BREAST AND CERVICAL CANCER SCREENING ATTENDANCE AMONG CZECH WOMEN

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SUMMARY

Objectives: The aim of the study was to investigate the variation in breast and cervical cancer screening attendance among Czech women by age and in regions in 2009–2017.

Methods: The data from the health insurance company that covers around 50% of the Czech population were used to calculate age-specific attendance rates and standardized attendance rates by year and region.

Results: In 2017, the attendance of all eligible women was 52% in breast cancer screening and 46% in cervical cancer screening. There were differences in attendance among groups of women. Women aged 45–49 had attendance rates in both screenings around 60%, while 39% of women aged 75–79 attended breast cancer screening, and 23% attended cervical cancer screening. In regions, attendance ranged from 38% to 70% in breast cancer screening and from 32% to 55% in cervical cancer screening.

Conclusions: We identified the age-specific differences and regional variation in both breast and cervical cancer screening attendance among Czech women. Those with lower attendance may have a higher risk of dying from breast and cervical cancers. Mitigating this risk should be a priority of public health policies.

Key words: cancer screening, breast cancer, cervical cancer, cancer prevention, Czechia

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INTRODUCTION

Cancer is the second leading cause of death in Czechia, causing annually about one-quarter of all deaths. Breast cancer is the most frequently diagnosed cancer among women and the third most common cancer in the Czech population. Due to breast cancer 1,620 women died, which accounts for 13% of all cancer deaths among Czech women in 2017 (1). In the last 30 years, the number of newly diagnosed breast cancer cases per year has increased more than twice, with over 7,000 women being diagnosed in 2017 (2).

Cervical cancer is less common, however still a quite frequent disease with around one thousand diagnosed cases every year. Since 2011 the incidence has dropped below 1,000 cases per year to almost 800 cases in 2017 (2). In 2017, there were 354 deaths due to cervical cancer in Czechia (1).

Breast cancer mortality in Czechia was below the average of the European Union in 2016 (3). The value of standardized mortality rate for the EU-28 was 32.9 deaths per 100,000 females, while in Czechia 30.1 deaths per 100,000 females. On the other hand, the standardized cervical cancer mortality rate of Czechia – 5.6 deaths per 100,000 females, was slightly higher than EU-28 average of 3.8 per 100,000 females.

The success of cancer treatment depends heavily on the timely diagnosis in the earliest stage possible. Screening is a valuable tool for achieving cancer mortality reduction of some cancer sites. For instance, it has been estimated that breast cancer mortality can be reduced approximately by 20% (4, 5) and cervical cancer by 80% (6) due to screening. Landy et al. (7) showed that cervical cancer mortality of women aged 25–79 could be reduced by half if all of them attended screening regularly. The evidence for mortality reduction due to screening in older women is limited. However, Galit et al. (8) suggest that women aged 75 and older with reasonably estimated life expectancy and without comorbidities may benefit from breast cancer screening in terms of reduced breast cancer mortality and detection of smaller tumours. The efficiency of cervical cancer screening for older women (age 55–79) has also been shown (9). In older women, the potential harms and benefits of breast cancer screening should always be taken to account (10).

According to the EU guidelines for quality assurance, breast cancer screening should be provided to women aged 50–69 every two years using mammography (11). For cervical cancer screening, the guidelines recommend cervical cytology, which should start between the ages of 20 and 30 and should continue in 3–5 years interval until the age of 60 (12).

The Czech Breast Cancer Screening Programme – population-based cancer screening – was launched in September 2002. Until

the end of 2009, the target population was only women at the age of 45–69. Since 2010 screening has been provided to all women from the age of 45+ without any upper age limit (13). Compared to EU recommendations and most other EU member states, Czechia has a wider age interval, as it does not have any upper age boundary for participating in the screening programme (14). The screening is provided free of charge once in two years in one of around 70 specialized mammographic centres. If a woman wishes to participate in the screening programme, she firstly must visit her primary care provider (general practitioner or gynaecologist) to get a request form and then she can be screened in the mammographic centre.

The Cervical Cancer Screening Programme was launched in 2008 (15). The Pap smear test is used as a screening method, and it is an integral part of the annual gynaecologist check-up. The target age for screening is the same as the target age of this check-up, which is 15+ years (although the age of the first visit to the gynaecologist may vary slightly). Again, compared to EU recommendations and most of the EU member states, there are no upper age limits for cervical cancer screening and the target age is 15+ in Czechia (14). The screening is performed annually and free of charge.

In 2014, the personalized invitation programme was introduced (16). The health insurance company sends the invitation letter to every woman aged 45–70 for the breast cancer screening and to every woman aged 25–70 for cervical cancer screening when she has been insured at that company for at least four years and has not been attending the screening for a longer period of time. The purpose of personalized invitations is to increase the attendance of long-term non-attendees.

Attendance in screening is a critical measure in a country with population-based screening (17) not only for the evaluation of screening usage but also for better targeting of screening and promotion. According to our knowledge, there is only one study evaluating the breast cancer screening attendance in Czechia (18). This study provides information about the first 7 years of the screening (2002 to 2008) and only takes women aged 45–69 into account. Therefore, the presented paper aims to investigate the attendance rates in breast and cervical cancer screening among Czech women and to analyse the regional differences and age structure of those rates from 2009 to 2017. Additionally, problematic regions and age groups of women will be identified.

MATERIALS AND METHODS

We used data from the General Health Insurance Company (Czech acronym VZP). This health insurance company covers healthcare of approximately 55–60% of the whole Czech population, which makes it the largest provider of health insurance in Czechia. Health insurance in Czechia is mandatory by law, so everyone must be insured by one of 7 insurance providers. The insurance covers almost all expenses, such as preventive care, diagnostic care, hospital care, pharmaceuticals, etc. (only a small part of care is excluded, such as some dental care, cosmetic surgery and non-essential procedures). Cancer screening is provided free of charge to every resident who is in the eligible group (19).

Anonymized healthcare records were provided for this study in the form of an extensive database based on Act No. 106/1999 Coll., on Free Access to Information. There was a single record for every treatment provided to a patient with the information on sex, year of birth, year when the care was provided, district of permanent residence of the patient (LAU 1 administrative division (20) – "districts" in Czechia), district of healthcare provider, code of the treatment and anonymized ID. Data were provided for the years 2009–2017. Also, the end period structure (structure on 31st December) of insured clients was provided in 5-year age intervals for years 2008–2017, from which mid-period counts for every observed year were counted. We selected counts of two medical procedures – breast cancer screening and cervical cancer screening, both divided by 5-year intervals and LAU 1 districts of patient residence.

From the provided data, the screening attendance rates were counted. First, we counted the crude attendance rates for both screenings. In the case of cervical cancer screening, the crude attendance rates were counted as the number of performed cytology divided by the number of women insured by the VZP for every age interval and district. For the breast cancer screening, the number of women insured by the VZP was divided by two, due to the two-year screening interval and then applied the same way as for the cervical cancer screening. Second, we counted standardized attendance rates for both screenings, using the 2013 European Standard Population (21). Age-specific attendance rates were counted as well for every year. Although the results of the analysis are rates, for simplification they are presented as a percentage of the population. As the eligible group for the breast cancer screening changed in 2010, instead of the year 2009 the year 2010 was chosen for comparing with the year 2017 in regional results for both screenings and in breast cancer screening for national results.

RESULTS

Table 1 shows crude and standardized attendance rates of Czech women in both screening programmes. Based on the differences between crude and standardized rates, a slight effect of age structure on the overall attendance rates was observed. The attendance rates in breast cancer screening rose between 2010 and 2017. The attendance has also grown between 2009 and 2017, however, there has been a stagnation since the year 2013. Since 2014 the attendance in breast cancer screening has been over 50% but it has remained under 50% for cervical cancer.

Age-specific Screening Attendance

Figure 1 shows age-specific breast cancer screening attendance rates. In each age group, attendance has grown between the years 2009 and 2017. The attendance was the highest among the youngest women (45–49 years) with a 61.8% attendance rate in 2017 (compared to 49.4% in 2009). However, after the age of 70, attendance drops rapidly. In the year 2017, women aged 45–49 attended almost twice as much as women aged 75–79 and more than four times compared with women in the age group 80–84.

Similar results were found for the age-specific cervical cancer attendance rates (Figure 2).

Younger women had higher attendance (except for the youngest group 15–19 years of age). In 2017, the highest attendance

Table 1. *Crude and standardized breast and cervical cancer screening attendance rates (%), Czech women, 2009–2017*

Year	Crude rates (%)		Standardized rates (%)	
	Breast cancer screening	Cervical cancer screening	Breast cancer screening	Cervical cancer screening
2009[a]	45.5	39.7	45.8	41.0
2010	39.6	41.6	41.1	43.1
2011	40.5	42.4	42.0	44.0
2012	43.5	42.4	45.1	44.0
2013	46.0	43.7	47.9	45.4
2014	49.0	43.3	50.9	45.0
2015	48.1	44.0	50.1	45.8
2016	49.4	44.1	51.4	45.8
2017	49.7	44.1	51.7	45.9

[a]In 2009 only women aged 45–69 were eligible for the population-based breast cancer screening

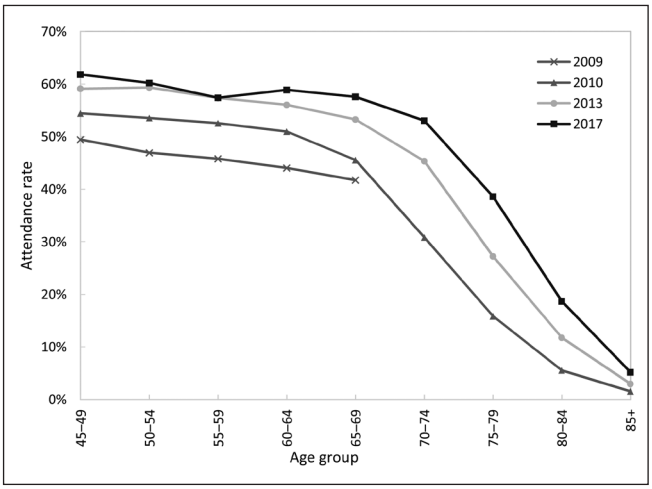

Fig. 1. *Age-specific breast cancer screening attendance rates (%), Czech women.*

of 61.9% in cervical cancer screening was at the age of 30–34, whilst in 2009 it was 60.7% at the age of 25–29. Between the years 2013 and 2017, the cervical cancer screening attendance has dropped for the two youngest categories. The attendance

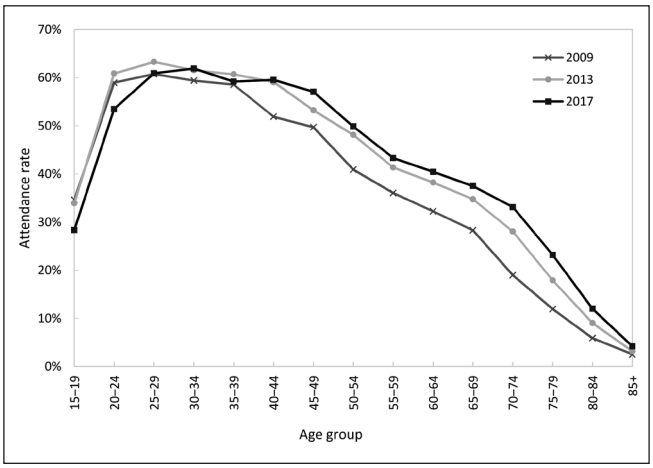

Fig. 2. *Age-specific cervical cancer screening attendance rates (%), Czech women.*

rates started declining at younger ages than in the case of breast cancer screening – at around the age of 50 years. In 2017 women in the age group 30–34 attended screening 1.5 times more than those aged 60–64 and almost three times more than women in the age group 75–79.

Regional Variation in Cancer Screening Attendance

Standardized attendance rates for 77 LAU 1 districts were counted. Results for both breast cancer screening (Figures 3a, 3b) and cervical cancer screening (Figures 4a, 4b) are shown for the years 2010 and 2017. The data for each year and district can be found in the supplementary Tables S1 and S2.

From 2010 to 2017, attendance in breast cancer screening has increased in all 77 districts. The highest attendance in 2017 was in Třebíč district with 69.8% of women attending, lowest in the Jeseník district with only 38.3% attendance rate. The highest increase in breast cancer screening attendance was observed in Mladá Boleslav; it was 3.6 times higher in 2017 than in 2010. In the case of cervical cancer screening, attendance has increased in all except 7 districts. The highest attendance in cervical cancer screening was in the Jindřichův Hradec district, where 55.0% of women attended in 2017. The lowest attendance was again observed in the Jeseník district with an attendance rate of 32.5%. The highest increase in cervical cancer screening attendance was observed in the Teplice district, where 1.26 times more women attended in 2017 compared to 2010. On the other hand, 11% fewer women in 2017 compared to 2010 attended in the Nový Jičín district.

DISCUSSION

We found that screening attendance varied substantially between the different groups. Younger women tended to attend screenings more often than older women. One of the explanations may be that the screening and other preventive exams are rather new, and older women are not used to attend these measures and care for prevention as much as the younger women. A similar age pattern was found in other studies, e.g., when interviewing women over 65 years of age, more women aged 80+ would refuse breast cancer screening if it was offered to them (22).

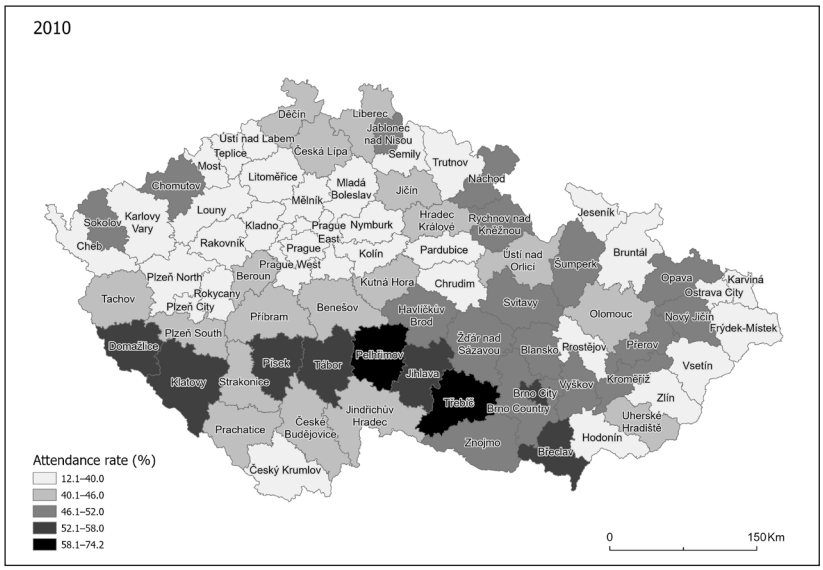

Fig. 3a. *Standardized breast cancer screening attendance rates (%), 2010, Czech women, LAU 1 structure.*

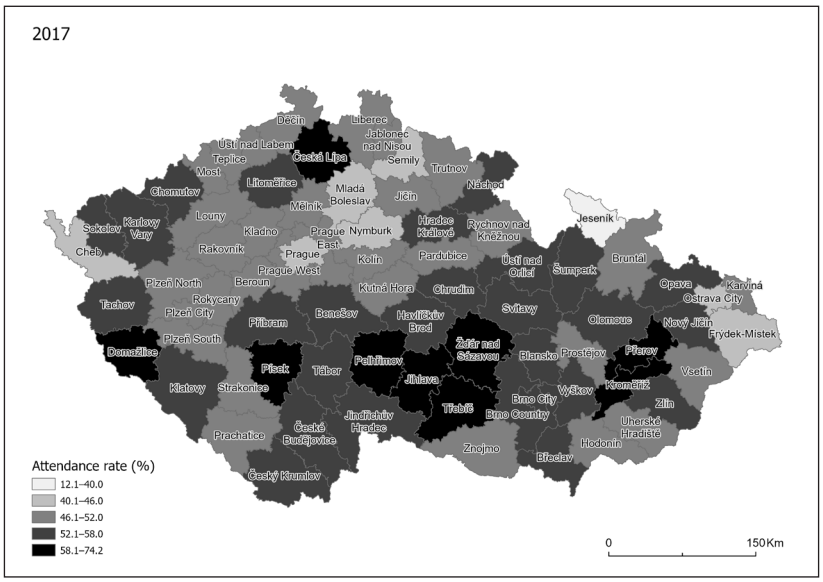

Fig. 3b. *Standardized breast cancer screening attendance rates (%), 2017, Czech women, LAU 1 structure.*

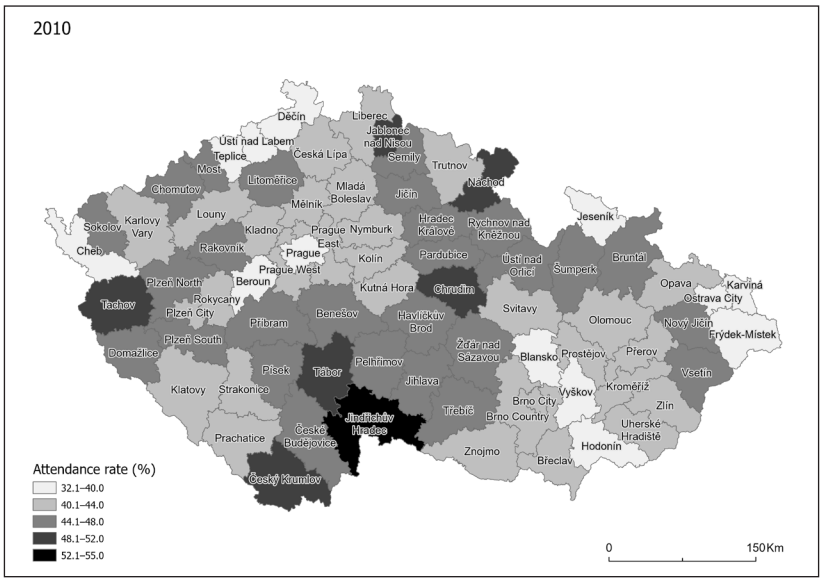

Fig. 4a. *Standardized cervical cancer screening attendance rates (%), 2010, Czech women, LAU 1 structure.*

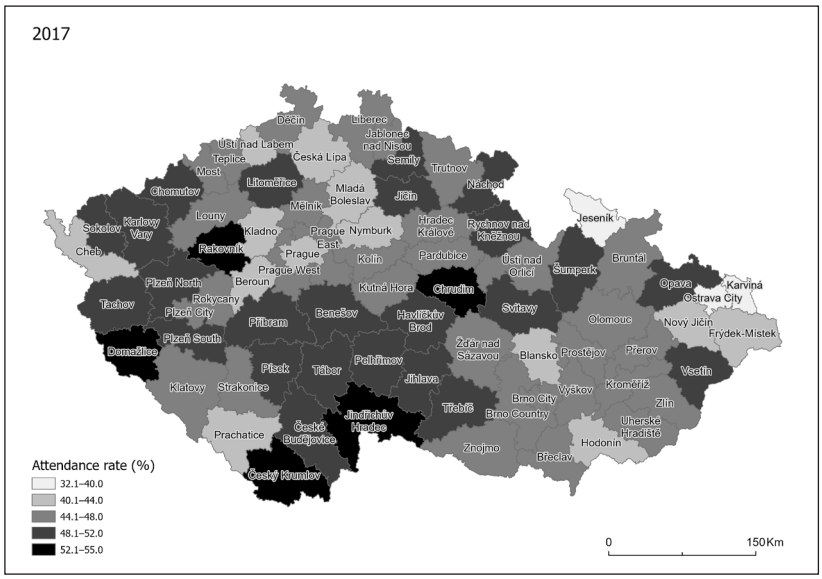

Fig. 4b. *Standardized cervical cancer screening attendance rates (%), 2017, Czech women, LAU 1 structure.*

For cervical cancer screening, the pattern changed slightly during the observed period. Among the youngest age groups (15–24 years), the screening attendance rates dropped slightly. It is not clear why the attendance of women aged 15–24 is lower in 2017 than in 2013 for both cervical cancer screening and gynaecological check-up. It might be due to the changes in sexual behaviour and the recent drop in the use of oral contraceptives (23), which requires gynaecologists' prescription, that would also imply an overall drop in the visits.

According to the Report on the implementation of the Council Recommendation (14) on cancer screening, the national breast cancer screening examination coverages varied among EU countries. While in countries like Sweden, Finland, Ireland or the Netherlands more than 75% of women aged 50–69 were screened and, in the UK, more than 83% were screened, in some countries screening coverage was relatively low – 33.6% in Latvia, 33.0% in Belgium, 19.1% in Slovenia, and 16.5% in Cyprus. For cervical cancer screening examination coverage reached more than 80% in Ireland, Denmark and Sweden, but in Italy 30.6%, in Latvia 26.0%, in Poland 21.1%, and in Romania only 9.2% women were screened.

That means that cancer screening attendance rates found in this study put Czechia in the middle of screening coverages in Europe. Considering the tradition of screening in many of the countries with higher screening coverage is longer (e.g., the breast cancer screening was implemented in 1986 in Sweden, 1987 in Finland and in 1989 in the Netherlands), the results for Czechia can be considered good; however, there is a potential for improvement. We believe that the attendance of older women will rise in the future, as the cohorts who are attending screening now grow older. Also, as cancer screening is a new preventive measure in Czechia compared to countries as mentioned above (14), it is possible that the general awareness of screening existence and importance will grow with time.

There are considerable differences in regional attendance rates in both screenings in 2017, varying from 38.3% to 69.8% in breast cancer screening and from 32.5% to 55.0% in cervical cancer screening. For the breast cancer screening, the attendance has grown in the observed period in all 77 districts of Czechia. For the cervical cancer screening, the attendance has dropped in 7 districts. We have expected higher attendance in the city regions, like Prague, Brno, Ostrava, Plzeň, or Liberec, as the overall health awareness should be higher as well as the accessibility of the health services, screening centres etc. This assumption, however, showed not to be accurate, as the highest attendance rates are in the less urban districts. One of the reasons could be, that in Czechia people with lower health literacy tend to visit medical professionals less often than those with higher health literacy (24). According to Leung et al. (25), the screening attendance does not necessarily have to be lower in rural regions compared to urban ones.

The limitation of this study is a transversal approach to the data. It is not possible to consider the cohort approach due to data available only from 2009 onwards. The sample size is still large enough for the findings being applicable to the whole population and the period data are easier to use and more sensitive to the new trends in treatment and prevention.

The use of data by region of permanent residence may be another limitation of the study. As the Czech system does not require registration of the address of usual residency, it is very hard to track the place where individuals actually live and seek health care. Therefore, the place of permanent residence does not have to correspond with the place where a person attended the screening. This might result in some imprecision in the regional attendance rates, which cannot be detected.

Despite the limitations of this study, to our knowledge, this is the first study using age-standardized attendance rates, especially both on the national and regional level, which allows to compare data across years, countries and regions, and also to count attendance for all age groups together. Also, it provides a unique look at how attendance in screening may vary across the regions of one country and between relatively small administrative units.

CONCLUSION

With breast cancer being the most commonly diagnosed cancer among Czech women and cervical cancer incidence remaining around the same value in recent years, those cancers

are an important issue in Czechia. Even though the country has implemented organized screening according to the European Union recommendations already more than ten years ago, recent studies evaluating the screening attendance of Czech women or performance of the screening itself are missing.

We have discovered that the overall attendance rates in both breast and cervical cancer screening were relatively low, considering that the population-based breast cancer screening programme has been running since 2002 and cervical cancer screening for 12 years. Only around half of Czech women attended the screening.

There were large differences among various groups of women. In general, older women attended less compared to younger women. It is expected that the attendance of women at older ages will grow as the cohort of women attending the screening will grow older. Despite our expectations, attendance is lower in the city regions. Further research is needed to investigate the reasons for the regional variation. The strategy of how to increase the attendance rate of Czech women in breast and cervical cancer is crucial for the prevention of these cancers.

Electronic Supplementary Material

This article contains supplementary material (Tables S1 and S2) available at https://doi.org/10.21101/cejph.b0144.

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Availability of the data and material: The data for this study were provided upon request by the General Health Insurance Company, which does not allow further redistribution.

Conflict of Interests

None declared

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