

## Female breast cancer in Świętokrzyskie Voivodeship in 1999–2012. New cases and the incidence of invasive breast cancer

### *Rak piersi u kobiet w województwie świętokrzyskim w latach 1999–2012. Zachorowania i zachorowalność na inwazyjnego raka piersi*

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**Key words:** epidemiology, incidence, invasive breast cancer, Świętokrzyskie Voivodeship.

**Słowa kluczowe:** epidemiologia, zachorowalność, inwazyjny rak piersi, województwo świętokrzyskie.

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#### Abstract

**Introduction:** Breast cancer is the most common malignant tumour among women in Poland. In 2012 invasive breast cancer was diagnosed in 17,000 Polish women. The effective fight against breast cancer is based on activities to prevent its occurrence or to enable early detection of the disease and then its effective treatment (cure).

**Aim of the research:** To assess the prevalence of invasive breast cancer in women in Świętokrzyskie Voivodeship in 1999–2012.

**Material and methods:** A total of 6079 new female invasive breast cancer cases were analysed. Crude rates (CRs) and age-standardised rates (ASRs) per 100,000 population were calculated. The total value of incidence rates was analysed for all ages (0–85+) and in separate age groups (15–49, 50–69, and 70–85+).

**Results:** In 1999–2012 in Świętokrzyskie Voivodeship 6079 new invasive female breast cancer cases were diagnosed. Fifty-three percent of them were in the age group of 50–69 years, 25.0% in the age group 70–85+, and 21.5% in the age group 15–49 years. The incidence of BC in general (0–85+) increased from 41.2/10<sup>5</sup> in 1999 to 43.8/10<sup>5</sup> in 2012. In the women aged 15–49 years the value of ASRs of incidence increased. In the age group of 50–69 years the value of ASRs increased from 146.6/10<sup>5</sup> in 1999 to 163.5/10<sup>5</sup> in 2012. The increase in the incidence of breast cancer was reported among women in perimenopausal age and in premenopausal women. The decrease in breast cancer cases was observed among young, premenopausal women (15–49 years) as well as among women over 70 years of age.

**Conclusions:** Świętokrzyskie Voivodeship is a region in Poland with moderate risk of breast cancer.

## Streszczenie

**Wprowadzenie:** Rak piersi jest najczęściej występującym nowotworem złośliwym u kobiet w Polsce. W 2012 r. u Polek zdiagnozowano 17 tysięcy inwazyjnych raków piersi. Efektywna walka z rakiem piersi opiera się na działaniach zapobiegających wystąpieniu czy też umożliwiających wczesne wykrycie choroby, a następnie skutecznym jej leczeniu (wyleczeniu).

**Cel pracy:** Ocena rozpowszechnienia inwazyjnego raka piersi u kobiet w województwie świętokrzyskim w latach 1999–2012.

**Materiał i metody:** Analizie poddano 6079 zachorowań na inwazyjnego raka piersi u kobiet. Obliczono surowe (CR) i standaryzowane (ASR) współczynniki zachorowalności, wyrażone na 100 000 ( $10^5$ ) populacji. Analizowano wartość współczynników zachorowalności ogółem (0–85+) oraz w odpowiednich grupach wiekowych (15–49, 50–69 i 70–85+).

**Wyniki:** W latach 1999–2012 w województwie świętokrzyskim zdiagnozowano 6079 nowych zachorowań na inwazyjnego raka piersi u kobiet. Spośród nich 53,0% wystąpiło w grupie wiekowej 50–69 lat, 25,5% w grupie wiekowej 70–85+ lat, a 21,5% w grupie wiekowej 15–49 lat. Zachorowalność na raka piersi ogółem (0–85+) wzrosła z  $41,2/10^5$  w 1999 r. do  $43,8/10^5$  w 2012 r. U kobiet w wieku 15–49 lat wzrosła zachorowalność wyrażona wartościami ASR. W grupie wiekowej 50–69 lat wartość ASR zwiększyła się z  $146,6/10^5$  w 1999 r. do  $163,5/10^5$  w 2012 r. Wzrost zachorowalności na raka piersi odnotowano u kobiet w wieku okołomenopauzalnym i przedmenopauzalnym. Zmniejszenie liczby zachorowań stwierdzono u kobiet młodych i w wieku przedmenopauzalnym (15–49 lat) oraz u kobiet po 70. roku życia.

**Wnioski:** Województwo świętokrzyskie należy do regionów średniego ryzyka raka piersi w Polsce.

## Introduction

Breast cancer is the most common malignant tumour among women in Poland. In 2012 invasive breast cancer was diagnosed among 17,000 Polish women (ASR:  $51.9/10^5$ ). This number corresponds to 22% of all diagnoses of malignant tumours in women [1]. In the same year, in all European countries, breast cancer was the most common cancer for females, and the most common cancer overall. According to the report of the European Network of Cancer Registries (ENCR) an estimated 464,000 women were diagnosed with breast cancer in Europe in 2012. It was the leading cancer site among women in all European countries, accounting for 29% of all new female cases that year [2].

The incidence of cancer, including breast cancer, is strongly associated with age [3]. Along with the observed prolongation of life, in subsequent years the projected number of new cases will rise. It is estimated that in 2025 more than 21,000 Polish women will develop invasive breast cancer, and the growth of new diagnoses will be about 24% higher in comparison to 2012 [4]. In Europe the projected number of diagnoses of invasive breast cancer will increase, reaching almost 502,000 cases in 2025. The expected growth will be lower than in Poland, which will account for 9% (compared to 2012) [5]. The difference in forecasts of the incidence, compared to Poland, correlates with the great regionalisation of the frequency of occurrence of breast cancer in Europe. The highest risk of invasive breast cancer incidence is observed in Western (ASR:  $91.1/10^5$ ) and Northern Europe (ASR:  $89.4/10^5$ ), less in Southern Europe (ASR:  $74.5/10^5$ ) and the least in Central and Eastern Europe (ASR:  $47.7/10^5$ ) to ASR for Europe overall  $69.9/10^5$  [5].

Over the last quarter of a century incidence rates of breast cancer have increased by an average of about 30%. The reasons behind this phenomenon are, among others, changes in diet and reproductive be-

haviour, lack of physical activity, and the widespread use of hormone replacement therapy [6]. The increase in incidence is also caused by the demographic factor (steady increase in the number of women who reach old age, which leads to a higher probability of developing breast cancer), as well as by improved detectability of the disease through implemented screening programs [7].

The effective fight against breast cancer is based on activities to prevent the occurrence (primary prevention) or to enable early detection of the disease (secondary prevention) and then its effective treatment (cure). Mammographic screening is the basic tool of secondary prevention [8]. It is estimated that over 30% of breast cancers diagnosed in screening mammography are clinically asymptomatic cancers, which means that they cannot be detected by physical examination [9]. The implementation of mammographic screening in Poland has changed the image of incidence of breast cancer. A significant increase in the number of carcinomas *in situ* (CIS) was detected among the diagnosed women participating in the screening, which leads to the start of treatment at an early stage of the disease. This, in turn, results in less radicality of the treatment, better results, and improvement in the quality of life of patients after the treatment [10, 11].

Despite the systemic nature of research and several years of experience in their implementation (The Population Breast Cancer Early Detection Programme has been carried out in Poland since 2006), reportability on preventive mammography remains on an unsatisfactory level but is steadily increasing (from 23.4% in 2006 to 43.3% in 2013) [12]. The Ministry of Health aims to reach the level of 70% of women participating in the programme. Simulations indicate that with the current tendency the population coverage ratio will not be exceeded until the year 2025 [13]. However, that figure, and a higher level of mass mammography screening, was achieved in Western Europe, where

awareness of prevention is more developed than in Poland [14]. For example, in Sweden, despite the fact that women make a financial contribution to mammography screening, their participation in the breast screening programme is on a level higher than 80% [15]. The expected participation of Polish women in the programme is a real opportunity to permanently increase the percentage of breast cancer detection in the target group (50–69 years old) in the early stages of its development [16].

### Aim

The aim of the study was to assess the prevalence of invasive breast cancer in women in Świętokrzyskie Voivodeship in the years 1999 to 2012 on the basis of epidemiological analysis of the cases and the incidence of this cancer among women in general and in separate age groups.

### Material and methods

The cases of breast cancer (C50) were coded according to the X Revision of the International Statistical Classification of Diseases and Related Health Problems [17]. The number of breast cancer cases was obtained from the Department of Cancer Epidemiology in Holycross Cancer Centre (HCC) in Kielce. In relation to published data of the National Cancer Registry (NCR), these data, which were verified for the use of this analysis, contain new cancer cases from the time span of the analysed 14 years (5926 by NCR vs. 6079 new cases by HCC, as reported in 2014).

The crude rate (CR) and age-standardised rate (ASR) per 100,000 ( $10^5$ ) population were calculated [18]. The crude rates determine the number of cases in the study population but do not include a measure of the age structure of the population. The coefficients of crude (called intensity rates) depend exclusively on the number of cases of the disease and the size of the population but not on the age structure. Standardisation of coefficients is a method that makes the compared coefficients independent from the differences in the structure of the population. Standardised coefficients determine how many cases would occur in the population if the population age structure were the same as the age structure of the population adopted as standard. In the thesis, standardisation was performed using a direct method according to the age structure of the population adopted as standard. This method eliminates the effect of changes in the age structure, sanctioning the value of compared rates in time [9, 19].

The data concerning the female population structure from Świętokrzyskie Voivodeship in the period considered, published in the National Cancer Registry, were used in order to develop the crude rates [20]. Age-standardised rates have been standardised according to the World Standard Population, as proposed by Segi and modified by Doll *et al.* [21].

The incidence of invasive breast cancer was evaluated by calculating the rates of morbidity (in each analysed year) – as crude and as standardised by age. The total value of these rates was analysed for all ages (in the age group 0–85 years and older) and in separate age groups (15–49, 50–69, and 70–85 years and older). During the process of separating age ranges, the age group 0–14 years, which did not contain breast cancer incidence, was excluded. Splitting of other age ranges was correspondent to the age groups for which screening for breast cancer is meant (age range 50–69 years) and for women in pre-screening age (age group 15–49 years) as well as post-screening age (age range 70–85 years and older) [10].

### Statistical analysis

Statistical analysis as well as graphic presentation of the results was performed with the help of Microsoft Office 2010 with the author's license.

### Results

In the period between 1999 and 2012 in Świętokrzyskie Voivodeship 6079 new invasive breast cancer cases were diagnosed among women. Comparing 2 extreme years of analysis, an increase in new cases of 15.7% was observed (408 in 1999 vs. 472 in 2012). The highest incidence values, expressed in absolute counts, occurred in 2009 and 2011 ( $n = 480$ ), lowest in 2004 ( $n = 387$ ). There was no constant upward tendency – in 4 years declines in the number of cases are noticeable compared to the preceding year (2003, 2004, 2006, and 2010, respectively).

While investigating the occurrence of breast cancer among women in Świętokrzyskie Voivodeship during 1999–2012 special attention was paid to differences in separated age groups. The changing tendencies with respect to the number of cases in each year of the analysis (increases/decreases) were also observed, confirming the lack of a constant declining or rising tendency in the entire 14-year period.

In the years 1999 to 2012 more than half (53.0%) of new cancer cases ( $n = 3223$ ) occurred in the age group of 50–69 years. The group of 70–85 years and older accounted for 25.5% ( $n = 1547$ ) and the age range 15–49 years accounted for 21.5% ( $n = 1309$ ) of the total number of new invasive breast cancer cases. Similar tendencies were observed also in the 2 border years of analysis. In 1999, at highest risk of developing breast cancer, in the age group 50–69 years, the number of cases amounted to 202, which accounted for 49.5% of new breast cancer cases (ASR: 146.6/10<sup>5</sup>). The same age range in 2012, with 285 new cases (ASR: 163.5/10<sup>5</sup>), made up 60.4% of the total number of new breast cancer cases. Among women aged 70–85 and older, 110 new breast cancer cases (ASR: 145.9/10<sup>5</sup>) were observed in 1999, which constituted 27.0% of the total number of new breast cancer cases diagnosed

in the discussed year. In 2012, 102 new cases (ASR: 114.3/10<sup>5</sup>) were registered in the oldest age group, i.e. 21.6% of all invasive breast cancers diagnosed that year. The age group 15–49 years suffered from the lowest number of new breast cancer cases, except for in years 2000 and 2003, when the percentage of diagnosis was higher than in the oldest age group (2000: 15–49: 27.0%,  $n = 119$  and 2000: 70–85+: 20.9%,  $n = 92$  vs. 2003: 15–49: 24.6%,  $n = 98$  and 2003: 70–85+: 23.6%,  $n = 94$ ). In 1999 among the youngest patients 96 new breast cancer cases (ASR: 24.3/10<sup>5</sup>) were observed, which constituted 23.5% of the total number of new breast cancer cases in that year. On the other hand, in 2012 in the same age group 85 cases (ASR: 26.6/10<sup>5</sup>) were diagnosed, i.e. 18.0% of all new breast cancer cases (Table 1).

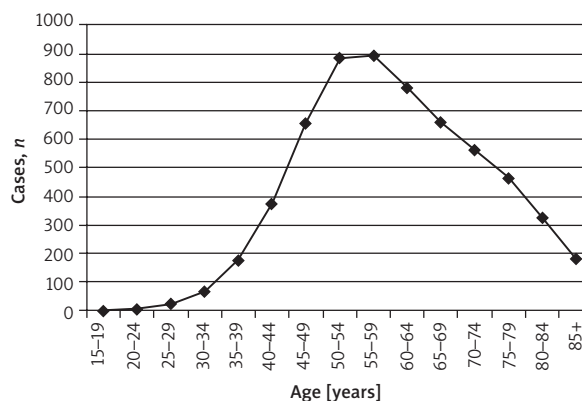
The risk of breast cancer increases with age. Analysis of the number of cases in 5-year age groups showed significant differences in the incidence of breast cancer. For women under 35 years of age, breast cancer throughout the analysed period (1999–2012) was diagnosed relatively rarely (4.5%,  $n = 276$ ). The vast majority were diagnosed after 40 years of age (95.5%,  $n = 5803$ ). The peak incidence was recorded for women between 50 and 64 years of age ( $n = 2564$ ), which accounted for 42.2% of all diagnoses. A high number of cases were also reported in the age groups 45–49 and 65–69 years of age ( $n = 657$ ,  $n = 659$ , respectively), which in both groups represented 10.8% of the total number of diagnosed breast cancers (Figure 1).

The incidence of invasive breast cancer in general (for all ages), measured with the crude rates, increased in the considered period of time. The value of CR increased from 60.0/10<sup>5</sup> in 1999 to 72.3/10<sup>5</sup> in 2012. The highest value of total crude incidence rates (CR: 73.3/10<sup>5</sup>) was recorded in 2011. Equally high incidence occurred in 2009 (CR: 73.2/10<sup>5</sup>) and slightly lower in 2002 (CR: 69.0/10<sup>5</sup>). The lowest value of the crude rate was recorded in 2004 (CR: 58.1/10<sup>5</sup>). Apart from in the year 2003 (CR: 59.8/10<sup>5</sup>), its value exceeded the level of 62.7/10<sup>5</sup>.

In the youngest age group (15–49) the value of crude rates incidence was the same in the first and the last year of analysis and amounted to 28.3/10<sup>5</sup>. The highest value of the crude incidence rate of breast cancer (CR: 35.0/10<sup>5</sup>) was recorded in 2000. Its high value also occurred in 2002 (CR: 34.6/10<sup>5</sup>). The lowest value of the crude rate was recorded in 2007 (CR: 24.6/10<sup>5</sup>), and slightly higher in 2008 (CR: 25.5/10<sup>5</sup>) and in 2005 (CR: 26.6/10<sup>5</sup>). In other years its values exceeded the level of 28.4/10<sup>5</sup>. In the next age group (50–69 years) fluctuations in crude rates were much more noticeable. The value of the CR increased from 147.9/10<sup>5</sup> in 1999 to 165.2/10<sup>5</sup> in 2012. The highest value (CR: 165.7/10<sup>5</sup>) was recorded in 2000, and similarly higher incidence occurred in 2012 (CR: 165.2/10<sup>5</sup>). The lowest value of the crude rate was recorded in 2004 (CR: 133.9/10<sup>5</sup>). In 2010 the CR reached the value of 139.4/10<sup>5</sup> and in

**Table 1.** New invasive breast cancer cases among women in all ages (0–85+) and in separate age groups (15–49, 50–69, 70–85+), Świętokrzyskie Voivodeship, 1999–2012

Year	Age groups			
	0–85+ (all ages)	15–49	50–69	70–85+
1999	408	96	202	110
2000	440	119	229	92
2001	448	107	223	118
2002	462	114	201	147
2003	399	98	207	94
2004	387	81	199	107
2005	427	86	216	125
2006	415	93	218	104
2007	418	78	254	86
2008	421	80	228	113
2009	480	97	252	131
2010	422	89	233	100
2011	480	86	276	118
2012	472	85	285	102
1999–2012	6079	1309	3223	1547



**Figure 1.** New invasive female breast cancer cases ( $n$ ) by 5-year age groups, Świętokrzyskie Voivodeship, 1999–2012

other years it was higher than 140.9/10<sup>5</sup>. Only in the oldest age group (70 years and older) did the incidence measured with crude rates fall significantly. The value of the crude rate decreased from 145.6/10<sup>5</sup> in 1999 to 111.6/10<sup>5</sup> in 2012. The greatest variations in the coefficients were in this age group where the difference was nearly twice. The highest value of the CR was recorded in 2002 (CR: 178.9/10<sup>5</sup>). The lowest was in 2007 (CR: 97.0/10<sup>5</sup>). In the other years the CR reached a level above 108.9/10<sup>5</sup> (in 2010) (Table 2, Figure 2).



**Table 2.** Crude rates (CRs) and age-standardised rates (ASRs) of invasive female breast cancer in all ages and in separate age groups (15–49, 50–69, 70–85+), Świętokrzyskie Voivodeship, 1999–2012 (per 10<sup>5</sup>)

Year	Age groups							
	0–85+ (all ages)		15–49		50–69		70–85+	
	CR	ASR	CR	ASR	CR	ASR	CR	ASR
	per 10 <sup>5</sup>	per 10 <sup>5</sup>	per 10 <sup>5</sup>	per 10 <sup>5</sup>	per 10 <sup>5</sup>	per 10 <sup>5</sup>	per 10 <sup>5</sup>	per 10 <sup>5</sup>
1999	60.0	41.2	28.3	24.3	147.9	146.6	145.6	145.9
2000	64.7	45.9	35.0	29.8	165.7	166.9	118.3	114.9
2001	66.0	44.5	31.5	26.6	158.9	160.6	147.4	144.4
2002	69.0	44.4	34.6	30.1	140.5	140.0	178.9	181.8
2003	59.8	40.0	29.9	25.7	142.3	142.8	113.2	113.5
2004	58.1	37.0	24.9	21.8	133.9	132.8	126.8	127.1
2005	64.3	40.2	26.6	23.9	142.4	141.9	145.6	144.6
2006	62.7	40.7	29.1	25.9	140.9	143.9	119.0	125.3
2007	63.4	41.2	24.6	22.2	161.0	163.8	97.0	102.0
2008	64.0	39.3	25.5	23.4	141.7	142.2	126.2	128.4
2009	73.2	45.4	31.3	29.5	153.9	156.5	144.6	147.4
2010	64.2	39.3	29.0	26.8	139.4	139.2	108.9	96.6
2011	73.3	44.0	28.4	26.3	162.6	162.7	128.2	126.3
2012	72.3	43.8	28.3	26.6	165.2	163.5	111.6	114.3

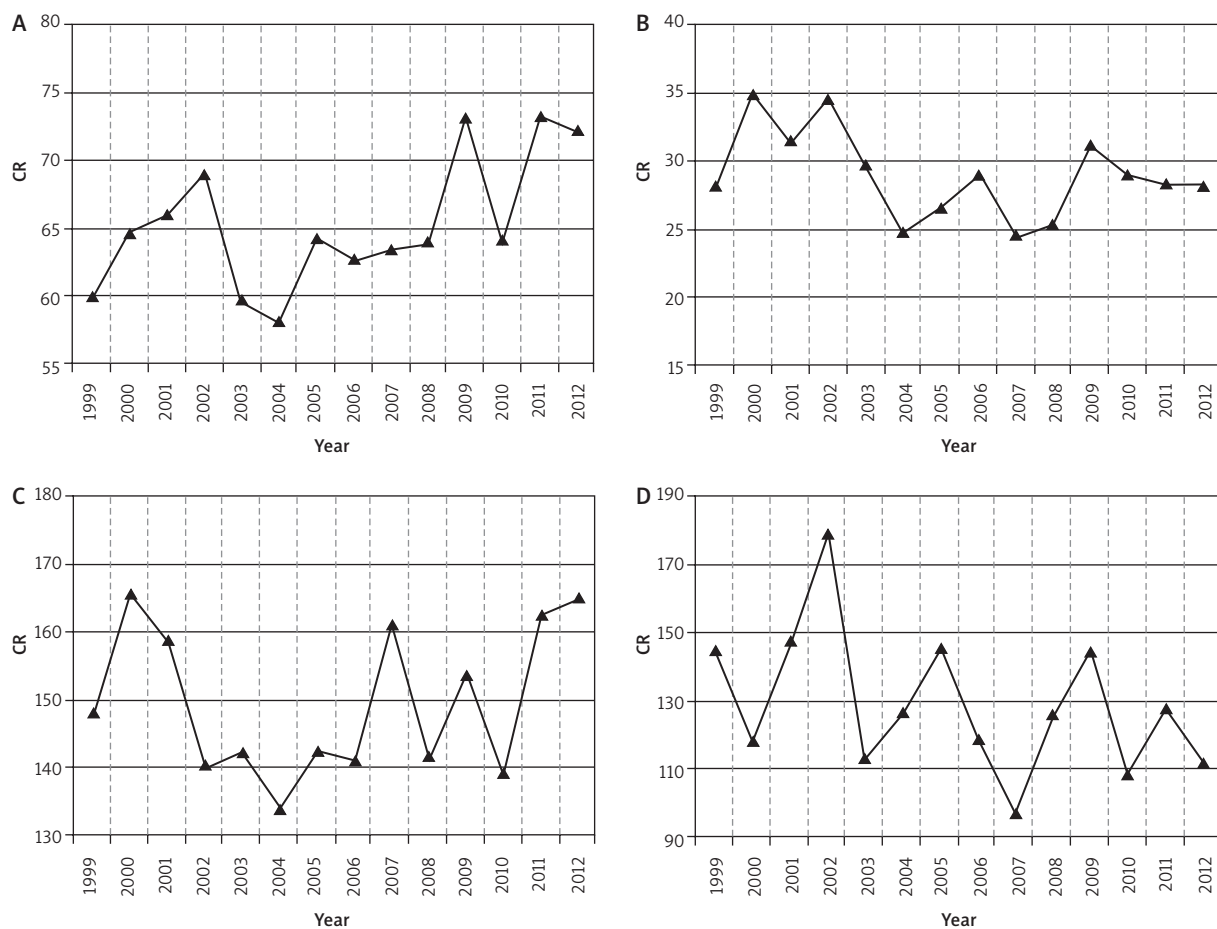
The incidence of breast cancer in general (0–85+), standardised by age, also increased. The value of the ASR increased from 41.2/10<sup>5</sup> in 1999 to 43.8/10<sup>5</sup> in 2012. The highest value of age-standardised incidence rate for all ages (ASR: 45.9/10<sup>5</sup>) was observed in 2000. An equally high incidence, similarly to the crude rate, occurred in 2009 (ASR: 45.4/10<sup>5</sup>). The lowest incidence was recorded in 2004 (ASR: 37.0/10<sup>5</sup>). Apart from in the year 2010 (ASR: 39.3/10<sup>5</sup>), standardised rates exceeded the level of 40.2/10<sup>5</sup> (the value of CR in 2005). In the group of the youngest female inhabitants of the Świętokrzyskie region (age group 15–49) the value of standardised coefficients of incidence of breast cancer increased, unlike the crude rates, from 24.3/10<sup>5</sup> in 1999 to 26.6/10<sup>5</sup> in 2012. The highest value of ASR (30.1/10<sup>5</sup>) was recorded in 2002. An equally high value of this rate occurred in 2000 (ASR: 29.8/10<sup>5</sup>). The lowest value of the standardised incidence rate of breast cancer was reported in 2004 (ASR: 21.8/10<sup>5</sup>), and slightly higher in 2007 (ASR: 22.2/10<sup>5</sup>). In another age group (50–69 years old) the value of standardised rate increased while comparing extreme periods of analysis (ASR 1999: 146.6/10<sup>5</sup> vs. ASR 2012: 163.5/10<sup>5</sup>). The highest value of ASR (166.6/10<sup>5</sup>) was observed in 2000. The lowest value of standardised rate occurred in 2004 (ASR: 132.8/10<sup>5</sup>). In other years, its value ranged from 139.2/10<sup>5</sup> (in 2010) to 163.8/10<sup>5</sup> (in 2007). Similarly to the crude rates, the incidence measured by the standardised coefficients decreased only in the

last age group (70 years and more). The value of ASR declined from 145.9/10<sup>5</sup> in 1999 to 114.3/10<sup>5</sup> in 2012. Among the oldest women there were also the greatest variations in the coefficients, compared to the CR, the difference being nearly a factor of two. The highest value of ASR (181.8/10<sup>5</sup>) was recorded in 2002. The lowest value of standardised rate was observed in 2010 (ASR: 96.6/10<sup>5</sup>). In other years, its value fluctuated from 102.0/10<sup>5</sup> (in 2007) to 147.4/10<sup>5</sup> (in 2009) (Table 2, Figure 3).

Throughout the 14-year analysis the average annual number of cases in the period amounted 434 ±30.1. The range of the absolute number of new cases was 93. The average annual incidences expressed as crude rates were 65.4/10<sup>5</sup> (group 0–85+), 29.1/10<sup>5</sup> (group 15–49), 149.7/10<sup>5</sup> (group 50–69), and 129.4/10<sup>5</sup> (group 70–85+). The average annual incidences expressed as standardised rates were 41.9/10<sup>5</sup> (group 0–85+), 25.9/10<sup>5</sup> (group 15–49), 150.3/10<sup>5</sup> (group 50–69), and 129.5/10<sup>5</sup> (group 70–85+).

## Discussion

The author's research results on the prevalence of female invasive breast cancer in Świętokrzyskie Voivodeship, covering a period of 14 years (1999–2012), have mostly confirmed the nationwide tendencies of changes (based on NCR's data (20)), both in terms of the number of cases and in the value of crude



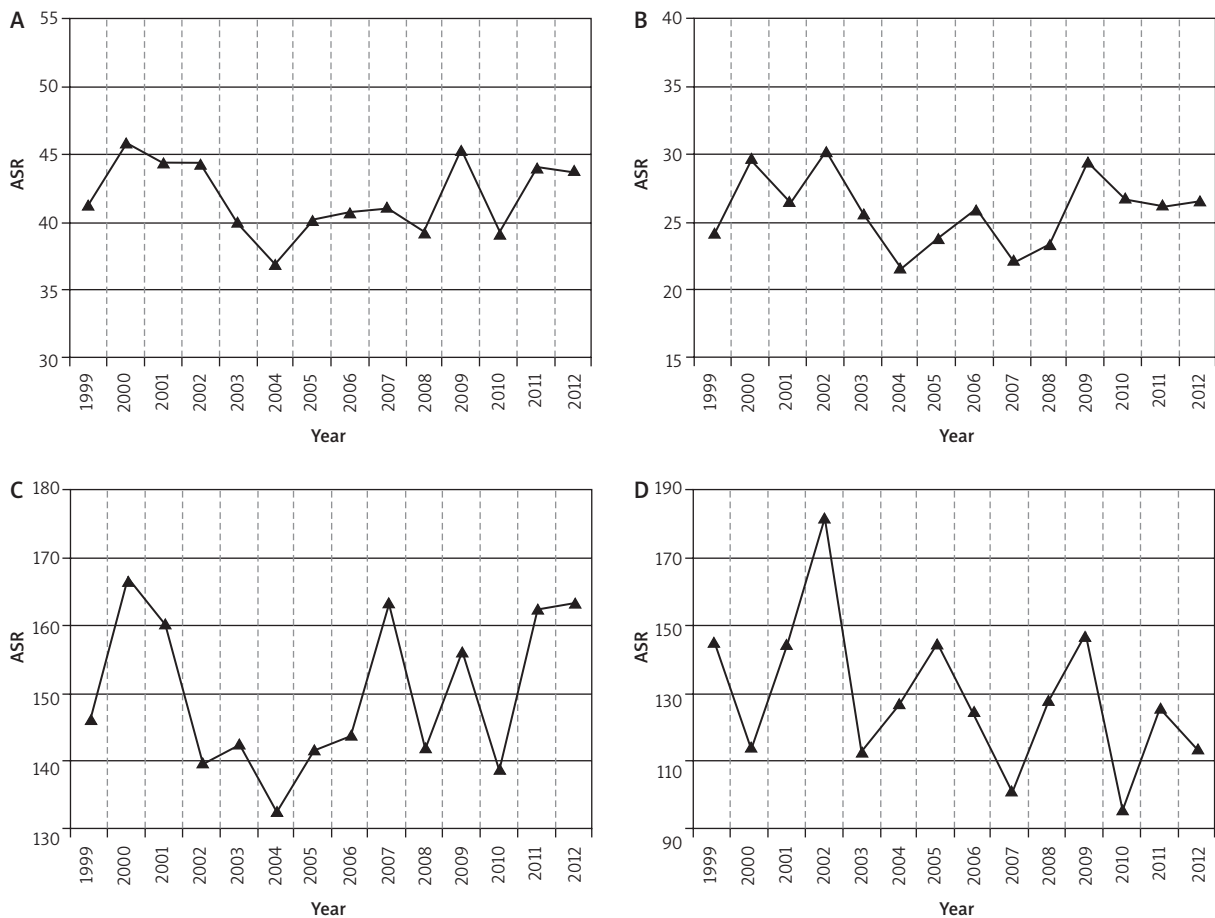
**Figure 2.** Crude rates (CRs) of invasive female breast cancer in all ages (A) and in separate age groups (15–49 (B), 50–69 (C), 70–85+ (D)), Świętokrzyskie Voivodeship, 1999–2012

and standardised incidence rates. Analogical increases occurred in the group of women in total (0–85+) and among middle-aged (50–69), and a slight decline in younger women (15–49). Different tendencies were observed in women belonging to the oldest age group (70–85+) – in Świętokrzyskie Voivodeship a decline was observed, both with respect to the detected breast cancers and morbidity rates (CR and ASR), in contrast to the data for Poland, where they were higher.

The observed increases in incidence rates (CRs and ASRs) in all age groups were significantly higher for Poland than for Świętokrzyskie, which reflects the less dynamic changes in the prevalence of invasive breast cancer in this region. Significant differences in the crude and standardised coefficients (in the group of women in all ages) prove that the majority of cases concern older age groups. Noteworthy is the fact that despite the decline in the number of cases (for the age group 15–49 in Świętokrzyskie) in the border years of analysis the values of standardised rates increased and the values of crude rates remained at the same level. During the studied 14 years the incidence in Świętokrzyskie based on crude rates rose by 12.3

points (per  $10^5$  of female population). The growth, on the basis of the standardised coefficients is not so large, because it reaches the level of 2.6 points (per  $10^5$  of female population), which indicates that the increase in cases of invasive breast cancers registered in Świętokrzyskie is associated with an increase in the share of mature age groups (“the ageing of the population”).

In the study by Krzyżak *et al.*, conducted in Podlaskie in the years 2000–2005 (before screening), similar tendencies were observed in the results of incidence in separate age groups (identical) as in Świętokrzyskie. In both voivodeships the largest proportion of cases of invasive breast cancer were observed among women 50–69 years old – in Podlaskie 50.2%, in Świętokrzyskie 49.7%. At the same time, the second highest percentage of cases was occupied by women aged 70–85 years and more – 23.7% and 26.6%, respectively. 26.1% of cases in Podlaskie and 23.6% in Świętokrzyskie occurred in the youngest group (age range 15–49). Comparing the average annual standardised incidence rates, higher values were observed in Świętokrzyskie – in the age group 50–69



**Figure 3.** Age-standardised rates (ASRs) of invasive female breast cancer in all ages (A) and in separate age groups (15–49 (B), 50–69 (C), 70–85+ (D)), Świętokrzyskie Voivodeship, 1999–2012

the ASR was  $147.5/10^5$  (vs.  $135.1/10^5$  in Podlaskie), in women aged 70–85+  $137.7/10^5$  (vs.  $110.0/10^5$  in Podlaskie), and in women aged 15–49 years  $26.3/10^5$  (vs.  $25.0/10^5$  in Podlaskie) [8].

These data indicate that the incidence of breast cancer in women in Poland is not evenly distributed. Analysis of the ASR in the years 1999 to 2012 showed significant fluctuations in individual voivodeships. The differences in the incidence of invasive breast cancer have been confirmed, e.g. by Grądalska-Lampart *et al.* [22]. In 1999 the highest value of standardised incidence rates among women of all ages affected Pomorskie Voivodeship ( $ASR: 50.8/10^5$ ), and the lowest was in Lodzkie Voivodeship ( $ASR: 16.7/10^5$ ), with the Polish average being  $38.8/10^5$ . In 2012 the average value of the standardised rate for Poland was  $51.9/10^5$ . The highest ASR was unchanged in Pomorskie Voivodeship ( $ASR: 58.5/10^5$ ), and the was lowest in Świętokrzyskie Voivodeship ( $ASR: 43.8/10^5$ ) [1].

A comparison of ASRs in 1999 and 2012 in all voivodeships (in all ages as well as in separate age ranges) showed an increasing tendency in breast cancer incidence. Fluctuations of increase of ASR were

significant and the highest were observed in Lodzkie Voivodeship – this regards incidence in all ages (246.2%) as well as in separate age ranges (15–49: 118.3%, 50–69: 328.1%, 70–85+: 276.1%). In the 14-year period of the analysis, the lowest incidence was characteristic for Świętokrzyskie Voivodeship (5.9%), while the average increase for Poland was 33.9%. The lowest increase among women between 15 and 49 years old was observed in Kujawsko-Pomorskie Voivodeship (1.2%), with the average for Poland being 18.6% (in Świętokrzyskie Voivodeship 10.5%). Among women aged 50–69 years the lowest incidence was in Świętokrzyskie Voivodeship (10.8%), with the average for Poland in that age range being 44.9%. Among women of 70–85+ the lowest increase of incidence was in Malopolskie Voivodeship (3.0%) with the average for Poland being 25.2%. The values of ASR in the border years of analysis did not confirm the increase of incidence in a few cases. A decreasing tendency of breast cancer incidence was observed only in the age range 15–49 years in Opolskie Voivodeship (a decrease of 11.2%) as well as in the last age range (70–85+ years) in the following voivodeships: Podlaskie

(–23.5%), Świętokrzyskie (–22.8%) and Malopolskie (–2.3%) [20].

According to the data obtained from the National Cancer Registry, a more than two-fold increase was observed over the past three decades in the incidence of invasive breast cancer [23]. In order to fully illustrate the prevalence of breast cancer in the selected region, earlier available data concerning this matter were also taken into consideration. According to the results demonstrated in the analysis of Goźdź *et al.*, standardised incidence rates of breast cancer in 1988 amounted  $26.4/10^5$ , in 1998 –  $39.5/10^5$  (a significant increase compared to 1988), and in 2002  $44.0/10^5$  (a further increase) [24]. On the basis of the author's research results ASR was  $43.8/10^5$  in 2012. Data from previous years and results of the author's analysis shows an increase in the incidence of invasive breast cancer in Świętokrzyskie of 17.4 points (1988 vs. 2012), i.e. lower than the national average. This fact proves that, similarly to the years 1999–2012, the incidence in the selected region was lower than in Poland in general.

Comparing the incidence of invasive breast cancer in Poland to other European countries, the average values of standardised incidence rates were observed to be among the lowest in Europe. However, countries generally considered as low risk with respect to breast cancer cannot be found among the countries of the Old Continent. The incidence of breast cancer is determined as low if ASR is less than  $20.0/10^5$  regarding the studied population [25]. Such ASR values are observed in most countries in sub-Saharan Africa, China, and other East Asian countries, excluding Japan [5]. In Europe, as in Poland, there is a big variation in incidence – regarding the value of ASR, the differences are almost a factor of three in different European countries. According to Ferlay *et al.*, estimated values of ASR oscillated in an interval of  $49.1$ – $147.5/10^5$  in the female population. The highest values of ASR were estimated in Western Europe: in Belgium (ASR:  $147.5/10^5$ ), in France (ASR:  $136.6/10^5$ ), and in the Netherlands (ASR:  $131.3/10^5$ ). Equally high parameters were observed in Northern Europe: in Denmark (ASR:  $142.8/10^5$ ), in Iceland (ASR:  $130.7/10^5$ ), in Great Britain (ASR:  $129.2/10^5$ ), and in Finland (ASR:  $121.0/10^5$ ). In Southern Europe the highest values of ASR were noted in Italy (ASR:  $118.0/10^5$ ), in Malta (ASR:  $116.2/10^5$ ), and in Cyprus (ASR:  $104.3/10^5$ ), while the lowest were in Albania (ASR:  $69.4/10^5$ ), Greece (ASR:  $58.6/10^5$ ), and in Bosnia and Herzegovina (ASR:  $49.1/10^5$ ). In Central and Eastern Europe the highest values of age-standardised incidence rates were estimated in the Czech Republic (ASR:  $95.5/10^5$ ) and in Slovakia (ASR:  $78.1/10^5$ ), while the lowest were in Moldavia (ASR:  $52.9/10^5$ ) and Ukraine (ASR:  $54.0/10^5$ ). In the same year, the estimated value of ASR in Poland amounted to  $69.9/10^5$  [26].

To summarise the analysis undertaken, it should be stated that the incidence of breast cancer, both in Poland and in Świętokrzyskie Voivodeship, is pro-

gressive. Due to the increasing number of cases, as well as increasingly younger age of patients, breast cancer is becoming not only a medical problem, but also social and economic problem. Early detection of the disease and effective treatment are crucial factors in the fight against breast cancer. One of the factors determining the effectiveness of treatment is the time from diagnosis to the beginning of treatment. A new systemic solution dedicated to the faster diagnosis and giving patients the full access to oncological treatment in a shorter period of time comes in the form of the introduction of the Oncological Package initiated on 1 January of 2015. The package assumptions are particularly justified in view of the study, published by the “Journal of Clinical Oncology”, which suggests that early detection as well as appropriate and timely started treatment can increase the 5-year survival rate by as much as 98%. This study confirms that women diagnosed with advanced breast cancer, who wait for longer than 60 days to the start of cancer therapy have a significantly higher risk of death than those who start treatment soon after diagnosis [27]. Along with the currently observed progress in the use of anticancer therapies (less aggravating and less negative impact on quality of life, tailored to the specific biological characteristics of the tumour and the general health of the patient), quick diagnosis and the therapy (both breast cancer diagnosis and the initiation of treatment) mean that for many patients breast cancer will soon become a curable disease.

In this paper, the prevalence of invasive breast cancer (the cases and the incidence) in women in Świętokrzyskie Voivodeship in a 14-year period was analysed. According to the aim of the study, time trends in incidence of breast cancer have not been analysed. A trend analysis will be carried out, using appropriate statistical tools, in the next study, which is a series study on female breast cancer in Świętokrzyskie Voivodeship in the years 1999 to 2012.

## Conclusions

In the years 1999 to 2012 in Świętokrzyskie Voivodeship the number of new breast cancer cases among women in all ages (0–85+) increased by 15.7% but this percentage was the lowest in the whole country (Poland). In analysed period of time a decrease in breast cancer cases in Świętokrzyskie Voivodeship was observed among young women, premenopausal women (15–49 years), and among women over 70 years of age. In the years 1999 to 2012 a increase in the incidence of breast cancer in Świętokrzyskie Voivodeship was reported among women in perimenopausal age as well as among premenopausal women. In the years 1999 to 2012 breast cancer incidence among women of all ages (0–85+) ranked Świętokrzyskie Voivodeship among the regions of moderate risk of breast cancer. In Świętokrzyskie Voivodeship values of standardised



incidence rates in all ages (0–85+) were higher in 1999–2002 and lower in 2003–2012 than rates for Poland at the same time. The risk of breast cancer among women in Świętokrzyskie Voivodeship in the years 1999 to 2012 increased.

### Conflict of interest

The authors declare no conflict of interest.

### References

1. Wojciechowska U, Didkowska J, Zatoński W. Nowotwory złośliwe w Polsce w 2012 roku. Centrum Onkologii – Instytut im. M. Skłodowskiej-Curie, Warsaw 2014.
2. ENCR Factsheet Breast Cancer; [http://www.encl.eu/images/docs/factsheets/ENCR\\_Factsheet\\_Breast\\_2014.pdf](http://www.encl.eu/images/docs/factsheets/ENCR_Factsheet_Breast_2014.pdf).
3. Moser K, Patnick J, Beral V. Do women know that the risk of breast cancer increases with age? *Br J Gen Pract* 2007; 57: 404-6.
4. Didkowska J, Wojciechowska U, Zatoński W. Prognozy zachorowań i zgonów na wybrane nowotwory złośliwe w Polsce do 2025 roku. Centrum Onkologii – Instytut im. M. Skłodowskiej-Curie, Warsaw 2009.
5. GLOBOCAN 2012. Online Analysis; <http://globocan.iarc.fr/Pages/online.aspx>.
6. Szewczyk K. Epidemiologia i profilaktyka raka piersi. In: Kornafel J. Rak piersi. Centrum Medyczne Kształcenia Podyplomowego w Warszawie, Warsaw 2011; 5-13.
7. Szkiela M, Worach-Kardas H, Marcinkowski JT. Nowotwór złośliwy piersi – epidemiologia, czynniki ryzyka, znaczenie profilaktyki pierwotnej i wtórnej. *Probl Hig Epidemiol* 2014; 95: 292-302.
8. Krzyżak M, Maślach D, Bielska-Lasota M, et al. Zagrożenie rakiem piersi w województwie podlaskim przed wprowadzeniem Populacyjnego Programu Wczesnego Wykrywania Raka Piersi. *Probl Hig Epidemiol* 2011; 92: 35-9.
9. Szadowska-Szlachetka Z, Majder A, Łuczyk M, et al. Ocena wiedzy kobiet w wieku 50–69 lat na temat badania mammograficznego wykonywanego w ramach badań profilaktycznych raka piersi. *J Health Sci* 2014; 4: 19-29.
10. Matkowski R, Jagas M, Kotowska J, et al. Osiem lat populacyjnego programu wczesnego wykrywania raka piersi. *Inż Fiz Med* 2013; 6: 293-6.
11. Kamusińska E, Ciosek M, Karwat ID. The importance of rehabilitation in the treatment of breast cancer. *Studia Medyczne* 2014; 30: 214-20.
12. Minister Zdrowia. Sprawozdanie z realizacji Narodowego Programu Zwalczenia Chorób Nowotworowych w 2013r. Warszawa 2014; [http://www.mz.gov.pl/\\_data/assets/pdf\\_file/0004/18850/Sprawozdanie-NPZCHN-2013r.pdf](http://www.mz.gov.pl/_data/assets/pdf_file/0004/18850/Sprawozdanie-NPZCHN-2013r.pdf).
13. Wesołowska E, Seroczyński P. Co wiemy o kontroli jakości w polskim skryningu raka piersi? *Nowotw J Oncol* 2011; 61: 172-3.
14. Altobelli E, Lattanzi A. Breast cancer in European Union: an update of screening programmes as of March 2014. *Int J Oncol* 2014; 45: 1785-92.
15. Kołłątaj B, Kołłątaj W, Sowa M, et al. Assessment of knowledge of women, participating in mammography screening, on breast cancer and the breast cancer prevention program. *J Health Sci* 2013; 3: 349-64.
16. Ile kobiet wykonuje profilaktyczne badanie mammograficzne w ramach Programu NFZ?; <http://www.fundusze.mammo.pl/ile-kobiet-wykonuje-profilaktyczne-badanie-mammograficzne-w-ramach-programu-nfz/>.
17. Międzynarodowa Statystyczna Klasyfikacja Chorób i Problemów Zdrowotnych. Rewizja dziesiąta. International Statistical Classification of Disease's and Related Health Problems, ICD-10. Centrum Systemów Informacyjnych Ochrony Zdrowia, Warsaw 2012.
18. Didkowska J, Wojciechowska U, Zatoński W. Nowotwory złośliwe w Polsce w 2011 roku. Centrum Onkologii – Instytut im. M. Skłodowskiej-Curie, Warsaw 2013.
19. Szczęch B, Dyzmann-Sroka A. Ewaluacja Karty Zgłoszenia Nowotworu Złośliwego w odpowiedzi na zmiany zachodzące w lecznictwie i populacji. *Zesz Nauk Wielkop Cent Onkol* 2012; 9: 141-8.
20. Raporty Krajowego Rejestru Nowotworów; <http://onkologia.org.pl/raporty/>.
21. Doll R, Payne P, Waterhouse JAH. Cancer incidence in five continents, Vol. 1. Union Internationale Contre le Cancer, Geneva 1966.
22. Grądalska-Lampart M, Karczmarek-Borowska B, Strykowska A. Epidemiological analysis of morbidity and mortality from breast cancer including screening in Podkarpackie voivodeship. *Przeгляд Med Uniw Rzesz Nar Inst Leków* 2013; 1: 106-18.
23. Wojciechowska, Urszula, Didkowska J. Zachorowania i zgony na nowotwory złośliwe w Polsce. *Krajowy Rejestr Nowotworów*; <http://onkologia.org.pl/nnowotwory-zlosliwe-ogolem-2/>.
24. Gózdź S, Siudowska U, Lis K. Epidemiologia nowotworów złośliwych w województwie świętokrzyskim w latach 1988-2002. *Świętokrzyskie Centrum Onkologii, Kielce* 2005.
25. Dyzmann-Sroka A, Marcinkowski JT, Kubiak A, et al. Who should deal promot screen popul programme early breast cancer detect. *Probl Hig Epidemiol* 2009; 90: 621-6.
26. Ferlay J, Steliarova-Foucher E, Lortet-Tieulent J, et al. Cancer incidence and mortality patterns in Europe: estimates for 40 countries in 2012. *Eur J Cancer* 2013; 49: 1374-403.
27. McLaughlin JM, Anderson RT, Ferketich AK, et al. Effect on survival of longer intervals between confirmed diagnosis and treatment initiation among low-income women with breast cancer. *J Clin Oncol* 2012; 30: 4493-500.

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