

The Impact of COVID-19 Pandemic on the Detection and Management of Cancer: A German Claims Data Analysis

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Background

The COVID-19 pandemic impacted the German healthcare system comprehensively. It is being widely discussed whether there was also a negative effect on cancer care, but evidence to quantify such an effect is lacking. This analysis aims to investigate the pandemic's impact on the detection and management of breast cancer (BC), colorectal cancer (CC), lung cancer (LC), and prostate cancer (PC).

Table 1: Identification and treatment definitions

	Breast cancer	Colorectal cancer	Lung cancer	Prostate cancer
Disease definition (metastatic)	ICD-10-GM: C50- (C77-/C78-/C79-)	ICD-10-GM: C18-/C19-/C20- (C77-/C78-/C79-)	ICD-10-GM: C34- (C77-/C78-/C79-)	ICD-10-GM: C61- (C77-/C78-/C79-)
Surgery	Breast surgery (OPS 5-87)	Intestine or rectum surgery (OPS 5-45/5-48)	Bronchus or lung surgery (OPS 5-32)	Prostate surgery (OPS 5-60)
Radiotherapy	inpatient (OPS 8-52) /outpatient (EBM 253-)			
Systemic treatment	antineoplastic agents (ATC L01) / endocrine therapy (ATC L02-) / inpatient chemotherapy or immunotherapy (OPS 8-54)			

OPS = Operationen- und Prozedurenschlüssel (German inpatient procedure code); EBM = Einheitlicher Bewertungsmaßstab (outpatient fee schedule); ATC = Anatomical Therapeutic Chemical classification

Results

For the years 2019 and 2020 we could identify 1,319/1,248 incident BC patients, 1,575/1,321 incident CC patients, 918/847 incident LC patients and 1,250/1,237 incident PC patients.

In all groups, the proportion of patients with metastases at the time of incident diagnosis or within the first three months did not differ considerably between the years (Table 2).

Age at index date did not differ significantly between the years in BC, CC, and LC. Patients with PC were 1.1 years younger in 2020 (p=0.029; see Table 2).

Table 2: Number of patients, disease stage at onset and mean age of patients at onset

	2019	2020	p-value
Breast cancer			
Number of patients	1,319	1,248	
N (%) patients with metastases at onset	359 (27.2)	330 (26.4)	>0.100
Mean (SD) age at onset	67.7 (15.3)	67.5 (15.7)	>0.100
Colorectal cancer			
Number of patients	1,575	1,321	
N (%) patients with metastases at onset	570 (36.2)	491 (37.2)	>0.100
Mean (SD) age at onset	73.0 (13.0)	72.0 (13.1)	0.071
Lung cancer			
Number of patients	918	847	
N (%) patients with metastases at onset	625 (68.1)	573 (67.7)	>0.100
Mean (SD) age at onset	68.5 (11.8)	68.8 (11.5)	>0.100
Prostate cancer			
Number of patients	1,250	1,237	
N (%) patients with metastases at onset	218 (17.4)	207 (16.7)	>0.100
Mean (SD) age at onset	72.5 (9.6)	71.6 (9.7)	0.029

CUMULATIVE INCIDENCE

The standardized cumulative incidences of CC and LC in 2020 were significantly lower compared to 2019 (CC: 0.045%/0.037%; LC: 0.028%/0.025%; all p<0.001; see Figure 1). The incidence of CC and LC in 2020 was even below the rates of the preceding three years.

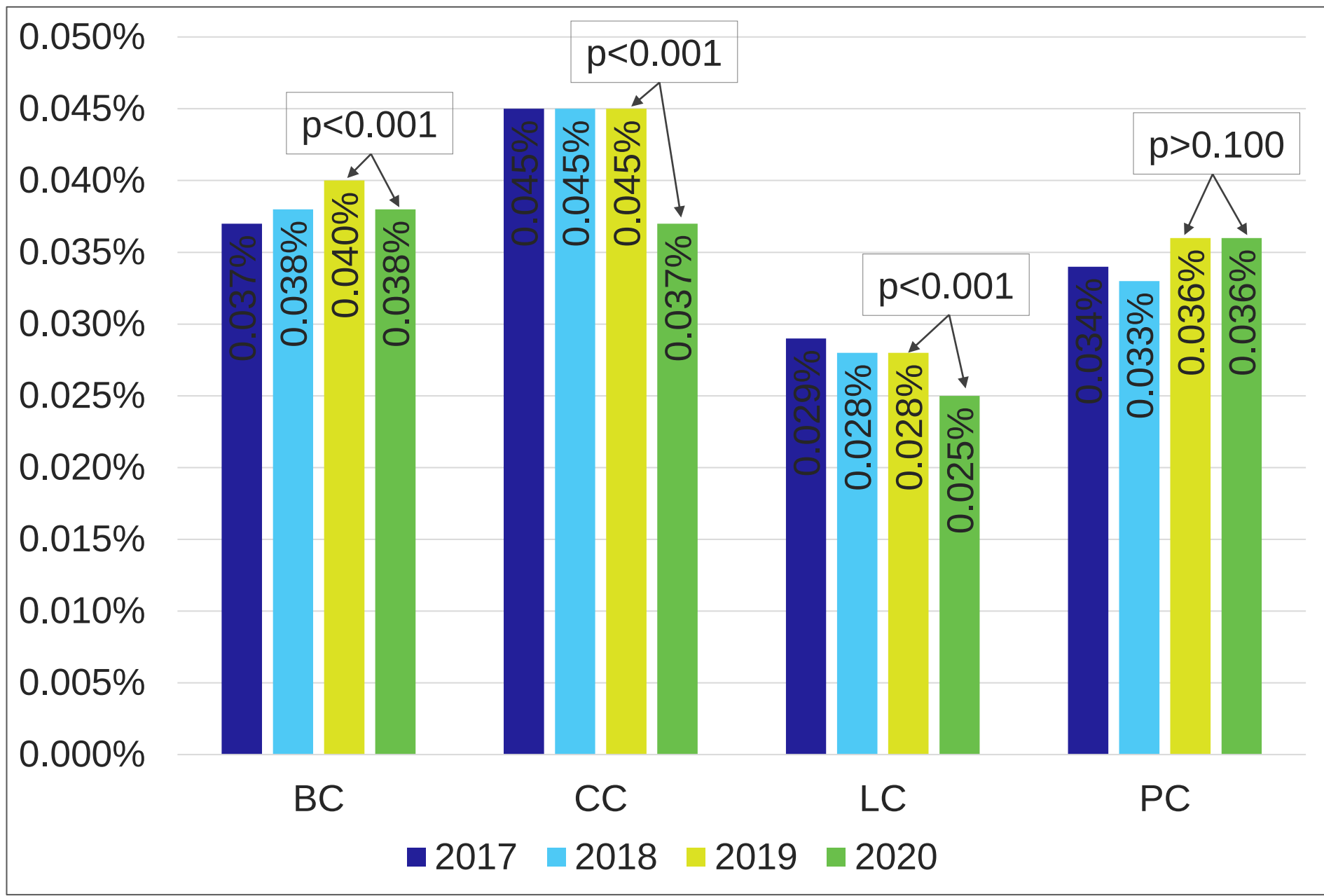
The standardized cumulative incidence of BC in 2020 was significantly lower compared to 2019 (0.040%/0.038; p<0.001; see Figure 1). The incidence of 2020 was on a comparable level to 2017 and 2018.

Methods

The analysis was based on anonymized claims data from a German statutory health insurance (AOK PLUS). Incidence was defined as at least one inpatient or two outpatient diagnoses of one of the four cancer types (Table 1) after a 24-month pre-index period without any cancer diagnoses. Incident patients in 2019 were observed from incident diagnosis until death or 30/06/2020; incident patients in 2020 were observed from incident diagnosis until death or 30/06/2021. Continuous insurance was mandatory for the 24-month pre-index period as well as for the entire follow-up. Standardized cumulative incidences and the proportions of patients with a metastatic diagnosis within the first three months after incident diagnosis were compared between 2019 and 2020. Differences in the time to treatment initiation (surgery, radiation, or systemic anticancer treatment; Table 1) between 2019 and 2020 were investigated using Kaplan-Meier estimation and a Cox proportional hazards model.

In PC, a similar standardized cumulative incidence was observed in the years 2019 and 2020 (0.036%/0.036%; p>0.001; see Figure 1), which were slightly higher compared to 2017 and 2018.

Figure 1: Standardized cumulative incidence in 2017, 2018, 2019 and 2020 (p-values refer to the comparison of the incidence in 2019 versus 2020)

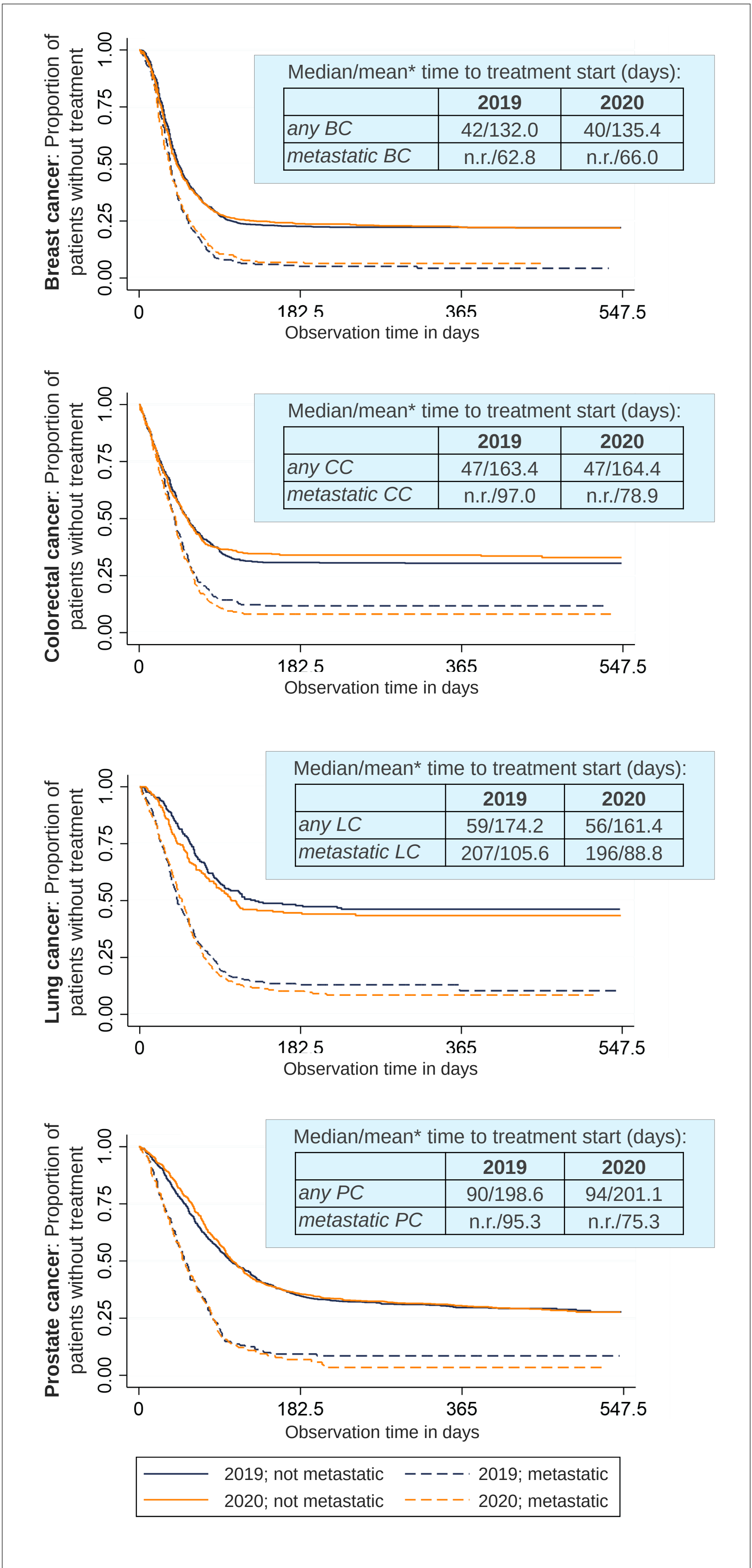


TIME TO TREATMENT START

The time to treatment initiation after incident diagnosis did not differ significantly between 2019 and 2020 in the investigated overall and metastatic populations (see Figure 2):

- In incident (metastatic) BC patients, the median/mean time to therapy start was 42/132 (-/63) days in 2019 versus 40/135 (-/66) days in 2020 (HR [95%-CI]: 1.01 [0.92-1.10]; 0.97 [0.82-1.14]; each p>0.100).
- In incident (metastatic) CC patients, the median/mean time to therapy start was 47/163 (-/97) days in 2019 versus 47/164 (-/79) days in 2020 (HR [95%-CI]: 1.02 [0.92-1.13]; 1.11 [0.94-1.30]; each p>0.100).
- In incident (metastatic) LC patients, the median/mean time to therapy start was 59/174 (207/105) days in 2019 versus 56/161 (196/89) days in 2020 (HR [95%-CI]: 1.06 [0.94-1.20]; 1.05 [0.91-1.21]; each p>0.100).
- In incident (metastatic) PC patients, the median/mean time to therapy start was 90/199 (-/95) days in 2019 versus 94/201 (-/75) days in 2020 (HR [95%-CI]: 0.97 [0.88-1.07]; 1.06 [0.86-1.31]; each p>0.100).

Figure 2: Kaplan-Meier survival estimates: time to treatment start (restricted mean in days; any treatment incl. radiotherapy, surgery or systemic treatment)



*restricted mean (largest observed analysis time is censored); n.r. = median not reached

Conclusions

Utilizing retrospective claims data of a regional SHI fund covering about 3.4 million individuals, this analysis showed significantly fewer patients were diagnosed with BC, CC, and LC in the year the COVID pandemic started (2020) compared to 2019, possibly due to lower cancer screening rates. The cumulative incidence of PC did not differ between the years 2019 and 2020.

The timing of therapy initiation in newly diagnosed cancer patients in 2020 was not substantially different from the pre-pandemic year in the observed overall as well as in the metastatic populations.

Disclosure & Acknowledgment

Antje Mevius participated in this study as a staff member of IPAM, Sabrina Müller has nothing to declare. Thomas Wilke has received honoraria from several pharmaceutical companies, e.g., Takeda, Amgen, Merck, GSK, Astra Zeneca, Bayer, and Boehringer Ingelheim. Ulf Maywald participated in this study as an employee of AOK PLUS.

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