

EDITORIAL



Striving to excel – effects from vacation periods on cancer incidence and outcome

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ARTICLE HISTORY Received 8 February 2023; Accepted 11 February 2023

Sweden has a strong tradition for long summer vacations, which typically last 4–5 weeks between late June and mid-August. In the healthcare system, planning for the summer period starts early in the year to adjust services and secure sufficient staffing. During holidays and vacation periods diagnostic capacities are reduced with temporary halts in cancer screening programs and reduced access to primary care. In specialized care, surgical capacities are reduced and chemotherapy holidays are recommended for patients where this is deemed safe. At the same time, there is increasing evidence to suggest that patients with cancer may be especially vulnerable to the effects of altered care patterns during holidays and vacation periods based on studies that suggest negative effects on cancer diagnosis and outcome of treatment during vacation periods.

In this issue of *Acta Oncologica*, Wikén et al. report on decreased incidences of several cancer types during vacation periods and excess mortality for individuals diagnosed during these periods based on data from Swedish cancer care [1]. In a population-based study of 882,980 patients diagnosed between 1990 and 2019 cancer incidence and excess mortality for nine cancer types were assessed based on data from the National Cancer Registry. The diagnoses included prostate cancer, breast cancer, lung cancer, urothelial cancer, colorectal cancer, pancreatic cancer, melanoma of the skin, non-Hodgkin lymphoma, and acute leukemia.

Seasonal variation in cancer incidence was most pronounced for prostate cancer, breast cancer, and colorectal cancer with similar but less pronounced patterns in lung cancer, urothelial cancer, and non-Hodgkin lymphoma. The age-standardized incidence rate (IRR) indeed decreased to 0.58 for breast cancer and 0.60 for prostate cancer during vacation periods. A significant, but less pronounced effect, was observed also for pancreatic cancer with an IRR of 0.92 during the vacation periods. In melanoma of the skin, an increased incidence during the late spring and early summer was observed followed by a decrease in incidence during the summer months. Similar seasonal variations in melanoma incidence have been reported in several countries with a peak in the spring and early summer, which has been linked

to summer clothing and more visible skin, though a potential effect on melanoma prognosis is uncertain [2,3]. Seasonal trends in cancer diagnoses linked to hospital delays during vacation periods have indeed been observed in Sweden already in data from 1980's [4].

Wilkén et al. further demonstrate excess cancer mortality for patients diagnosed within the vacation season with significant differences at two years for patients with colorectal cancer, urothelial cancer, pancreatic cancer, breast cancer, prostate cancer, and malignant melanoma [1]. Adverse effects remained also at five years after diagnosis for some of these diagnoses. The study does, however, not provide information related to drivers of excess mortality such as tumor stage, treatment, and lead times, which are needed to unravel key determinants of adverse effects from vacation-period diagnostics.

In 2009, a Swedish study based on Cancer Registry data from 1964–2004 suggested a higher risk (HR 1.14–1.20) for death in men and women diagnosed with prostate cancer and breast cancer, respectively, during the summer months [5]. The authors also demonstrated a higher proportion of advanced-stage disease during the summer months and noted that the trend was stronger in the later years of the study period.

In 2017, a study based on more than 228,000 patients with 16 types of cancer in Swedish cancer care confirmed adverse effects on disease-specific mortality for breast cancer and for subgroups of cancers of, e.g., the colon, the rectum, head and neck, thyroid, and urological cancers, in patients that had undergone surgery during vacation periods [6]. This observation sparked more detailed analyses on the potential effects of diagnosis and treatment during vacation periods for various cancer diagnoses and treatment types. A Swedish study on patients undergoing oesophagectomy during vacation periods did not demonstrate any increased short-term or long-term mortality, suggesting that adequate surgical experience is maintained during the holiday periods [7]. In urinary bladder cancer, a study on Swedish registry-based data did not suggest differences in outcome and survival for patients who underwent radical cystectomies during holiday

and vacation periods with robust results after correction for, e.g., time period, surgical volume, and patient-related and tumor-related factors such as comorbidity and stage [8]. In a Dutch study, the impact of holiday periods on gastric cancer surgery did not reveal differences in time to treatment initiation, but showed an increased frequency of R1/R2 resections during the holiday periods though tumor and treatment characteristics were comparable between the groups [9]. In an Italian high-volume center, longer waiting lists and an increased risk for severe morbidity were demonstrated in patients who underwent surgery during vacation periods, whereas no effect on mortality was demonstrated [10].

A study from Canada compared outcomes in patients with cancer who underwent emergency admittance during weekends compared to weekdays. Data from more than 290,000 urgent hospital admissions for patients with cancer revealed an increased risk of 7-day in-hospital mortality (OR 1.13) for patients admitted during weekends [11]. Patients admitted during weekends did less often have procedures performed within the first days of admission, whereas admissions to critical care did not differ. This observation corresponded to 137 excess deaths annually for patients admitted during weekends compared with weekdays.

In summary, current data on the effects on adverse outcomes for patients diagnosed during holidays and vacation periods cannot directly be linked to insufficiencies in cancer surgery, but rather seem to differ between diagnoses and potentially also between healthcare providers, which could reflect vacation planning, access to key procedures and availability of skilled staff. It should also be kept in mind that seasonally-linked mortality with excess deaths during the winter has been demonstrated in the Nordic countries with less pronounced effects for cancer, whereas deaths from cardiovascular-related mortality are markedly higher during the winter season [12].

Denmark, Norway, and Sweden have during the last decade implemented several initiatives aimed at earlier and more efficient cancer diagnostics and equity in care, e.g., uniform care guidelines and standardized care pathways aimed to streamline diagnostic investigations and rapid evaluations in patients with symptoms suspected of cancer. These initiatives have been estimated to explain part of the improvements in cancer survival observed in Nordic countries [13].

In healthcare systems based on the equity of access and priority settings based on the severity of health condition, patient benefit, and cost-effectiveness, the negative effects on cancer incidence and excess mortality observed by Wikén et al. [1] are worrying. The explanations are likely multifaceted and further research is needed to identify key procedures that drive an outcome. The need to prevent a relative shortage of resources during vacation periods and ensure expertise is up to standards are estimated to be major development points in future cancer policies. Timely access to

diagnostics, minimal lead times to treatment, access to specialized staff, and reasonable workloads for health professionals during vacation periods will be central to further positive developments in cancer care. The results here presented should therefore trigger hospitals and healthcare providers to perform in-depth investigations of the quality of cancer care provided in their centers during vacation periods.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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