

# Low Rate of SARS-CoV-2 Infection in Adults With Active Cancer Diagnosis in a Nonendemic Region in the United States

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## ABSTRACT

**Introduction:** The mortality rate in cancer patients with SARS-CoV-2 has been cited to be as high as 13% amidst a global pandemic. Here we present the prevalence of SARS-CoV-2 in adult patients with active cancer in a nonendemic cancer center at the time of the study.

**Methods:** All adult patients with an active history of cancer undergoing any elective surgery were screened for SARS-CoV-2 symptoms, including fever  $\geq 38$  degrees Celsius, chills, dyspnea, cough, sputum production, pharyngitis, myalgia/arthralgia, headache, anosmia, and nasal discharge. Both symptomatic and asymptomatic patients were tested for SARS-CoV-2 preoperatively via nasopharyngeal swab within 48 hours of surgery using an RT-PCR assay. Active cancer was defined as receipt of chemotherapy and/or radiation within 1 year of the SARS-CoV-2 test. Deidentified, institutional review board-exempt patient data was analyzed with IBM Statistical Package for the Social Sciences (SPSS) Version 26.

**Results:** Between March 16, 2020 and June 30, 2020, a total of 227 patients were tested preoperatively for SARS-CoV-2. Median age was 64.0 years (range 21 to 90). The majority of the cohort were White. Only 2 patients (0.8%) were positive for SARS-CoV-2. One 73-year-old woman undergoing hip replacement had Stage IV breast cancer and a 75-year-old man undergoing port placement had Stage IV retroperitoneal leiomyosarcoma. Neither patient had symptoms of SARS-CoV-2, underwent hospitalization for SARS-CoV-2, or proceeded to have the scheduled surgery after the positive test results until a 14-day quarantine period and a subsequent negative test result. Both patients subsequently received the procedures they were originally scheduled for with no complications.

**Conclusion:** Careful consideration of resource allocation and treatment limitations for cancer patients should occur in lower endemic regions.

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## INTRODUCTION

An outbreak of the novel coronavirus disease (SARS-CoV-2) occurred in Wuhan, China in December of 2019. Initial studies out of Wuhan warned clinicians of higher morbidity and mortality in those with an immunosuppressed state. Mortality rates in cancer patients with SARS-CoV-2 have been cited to be as high as 13% amidst a global pandemic.<sup>1-4</sup> In addition, postoperative pulmonary complications have been reported to occur in half of patients with perioperative SARS-CoV-2 infections, with high mortality rate.<sup>4</sup>

The University of Wisconsin Carbone Cancer Center instituted universal screening for SARS-CoV-2 on all patients prior to surgery as a method of preserving personal protective equipment and limiting exposures to SARS-CoV-2 for patients and health care workers on March 16, 2020. Here we present the prevalence of SARS-CoV-2 in adult patients with active cancer in an area which was a nonendemic at the time of the study.

## METHODS

All adult patients with an active history of cancer undergoing any elective surgery were screened for SARS-CoV-2 symptoms, including fever  $\geq 38$  degrees Celsius, chills, dyspnea, cough, sputum production, pharyngitis, myalgia/arthralgia, headache, anosmia, and nasal discharge. Both symptomatic and asymptomatic patients were tested for SARS-CoV-2 preoperatively via nasopharyngeal swab within 48 hours of surgery using an

RT-PCR assay. Active cancer was defined as receipt of chemotherapy and/or radiation within 1 year of SARS-CoV-2 test. The study population was representative of the cancer center's typical patient population. Emphasis was made to delay patients with cancer who could have been delayed through use of nonimmunosuppressive medical therapy, but most patients with cancer received their treatment as was scheduled prior to the pandemic.

Deidentified, institutional review board-exempt patient data was analyzed with IBM Statistical Package for the Social Sciences (SPSS) Version 26.

## RESULTS

Between March 16, 2020 and June 30, 2020, a total of 227 active cancer patients were tested preoperatively for SARS-CoV-2. Median age was 64.0 years (range 21 to 90). The majority of the cohort were White. Only 2 patients (0.8%) were positive for SARS-CoV-2 (Table). One 73-year-old woman undergoing hip replacement had Stage IV breast cancer, and a 75-year-old man undergoing port placement had Stage IV retroperitoneal leiomyosarcoma. Neither patient had symptoms of SARS-CoV-2, underwent hospitalization for SARS-CoV-2, or proceeded to have the scheduled surgery after the positive test results until a 14-day quarantine period and a subsequent negative test result. Both patients subsequently received the procedures they were originally scheduled for with no complications.

## DISCUSSION

In December of 2019, there was an outbreak of the novel coronavirus disease (SARS-CoV-2) in Wuhan, China, which has resulted in a global pandemic. Reports from China regarding its cancer patients noted that infection rate of SARS-CoV-2 in patients with cancer is higher than the cumulative incidence of all diagnosed with SARS-CoV-2 cases reported over same time period.<sup>5-7</sup> As a result, many institutions took measures to reduce frequency of hospital visits of patients with cancer during the pandemic.

The incidence rate of SARS-CoV-2 infection in endemic regions ranges widely. In Wuhan, China, the asymptomatic all population rate of SARS-CoV-2 and asymptomatic cancer patient rate was estimated to be approximately 0.4% and 0.8%, respectively.<sup>7</sup> The incidence of SARS-CoV-2 infection in asymptomatic pediatric cancer patients was found to be 2.5% in New York City.<sup>2</sup> In adults, the rate of SARS-CoV-2 infection in asymp-

**Table.** Results of Routine SARS-CoV-2 Testing Prior to Surgery in Patients With Active Cancer History (n=227)

Variable	SARS-CoV-2 Positive (n=2)		SARS-CoV-2 Negative (n=225)	
	Median (Range)	N (%)	Median (Range)	N (%)
Age (Years)	74.0 (73.0-75.0)		63.0 (21.0-90.0)	
Sex				
Female		1.0 (50)		127.0 (56.4)
Male		1.0 (50)		98.0 (43.6)
Race				
White		2 (100)		212.0 (94.2)
Black or African American		0 (0)		5.0 (2.2)
Asian		0 (0)		3.0 (1.3)
American Indian or Alaska Native		0 (0)		2.0 (0.9)
Two or more races		0 (0)		1.0 (0.4)
Patient declined to answer		0 (0)		2.0 (0.9)
Body mass index	41.9 (39.3-44.4)	0 (0)	27.6 (13.8-49.4)	
Cancer type				
Bone marrow transplant		0 (0)		3.0 (0.4)
Bone and connective tissue		0 (0)		2.0 (0.9)
Melanoma		0 (0)		5.0 (2.2)
Other		0 (0)		9.0 (4.0)
Breast		1 (50)		25.0 (11.1)
Eye, brain, other nerve cancer		0 (0)		12.0 (5.3)
Gastrointestinal		1.0 (50)		74.0 (32.9)
Genitourinary		0 (0)		24.0 (10.7)
Gynecology		0 (0)		18.0 (8.0)
Head and neck		0 (0)		5.0 (2.2)
Hematologic		0 (0)		11.0 (4.8)
Lung and thoracic		0 (0)		37.0 (16.4)
Surgery type				
Inpatient		2 (100)		144.0 (63.1)
Outpatient		0.0 (0.0)		83.0 (36.9)

tomatic adult patients with cancer was found to be 8.2% in the United Arab Emirates.<sup>1</sup>

Cancer patients may be more susceptible to severe outcomes from SARS-CoV-2 infection than individuals without cancer because of their immunosuppressed state due to cancer treatment and/or their malignancy.<sup>3-5,8</sup> The majority of studies report these patients to be actively receiving anticancer therapy, including chemotherapy. As a result, many institutions took measures to reduce frequency of hospital visits of patients with cancer during the pandemic. However, there is little clarification whether or not patients had active cancer versus a history of cancer.

The present data was gathered from a National Cancer Institute (NCI) designated cancer center in Madison, Wisconsin, which at the time of this study had lower rates of SARS-CoV-2 prevalence compared to other states. Universal screening was implemented for SARS-CoV-2 for all patients undergoing any surgery preoperatively as a way to keep health workers safe, since the risk of aerosolized virus in the operating room is unclear. In addition, such a measure would protect the patient against complications from SARS-CoV-2 in the perioperative period, as well as prevent the spread of the infection further.

We elected to analyze this data to obtain the rate of SARS-CoV-2 infection positivity in patients with active cancer undergoing elective surgery. Active cancer was defined as receiving

either chemotherapy and/or radiation therapy within 1 year of SARS-CoV-2 test result. To date, this is the only study that clearly defines whether or not the study population had active cancer or just a history of cancer.

Our data analysis showed that only 2 cancer patients out of 227 (0.8%) tested positive for SARS-CoV-2 over a 3.5-month period during the pandemic. This rate is much lower than reported in other higher endemic regions. Both patients were asymptomatic and were not hospitalized for the infection. Interestingly, both patients had disseminated cancer.

Notably, our rate of SARS-CoV-2 positivity in adult patients with active cancer is much lower than that reported in higher endemic regions. While this may suggest decreased susceptibility to infection as previously thought, there are important limitations to our study that must be considered before generalizing this data. These limitations include the retrospective nature of this study, which limits the ability to understand other factors—including other social determinants of health—that may have led this population to take more precautions, leading to a reduced positivity rate. It can be presumed that just knowing about their cancer diagnosis made patients more aware that they may be more susceptible to the virus.

In addition, our physicians and other health care providers frequently counsel patients with cancer to take greater precaution with exposing themselves to the outside environment and other contacts. While these limitations must be considered, our data suggest a relatively low rate of SARS-CoV-2 positivity in adult patients with active cancer in an area that was nonendemic during the study period, which can be used to help plan expectations for cancellations of procedures and hospital resource allocation given the ongoing pandemic.

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