 50 – 69 in the mammography screening by 1.2% (11.5% vs 12.7%) (T 12, T 13, T 14, CH 10, CH 11, CH 12, CH 13, CH 14, CH 15, CH 16, CH 17). This target group included 252 diagnosed cancers, which corresponds to a malignancy rate of **5.5 cases per 1,000 women** (T 15, CH 18, CH 19).

T 12. Relative participation rate of asymptomatic women in screening mammography in 2022 per territory of activity of a mammography facility and region (NUTS 2).

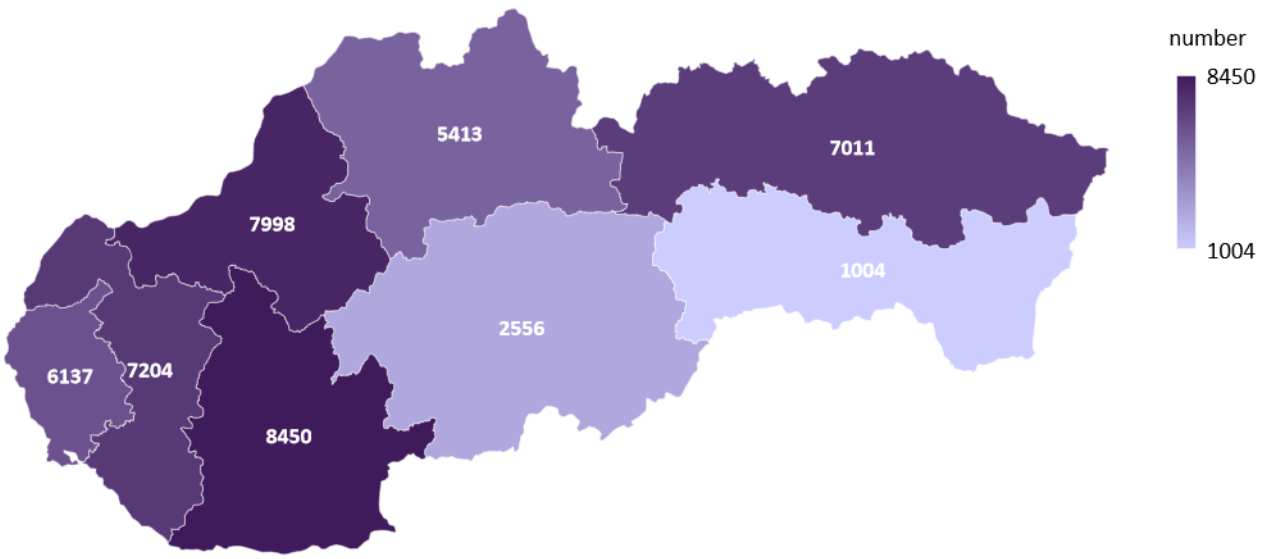
Territory of activity of a mammography facility per region (NUTS 2)	Number of women aged 50 – 69 / number of women when adhering to screening interval	Number of performed screening mammography exams of women aged 50 – 69	Relative participation rate when adhering to screening interval (%)
Bratislava region	90,848 / 45,424	6,137	13.5%
Western Slovakia	254,128 / 127,064	23,652	18.6%
Central Slovakia	177,054 / 88,527	7,969	9.0%
Eastern Slovakia	198,031 / 99,016	8,015	8.1%
SLOVAK REPUBLIC	**720,061 / 360,031**	**45,773**	**12.7%**

T 13. Relative participation rate of women in the mammography screening in 2022 per region with certified mammography screening facility.

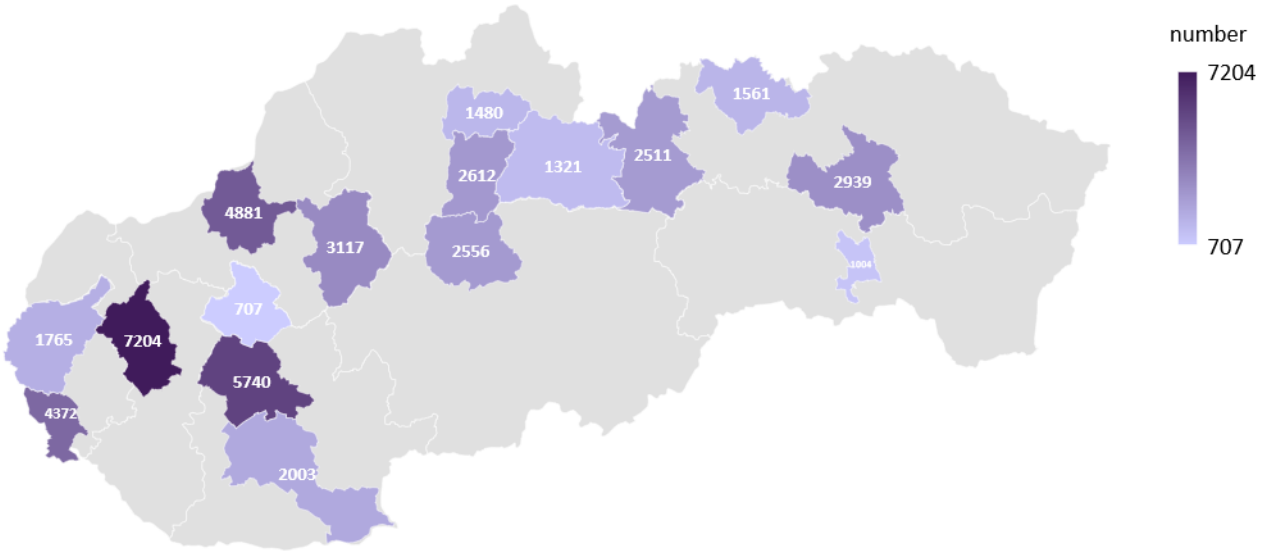
Territory of activity of a mammography facility	Number of women aged 50 – 69 / number of women when adhering to screening interval	Number of performed screening mammography exams of women aged 50 – 69	Relative participation rate when adhering to screening interval (%)
Banská Bystrica region	87,020 / 43,510	2,556	5.9%
Bratislava region	90,848 / 45,424	6,137	13.5%
Košice region	98,969 / 49,485	1,004	2.0%
Nitra region	95,842 / 47,921	8,450	17.6%
Prešov region	99,062 / 49,531	7,011	14.2%
Trenčín region	80,750 / 40,375	7,998	19.8%
Trnava region	77,536 / 38,768	7,204	18.6%
Žilina region	90,034 / 45,017	5,413	12.0%
SLOVAK REPUBLIC	**720,061 / 360,031**	**45,773**	**12.7%**

T 14. Relative participation rate of women in the mammography screening in 2022 per district with certified mammography screening facility.

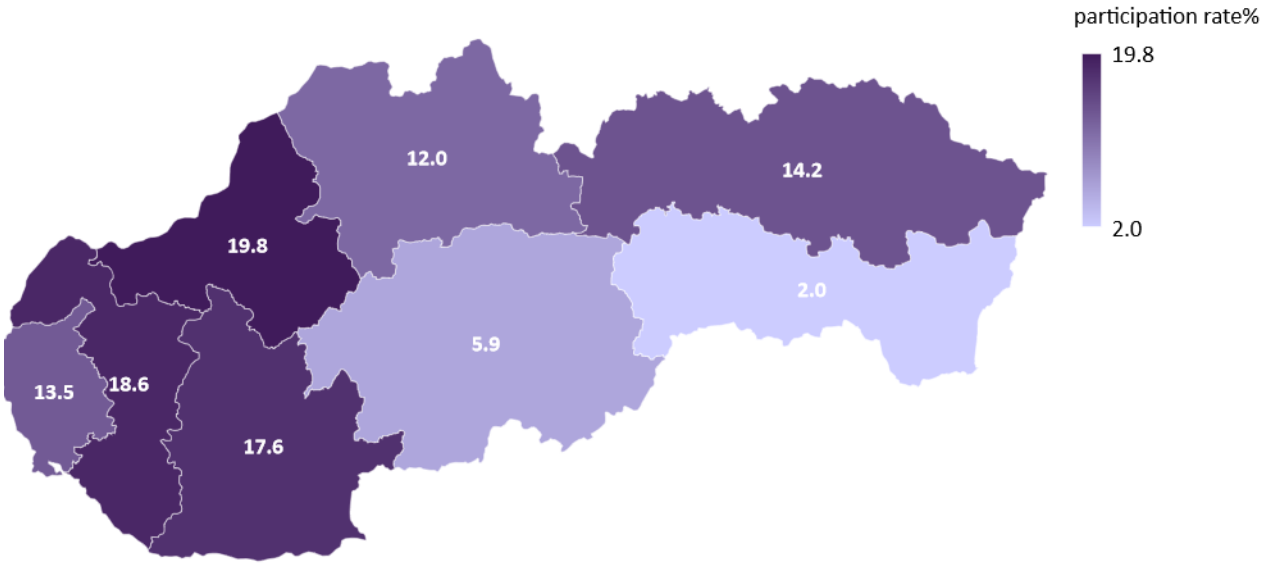
Territory of activity of a mammography facility	Number of women aged 50 – 69 / number of women when adhering to screening interval	Number of performed screening mammography exams of women aged 50 – 69	Relative participation rate when adhering to screening interval (%)
Banská Bystrica	16,107 / 8,054	2,556	31.7%
Bratislava	61,665 / 30,833	4,372	14.2%
Malacky	9,717 / 4,859	1,765	36.3%
Košice	46,061 / 23,031	1,004	4.4%
Nitra	22,312 / 11,156	5,740	51.5%
Nové Zámky	19,962 / 9,981	2,003	20.1%
Topoľčany	9,992 / 4,996	707	14.2%
Poprad	13,610 / 6,805	2,511	36.9%
Prešov	21,781 / 10,891	2,939	27.0%
Stará Ľubovňa	5,941 / 2,971	1,561	52.6%
Prievidza	19,016 / 9,508	3,117	32.8%
Trenčín	15,241 / 7,621	4,881	64.1%
Trnava	17,532 / 8,766	7,204	82.2%
Dolný Kubín	5,190 / 2,595	1,480	57.0%
Liptovský Mikuláš	10,248 / 5,124	1,321	25.8%
Ružomberok	7,694 / 3,847	2,612	67.9%
SLOVAK REPUBLIC	**720,061 / 360,031**	**45,773**	**12.7%**



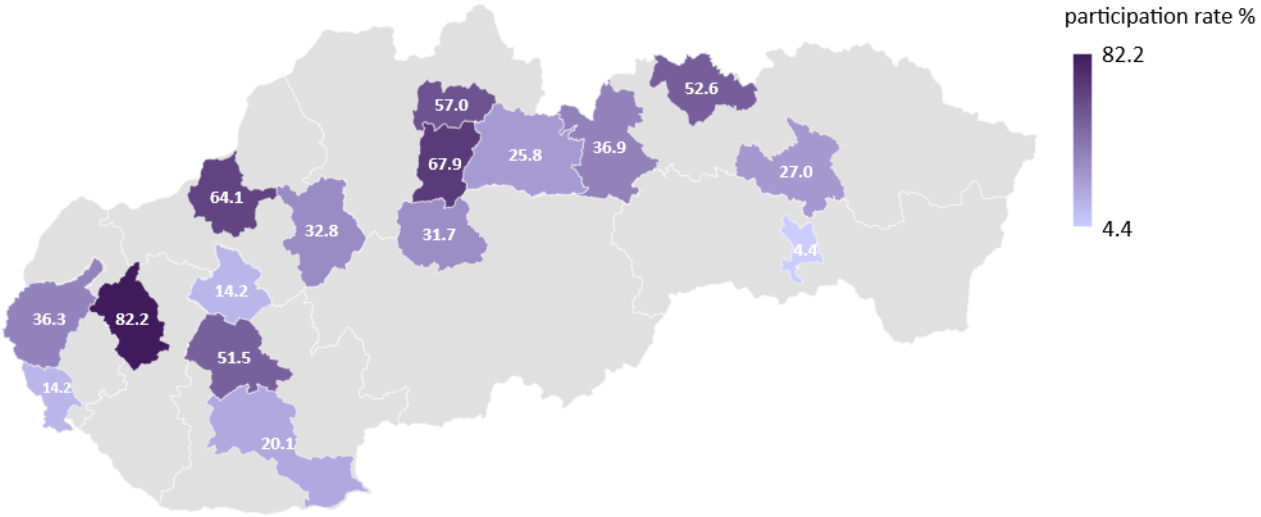
CH 10. Number of performed screening mammography exams at certified mammography screening facilities in 2022 per region with certified mammography screening facility.



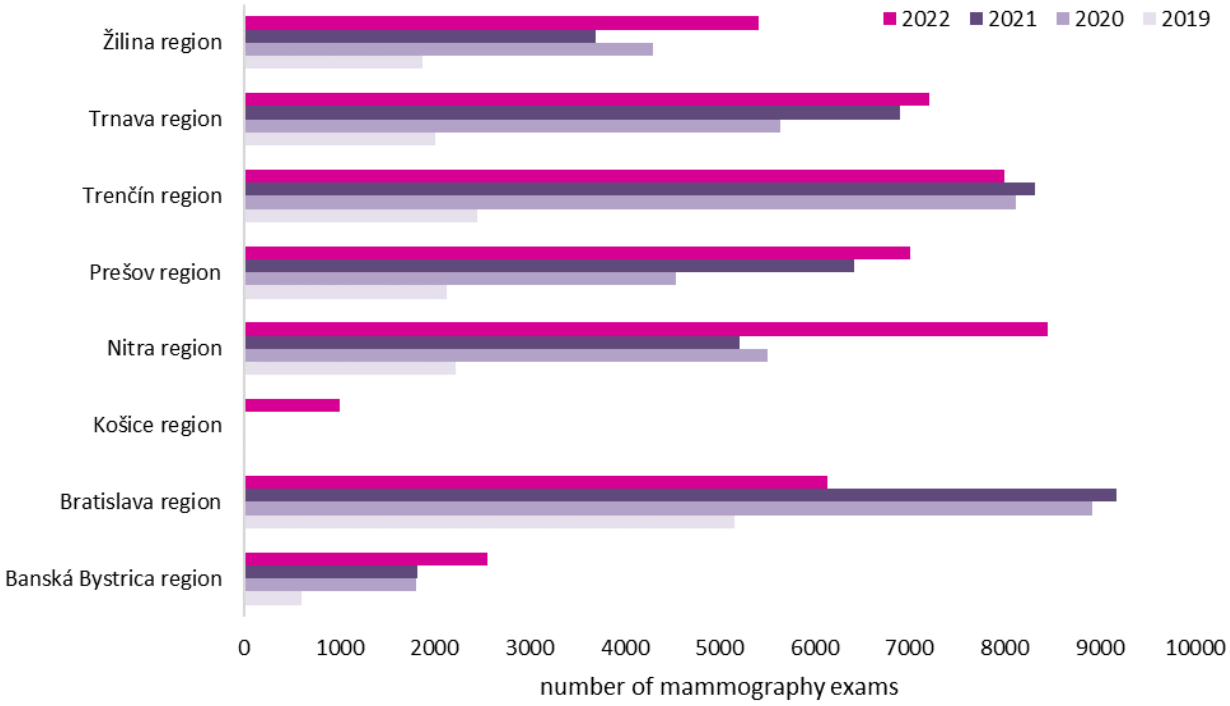
CH 11. Number of performed screening mammography exams at certified mammography screening facilities in 2022 per district with certified mammography screening facility.



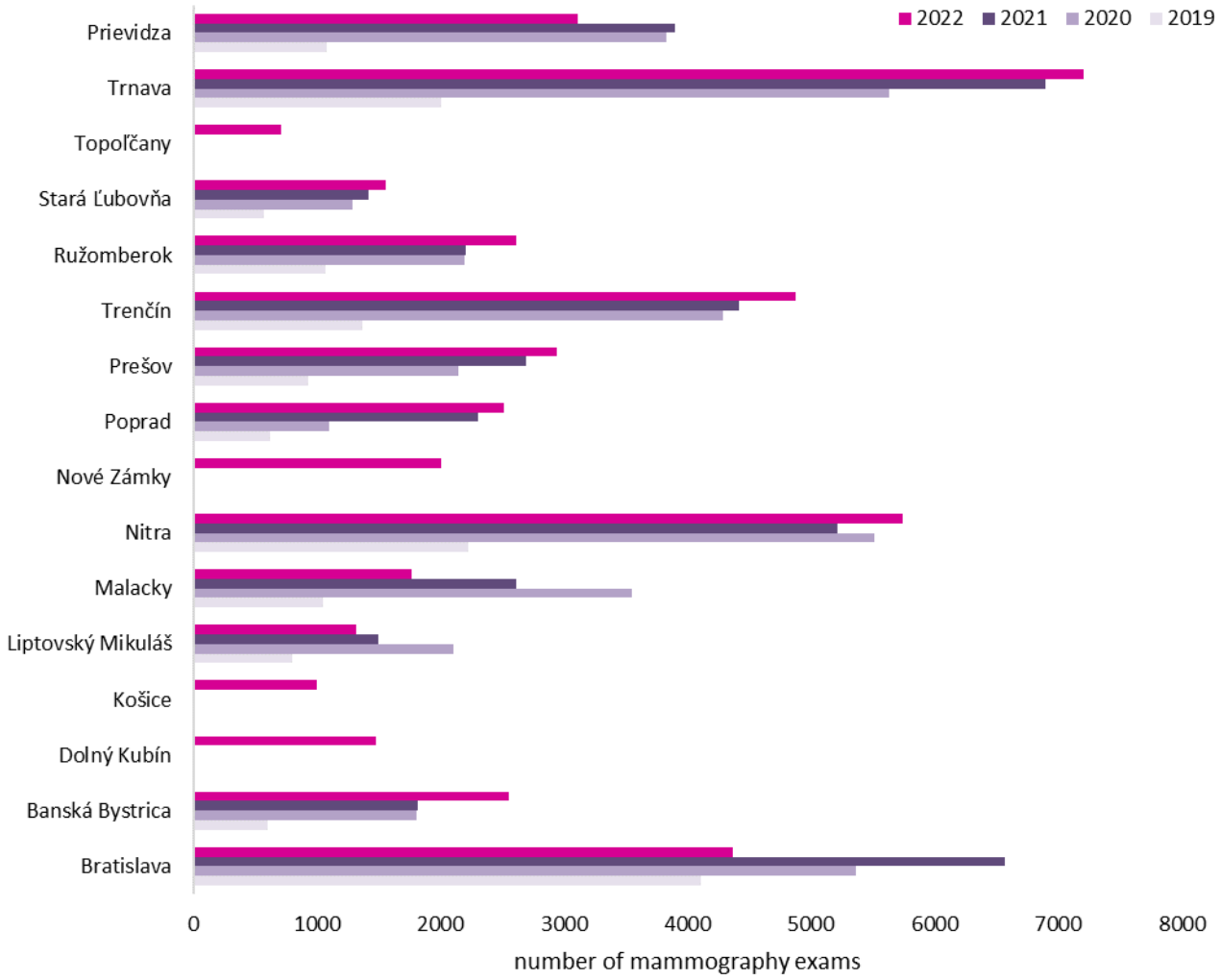
CH 12. Participation rate of women in screening mammography exams at certified mammography screening facilities in 2022 per region with certified mammography screening facility.



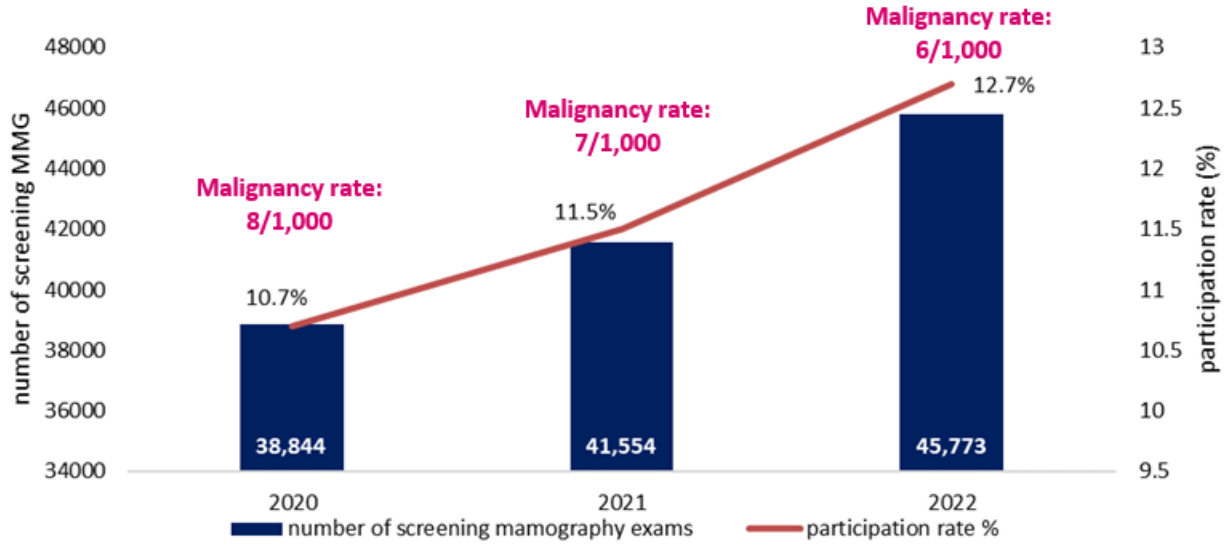
CH 13. Participation rate of women in screening mammography exams at certified mammography screening facilities in 2022 per district with certified mammography screening facility.



CH 14. Comparison of the number of performed screening mammography exams at certified mammography screening facilities in 2019 – 2022 per region with certified mammography screening facility.



CH 15. Comparison of the number of performed screening mammography exams at certified mammography screening facilities in 2019 – 2021 per district with certified mammography screening facility.



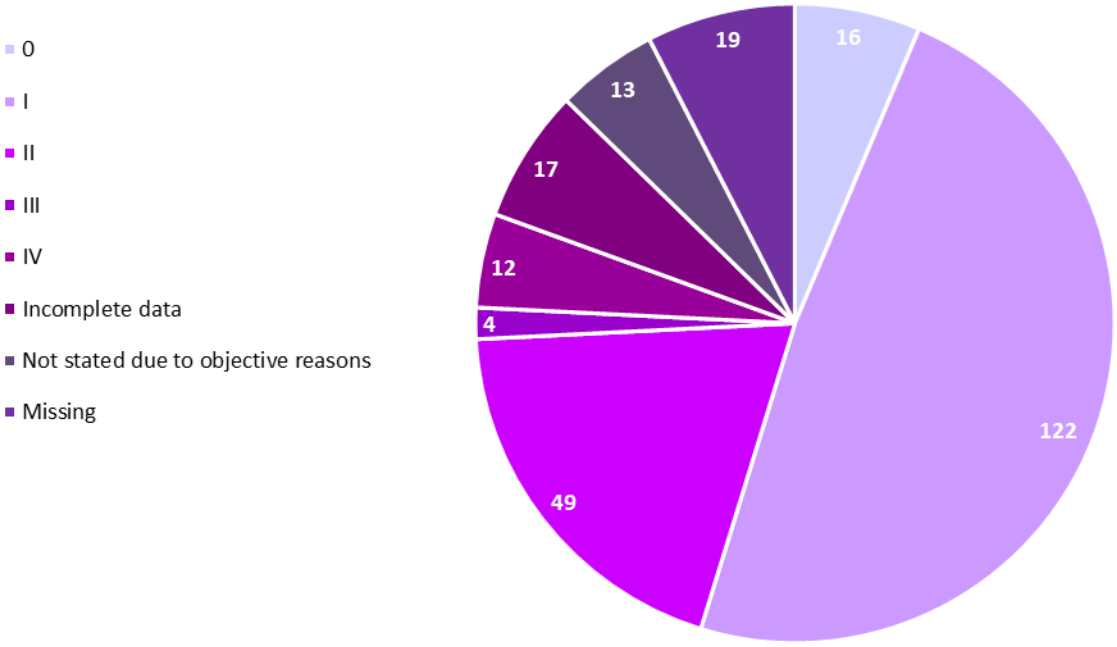
CH 16. Comparison of trends in mammography screening participation rate (organized, opportunistic) in 2020 – 2022.

CH 17. Comparison of the number of performed screening mammography exams at certified mammography screening facilities in 2020 – 2022 per month.

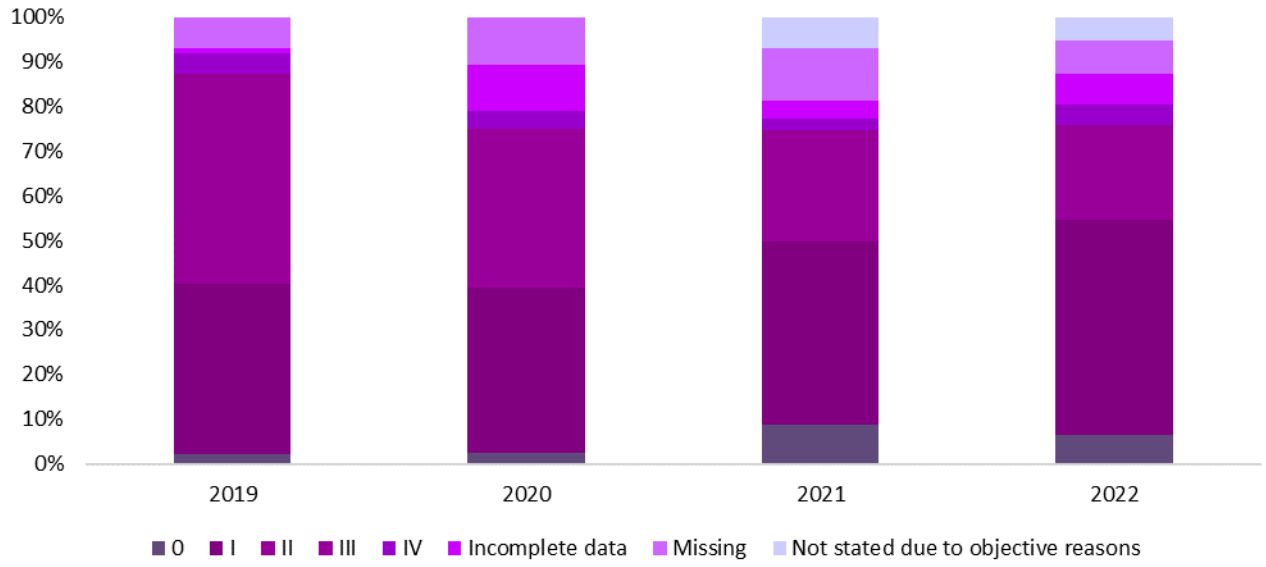
T 15. Number of malignancies diagnosed during mammography screening at certified mammography screening facilities in 2022 per TNM stage.

TNM stage	Number of malignancies diagnosed during mammography screening in 2022	
	number	percentage
0	16	6.3%
IA	122	48.4%
IIA	38	15.1%
IIB	11	4.4%
IIIA	3	1.2%
IIIB	1	0.4%
IV	12	4.8%
Incomplete data[8]	17	6.7%
Not stated due to objective reasons[9]	13	5.2%
Missing[10]	19	7.5%
All malignancies	**252**	**100%**

[8] ***TNM stage was classified as incomplete due to missing information about the M-stage***
[9] ***TNM not stated due to objective reasons: death, neoadjuvant treatment, refusal of treatment by the patient, contraindication of cancer treatment***
[10] ***Missing TNM***



CH 18. Percentage of clinical stages of malignant breast cancers diagnosed during mammography screening at certified mammography screening facilities in the SR in 2022.



CH 19. Number and percentage of clinical stages of malignant breast cancers diagnosed during mammography screening at certified mammography screening facilities in the SR in 2019 – 2022.

6 COMPARISON OF STATISTICAL DATA FROM MAMMOGRAPHY SCREENING IN 2022: ANONYMIZED DATA PROVIDED BY CERTIFIED MAMMOGRAPHY SCREENING FACILITIES AND HEALTH INSURANCE COMPANIES

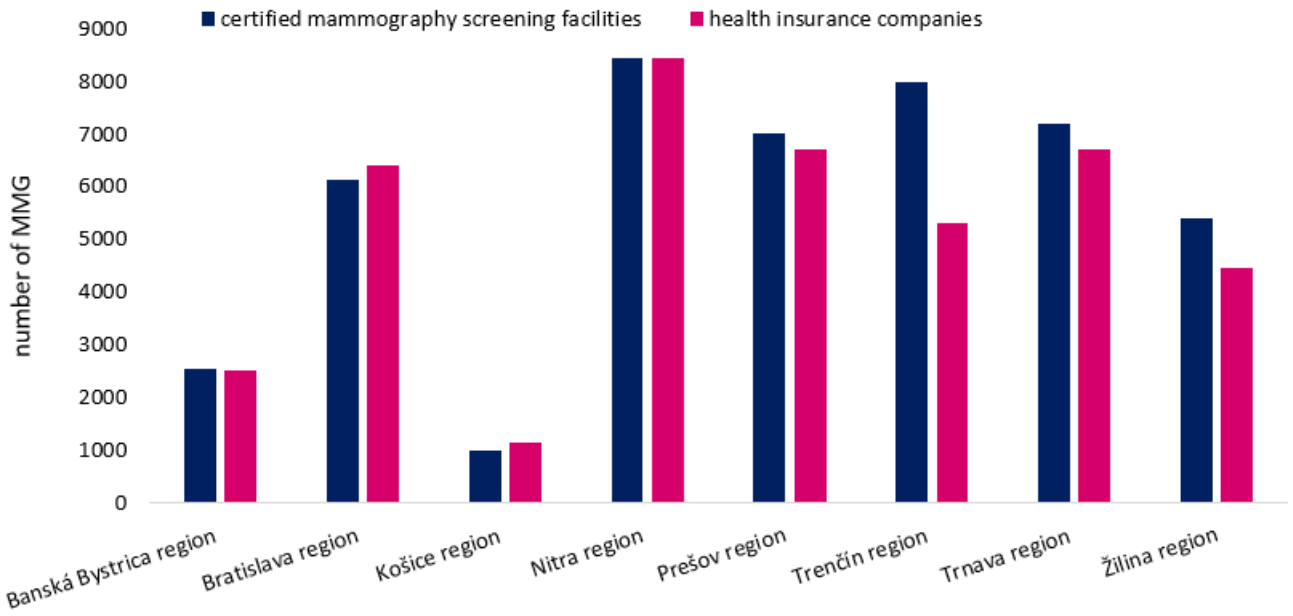
Based on data provided by certified mammography screening facilities and HICs, NOI was able to compare the numbers of performed mammography exams. The final comparison has shown a total **discrepancy of 8.9%.** Based on data from certified mammography screening facilities, 45,773 screening mammography exams were performed in 2022, whereas HIC data report 41,690 screening mammography exams in these facilities. Compared to 2021, when the discrepancy between the data provided by certified screening facilities and health insurance companies was 19.9%, we can see an improvement of the situation in 2022 and a reduction of the discrepancy by 11%, i.e., to 8.9% (T 16, T 17, CH 20, CH 21).

T 16. Comparison of the number of screening mammography exams based on anonymized data provided by certified mammography screening facilities and health insurance companies in 2022.

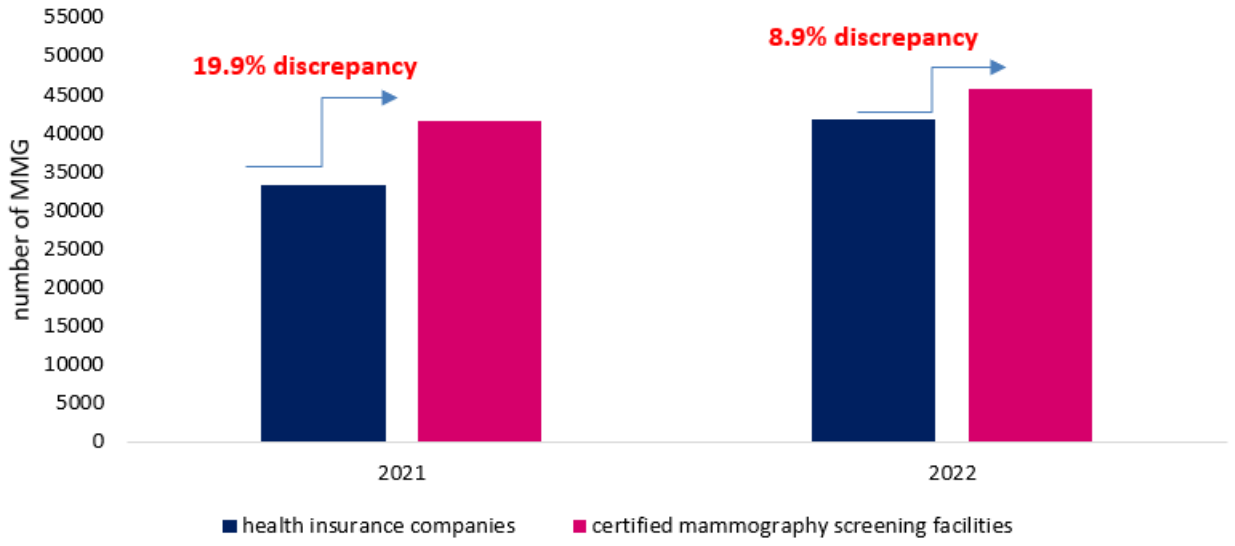
Territory of activity of a certified mammography screening facility / Region	Number of screening mammography exams based on anonymized data		discrepancy
	From certified mammography screening facilities	From health insurance companies	
Banská Bystrica region	2,556	2,525	-1.2%
Bratislava region	6,137	6,401	+4.3%
Košice region	1,004	1,150	+14.5%
Nitra region	8,450	8,436	-0.2%
Prešov region	7,011	6,710	-4.3%
Trenčín region	7,998	5,317	-33.5%
Trnava region	7,204	6,702	-7.0%
Žilina region	5,413	4,449	-17.8%
SLOVAK REPUBLIC	**45,773**	**41,690**	**-8.9%**

T 17. Comparison of relative participation rate of women in screening mammography exams based on data provided by certified mammography screening facilities and health insurance companies in 2022.

Territory of activity of a certified mammography screening facility	Relative participation rate of women in screening mammography exams based on data (%)		Discrepancy
	From certified mammography screening facilities	From health insurance companies	
Banská Bystrica region	5.9%	5.8%	-0.1%
Bratislava region	13.5%	14.1%	+0.6%
Košice region	2.0%	2.3%	+0.3%
Nitra region	17.6%	17.6%	0.0%
Prešov region	14.2%	13.5%	-0.7%
Trenčín region	19.8%	13.2%	-6.6%
Trnava region	18.6%	17.3%	-1.3%
Žilina region	12.0%	9.9%	-2.1%
SLOVAK REPUBLIC	**12.7%**	**11.6%**	**-1.1%**



CH 20. Comparison of the number of screening mammography exams based on data provided by certified mammography screening facilities and health insurance companies in 2022.



CH 21. 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 2022.

7 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 errors in procedure code and diagnosis code reporting related to mammography exams performed at a certified mammography screening facility 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 at 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 at certified mammography screening facilities across the board, which is in development by NOI.

It would be very helpful if NHIC and NOI could cooperate more closely and establish 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.

Cervical Cancer Screening Program Update, Report for 2022

Due to the etiopathogenesis and gradual development of invasive cancer through precancerous stages, cervical cancer is one of the few malignancies which can be completely prevented via secondary prevention. It is possible to significantly reduce cervical cancer mortality and incidence via screening program.

Until 2021, only opportunistic screening was taking place in Slovakia within preventive gynecology check-ups to which every woman is entitled once a year. An organized screening – active sending of invitations to women by health insurance companies – was initiated in August 2021. The invitations are sent to women from the target population who do not attend preventive gynecology check-ups regularly and have not undergone cervical cancer screening for more than three years. At the same time, opportunistic screening based on the women's own initiative or their gynecologists' initiative is still taking place alongside the organized screening.

There were approximately 1,565,008 women aged 23 – 64 years in Slovakia in 2022 (source: Statistical Office of the SR). According to currently available data from HICs, **596,113 women aged 23 – 64** underwent routine gynecological check-ups **in 2022. This meant an increase compared to 2021 when 547,627 women participated**. **In 2022, there was a slight reduction in the number of reported abnormal findings from 45,254 (7%) in 2021 to 43,532 (6.3%) in 2022**.

However, it should be noted that it is impossible to evaluate the screening per participation rate with currently available data from HICs and to identify a screening interval in which the women were examined. In EU Country Cancer Profile 2023 OECD report (OECD 2023, *EU Country Cancer Profile: Slovak Republic 2023, EU Country Cancer Profiles, OECD Publishing, Paris*, https://doi.org/10.1787/01a8d361-en), the cervical cancer screening participation rate with a three-year interval equals 64% (calculations based on interviews within European Health Interview Survey – EHIS from 2019). However, we assume that the screening participation rate with a three-year interval in Slovakia is lower compared to the OECD report, given that practical experience at the moment shows that the majority of women undergo cervical cancer screening in a yearly interval within their routine gynecological check-ups, not in the approved 1-1-3 screening interval.

These data show that the most important thing at the moment is to work to increase the screening participation rate. High participation rate is the basic precondition for screening success. A new communication strategy for cancer screenings called ONKOKONTROLA was introduced at an MoH SR press conference in October 2022 with the goal to raise awareness and inform the population about the prevention of cervical cancer, breast cancer and colorectal cancer.

Cervical cancer screening design in the Slovak Republic is defined in the Annex No. 2 "Preventive Gynecology Check-up" of the Act of the National Council of the Slovak Republic No. 661/2007, Coll., amending Act No. 577/2004, Coll. Cervical cancer screening is part of preventive gynecology check-up. The screening method used is cervical cytology exam of a Pap smear. The target population consists of women aged 23 to 64. The screening interval at the beginning of the screening is one year and becomes three years in case of two negative cytology results. The annual interval at the beginning of the screening increases CIN 2+ detection. If the last 3 cytology results are negative, the screening ends at 64 years of age. The cervical smear for the cytology exam is done by a gynecologist, cytology laboratories are certified and undergo quality control.

The knowledge that long-term infection by high-risk HPV (hrHPV) plays a crucial role in cervical cancer etiology led to a creation of an HPV test. The HPV test detects the presence of high-risk HPV virus DNA in cervical cells. DNA detection confirms whether the virus is present. It does not say

whether cells have been changed by the virus's activity. HPV testing contributes to earlier detection and subsequent earlier treatment of precancerous stages but can also lead to more frequent referrals to expert colposcopy and excessive treatment of non-progressive lesions. The HPV test has a high negative predictive value, which is why a longer screening interval is possible (5 – 10 years). A meta-analysis published in the Cochrane Database in 2017 proved higher sensitivity to CIN 2+ detection in HPV testing compared to cytology exam [1]. Czech LIBUSE study has shown that screening based on HPV testing detected 4 times more high grade lesions, including glandular lesions, compared to standard cytology screening in three years. Adding HPV DNA testing to cytology screening in women aged 35 and 45 significantly increased the sensitivity and safety of the screening program [2, 3].

Cytology screening significantly reduced the incidence and mortality of cervical cancer [4, 5]. A well-organized, high-quality screening program using cytology exams in 3 – 5-year intervals is able to prevent 80% of cervical cancer cases and reduce their mortality by 80% [6]. HPV test as the primary screening method has replaced cytological screening in many countries after evaluation and comparison of clinical and economic outcomes, cost-efficiency analysis of individual screening types. These countries had had a well-functioning organized population-wide screening with high coverage of the target population for a long time. The current recommendation of the European Commission for cervical cancer screening prefers human papillomavirus (HPV) testing in women aged 30 to 65 with a 5-year interval or longer and suggests adjusting the age and interval according to individual risk based on medical history, especially HPV vaccination. The Commission recommends preferring HPV screening in women aged 30 to 65 to cytology screening in women aged 20 to 30.

At the moment, the cytology screening infrastructure in Slovakia is good and the priority is to increase the coverage of the target population and ensure data flow for screening evaluation, check and quality assurance. The Improving Cancer Care Coordination and Screening in Latvia and Slovakia (ICCCS) project has been taking place since March 2022. It is a project of the International Agency for Research on Cancer (IARC) within its joint initiative with the European Commission and national ministries of health to support the fight against cancer. The goal of the ICCCS project, which is in accordance with the Europe's Beating Cancer Plan, is to prepare strategic plans and roadmaps in cooperation with national partners in order to reduce cancer mortality in Slovakia and Latvia. Special attention will be devoted to building capacities for population-wide registration of oncological diseases, improving information systems used for identification and invitation of suitable people to the screening, creating a screening program monitoring framework and helping oncology centers to gain accreditation from the Organization of European Cancer Institutes (OECI).
Based on the European guidelines on cervical cancer screening quality, screening exam should be undergone by at least 70% of women from the target population, at least 95% of women from the target population should be invited and at least 70% of the invited women should go to the screening. A gradual increase of participation rate is a desirable and expected outcome of awareness campaigns and active invitation of women. Not even a perfect screening test can ensure a decrease in incidence and mortality of cervical cancer if the participation is insufficient. Screening based on primary HPV testing is more suitable in case of high participation rate and it seems to be a better strategy in countries where organized population-wide screening has been established for a long time. In order to detect more cases, it is globally recommended to add HPV test to the screening methods in specific age groups. Every decision about the implementation of primary HPV testing within cervical cancer screening should be guided by health and economic factors and whether it is possible to ensure correct use of the test according to manufacturer's instructions. The health and economic factors to be considered in planning and subsequent implementation steps include HPV infection prevalence, multiple testing burden, colposcopy and CIN treatment based on HPV testing, quality and influence of the existing cytology screening programs.

Due to the confirmed benefit of hrHPV DNA testing implementation, it is desirable to adjust the screening program in Slovakia as well. The next goal is to implement the screening hrHPV DNA test which shall be done along with the cytology exam in certain age groups, more specifically in women aged 36 and 45 (+ 364 days). NOI has presented a screening program update proposal at a meeting of the Cancer Screening Committee of the SR which also includes representatives of health insurance companies. The aforementioned age groups were selected according to the Czech model where the benefit of HPV testing implementation along with cytology screening for ages 35 and 45 has already been confirmed. The age groups will be adjusted according to set cytology screening intervals in Slovakia. Given the annual interval at the beginning of the screening and subsequent three-year intervals after two previous negative cytology results and start of the screening at 23 years, this new screening will be done at 36 and 45 years. The screening hrHPV DNA test should be done at the same time. HPV testing will still be performed as a triage test in case of inconclusive cytology result. In relation to the planned change, it is necessary to implement new procedure codes for the screening and triage HPV test – specific procedure codes for negative and positive results of the screening HPV test and negative and positive results of the triage HPV test to be reported by laboratories doing the HPV testing. It must be determined which HPV tests will be used. Only clinically validated HPV tests can be accepted for cervical cancer screening and they must have proven reproducible, sustained high sensitivity to CIN2+ and CIN 3+ lesions and only minimal detection of clinically irrelevant temporary HPV infections. According to the European guidelines, HPV screening should be performed only by qualified laboratories certified by an authorized certification body as per international standards. An authorized laboratory should perform at least 10,000 HPV tests annually [7]. There are precisely defined international validation criteria for hrHPV DNA tests acceptable for use in primary cervical cancer screening based on their relative precision of CIN2+ detection compared to a standard comparative test. High risk HPV DNA test should not have lower sensitivity and specificity to CIN2+ than one of the comparative tests. Standard comparative tests are two tests (Hybrid Capture 2 (HC2) and GP5+/6+ PCR EIA) which have been validated by extensive randomized controlled studies, showing lower incidence of cervical cancer in comparison with high-quality cytology exam [8].
If primary HPV testing is approved to be included in the existing population-wide cervical cancer screening program, complex planning, feasibility assessment and pilot programs should be carried out before its routine implementation in order to ensure that adequate cost-benefit balance is achieved when switching over to primary HPV screening, including effective and efficient use of resources [7].

Written by: Lucia Kocová, M.D., NCI oncogynecologist
Expert consultant for cervical cancer screening at NOI

Revised by: Mária Rečková, M.D., PhD., Dr. Jana Trautenberger Ricová

In Bratislava on November 30, 2022
Revision with added data from 2022: May 3, 2023

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Colorectal Cancer Screening Program Update, Report for 2022

Explanation of abbreviations:

CRC	colorectal cancer
KRCA	web interface for cancer screening reporting
NHIC	National Health Information Center
SGS	Slovak Society of Gastroenterology
FOBT	fecal occult blood test
HIC	health insurance companies
GP	general practitioner for adults
NOR	National Oncology Register
FIT	fecal immunochemical test
qFIT	quantitative fecal immunochemical test
RC	routine check-up
POCT	point of care testing

Annex 3

Colorectal cancer (CRC) screening in Slovakia has been going on for over 10 years via opportunistic screening, i.e., performing FOBT (fecal occult blood test) by a general practitioner with a follow-up colonoscopy in case of a positive test result, an alternative process being primary screening colonoscopy (without previous FOBT). This type of screening is stipulated in the Act No. 577/2004 Coll. Data about performed colonoscopy exams are collected via www.krca.sk web interface and evaluated by the head of the Working Group for Colorectal Cancer Screening at the Slovak Society of Gastroenterology (SGS), Rudolf Hrčka, M.D., PhD. They have been accompanied by data from health insurance companies in the recent years. A population-wide invitation screening under the auspices of the Ministry of Health of the SR coordinated by the National Oncology Institute has been implemented in Slovakia according to the recommendations of the European Commission in order to increase the screening participation rate. After a pilot project in 2019, the actual sending of invitations, which include a qualitative FOBT, started only in 2021 mainly because of the COVID-19 pandemic.

In 2021, 310,759 FOBTs were evaluated based on the available data from HIC, which means a participation rate of app. 37.7% (if we consider half of the population aged 50 – 75, which, however, was not decreased by CRC prevalence or high-risk patient groups). In the same year and age group 50 – 75, 39,400 pancolonoscopies were reported, of which 8,445 pancolonoscopies with screening codes. 8,315 valid forms were submitted to the KRCA system.

Within the pilot project in 2019, the FIT sent was performed and handed over for evaluation by 34% of invited insured persons.

As seen in Chart 1, based on available data from HICs and reported healthcare codes, **313,309 and 410,967 FOBTs** were evaluated in 2021 and 2022 respectively – this constitutes a year-on-year increase of 31%). If this also translated into the number of examined people, it would correspond to a participation rate of app. **37.9% in 2021 and 49.5% in 2022** (counting half of the population aged 50 – 75, but without subtracting CRC prevalence or high-risk patient groups). However, this is the absolute number of all reported FOBT procedures (i.e., if a patient was examined and reported to an HIC repeatedly, they are in the system several times), which is why the percentual participation rates based on this data are not precise.

Chart 1

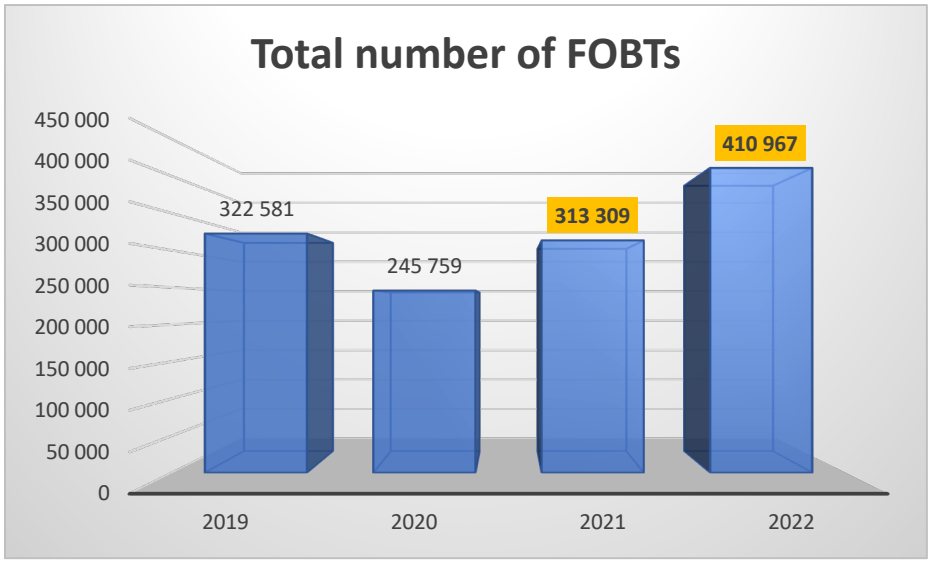
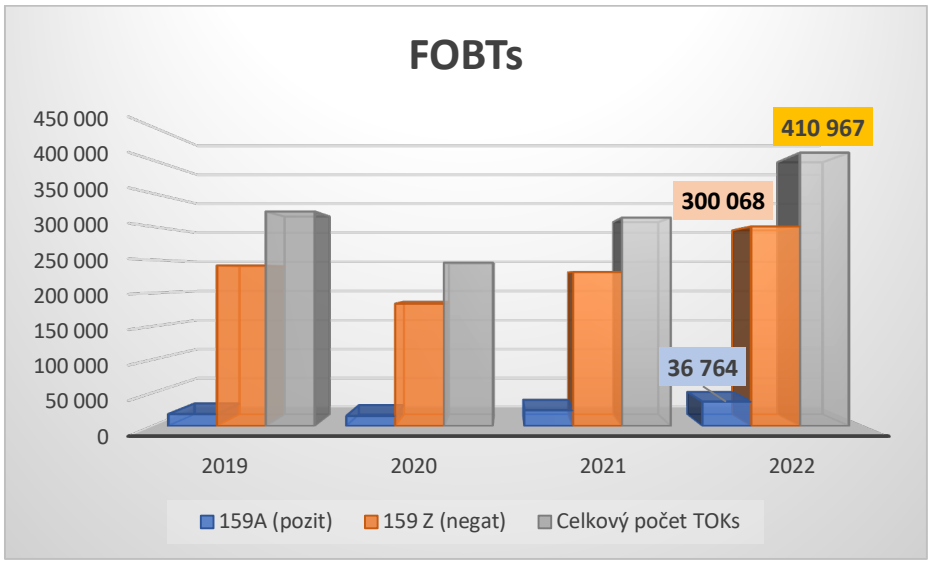


Chart 2 shows the number of reported positive and negative FOBTs, where **positivity % in 2022 was 10.9%, in comparison with 2021, when positivity % was 9.3% with the same input parameters.**

Chart 2



39,400 and 47,572 pancolonoscopies were reported in the age group 50 – 75 **in 2021 and 2022 respectively** (chart 3), of which **8,445 and 11,804 pancolonoscopies had screening codes** (chart 4), which represented a year-on-year increase by 39.8%. 8,315 and 11,186 valid forms were sent via the KRCA system, respectively.

Chart 3

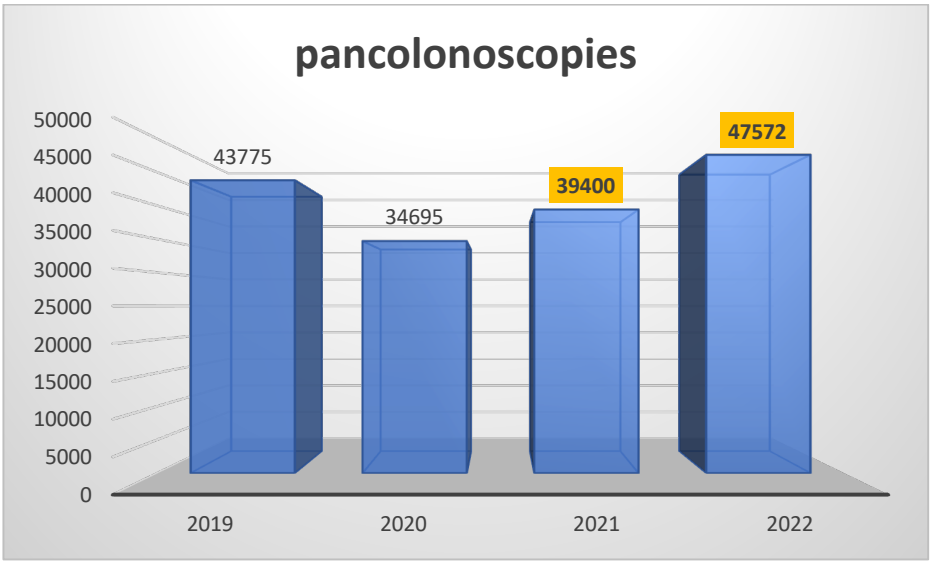
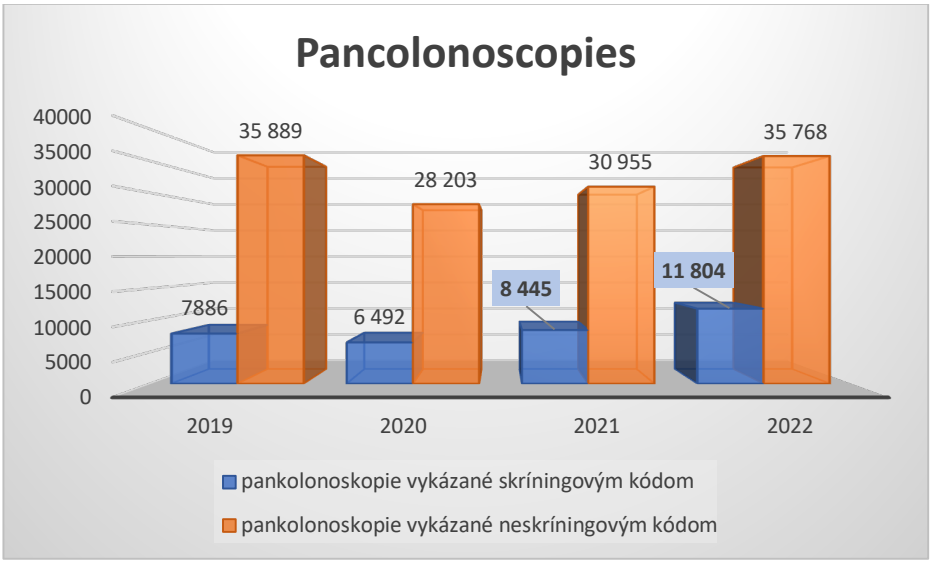


Chart 4



The aforementioned increase in the number of performed exams is probably a response to the implementation of active sending of invitations to the target population by health insurance companies. However, we currently (April 2023) do not have complete data from health insurance companies about precise numbers of insured persons who have responded to the invitation with the test since the beginning of the invitation screening in 2021 and handed it over for evaluation to their GP.

Current Problems with the CRC Screening Program

1. **Collection and Evaluation of Screening Data**
    - insufficient data on the incidence, prevalence and clinical stages at the time of CRC diagnosis (NOR is not up-to-date)
    - inaccurate data on performed exams and procedures within the screening, complicated availability of data from HIC databases, although this data is essential to evaluate the screening process
    - the majority of clinical data can be acquired only via forms on the KRCA page which should be updated

2. **Population Participation Rate and Screening Organization**
    - HIC report low rates of screening exams performed based on the sent invitation with the test. Practice has shown that part of the insured persons evaluate the test on their own and do not report it to their GP if the result is negative; part of the GPs do not perform this test when patients come with a test from their HIC but instead perform a quantitative FIT which is normally used in physicians' offices
    - another problem seems to be an error in the invitation system – more specifically, inviting insured persons who have undergone a screening exam (FOBT, colonoscopy) recently (this is caused by a time lag in provided healthcare reporting)
    - moreover, HIC preliminarily announced low % of follow-up colonoscopy exams after a positive FOBT result (group of insured persons invited to the screening by HIC). In a survey by Snowball Agency for SGS, 23% of respondents said they were afraid of pain and as much as 40% were afraid of unpleasant experience during colonoscopy (analgosedation during colonoscopy is still not reimbursed from public health insurance)
    - we do not know the actual capacities of colonoscopy facilities; the accessibility of colonoscopy is lower in some districts
    - FOBT is repeated every 2 years even if the insured person has had colonoscopy along with another recommended screening interval/test
    - insufficient identification of patient risk groups which should be referred to primary screening colonoscopy

3. **Reporting Diagnosis and Procedure Codes and Reimbursements**
    - not unified diagnosis/procedure codes reporting by gastroenterology facilities, which leads to inaccuracies in data collection from HIC; screening colonoscopy codes including ileoscopy are still missing
    - procedure 93k (analgosedation during colonoscopy) has not been included in the procedure catalog yet; it should be reimbursed to gastroenterology offices
    - procedure codes for CRC screening in at-risk population have not been introduced yet

- the healthcare procedure catalog does not include many standard or new advanced procedures used to remove pre-cancerous lesions. For example, dealing with complications – stopping bleeding or clipping perforations, advanced methods include e.g., endoscopic submucosal dissection
- the reimbursement mechanism for endoscopic polypectomy does not take into account accessories used. Primarily, their costs have increased significantly in the recent years and the absolute majority of accessories is disposable and used more in procedures due to advances in endoscopic treatment methods (endoscopic markers, endoloops, clips, nets etc.)

Discussion Prompts about Possible Solutions to the Aforementioned Issues

1. **Collection and Evaluation of Screening Data**
    - identify problems hindering smooth, automated data sharing needed to evaluate CRC screening in the direction HIC-NHIC-NOI
    - put sufficient (legislative) pressure on HIC and NHIC to ensure smooth and automated sharing of necessary CRC screening data and NOR updates in order to include data with max. 2 – 3 years' delay (it is possible in the Czech Republic, why not here?)
    - prospectively, simplify reporting of oncological diseases (eHealth functionality?)
    - structural colonoscopy result would be the optimal way to obtain clinical data in an automated manner, however, this can be problematic due to the number of different outpatient and inpatient information systems. A possible solution could be to add such functionality to eHealth and draw up colonoscopy results in a pre-made structured template in order to ensure immediate availability of the data in NHIC
    - until automated clinical data collection is implemented (see the point above), it is suitable to transfer filling the forms with clinical data from the KRCA web to eHealth under the management and responsibility of a state institution (NHIC + NOI) with full access for SGS representatives. Updating/simplifying some items is also necessary (for ex. evaluation of preparation according to validated scales – BBPS, necessity to enter the manner of lesion removal to be considered... if yes, this must also be updated – biopsy, cold snare, hot snare, EMR)

2. **Population Participation Rate and Screening Organization**
    - wait for final data on the number of on-invitation exams; if preliminary pessimistic predictions come true, it will be important to analyze why an insufficient number of exams is performed upon invitation:
        - incorrect invitation strategy?
        - insured persons do the test but do not hand it over to their GP for various reasons? (busy at work, GP is unavailable at a suitable time...?)
        - poor awareness?
        - misunderstanding, low interest?

- within the invitation inclusion criteria, change the interval when the insured person has not undergone a routine check-up to 3 years in order to partially eliminate the issue with incorrect invitation strategy
- add a reminder for non-responders (HIC app, SMS... reminder via post after 6 months)
- the qualitative test sent by HIC is disputable – current recommendations of the European Commission suggest using a quantitative FIT (qFIT). The transition to qFIT offers the following possibilities:
    - set up blanket cut-off according to capacities of colonoscopy facilities
    - prospectively set up cut-off per sex, age or other factors, which allows the screening to be customized
- continue/intensify bonuses for GPs for performing RCs and qFIT – thus support transition to POCT in physicians' offices and allow them to perform these exams also for patients not included in their capitation
- amendment to Act No. 577 should adjust the content of a routine check-up so that FOBT does not have to be included in medically justified cases
- consider possibilities to perform analysis of colonoscopy facilities' capacity in the SR (grant for SGS?) with subsequent creation of proposals for regional solutions in the interest of an even accessibility of screening colonoscopy
- raise awareness of GPs and specialists as well as the public about groups at higher risk of CRC and observe the screening recommendations in these groups according to the corresponding standard diagnostic and treatment procedure

3. Reporting Diagnosis and Procedure Codes and Reimbursements

- inform and motivate providers to correctly report diagnosis and procedure codes according to current methodology – for ex., reimbursing screening exams (colonoscopies) only if they are reported correctly, or include correct procedure reporting in the audit conditions for inclusion in the list of screening facilities

- payments for screening colonoscopy should further take into consideration the time necessary for related administrative tasks (e.g., filling in the form in the screening colonoscopy register) and should be lucrative enough so that the colonoscopy specialist does not tend to report the colonoscopy as a non-screening one

- update the list of healthcare procedures by screening colonoscopy with ileoscopy codes 763asn/763asp and 763apn/763app and screening colonoscopy codes in groups with higher risk of CRC according to a corresponding methodological guidance (763rsn /763rsp, 763arsn/763arsp, 760rsn/760rsp)

- accept painless colonoscopy as the standard, which in practice means introducing the code 93k (analgosedation during colonoscopy) with an adequate reimbursement and in the second step, enable general anesthesia reported separately as an individual procedure within outpatient healthcare independent of other outpatient healthcare procedures (colono + EMR)

Additional suggestions:

- at the moment, screening is divided into opportunistic and population-wide, or on-invitation (it probably should not be called population-wide because not the entire population is invited). Prospectively, it may be good to join these two subgroups, albeit formally, and only talk about CRC screening in which the main role would fall to qFIT within RC by GPs – which has been proven to be a functioning system + those who do not go to RCs would be invited by their HIC. This would help evaluate the entire coverage/participation in the screening
- talk to GPs about making room for the screening and RCs so that patients come at a specified time and do not mix with ill people etc. (but I assume this is how it works in most cases)
- some GPs have suggested creating a so-called "yellow time" dedicated to prevention – prospectively, we could also unify invitations + media campaigns in the same color such as is the case for other diseases
- create an intense and long-term media campaign to support individual screening programs and "translate" the word screening into more "human" language which can be understood also by lay public. The Working Group for Screening Media Coverage has created a unified name: Onkokontrola
- for the future, it must be considered whether to transfer the responsibility for one's health to the individual – via bonuses for regular participation in RCs or maluses for skipping them (health contributions to HIC, deductibles for treatment...)

Written by: Andrej Orságh, M.D.

Department of Gastroenterology of NCI

Expert consultant for cervical cancer screening at NOI

Revised by: Prof. Tibor Hlavatý, M.D., PhD., Mária Rečková, M.D., PhD., Dr. Jana Trautenberger Ricová

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CONTACT:
National Oncology Institute
National Cancer Institute,
Klenová 1
833 10 Bratislava
Slovak Republic
+421 2 59 378 429
noi@noisk.sk
www.noisk.sk