



MAMMOGRAPHY SCREENING SR – ADDENDUM

Statistical Results from Anonymized Data of the Ministry of Health
of the SR and Health Insurance Companies for 2021

National Oncology Institute

National Oncology Institute
Klenová 1, 833 10 Bratislava
Slovak Republic

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



Authors:

Dr. Bárdyová Zuzana, PhD.,MPH

Slobodníková Jana, M.D.

Laktišová Michaela, MSc.

Slobodníková Jana, M.D., PhD.

Štrbavý Adam, MSc.

Dr. Trautenberger Ricová Jana

Translation:

Veronika Maťúšová, MA

Acknowledgments

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

Data contained in this publication can be used only with a cited source.

If not otherwise stated, the data concerns exclusively women from the Slovak Republic aged 50 - 69 who represent the mammography screening target group in the SR.

TABLE OF CONTENTS

List of tables and graphs.....	4
List of abbreviations used.....	5
Introduction.....	7
1 Breast cancer (C50) epidemiology according to data from MoH SR (internal processing from insured persons' accounts in health insurance companies) for 2018 - 2020.....	13
2 The state of mammography in the Slovak Republic according to anonymized data from health insurance companies in 2019 - 2021.....	16
3 First comparison of statistical mammography screening data from 2021: anonymized data from certified screening mammography facilities and health insurance companies.....	22
4 Conclusion.....	25

LIST OF TABLES AND GRAPHS

Graph 1. Number of newly diagnosed cases of C50 in women in the SR per age group.	14
Graph 2. Percentage of newly diagnosed cases of C50 in women per age group.	14
Graph 3. Percentage of newly diagnosed cases of C50 in women in the age group 45 - 75.	15
Graph 4. Number of all mammography exams performed in the SR in 2019 - 2021 per age group. ...	16
Graph 5. Total number of mammography exams (diagnostic, preventive, screening) of women aged 50 - 69 in the SR in 2021 region of activity of mammography facility where the exam was performed.	19
Graph 6. Total number of mammography exams (diagnostic, preventive, screening) of women aged 50 - 69 in the SR in 2021 per district of activity of mammography facility where the exam was performed.	19
Graph 7. Relative participation rate of asymptomatic women aged 50 - 69 who were entitled to a screening mammography exam in individual regions of the SR and participated in preventive or screening mammography in the given region in 2021.	21
Graph 8. Relative participation rate of asymptomatic women aged 50 - 69 who were entitled to a screening mammography exam in individual districts of the SR and participated in preventive or screening mammography in the given district in 2021.	21
Graph 9. Comparison of the number of screening mammography exams based on data from certified screening mammography facilities and health insurance companies.	23
Graph 10. Percentage discrepancy in the number of screening mammography exams based on anonymized data from certified screening mammography facilities and health insurance companies in 2021.	24
Table 1. Overview of cumulative screening procedure codes.	9
Table 2. Diagnosis codes used with cumulative screening mammography codes.	10
Table 3. Diagnosis codes used with procedure codes 5092, 5092p in certified screening mammography facilities when reporting screening mammography for women without an invitation from HIC.	10
Table 4. Diagnosis codes used with procedure code 5092 in preventive or diagnostic mammography facilities when reporting preventive mammography in women aged 50 - 69.	10
Table 5. Overview of mammography exam procedure codes.	11
Table 6. Diagnosis codes used with procedure code 5092 in all mammography facilities for reporting diagnostic mammography in women aged 50 - 69.	11
Table 7. Number of newly diagnosed cases of C50 in women in Slovakia per age group.	13
Table 8. Gross incidence of C50 in women in Slovakia per age group.	15
Table 9. Number of diagnostic, preventive and screening mammography exams of women aged 50 - 69 in the SR in 2021 per region of activity of mammography facility where the exam was performed.	17
Table 10. Number of performed mammography exams in asymptomatic women aged 50 - 69 and relative participation rate of asymptomatic women who were entitled to screening mammography and underwent screening or preventive mammography in individual Slovak regions in 2021.	20
Table 11. Comparison of the number of screening mammography exams based on anonymized data from certified screening mammography facilities and health insurance companies.	22
Table 12. Comparison of relative participation rate in screening mammography exams based on data from certified screening mammography facilities and health insurance companies.	23

LIST OF ABBREVIATIONS USED

HIC	health insurance company
MG	mammography exam
MoH SR	Ministry of Health of the Slovak Republic
MRI	magnetic resonance imaging
NHIC	National Health Information Center
NOI	National Oncology Institute established under National Cancer Institute
SR	Slovak Republic
USG	ultrasound exam
VAB	vacuum biopsy

INTRODUCTION

This addendum was created from anonymized data provided by all health insurance companies (HIC) (2019 – 2020) and the Ministry of Health of the Slovak Republic (MoH SR) (2018 – 2020) to National Oncology Institute (NOI).

The mammography exams in Slovakia were performed as follows:

- **Screening mammography (organized mammography screening)**, i.e., mammography of asymptomatic women aged 50 - 69 in a certified mammography screening facility. List of mammography facilities recommended by the temporary Expert Working Group to be included in mammography screening is regularly updated and published at MoH SR website¹.
- **Preventive mammography (opportunistic mammography screening)**, i.e., mammography of asymptomatic women aged 40 - 69 in a preventive and diagnostic mammography facility (i.e., other than certified screening facility).
- **Diagnostic mammography**, i.e., mammography of women with symptoms of breast disease. Diagnostic mammography is done in all mammography facilities regardless of whether it is a certified or other mammography facility, i.e., preventive and diagnostic mammography facility.

Screening mammography codes are reported by cumulative screening codes 1301, 1301a, 1301b, 1301c, 1301d, 1301e, 1301f (table 1) and diagnosis codes Z01.6; Z80.3; Z87.7 (table 2)². Within our statistical evaluation, we identified two types of screening mammography reporting in certified screening mammography facilities based on whether the asymptomatic woman (taking into account the inclusion and exclusion criteria) received an invitation from her HIC.

- a) If the woman received an invitation to screening mammography exam from her HIC, she underwent a screening mammography exam in a certified screening mammography facility, which was reported by code 1301 or 1301_{a-f}.
- b) If the woman did not receive an invitation to screening mammography exam from her HIC, she underwent a screening mammography exam in a certified screening mammography facility, which was reported by code 5092 or 5092p. When reporting screening mammography by codes 5092 or 5092p, sometimes one of the diagnosis codes Z00 - Z80 is used, which was shown also in the statistical evaluation of the data (table 3).

In May 2021, a second revision of *“Standard Procedure for Medical Radiation and Prevention - Screening Mammography / Standard Procedure for Breast Cancer Prevention -*

¹ MoH SR. List of mammography facilities recommended by the temporary Expert Working Group to be included in mammography screening. 2022. Available online: <https://www.health.gov.sk/Clanok?dops-zamerana-na-zabezpecenie-kvality-namamograficky-ch-preventivnych-a-diagnostickych-pracoviskach>

² NOI, Behúnová Z. Methodical instruction for procedure and diagnosis code reporting for healthcare providers and their consequent reimbursement in association with the implementation of population-based breast cancer screening [draft proposal].

*Screening Mammography*³ was approved. One of the introduced changes is that radiologists have the right to examine an asymptomatic woman whose age is in the correct age range (50 - 69 years) and report it to HIC as screening mammography. This change significantly and positively affects the inclusion of asymptomatic women in the screening program even if they were not invited by their HIC or if they do not visit their gynecologist regularly but fulfill the inclusion criteria for this screening.

Since the second revision of the Standard Procedure came into effect, all women, regardless of whether they received an invitation from HIC or not, were examined by screening mammography in certified screening mammography facilities and the procedure was reported under one of the screening mammography codes (i.e., code 1301, 1301_{a-f}).

³ Horváthová M, Lehotská V, Nikodemová D, Kallayová 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 p. Available online: <https://www.standardnepostupy.sk/standardy-skriningove/>.

Table 1. Overview of cumulative screening procedure codes.⁴

Procedure code	Performed combination of exams	Description	Final result	Note
1301	MG	Screening breast mammography exam - negative result	Negative	If no other exam is indicated
1301a	MG	Screening breast mammography exam - abnormal result after MG without USG and biopsy	Abnormal	If the client does not undergo other recommended exams in the screening facility by the end of the following calendar month
1301b	MG + supplementary MG images and/or USG	Screening breast mammography exam - negative result after MG, supplementary MG images and/or USG without biopsy	Negative	If no further exams are needed
1301c	MG + supplementary MG images and/or USG	Screening breast mammography exam - abnormal result after MG, supplementary MG and/or USG without biopsy	Abnormal	If biopsy is recommended but the client does not undergo it in a screening facility by the end of the following calendar month, or if she is referred to follow-up, or if the result of the examination is BI-RADS 3
1301d	MG + supplementary MG images and/or USG + biopsy	Screening breast mammography exam - negative result after MG, supplementary MG images and/or USG and after biopsy	Benign	In case of benign biopsy result
1301e	MG + supplementary MG images and/or USG + biopsy	Screening breast mammography exam - malignant result after MG, supplementary MG images and/or USG and after biopsy	Malignant	In case of malignant biopsy result
1301c - e	MG + supplementary MG images and/or USG <i>or</i>	1301f - indication for follow-up	Abnormal with necessary follow-up by other method than baseline screening examinations	For example, MRI, VAB, stereotactic biopsy; if the screening facility does not provide the method in question, the client can be referred to another facility
+ 1301f	MG + supplementary MG images and/or USG + biopsy			A benign biopsy result (1301d) can also be an indication for follow-up in case of radiological-pathological discordance

⁴ NOI, Behúnová Z. Methodic instruction for procedure and diagnosis code reporting for healthcare providers and their consequent reimbursement in association with the implementation of population-based breast cancer screening [draft proposal].

Table 2. Diagnosis codes used with cumulative screening mammography codes.⁵

Diagnosis code	Description	Note
Z01.6	Radiology examination, not classified elsewhere	For clients without elevated risk of breast cancer
Z80.3	Malignant breast cancer in family history	Multiple instances of breast malignancy in close relatives in young age
Z87.7	Congenital defects, deformations and chromosomal anomalies in family history	For clients with proven genetic mutation associated with increased breast malignancy risk, group Q00 - Q99

Table 3. Diagnosis codes used with procedure codes 5092, 5092p in certified screening mammography facilities when reporting screening mammography for women without an invitation from HIC.

Diagnosis codes for reporting screening mammography used with procedure codes 5092, 5092p in certified screening mammography facilities

Z00.0; Z01.2; Z01.3; Z01.4; Z01.5; Z01.6; Z01.80; Z01.88; Z01.9; Z03.1; Z04.1; Z08.0; Z08.7; Z12.0; Z12.3; Z12.4; Z12.8; Z12.9; Z13.2; Z13.8; Z13.9; Z30.4; Z30.8; Z34.8; Z71.8; Z80.0; Z80.1; Z80.3; Z80.4; Z80.8; Z80.9

Preventive mammography, i.e., mammography of asymptomatic women aged 50 - 69 (age range for screening mammography) performed in other than certified screening mammography facility (i.e., preventive or diagnostic mammography facility), is reported under the codes 5092 or 5092p regardless of whether the woman was invited to screening mammography by her HIC. The procedure codes for screening mammography can be only used by facilities which fulfill the conditions for inclusion in the list of certified mammography facilities recommended by the temporary Expert Working Group to be included in mammography screening. Diagnosis codes Z00 - Z88 are recommended to report preventive mammography. In our statistical evaluation of preventive mammography reporting data, we came across diagnosis codes summarized in table 4.

Table 4. Diagnosis codes used with procedure code 5092 in preventive or diagnostic mammography facilities when reporting preventive mammography in women aged 50 - 69.

Diagnosis codes for reporting preventive mammography (in women aged 50 - 69) used with procedure code 5092 in preventive and diagnostic mammography facilities

Z00.0; Z00.5; Z01.0; Z01.1; Z01.2; Z01.3; Z01.4; Z01.5; Z01.6; Z01.7; Z01.80; Z01.9; Z03.1; Z03.9; Z04.1; Z04.8; Z04.9; Z08.0; Z08.2; Z08.7; Z08.9; Z09.0; Z09.88; Z09.9; Z10.0; Z10.1; Z12.0; Z12.2; Z12.3; Z12.4; Z14.8; Z12.9; Z13.2; Z13.3; Z13.9; Z30.3; Z30.5; Z36.8; Z40.8; Z42.3; Z48.9; Z51.4; Z80.0; Z80.2; Z80.3; Z80.9; Z85.4

Diagnostic mammography is reported by one of the procedure codes 5092, 5092a, 5092b, 5092c in all mammography facilities (table 5). It is currently also recommended to use one the diagnosis codes stated in table 6 with a procedure code for diagnostic mammography.

⁵NOI, Behúnová Z. Methodic instruction for procedure and diagnosis code reporting for healthcare providers and their consequent reimbursement in association with the implementation of population-based breast cancer screening [draft proposal].

Table 5. Overview of mammography exam procedure codes.

Procedure code	Description
5092	Bilateral mammography (standard mammography - two projections for each breast with axilla imaging)
5092p	Bilateral mammography (standard mammography - two projections for each breast with axilla imaging)
5092a	Unilateral mammography - two projections with axilla imaging
5092b	Supplementary mammography projections
5092c	Mammography - including localization of pathological process before surgery

Table 6. Diagnosis codes used with procedure code 5092 in all mammography facilities for reporting diagnostic mammography in women aged 50 - 69.

Diagnosis codes for reporting diagnostic mammography (in women aged 50 - 69) used with procedure code 5092 in all mammography facilities

A00.0; A41.9

B00.8; B60.8

C01; C02.1; C02.9; C03.9; C04.8; C05.9; C07; C09.1; C10.0; C11.8; C15.1; C15.2; C15.5; C16.0; C16.2; C16.3; C16.4; C16.8; C16.9; C17.0; C17.1; C17.2; C17.9; C18.0; C18.2; C18.3; C18.4; C185; C18.6; C18.7; C18.9; C19; C20; C21.0; C21.1; C22.0; C22.7; C22.9; C23; C24.0; C24.1; C25; C25.1; C25.8; C25.9; C26.8; C34.1; C34.2; C34.3; C34.8; C34.9; C38.1; C40.0; C40.2; C41.2; C43.0; C43.2; C43.3; C43.4; C43.5; C43.6; C43.7; C43.8; C43.9; C44.2; C44.3; C44.4; C44.5; C44.6; C44.7; C44.9; C48.0; C48.1; C48.2; C48.8; C49.0; C49.1; C49.2; C49.3; C49.5; C49.6; C49.9; C50.0; C50.1; C50.2; C50.3; C50.4; C50.5; C50.6; C50.8; C50.9; C51.0; C51.1; C51.2; C51.8; C51.9; C52; C53.0; C53.1; C53.8; C53.9; C54.0; C54.1; C54.2; C54.3; C54.8; C54.9; C55; C56; C57.0; C57.4; C57.8; C57.9; C58; C60.9; C61; C62.0; C62.9; C64; C65; C67.3; C67.4; C67.9; C69.3; C71.1; C71.6; C71.9; C72.0; C72.4; C73; C74.0; C74.9; C76.2; C76.7; C77.3; C77.9; C78.0; C78.1; C78.2; C78.6; C78.7; C79.5; C79.81; C79.88; C79.9; C80.0; C80.9; C81.0; C80.9; C81.0; C81.1; C81.2; C81.9; C82.0; C82.1; C82.2; C82.3; C82.7; C82.9; C83.0; C83.3; C83.3; C83.9; C84.4; C84.7; C85.2; C85.7; C85.9; C90.00; C91.10; C92.00; C92.01; C92.10; C92.80; C94.70; C96.7

D01.0; D02.4; D03.3; D04.1; D05.0; D05.1; D05.7; D05.9; D06.0; D06.1; D06.9; D07.0; D07.1; D09.9; D12.3; D12.6; D13.1; D13.9; D17.0; D17.1; D17.7; D17.9; D20.0; D21.3; D21.6; D21.9; D22.4; D22.5; D22.9; D23.5; D23.9; D24; D25.0; D25.1; D25.2; D25.9; D26.1; D26.9; D27; D28.7; D30.0; D33.1; D33.2; D33.3; D34; D35.2; D36.0; D36.7; D37.1; D37.70; D38.1; D38.3; D38.6; D39.0; D39.1; D39.7; D39.39; D41.0; D43.1; D44.0; D47.9; D48.0; D48.1; D48.3; D48.6; D48.7; D48.9; D50.0; D50.1; D50.8; D50.9; D51.8; D51.9; D64.9; D72.8; D72.9; D82.0

E02; E03.8; E03.9; E04.0; E04.9; E05.0; E06.3; E07.0; E07.1; E64.9; E78.2; E78.9; E86; E87.1

F45.41

G43.9; G44.1; G50.9; G54.4; G93.88

I10.00; I10.01; I10.90; I11.90; I13.90; I26.9; I35.1; I47.1; I50.13; I50.9; I63.3; I65.2; I73.0; I80.1; I80.2; I80.3; I80.8; I80.9; I89.0; I89.9

J01.0; J01.1; J01.4; J01.8; J02.0; J03.9; J04.0; J06.0; J06.9; J18.0; J18.9; J20.0; J20.9; J30.3; J39.0; J40; J44.0; J44.12; J44.80; J44.82; J45.1; J84.1; J90; J98.9

Table 6 (continued). Diagnosis codes used with procedure code 5092 in all mammography facilities for reporting diagnostic mammography in women aged 50 - 69.

Diagnosis codes for reporting diagnostic mammography (in women aged 50 - 69) used with procedure code 5092 in all mammography facilities

K01.0; K02.1; K04.0; K04.1; K049; K08.9; K29.9; K30; K31.9; K40.90; K44.0; K57.32; K60.4; K70.3; K71.4; K74.0; K74.6; K75.4; K76.0; K76.8; K76.9; K80.20; K80.81; K81.1; K81.1; K82.9; K83.1; K83.9; K92.0; K92.9
L02.0; L02.2; L02.8; L03.3; L03.8; L03.9; L04.1; L04.9; L08.8; L08.9; L72.0
M01.60; M02.81; M05.99; M07.30; M16.0; M16.1; M17.0; M17.1; M19.01; M19.04; M23.26; M23.97; M24.11; M25.50; M25.51; M25.52; M50.0; M50.1; M50.3; M51.1; M51.9; M53.27; M54.00; M54.15; M54.2; M54.00; M54.15; M54.2; M54.4; M60.80; M70.8; M75.5; M77.3; M81.08; M81.45; M95.1
N00.1; N01.4; N01.6; N03.0; N04.6; N06.8; N06.9; N10; N18.5; N20.9; N23; N28.8; N30.0; N30.9; N31.9; N39.42; N39.88; N49.0; N49.9; N50.9; N60.0; N60.1; N60.2; N60.3; N60.4; N60.8; N60.9; N61; N62; N63; N64.0; N64.11; N64.2; N64.3; N64.4; N64.5; N64.8; N64.9; N70.0; N70.1; N73.0; N73.1; N73.3; N73.9; N75.0; N76.0; N76.1; N76.4; N80.0; N80.1; N80.3; N80.6; N80.9; N81.2; N81.4; N81.8; N81.9; N83.0; N83.2; N83.3; N84.0; N84.1; N85.1; N85.8; N86; N87.0; N87.1; N87.2; N87.9; N88.9; N90.0; N90.6; N90.8; N90.9; N91.1; N91.5; N92.0; N92.1; N93.0; N93.8; N93.9; N94.0; N94.1; N94.4; N94.8; N94.9; N95.0; N95.1; N95.2; N95.3; N95.8; N95.9
Q65.1; Q83.8
R05; R06.0; R07.2; R07.3; R09.8; R10.0; R10.1; R10.2; R10.3; R10.4; R18; R22.2; R22.9; R50.9; R59.0; R59.1; R59.9; R60.0; R70.0; R77.8; R79.8; R87.60; R92
S00.00; S20.0; S20.10; S20.18; S20.30; S20.85; S29.9; S40.0; S42.24; S46.0; S60.0; S60.81; S61.80; S63.00; S80.0; S82.6; S83.6; S90.1; S93.40
T01.6; Z80.3; T98.1
U07.1; U07.2; U09.9; U99.01
V50.0; V50.9; V64.9
Y01.4; Y01.6; Y88.1

1 BREAST CANCER (C50) EPIDEMIOLOGY ACCORDING TO DATA FROM MOH SR (INTERNAL PROCESSING FROM INSURED PERSONS' ACCOUNTS IN HEALTH INSURANCE COMPANIES) FOR 2018 – 2020⁶

Oncological diseases of the breast are one of the most commonly diagnosed oncological diseases of women in Slovakia. Based on the MoH SR records (internal processing from insured persons' accounts in health insurance companies), it is estimated that in 2018, i.e., before the start of the general mammography screening, the gross incidence was 117/100,000 women (3,263 newly diagnosed cases of C50)⁷. In 2019, i.e., at the beginning of the mammography screening (initiated in September 2019), a 4-percent increase is estimated, with gross incidence of 122/100,000 women (3,403 newly diagnosed cases of C50). Subsequently, in 2020, the gross incidence was 112/100,000 women (3,134 newly diagnosed cases of C50), which represents an 8-percent decrease compared to 2019. This decrease was caused mainly by the COVID-19 pandemic and implementation of blanket preventive measures (3-month restriction of functioning of mammography and certified screening mammography facilities), which led to a lower number of performed preventive, screening and diagnostic mammography exams.

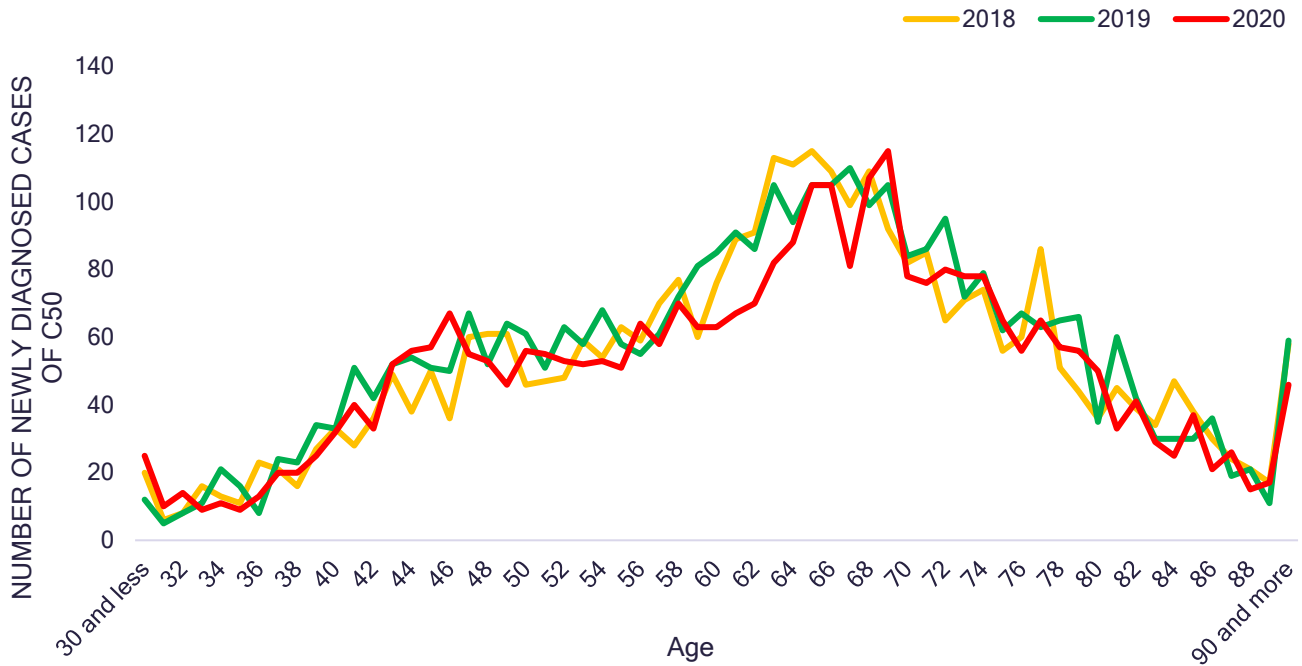
Table 7 and graph 1 show the number of newly diagnosed cases of breast cancer in women per age group. The percentage of newly diagnosed cases of C50 in women (graph 2) aged 50 - 69 (i.e., the target group of the mammography screening) in 2020 was 47% of all newly diagnosed cases of C50. Women aged 40 - 49 accounted for 16%, women younger than 40 for 5% and women older than 70 for 33%.

Table 7. Number of newly diagnosed cases of C50 in women in Slovakia per age group.

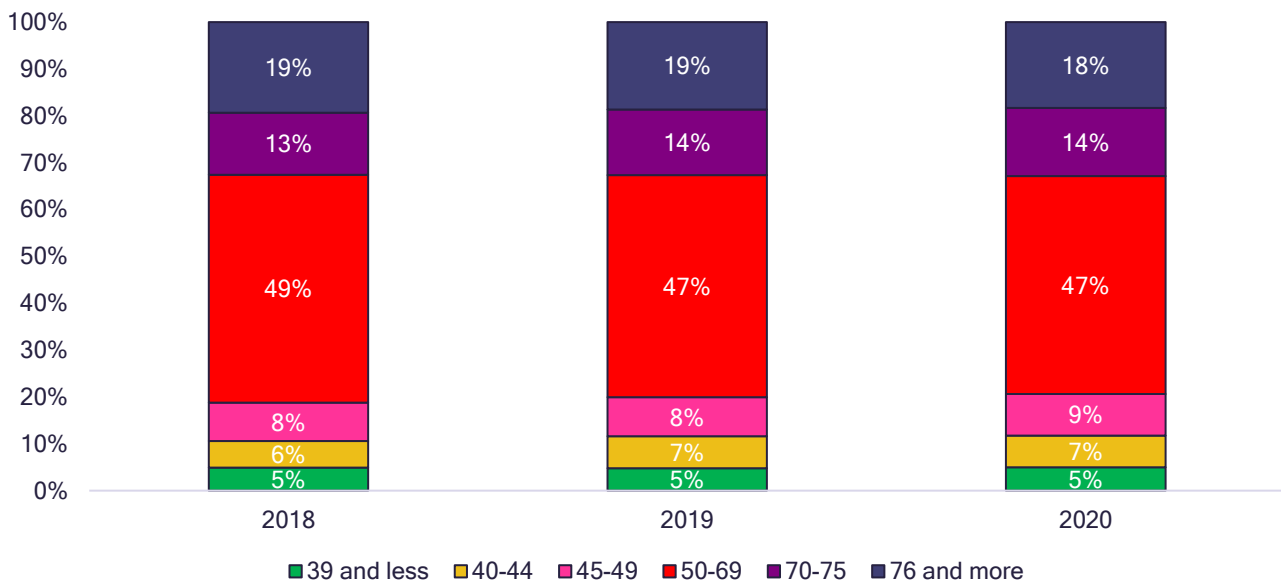
Age group	NUMBER OF NEWLY DIAGNOSED CASES OF C50		
	2018	2019	2020
Under 39	161	162	156
40 - 44	184	232	213
45 - 49	268	284	278
50 - 69	1,587	1,613	1,458
70 - 75	433	478	455
Over 76	630	634	574
All ages	3,263	3,403	3,134

⁶ Number of newly diagnosed cases of women with C50 according to MoH SR (internal processing from insured persons' accounts in health insurance companies), data provided to NOI in 2022.

⁷ Gross incidence was calculated based on the number of newly diagnosed cases of C50 in women according to the MoH SR (internal processing from insured persons' accounts in health insurance companies) provided to NOI and the data from the Statistical Office of the SR published in their public database, available online: <http://statdat.statistics.sk/>



Graph 1. Number of newly diagnosed cases of C50 in women in the SR per age group.



Graph 2. Percentage of newly diagnosed cases of C50 in women per age group.

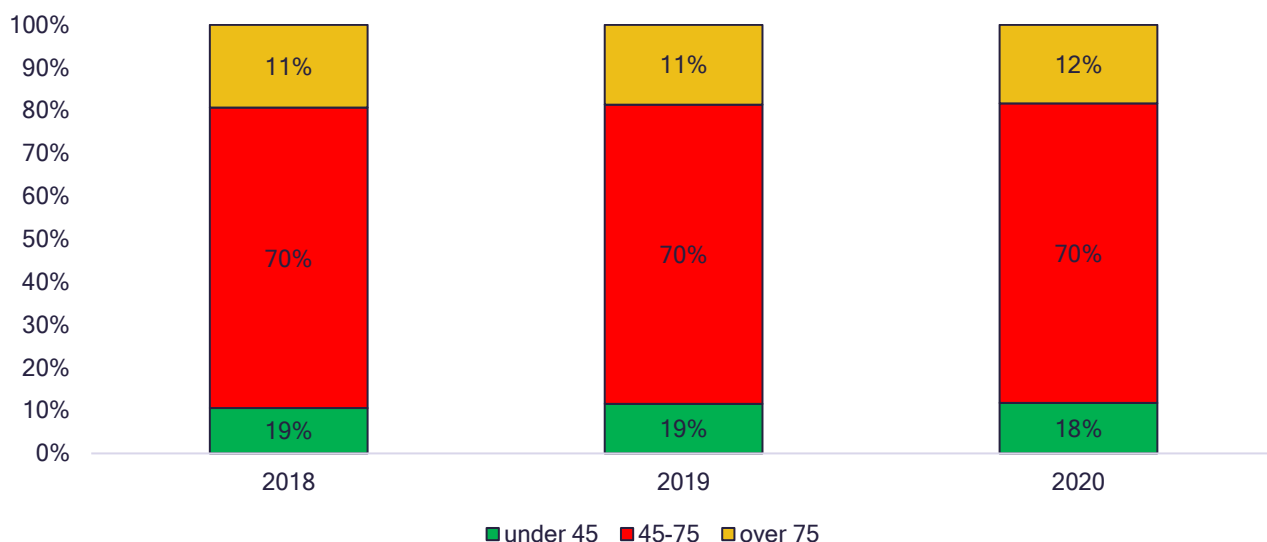
Table 8 shows the gross incidence of C50 in individual age groups. Estimated gross incidence of C50 in women aged 50 - 69 in 2020 was 201 cases of C50 per 100,000 women.

Table 8. Gross incidence of C50 in women in Slovakia per age group.

Age group	GROSS INCIDENCE PER 100,000 WOMEN ⁸		
	2018	2019	2020
Under 39	12	13	12
40 - 44	84	105	97
45 - 49	142	145	137
50 - 69	218	22	201
70 - 75	288	303	275
Over 76	313	308	273
Total gross incidence for women of all ages in the SR	117	122	112

Based on the most recent recommendations, the European Commission recommends extending mammography screening to the age group 45 - 75 in all Member States. Women with breast cancer aged 45 - 75 represented 70% of all diagnosed breast tumors in 2020 as well as in 2018 and 2019 (graph 3).

Gross incidence of C50 in women aged 45 - 75 was 214/100,000 women in 2018 (2,288 newly diagnosed cases of C50), 202/100,000 women in 2019 (2,375 newly diagnosed cases of C50), and 200/100,000 women in 2020 (2,191 newly diagnosed cases of C50).

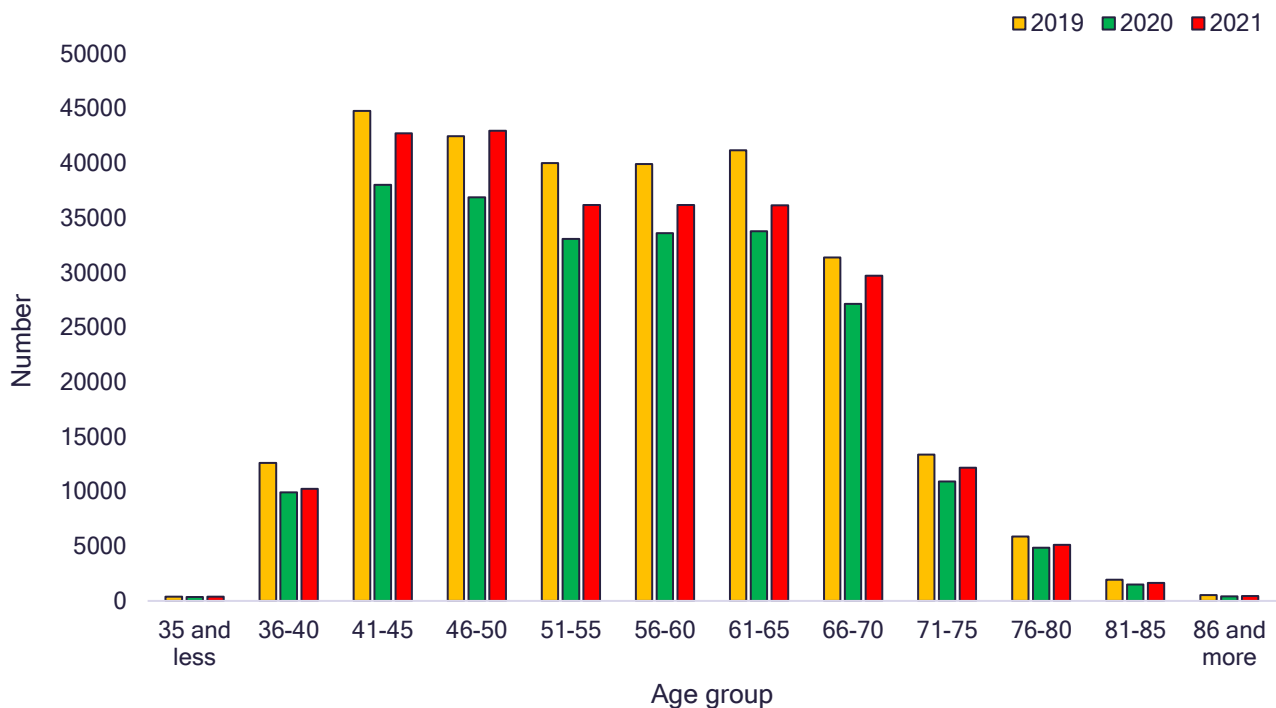


Graph 3. Percentage of newly diagnosed cases of C50 in women in the age group 45 - 75.

⁸ Gross incidence was calculated based on the number of newly diagnosed cases of C50 in women according to the MoH SR (internal processing from insured persons' accounts in health insurance companies) provided to NOI and the data from the Statistical Office of the SR published in their public database, available online: <http://statdat.statistics.sk/>

2 THE STATE OF MAMMOGRAPHY IN THE SLOVAK REPUBLIC ACCORDING TO ANONYMIZED DATA FROM HEALTH INSURANCE COMPANIES IN 2019 – 2021⁹

While 274,491 mammography exams were performed in 2019 (the figure includes preventive, screening and diagnostic mammography in all age groups), this number dropped to 230,458 in 2020, i.e., by 16%. This decrease was caused mainly by the COVID-19 pandemic. On the other hand, when the blanket measures were lifted in 2021, we could observe an increase by 10% (compared to 2020), i.e., to 253,989 mammography exams. In spite of this increase, the number of performed mammography exams did not achieve the minimal required number in 2019. This tendency can be seen in all age groups (graph 4).



Graph 4. Number of all mammography exams performed in the SR in 2019 - 2021 per age group.

In 2021, 142,121 mammography exams (screening, preventive and diagnostic mammography combined) were performed in the SR in women aged 50 - 69. Of this number, 51,990 mammography exams were performed in women with symptoms of oncological breast disease and 90,131 in asymptomatic women. Within organized mammography screening, 33,270 women were examined by screening mammography, which represents 37% of all mammography exams in asymptomatic women. Preventive mammography exam was performed in 56,861 asymptomatic women, which accounts for 63% of all mammography

⁹ Statistical processing of anonymized data from all health insurance companies (i.e., VŠZP, Dôvera, Union) provided to NOI in 2022.

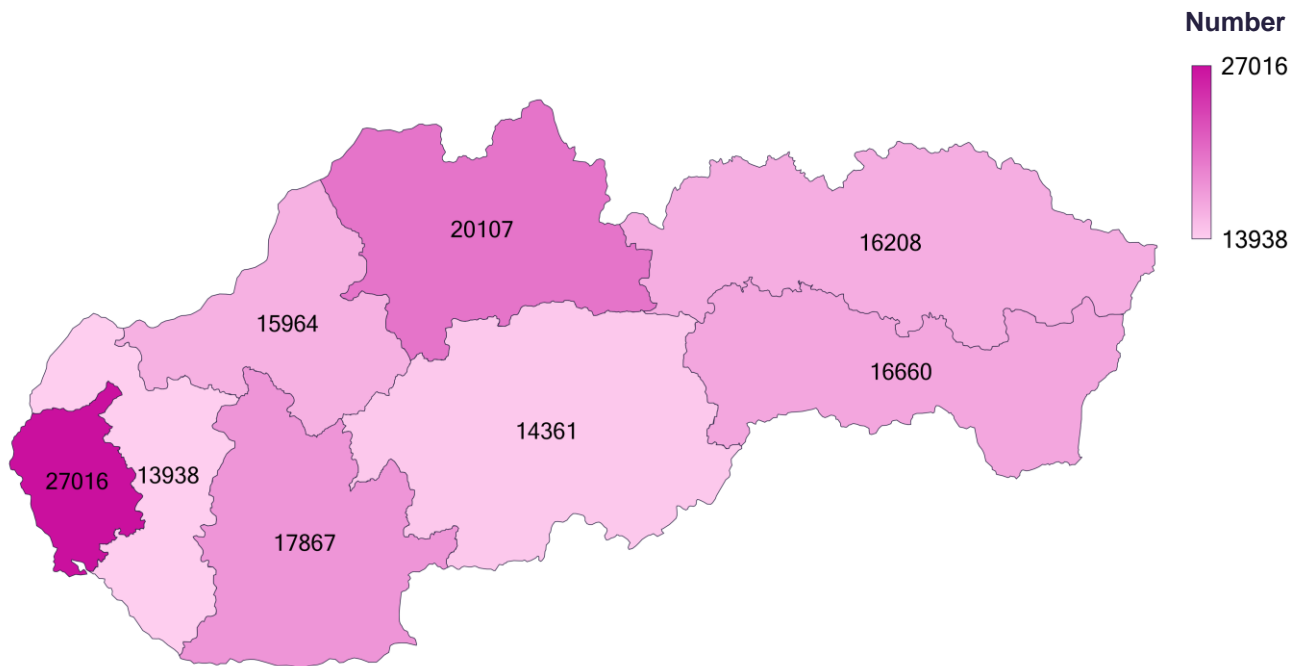
exams in asymptomatic women. Table 9 shows the number of diagnostic, preventive and screening mammography exams in women aged 50 - 69 in the SR in 2021 per region of activity of mammography facility. Graph 5 shows the total number of mammography exams (diagnostic, preventive, screening) of women aged 50 - 69 in the SR in 2021 per region of activity of mammography facility where the exam was performed. Graph 6 shows the total number of mammography exams (diagnostic, preventive, screening) of women aged 50 - 69 in the SR in 2021 per district of activity of mammography facility where the exam was performed.

Table 9. Number of diagnostic, preventive and screening mammography exams of women aged 50 - 69 in the SR in 2021 per region of activity of mammography facility where the exam was performed.

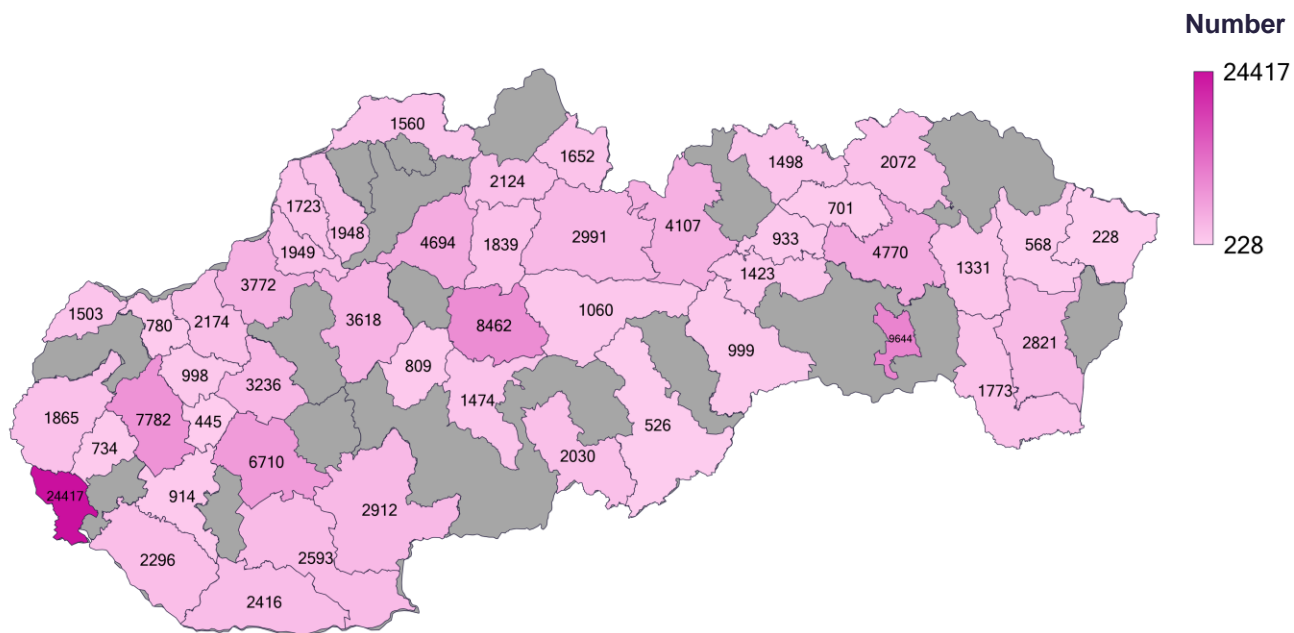
Region of activity of mammography facility	Total number of all mammography exams (screening, preventive, diagnostic)	Number of mammography exams of women aged 50 - 69	
		with symptoms of breast disease (diagnostic mammography)	without symptoms of breast disease (screening and preventive mammography)
Banská Bystrica region	14,361	6,595	7,766
Banská Bystrica	8,462	3,873	4,589
Brezno	1,060	344	716
Lučenec	2,030	1,913	117
Rimavská Sobota	526	156	370
Zvolen	1,474	255	1,219
Žiar nad Hronom	809	54	755
Bratislava region	27,016	16,961	10,055
Bratislava	24,417	16,610	7,807
Malacky	1,865	155	1,710
Pezinok	734	196	538
Košice region	16,660	4,635	12,025
Košice	9,644	2,804	6,840
Michalovce	2,821	892	1,929
Rožňava	999	81	918
Spišská Nová Ves	1,423	191	1,232
Trebišov	1,773	667	1,106
Nitra region	17,867	5,140	12,727
Komárno	2,416	1,878	538
Levice	2,912	536	2,376
Nitra	6,710	1,409	5,301
Nové Zámky	2,593	370	2,223
Topoľčany	3,236	947	2,289

Table 9 (continued). Number of diagnostic, preventive and screening mammography exams of women aged 50 - 69 in the SR in 2021 per region of activity of mammography facility.

Region of activity of mammography facility	Total number of all mammography exams (screening, preventive, diagnostic)	Number of mammography exams of women aged 50 - 69	
		with symptoms of breast disease (diagnostic mammography)	without symptoms of breast disease (screening and preventive mammography)
Prešov region	16,208	4,664	11,544
Bardejov	2,072	2,071	1
Humenné	568	157	411
Levoča	933	182	751
Poprad	4,107	352	3,755
Prešov	4,770	1,479	3,291
Sabinov	701	33	668
Snina	228	102	126
Stará Ľubovňa	1,498	107	1,391
Vranov nad Topľou	1,331	181	1,150
Trenčín region	15,964	5,311	10,653
Ilava	1,949	1,948	1
Myjava	780	83	697
Nové Mesto nad Váhom	2,174	220	1,954
Považská Bystrica	1,948	406	1,542
Prievidza	3,618	341	3,277
Púchov	1,723	627	1,096
Trenčín	3,772	1,686	2,086
Trnava region	13,938	3,726	10,212
Dunajská Streda	2,296	504	1,792
Galanta	914	342	572
Hlohovec	445	7	438
Piešťany	998	998	-
Skalica	1,503	88	1,415
Trnava	7,782	1,787	5,995
Žilina region	20,107	4,958	15,149
Čadca	1,560	36	1,524
Dolný Kubín	2,124	1,006	1,118
Liptovský Mikuláš	2,991	508	2,483
Martin	4,694	1,967	2,727
Ružomberok	1,839	218	1,621
Tvrdošín	1,652	455	1,197
Žilina	5,247	768	4,479
Slovak Republic	142,121	51,990	90,131



Graph 5. Total number of mammography exams (diagnostic, preventive, screening) of women aged 50 - 69 in the SR in 2021 region of activity of mammography facility where the exam was performed.



Graph 6. Total number of mammography exams (diagnostic, preventive, screening) of women aged 50 - 69 in the SR in 2021 per district of activity of mammography facility where the exam was performed.

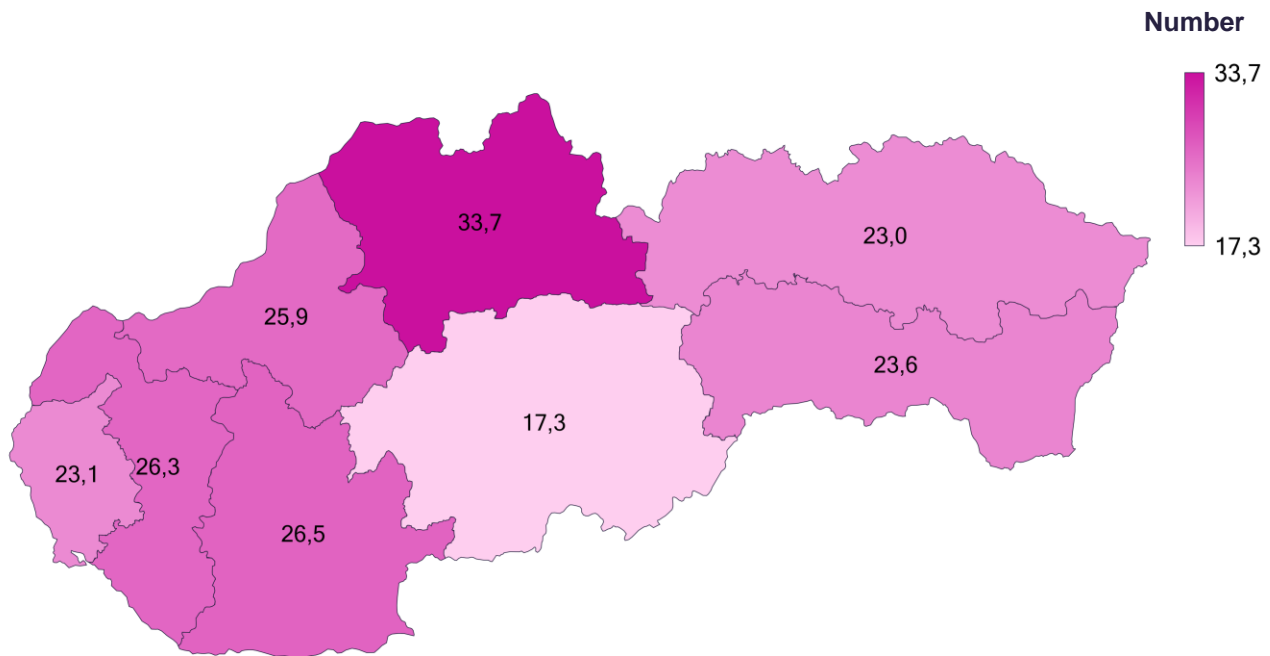
Total participation rate of asymptomatic women aged 50 - 69¹⁰ was 24.9% of all women in the SR entitled to undergo screening mammography in 2021. The participation rate of these women in the mammography screening performed in a certified screening mammography facility was 9.2% and the participation rate in other than certified facility was 15.7%.

Table 10 shows the number of performed mammography exams of asymptomatic women aged 50 - 69 and relative participation rate of asymptomatic women aged 50 - 69 who were entitled to screening mammography and underwent screening or preventive mammography in individual Slovak regions in 2021. Graph 7 shows relative participation rate of asymptomatic women aged 50 - 69 (i.e., women who were entitled to a screening mammography exam in individual regions) in preventive or screening mammography per region of activity of mammography facility where the exam was performed. Graph 8 shows relative participation rate of asymptomatic women aged 50 - 69 (i.e., women who were entitled to a screening mammography exam in individual districts) in preventive or screening mammography per district of activity of mammography facility where the exam was performed.

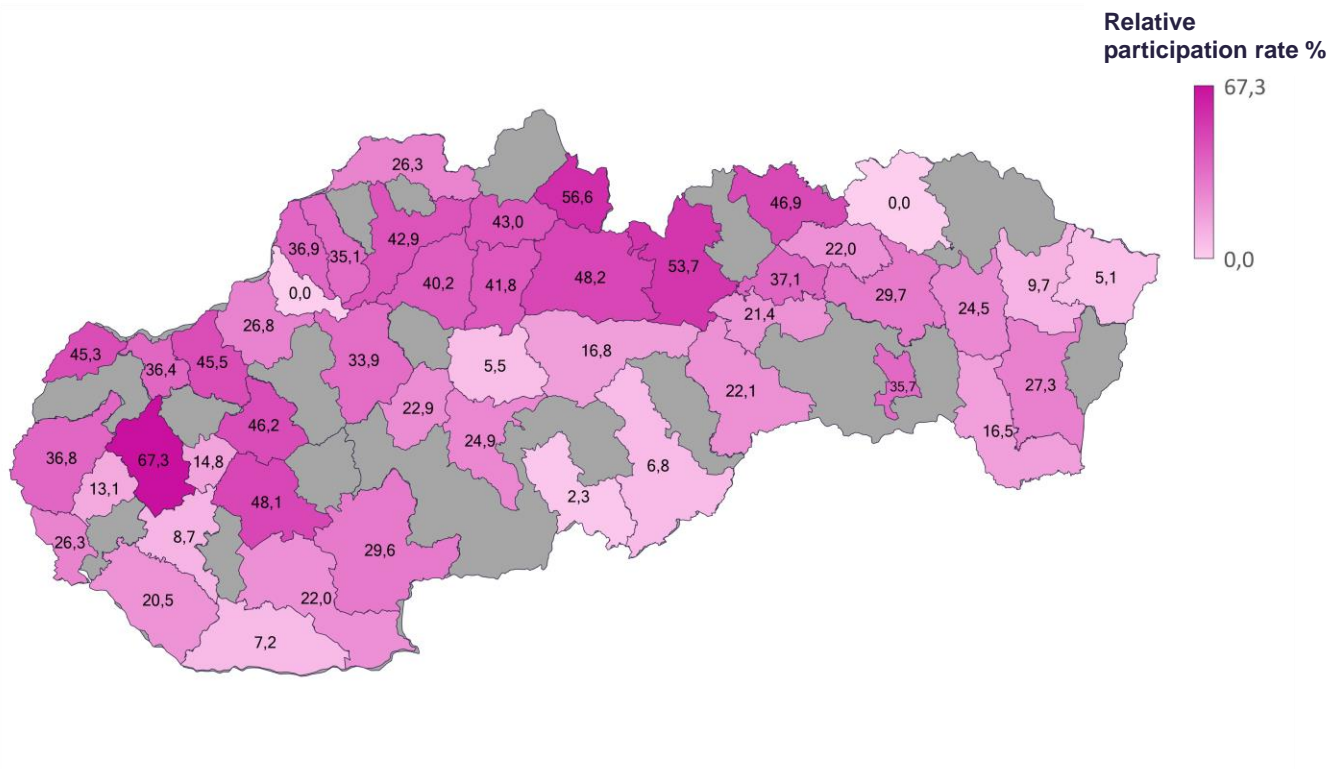
Table 10. Number of performed mammography exams in asymptomatic women aged 50 - 69 and relative participation rate of asymptomatic women who were entitled to screening mammography and underwent screening or preventive mammography in individual Slovak regions in 2021.

Region of activity of mammography facility / Region	Number of performed mammography exams		Relative participation rate, taking into account the screening interval, per region (%)
	Screening	Preventive	
Banská Bystrica region	1,812	5,954	17.3
Bratislava region	5,351	4,704	23.1
Košice region	-	12,025	23.6
Nitra region	5,301	7,426	26.5
Prešov region	6,601	4,943	23.0
Trenčín region	5,363	5,290	25.9
Trnava region	5,995	4,217	26.3
Žilina region	2,847	12,302	33.7
Slovak Republic	33,270	56,861	24.9

¹⁰ Participation rate was calculated as a ratio of actually performed mammography exams (i.e., mammography exam performed in a mammography facility according to region of activity) and the number of women entitled to a screening mammography (i.e., women entitled to a screening mammography exam in the given region/district) while taking into account the 2-year screening interval (it would be necessary to subtract all women currently treated for breast cancer or in palliative care).



Graph 7. Relative participation rate of asymptomatic women aged 50 - 69 who were entitled to a screening mammography exam in individual regions of the SR and participated in preventive or screening mammography in the given region in 2021.



Graph 8. Relative participation rate of asymptomatic women aged 50 - 69 who were entitled to a screening mammography exam in individual districts of the SR and participated in preventive or screening mammography in the given district in 2021.

3 FIRST COMPARISON OF STATISTICAL MAMMOGRAPHY SCREENING DATA FROM 2021: ANONYMIZED DATA FROM CERTIFIED SCREENING MAMMOGRAPHY FACILITIES AND HEALTH INSURANCE COMPANIES

The first comparison of the number of performed mammography exams was carried out based on anonymized data provided by certified screening mammography facilities and health insurance companies to the National Oncology Institute. The final comparison showed a total discrepancy of 19.9%. Based on the data from certified screening mammography facilities, 41,554 screening mammography exams were performed in 2021. Based on the data from health insurance companies, 33,270 screening mammography exams were performed in these facilities.

Table 11 compares the number of screening mammography exams based on anonymized data from certified screening mammography facilities and health insurance companies per region. Table 12 compares the relative participation rate of women (i.e., women aged 50 - 69 who were entitled to a screening mammography in the given region while taking into account the 2-year screening interval) in screening mammography exam based on data from certified screening mammography facilities and health insurance companies. Graph 9 shows the comparison of the number of screening mammography exams based on data from certified screening mammography facilities and health insurance companies. Graph 10 shows the difference in the number of screening mammography exams based on anonymized data from certified screening mammography facilities and health insurance companies in 2021.

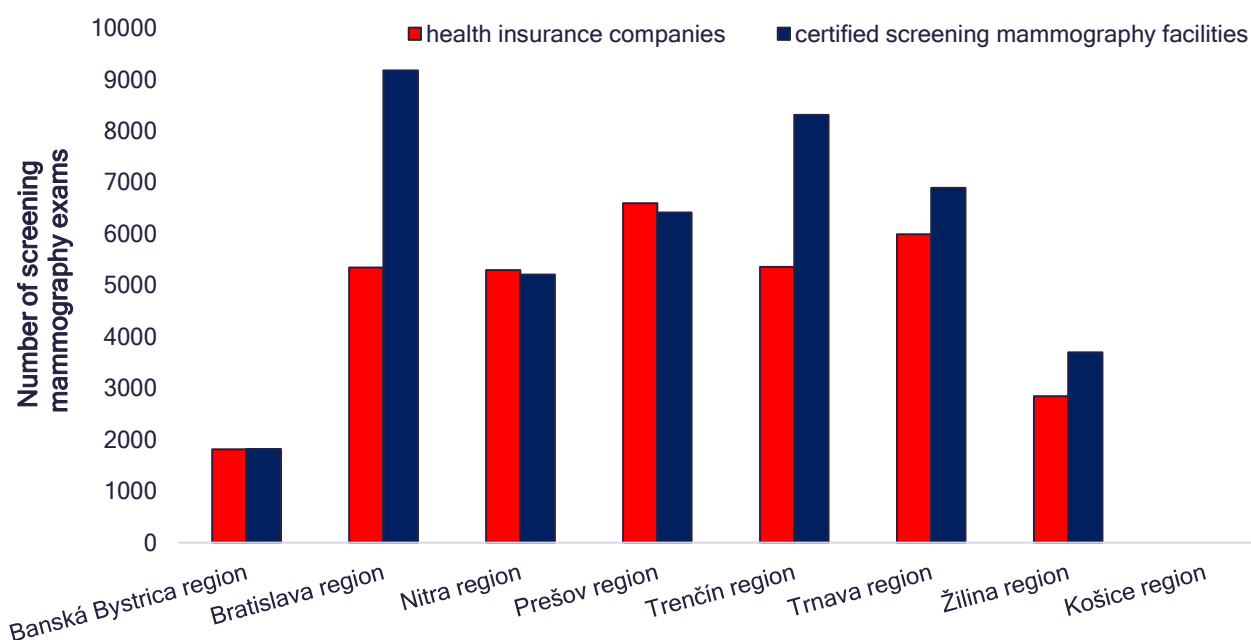
Table 11. Comparison of the number of screening mammography exams based on anonymized data from certified screening mammography facilities and health insurance companies.

Region of activity of certified screening mammography facility / Region	Number of screening mammography exams based on anonymized data		Percentage discrepancy ¹¹
	Certified screening mammography facilities	Health insurance companies	
Banská Bystrica region	1,819	1,812	-0.4%
Bratislava region	9,183	5,351	-41.7%
Nitra region	5,212	5,301	+1.7%
Prešov region	6,420	6,601	+2.8%
Trenčín region	8,318	5,363	-35.5%
Trnava region	6,900	5,995	-13.1%
Žilina region	3,702	2,847	-23.1%
Košice region	-	-	-
Slovak Republic	41,554	33,270	19.9%

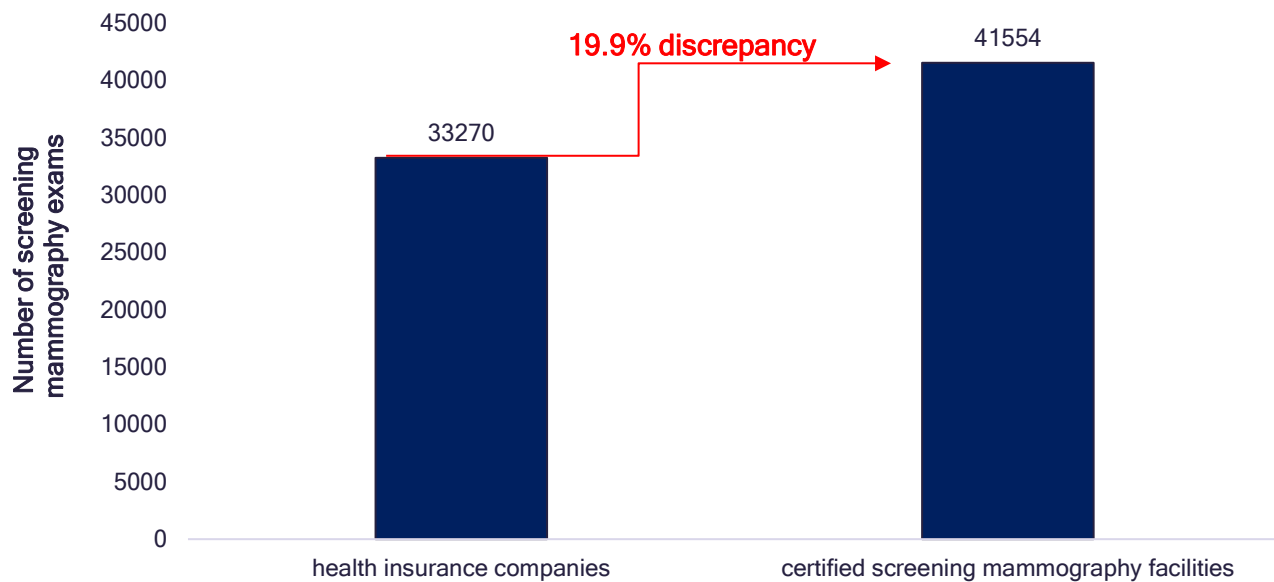
¹¹ Percentage discrepancy was calculated as the difference between anonymized data provided by certified screening mammography facilities and anonymized data provided by health insurance companies.

Table 12. Comparison of relative participation rate in screening mammography exams based on data from certified screening mammography facilities and health insurance companies.

Region of activity of certified screening mammography facility/ Region	Relative participation rate of women in screening mammography exams based on data (%)	
	Certified screening mammography facilities	Health insurance companies
Banská Bystrica region	4.1	4.0
Bratislava region	21.1	12.3
Nitra region	10.9	11.1
Prešov region	12.8	13.2
Trenčín region	20.3	13.1
Trnava region	17.8	15.4
Žilina region	8.2	6.3
Košice region	-	-
Slovak Republic	11.5	9.2



Graph 9. Comparison of the number of screening mammography exams based on data from certified screening mammography facilities and health insurance companies.



Graph 10. Percentage discrepancy in the number of screening mammography exams based on anonymized data from certified screening mammography facilities and health insurance companies in 2021.

4 CONCLUSION

Based on the analyzed anonymized data provided by certified screening mammography facilities and health insurance companies, it was possible to notice conformity in some districts, small discrepancies in others (lower numbers) and greater discrepancies in yet others. The difference can be explained by some procedures not being reimbursed because of an incorrect code reported by a certified screening mammography facility.

Due to this, it is suitable to:

- adjust and monitor the reporting of cumulative procedure codes for screening mammography in a targeted manner,
- adjust and monitor the reporting of diagnosis codes associated with the cumulative codes for screening mammography in a targeted manner,
- consult and verify the errors in procedure and diagnosis code reporting associated with mammography exams performed at certified screening mammography facilities within internal and external audit,
- strictly observe contracts and the 2nd revision of the Standard Procedure for Reporting Mammography Exams to Health Insurance Company, effective as of 15 May 2021.

Based on the above, we recommend preparing and publishing a binding guideline based on cooperation with representatives of health insurance companies and unifying the reporting of screening, preventive and diagnostic mammography in certified screening mammography facilities, which will have a positive impact on reducing the number of errors in the reporting of mammography exams.

Another factor which can affect this data can be an incorrect collection of mammography screening data by certified screening mammography facility. This should be verified by internal and external audit. It is also necessary to implement a general unified program for statistical data collection from mammography screening in certified screening mammography facilities, which is in preparation by NOI.

A more intense cooperation between NHIC and NOI and creation of a working group for data collection for all cancer screenings including mammography based on a recommendation by the Cancer Screening Committee would be a very helpful factor in the entire process.