We declare no competing interests.

*Allison Landman, Laura Feetham, Daniel Stuckey*

*The Lancet Oncology* (AL); *The Lancet Gastroenterology & Hepatology* (LF); *EBioMedicine* (DS), London EC2Y 5AS, UK

1 GBD 2017 Pancreatic Cancer Collaborators. The global, regional, and national burden of pancreatic cancer and its attributable risk factors in 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study. *Lancet Gastroenterol Hepatol* 2019; **4:** 934–47.

2 Yao W, Maitra A, Ying H. Recent insights into the biology of pancreatic cancer. *EBioMedicine* 2020; published online March 2. DOI:10.1016/j.ebiom.2020.102655.

3 Thomas SK, Lee J, Beatty GL. Paracrine and cell autonomous signalling in pancreatic cancer progression and metastasis. *EBioMedicine* 2020; published online March 2. DOI:10.1016/j.ebiom.2020.102662.

4 Christenson ES, Jaffee E, Azad N. Current and emerging therapies for patients with advanced pancreatic ductal adenocarcinoma: a bright future. Lancet Oncol 2020; published online March 2. http://dx.doi.org/S1470-2045(19)30795-8.

5 Pereira SP, Oldfield L, Ney A, et al. Early detection of pancreatic cancer. *Lancet Gastroenterol Hepatol* 2020; published online March 2. http://dx.doi.org/S2468-1253(19)30421-2.

# Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China

Published **Online** February 14, 2020 https://doi.org/10.1016/S1470-2045(20)30096-6

China and the rest of the world are experiencing an outbreak of a novel betacoronavirus known as severe acute respiratory syndrome corona virus 2 (SARS-CoV-2).[1] By Feb 12, 2020, the rapid spread of the virus had caused 42 747 cases and 1017 deaths in China and cases have been reported in 25 countries, including the USA, Japan, and Spain. WHO has declared 2019 novel coronavirus disease (COVID-19), caused by SARS-CoV-2, a public health emergency of international concern. In contrast to severe acute respiratory system coronavirus and Middle East respiratory syndrome coronavirus, more deaths from COVID-19 have been caused by multiple organ dysfunction syndrome rather than respiratory failure,[2] which might be attributable to the widespread distribution of angiotensin converting enzyme 2—the functional receptor for SARS-CoV-2—in multiple organs.[3,4] Patients with cancer are more susceptible to infection than individuals without cancer because of their systemic immunosuppressive state caused by the malignancy and anticancer treatments, such as chemotherapy or surgery.[5-8] Therefore, these patients might be at increased risk of COVID-19 and have a poorer prognosis.

On behalf of the National Clinical Research Center for Respiratory Disease, we worked together with the National Health Commission of the People's Republic of China to establish a prospective cohort to monitor COVID-19 cases throughout China. As of the data cutoff on Jan 31, 2020, we have collected and analysed 2007 cases from 575 hospitals (appendix pp 4–9 for a full list) in 31 provincial administrative regions. All cases were diagnosed with laboratory-confirmed COVID-19 acute respiratory disease and were admitted to hospital. We excluded 417 cases because of insufficient records of previous disease history.

18 (1%; 95% CI 0·61–1·65) of 1590 COVID-19 cases had a history of cancer, which seems to be higher than the incidence of cancer in the overall Chinese population (285·83 [0·29%] per 100 000 people, according to 2015 cancer epidemiology statistics[9]). Detailed information about the 18 patients with cancer with COVID-19 is summarised in the appendix (p 1). Lung cancer was the most frequent type (five [28%] of 18 patients). Four (25%) of 16 patients (two of the 18 patients had unknown treatment status) with cancer with COVID-19 had received chemotherapy or surgery within the past month, and the other 12 (75%) patients were cancer survivors in routine follow-up after primary resection. Compared with patients without cancer, patients with cancer were older (mean age 63·1 years [SD 12·1] *vs* 48·7 years [16·2]), more likely to have a history of smoking (four [22%] of 18 patients *vs* 107 [7%] of 1572 patients), had more polypnea (eight [47%] of 17 patients *vs* 323 [23%] of 1377 patients; some data were missing on polypnea), and more severe baseline CT manifestation (17 [94%] of 18 patients *vs* 1113 [71%] of 1572 patients), but had no significant differences in sex, other baseline symptoms, other comorbidities, or baseline severity of x-ray (appendix p 2).

Most importantly, patients with cancer were observed to have a higher risk of severe events (a composite endpoint defined as the percentage of patients being admitted to the intensive care unit requiring invasive ventilation, or death) compared with patients without cancer (seven [39%] of 18 patients *vs* 124 [8%] of 1572 patients; Fisher's exact p=0·0003).

See **Online** for appendix

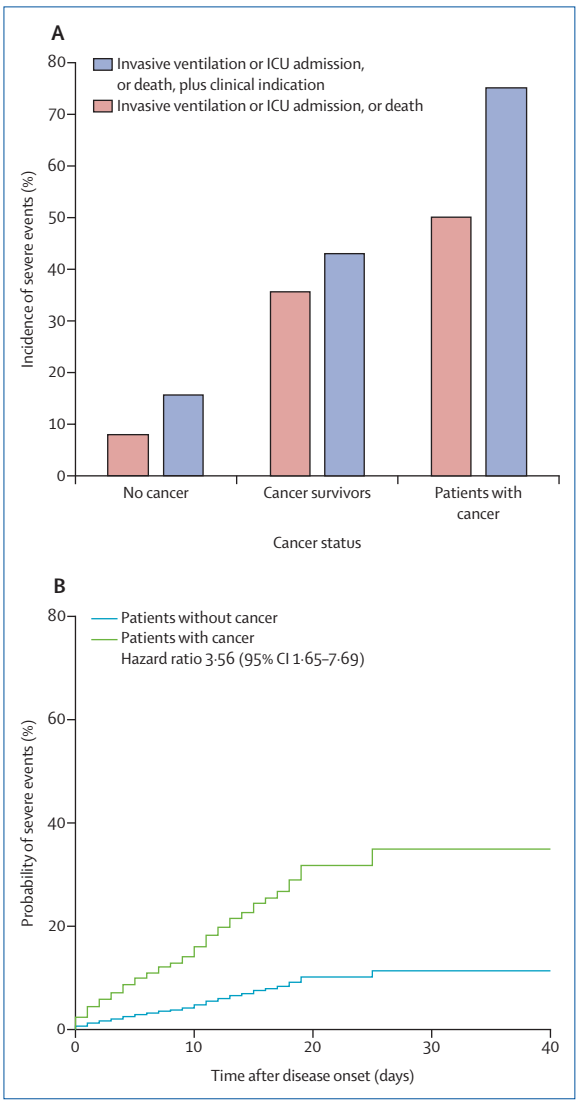


***Figure:*** **Severe events in patients without cancer, cancer survivors, and patients with cancer (A) and risks of developing severe events for patients with cancer and patients without cancer (B)**
ICU=intensive care unit.

We observed similar results when the severe events were defined both by the above objective events and physician evaluation (nine [50%] of 18 patients *vs* 245 [16%] of 1572 patients; Fisher's exact p=0·0008). Moreover, patients who underwent chemotherapy or surgery in the past month had a numerically higher risk (three [75%] of four patients) of clinically severe events than did those not receiving chemotherapy or surgery (six [43%] of 14 patients; figure). These odds were further confirmed by logistic regression (odds ratio [OR] 5·34, 95% CI 1·80–16·18; p=0·0026) after adjusting for other risk factors, including age, smoking history, and other comorbidities. Cancer history represented the highest risk for severe events (appendix p 3). Among patients with cancer, older age was the only risk factor for severe events (OR 1·43, 95% CI 0·97–2·12; p=0·072). Patients with lung cancer did not have a higher probability of severe events compared with patients with other cancer types (one [20%] of five patients with lung cancer *vs* eight [62%] of 13 patients with other types of cancer; p=0·294). Additionally, we used a Cox regression model to evaluate the time-dependent hazards of developing severe events, and found that patients with cancer deteriorated more rapidly than those without cancer (median time to severe events 13 days [IQR 6–15] *vs* 43 days [20–not reached]; p<0·0001; hazard ratio 3·56, 95% CI 1·65–7·69, after adjusting for age; figure).

In this study, we analysed the risk for severe COVID-19 in patients with cancer for the first time, to our knowledge; only by nationwide analysis can we follow up patients with rare but important comorbidities, such as cancer. We found that patients with cancer might have a higher risk of COVID-19 than individuals without cancer. Additionally, we showed that patients with cancer had poorer outcomes from COVID-19, providing a timely reminder to physicians that more intensive attention should be paid to patients with cancer, in case of rapid deterioration.

Therefore, we propose three major strategies for patients with cancer in this COVID-19 crisis, and in future attacks of severe infectious diseases. First, an intentional postponing of adjuvant chemotherapy or elective surgery for stable cancer should be considered in endemic areas. Second, stronger personal protection provisions should be made for patients with cancer or cancer survivors. Third, more intensive surveillance or treatment should be considered when patients with cancer are infected with SARS-CoV-2, especially in older patients or those with other comorbidities.

We declare no competing interests. This study was approved by the ethics committee of the First Affiliated Hospital of Guangzhou Medical University. We thank all medical staff who are fighting against this public crisis. We also thank the hospital staff (see appendix pp 4–9 for a full list) for their efforts in collecting patient data. This study is supported by the China National Science Foundation (grant no 81871893) and the Key Project of Guangzhou Scientific Research Project (grant no 201804020030).

*Wenhua Liang†‡, Weijie Guan†, Ruchong Chen†, Wei Wang†, Jianfu Li, Ke Xu, Caichen Li, Qing Ai, Weixiang Lu, Hengrui Liang, Shiyue Li, *Jianxing He‡*
**drjianxing.he@gmail.com**

†Joint first authors

‡Joint senior authors

Department of Thoracic Oncology and Surgery (WLi, WW, JL, KX, CL, QA, WLu, HL, JH) and Department of Respiratory Disease (WG, RC, SL), China State Key Laboratory of Respiratory Disease and National Clinical Research Center for Respiratory Disease, The First Affiliated Hospital of Guangzhou Medical University, Guangzhou 510120, China

1 Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020; published online Jan 29. https://doi.org/10.1016/S0140-6736(20)30211-7.

2 Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet* 2020; published online Jan 24. https://doi.org/10.1016/S0140-6736(20)30185-9.

3 Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature* 2020; published online Feb 3. DOI:10.1038/s41586-020-2012-7.

4 Hamming I, Timens W, Bulthuis ML, Lely AT, Navis G, van Goor H. Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis. *J Pathol* 2004; **203:** 631–37.

5 Kamboj M, Sepkowitz KA. Nosocomial infections in patients with cancer. *Lancet Oncol* 2009; **10:** 589–97.

6 Li JY, Duan XF, Wang LP, et al. Selective depletion of regulatory T cell subsets by docetaxel treatment in patients with nonsmall cell lung cancer. *J Immunol Res* 2014; **2014:** 286170.

7 Longbottom ER, Torrance HD, Owen HC, et al. Features of postoperative immune suppression are reversible with interferon gamma and independent of interleukin-6 pathways. *Ann Surg* 2016; **264:** 370–77.

8 Sica A, Massarotti M. Myeloid suppressor cells in cancer and autoimmunity. *J Autoimmun* 2017; **85:** 117–25.

9 Zheng RS, Sun KX, Zhang SW, et al. Report of cancer epidemiology in China, 2015. *Zhonghua Zhong Liu Za Zhi* 2019; **41:** 19–28 (in Chinese).

# Should patients who are incarcerated on death row receive palliative cancer care?

In modern society, it is accepted that individuals have the right to die with dignity. Since 1976, in the USA, people who are incarcerated have a limited constitutional right to health care, consistent with the Eighth Amendment. At present, there are more than 2600 incarcerated men and women in the USA who have been sentenced to death, most of whom have less than a high school diploma or High School Equivalency Certificate (GED), and are disproportionately of minority racial or ethnic backgrounds (42% African-American representation on death row *vs* 13% African-American representation in the US census).[1]

The combination of poor health status, social determinants of health, and paucity of adequate care provided in correctional facilities is driving a public health emergency, which is endangering the North American incarcerated population. We can expect the prevalence and burden of chronic illness to rise concomitantly with the growth of the ageing population in US prisons.[2] Data suggest that cancer is the leading cause of illness-related deaths in US state prisons.[2] In the absence of reform, the mass incarceration trends observed over the past three decades will substantially widen disparities, adversely affecting access to health care.

As the US prison population ages, and with it the subpopulation of individuals sentenced to death, the burden of cancer can be expected to increase. This increase will be accompanied by the inevitable debate over the appropriate health care, both legally and morally, for those with end-stage cancer. This dilemma is bound to have a downstream effect on patients with cancer who have been sentenced to death and can affect the quality of palliative care provided in correctional facilities. In the community, a multidisciplinary team would manage the medical, mental health, and social service needs of a patient who chooses palliative care for a terminal diagnosis. But what of the patient who is sentenced to die by judicial execution? That any such person should receive a benefit of any sort, including the traditional last meal, is met with public protest and outrage. Such consternation will probably increase despite the fact that denying palliative care results in unnecessary suffering for the patient at no benefit to public safety.

Burger/Phanie/Science Photo Library

It is well established that professional ethics forbids health-care staff from participating in any aspect of capital punishment. However, what of the incarcerated patient with cancer who is dying under the care of a physician with direct or indirect duties to the jurisdiction charged with judicial execution? What are the duties of the physician expected to provide palliative care to the incarcerated if the patient desires it? We argue that they are no different than those incumbent upon the physician and health-care staff in the community. The accepted framework of medico–ethical principles requires that oncology practitioners consider pain relief and other principles of palliative