Trends in age specific incidence rates of invasive cervical cancer in Germany

SZ Kim-Wanner[1], K Kraywinkel[2], B Holleczek[3], M Pflueger[4], E Sirri[5], A Katalinic[6], V Arndt[7]

[1]Hessian Cancer Registry, Hessian Office for Health and Care, Frankfurt, Germany; [2]German Center for Cancer Registry Data, Robert Koch Institute, Berlin, Germany; [3]Saarland Cancer Registry, Saarbrücken, Germany; [4]Clinical-Epidemiological Cancer Registry Brandenburg-Berlin, Berlin, Germany; [5]Epidemiological Cancer Registry of Lower Saxony, Oldenburg, Germany; [6]Cancer Registry of Schleswig-Holstein, Lübeck, Germany; [7]Epidemiological Cancer Registry Baden-Württemberg, German Cancer Research Center (DKFZ), Heidelberg, Germany.

BACKGROUND

Temporary trends in cervical cancer incidence have recently shown an increase in rates in younger women in Finland and Norway [1]. Cervical cancer screening for women age 20 years and older was implemented in Germany in 1971 and organized screening in 2020. However, recent trend analyses of incidence rates are rare and reports of other countries give cause of concern. Therefore, this study investigates temporary trends of age specific incidence rates of cervical cancer in Germany for the last two decades.

AIM OF THE STUDY

Monitoring of age specific incidence rates may help to evaluate the efficacy of cervical cancer screening and HPV immunization and guide further health protective measures.

METHODS

Incidence rates for invasive cervical cancer (ICD-10 C53) from 1999 to 2019 in Germany are based on estimates by the Center for Cancer Registry Data on pooled data from epidemiologic cancer registries in Germany with persistent good data quality [2-3]. Descriptive analysis for age-standardised incidence rates (European Standard Population, 1976) and age specific incidence rates (15-29, 30-39, 40-59, 60-69, 70+ years) were performed. Trends in incidence rates were analysed by the joinpoint regression model [4] using the Joinpoint Regression Program Version 5.0.2 (5). If the average annual percent change (AAPC) was different from zero at the alpha=0.05 level, the change was defined as significant.

RESULTS

New Cancer Cases

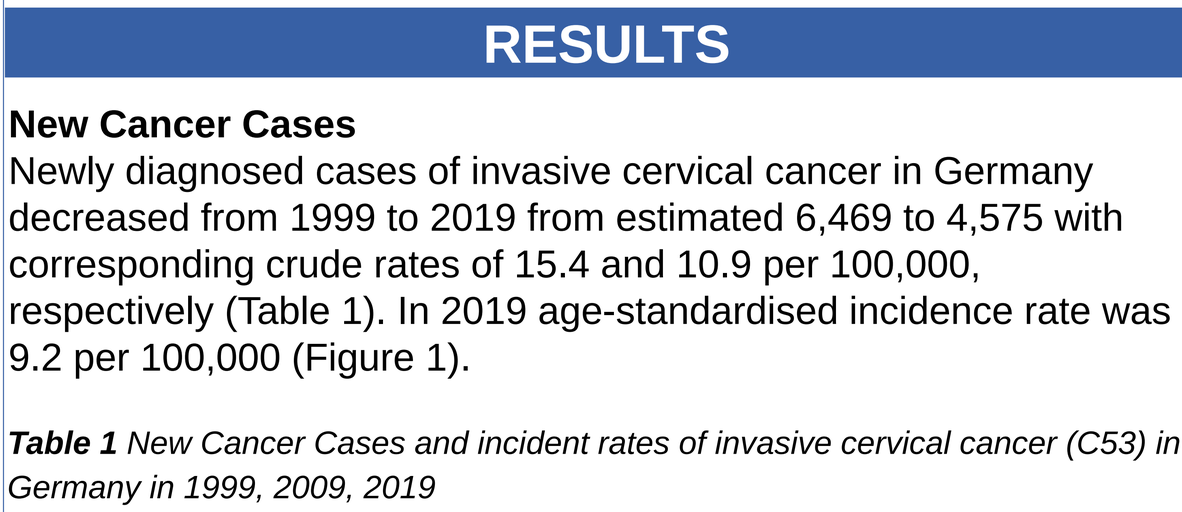
Newly diagnosed cases of invasive cervical cancer in Germany decreased from 1999 to 2019 from estimated 6,469 to 4,575 with corresponding crude rates of 15.4 and 10.9 per 100,000, respectively (Table 1). In 2019 age-standardised incidence rate was 9.2 per 100,000 (Figure 1).

Table 1 *New Cancer Cases and incident rates of invasive cervical cancer (C53) in Germany in 1999, 2009, 2019*

	1999	2009	2019
new cancer cases (absolut)	6,469	5,135	4,575
new cancer cases (per 100,000)	15.4	12.3	10.9
age-standardised incidence rate (per 100,000)	12.8	10.2	9.2
median age at diagnosis (years)	51	52	54

Age-standardised incidence rates were calculated using the European Standard Population (1976).

Figure 1 *Age-standardised incidence rates (ESP) in Germany from 1999 to 2019*

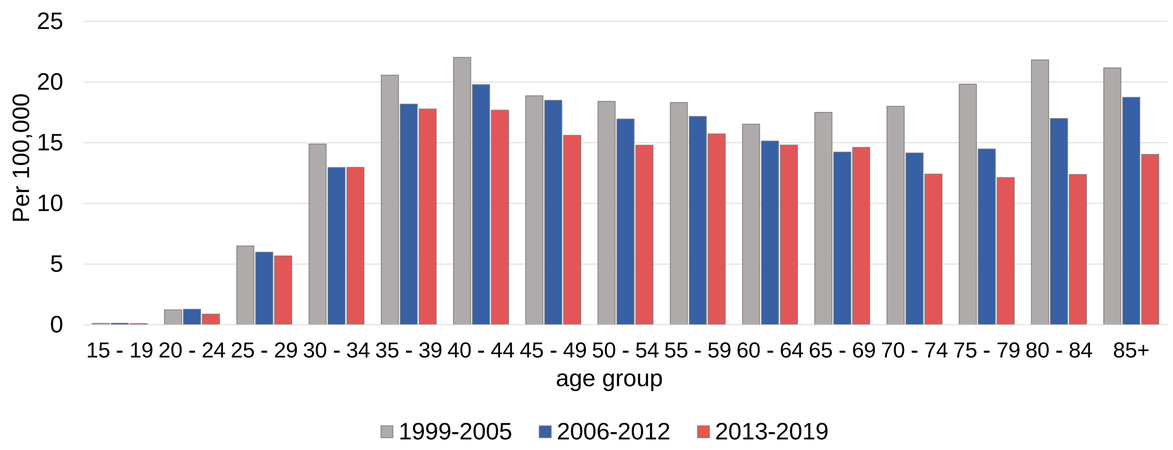


ESP= European Standard Population, 1976

Age distribution

From 1999 to 2005 incidence rates peak at age 35 to 49 and again at age over 75 years. While the first peak can be observed at a lower level in the later periods until 2019, the second peak completely flattened until 2019, mainly due to a reduction of the incidence rates in ages 70 to 84. Median age at diagnosis shifted from 51 years in 1999 to 54 years in 2019.

Figure 2 *Incidence rates (per 100,000) per age group in three seven years time periods from 1999 to 2019*



Trends in age specific incidence rates

Age specific incidence rates in 1999 were 3.2, 18.4, 21.3, 21.6 and 25.5 (per 100,000) and declined to 1.8, 15.4, 15.6, 16.8 and 12.0 in 2019 for age groups 15-29, 30-39, 40-59, 60-69, 70+ years, respectively. In all age groups some age specific incidence rates declined significantly over the last two decades. The highest decrease was observed in the oldest age group over 70 years with an AAPC of -3.1 (95%CI: -3.7 to -2.5). In age group 15-29 AAPC decreased significantly in the second decade (2009 to 2019), while for age groups 30-39 years and 60-69 years no significant change were observed in the second decade.

Figure 3 *Trends in incidence rates (per 100,000) per age group from 1999 to 2019*

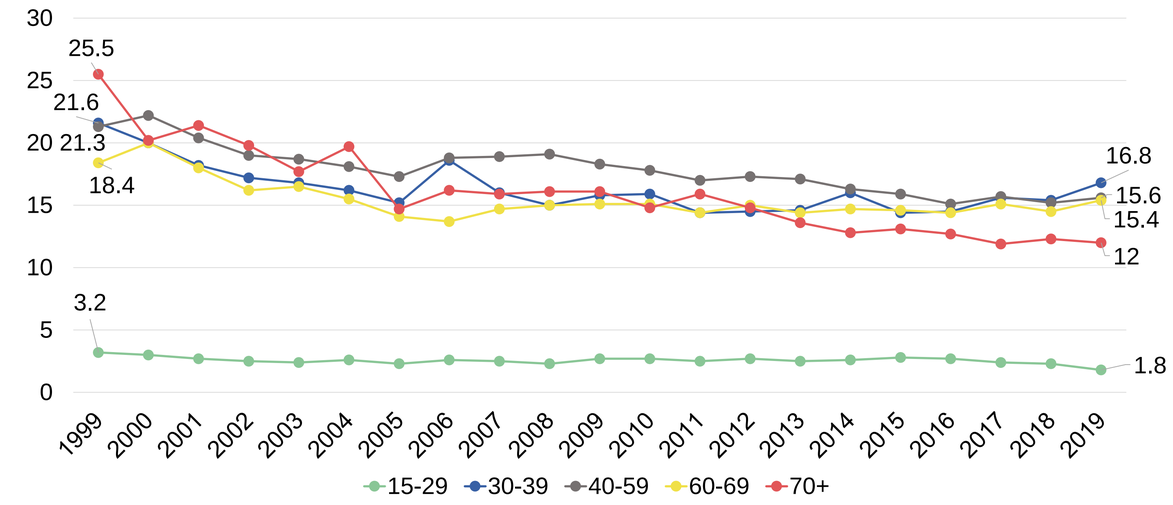


Table 2 *Average annual percent change (AAPC) from 1999 to 2019*

	1999-2009			2010-2019			1999-2019		
Age Group	AAPC	Lower CI	Upper CI	AAPC	Lower CI	Upper CI	AAPC	Lower CI	Upper CI
15-29	-1.9	-4.6	+0.9	-2.7*	-5.2	-0.1	-0.9*	-1.8	-0.0
30-39	-2.7*	-4.5	-0.9	+0.7	-1.1	+2.6	-1.2*	-2.0	-0.5
40-59	-1.5	-3.1	+0.1	-1.7*	-2.5	-1.0	-1.6*	-2.0	-1.3
60-69	-2.9*	-4.8	-0.9	+0.2	-0.8	+1.1	-1.0*	-1.6	-0.4
70+	-4.2*	-6.7	-1.6	-3.0*	-4.4	-1.6	-3.1*	-3.7	-2.5

*indicates the AAPC ist significantly different from zero at the alpha=0.05 level.

CONCLUSION

Heterogenous age specific trends in cervical cancer incidence were observed during the last two decades. Potential cohort effects associated with lifestyle factors or different participation in the screening might play a role. Evaluation of cervical cancer screening coverage rates may help to enlighten variances in age specific incidence rates and guide further cancer prevention measures.

References: *1 Hemminki K et al. Cervical, vaginal and vulvar cancer incidence and survival trends in Denmark, Finland, Norway and Sweden with implications to treatment. BMC Cancer. 2022 Apr 26;22(1):456. 2 Data Source: Zentrum für Krebsregisterdaten (ZfKD) im Robert Koch-Institut (2023): Datensatz des ZfKD auf Basis der epidemiologischen Landeskrebsregisterdaten Epi2021_3, Accessed: 2023.05.23. doi: 10.18444/5.03.01.0005.0017.0003 3 Kraywinkel K et al (2014) Von regionalen Daten zu bundesweiten Aussagen. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 57(1):13–21. 4 Kim HJ et al. Permutation tests for joinpoint regression with applications to cancer rates. Stat Med. 2000 Feb 15;19(3):335-51. doi: 10.1002/(sici)1097-0258. 5 Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute.*

contact: soo-zin.kim-wanner@hlfgp.hessen.de