

**S07-01 Examining COVID-19 preventive behaviors among cancer survivors in the United States: An analysis of the COVID-19 Impact Survey.** Jessica Y. Islam<sup>1</sup>, Marlene Camacho-Rivera<sup>2</sup>, Denise C. Vidot<sup>3</sup>. <sup>1</sup>UNC Lineberger Comprehensive Cancer Center, Chapel Hill, NC, <sup>2</sup>SUNY Downstate Health Sciences University, New York, NY, <sup>3</sup>University of Miami Sylvester Comprehensive Cancer Center, Miami, FL.

**Background:** Cancer survivors are at high risk of contracting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the infection that leads to COVID-19, as they are generally older and cancer therapies frequently lead to immunosuppression. Recently, to mitigate exposure the CDC recommended avoiding nonessential doctor appointments, which may lead to barriers in effective continuity of care and surveillance of cancer survivors during the COVID-19 pandemic. The patterns of COVID-19 preventive behaviors practiced by cancer survivors are unknown, including practices related to canceling doctors' appointments.

**Objective:** Our objective was to evaluate COVID-19-related preventive behaviors among cancer survivors in the United States (US). We further examined behaviors related to canceling or postponing activities, specifically doctors' appointments.

**Methods:** We utilized nationally representative weighted data from a sample of 4,428 US adults from the COVID-19 Impact Survey collected during Week 1 (April 20-26, 2020) and Week (May 4-10, 2020). We defined cancer survivors as those with a self-reported prior diagnosis of cancer. We presented frequencies and used  $\chi^2$  tests to compare COVID-19-related preventive behaviors among cancer survivors to other adults. We calculated prevalence ratios with 95% confidence intervals using Poisson regression and robust estimation of standard errors to estimate determinants of canceling doctors' appointments among cancer survivors.

**Results:** Cancer survivors were mostly over the age of 60 years (62%), female (53%), non-Hispanic White (62%), and resided in urban areas (72%). Cancer survivors adhered to most recommended COVID-19-related preventive behaviors and were more likely to maintain social distancing (92%,  $\chi^2$  p-value=0.005), wear a face mask (89%,  $\chi^2$  p-value=0.001), and avoid crowded areas (84%,  $\chi^2$  p-value=0.048) compared to other adults. Additionally, we found that cancer survivors are more likely to cancel their doctors' appointments (44%,  $\chi^2$  p-value=0.001) whereas they were less likely to cancel other social activities such as work (20%,  $\chi^2$  p-value=0.001) and school-related (12%,  $\chi^2$  p-value=0.002) activities, even among those below the age of 60. However, cancer survivors were more likely to report symptoms in the last 7 days, including muscle or body aches ( $\chi^2$  p-value=0.003). The proportion of cancer patients who have canceled doctors' appointments due to COVID-19 rose from the

month of April (35%) to May (52%). Younger adults aged 18-29 years, females, and rural cancer survivors were more likely to cancel their doctors' appointments, whereas NH-Blacks are less likely to cancel a doctor's appointment when compared to NH-Whites.

**Conclusion:** Cancer survivors are adhering to recommended preventive behaviors. Cancer survivors' continuity of care may be impacted by COVID-19, specifically young adults, females, and rural residents.

**S09-01 Cancer and race: Two important risk factors for COVID-19 incidence as captured by the COVID Symptom Study real-time epidemiology tool.** David A. Drew<sup>1</sup>, Long H. Nguyen<sup>1</sup>, Wenjie Ma<sup>1</sup>, Chun-Han Lo<sup>1</sup>, Amit D. Joshi<sup>1</sup>, Daniel Sikavi<sup>2</sup>, Christina M. Astley<sup>3</sup>, Karla Lee<sup>4</sup>, Mary Ni Lochlainn<sup>4</sup>, Maria Gomez<sup>5</sup>, Sebastien Ourselin<sup>4</sup>, Andrew T. Chan<sup>1</sup>. <sup>1</sup>Massachusetts General Hospital and Harvard Medical School, Boston, MA, <sup>2</sup>Massachusetts General Hospital, Boston, MA, <sup>3</sup>Boston Children's Hospital, Harvard Medical School, Broad Institute of Harvard and MIT, Boston, MA, <sup>4</sup>King's College London, London, United Kingdom, <sup>5</sup>Lund University, Malmo, Sweden.

**Background:** The COVID-19 pandemic and response underscore the urgent need for real-time population-level data, especially for vulnerable populations (e.g., cancer patients, racial and ethnic minorities). Smartphone applications (“apps”) facilitate the collection of self-reported data at scale, the results of which can then be rapidly redeployed to inform the public health response. The COVID Symptom Study is an app that was launched March 24, 2020, and is now used by nearly 4 million people in the U.S., U.K., and Sweden.

**Methods:** COVID Symptom Study app users self-report health status (e.g., symptoms, COVID-19 testing, health care utilization), comorbidities, demographics, and key risk factors for infection on a daily basis. Multivariable adjusted logistic regression models were used to determine the association of cancer and race with COVID-19 prevalence, adjusting for age, sex, comorbidities, and risk factors for infection, from app launch through May 25, 2020.

**Results:** Among 23,266 individuals with cancer and 1,784,293 without cancer, we documented 155 and 10,249 self-reports of COVID-19, respectively. Compared to individuals without cancer, those with cancer had an increased risk of COVID-19 (adjusted odds ratio (aOR): 1.60; 95% confidence interval (CI): 1.36-1.88). The association was stronger among older participants >65 compared to younger participants (Pinteraction<0.001) and among males (aOR: 1.71; 95%CI: 1.36-2.15) compared to females (aOR: 1.43; 95%CI: 1.14-1.79; Pinteraction=0.02). Chemotherapy/immunotherapy was associated with a 2-fold increased risk of COVID-19 (aOR: 2.22; 95% CI: 1.68-2.94) and risk of COVID-related hospitalization (aOR:2.47; 95% CI: 2.22-2.76). In a separate analysis, we documented 8,990 self-reported cases of positive COVID-19 testing among 2,304,472 non-Hispanic white participants (93.6% of cohort); 93 among 19,498 Hispanic participants; 204 among 19,498 Black participants; 608 among 64,429 Asian participants; and 352 among 65,046 mixed race/other racial minorities. Compared with non-Hispanic white participants, the ORs for reporting a positive COVID-19 test for racial minorities

ranged from 1.44 (mixed race/other races) to 2.59 (Black). After accounting for risk factors for infection, comorbidities, and sociodemographic characteristics, the aORs were 1.37 (95% CI 1.09-1.72) for Hispanic participants, 1.42 (95% CI 1.23-1.64) for Black participants, 1.44 (95% CI 1.33-1.57) for Asian participants, and 1.18 (95% CI 1.06-1.32) for mixed race/other minorities.

**Conclusion:** Our results demonstrate an increase in COVID-19 risk among ethnic minorities and individuals with cancer, particularly those on treatment with chemotherapy/immunotherapy. The association with minorities was not completely explained by other known risk factors for COVID-19 or sociodemographic characteristics. These findings highlight the utility of app-based syndromic surveillance for quantifying the impact of the COVID-19 pandemic on at-risk populations.

**S09-04 Unemployment and cancer screening: Baseline estimates to inform health care provision in the context of COVID-19 economic distress.** Stacey A. Fedewa, K. Robin Yabroff, Zhiyuan Zheng, Priti Bandi, Ann Goding Sauer, Robert A. Smith, Nigar Nargis, Jeffrey Drope, Ahmedin Jemal. Office of the Chief Medical and Scientific Officer, American Cancer Society, Atlanta, GA.

**Introduction:** During the COVID-19 pandemic, the unemployment rate has sharply risen from 3.5% in February 2020 to 13.3% in May 2020, a level not seen since the Great Depression. There are an estimated 21.0 million unemployed adults in the United States. Employers are the most common source of health insurance among working-aged adults and their families. Thus, job loss may lead to loss of insurance and reduce access to cancer screening, which can detect cancer at earlier, more treatable stages, and reduce cancer mortality. In this study, we examined sequential associations between unemployment, health insurance, and cancer screening to inform COVID's potential longer-lasting impacts on early cancer detection.

**Methods:** Up-to-date (UTD) and recent (past-year) breast (BC) and colorectal cancer (CRC) screening prevalence were computed among respondents aged 50-64 years in 2000-2018 National Health Interview Survey data. Respondents were grouped as unemployed (not working but looking BC n=852; CRC n=1,747) and employed (currently working BC n=19,013; CRC n= 36,566). A series of logistic regression models with predicted marginal probabilities were used to estimate unemployed vs. employed unadjusted (PR) and adjusted prevalence ratios (aPR) and corresponding 95% Confidence Intervals (CI).

**Results:** Unemployed adults were four times as likely to be uninsured as employed adults (41.4% v 10.0%, p-value <0.001). Unemployment was associated with lower UTD breast (67.8% vs 77.5%, p-value<0.001, PR=0.82, 95%CI 0.77,0.87) and colorectal (49.4% and 60.1%, p-value<0.001, PR=0.86, 95%CI 0.80, 0.92) cancer screening prevalence. These differences remained after adjusting for race/ethnicity, age, and sex, but were eliminated after accounting for health insurance. Patterns and magnitudes of PR and aPRs were similar for past-year CRC and BC screening prevalence.

**Conclusion:** Unemployment was adversely associated with guideline-recommended and potentially life-saving breast and colorectal cancer screening. Compared to the employed, the unemployed disproportionately lacked health insurance, which accounted for their lower cancer screening utilization. Expanding and ensuring health insurance coverage after job loss may mitigate COVID-19's economic impacts on cancer screening.

**S11-02 Patient-reported impact of the COVID-19 pandemic on breast cancer screening, diagnosis, and treatment: A national survey.** Erica T. Warner<sup>1</sup>, Emily Restrepo<sup>1</sup>, Christine Benjamin<sup>2</sup>, Ricki Fairley<sup>3</sup>, Laura Roudebush<sup>4</sup>, Leah Eshraghi<sup>4</sup>, Crystal Hertz<sup>4</sup>, Simo Du<sup>5</sup>, Laura Carfang<sup>5</sup>. <sup>1</sup>Massachusetts General Hospital, Boston, MA, <sup>2</sup>SHARE Cancer Support, New York, NY, <sup>3</sup>Sisters Network Inc., Houston, TX, <sup>4</sup>Dr. Susan Love Foundation for Breast Cancer Research, Encino, CA, <sup>5</sup>Survivingbreastcancer.org, Boston, MA.

**Introduction:** The COVID-19 pandemic has altered the health care delivery system. The purpose of this study was to determine the impact of the COVID-19 pandemic on breast cancer screening, diagnosis, and treatment.

**Methods:** Potential survey respondents were identified through partnerships with breast cancer organizations including Dr. Susan Love Foundation for Breast Cancer Research, SHARE, Survivingbreastcancer.org, Sisters Network Inc., the African American Breast Cancer Alliance, and through ResearchMatch.org. Study information was shared via social media, websites, or email. Individuals were eligible for this study if they: 1) receive routine breast cancer screening, *or* 2) are undergoing diagnostic evaluation for breast cancer, *or* 3) had ever been diagnosed with breast cancer. Participants accessed and completed the 10-15-minute REDCap survey either by emailing the research team and receiving a private survey link or by clicking a public link. The survey collected information on respondent demographics; breast cancer screening and diagnosis; the extent to which screening, diagnosis, or treatment had been changed, delayed, or canceled because of COVID-19; personal protective practices; extent of worry about financial and health implications of COVID-19; and use of telemedicine. We used descriptive statistical analyses to better understand the impact of the COVID-19 pandemic on respondents.

**Results:** There are currently 415 survey respondents, 404 of whom agreed to participate in the study. 46.8% (N=189) of respondents were white, 26.7% (N=108) Black, 6.7% (N=27) Asian, and 5.5% Hispanic or Latino (N=22). Most respondents were between the ages of 50 and 69 years (52.2%, N=211). 43.3% (N=175) of respondents had been diagnosed with breast cancer and, of those, 36% (N=63) were in active treatment. More than a quarter of participants (26.5%, N=107) reported delayed or canceled breast cancer care due to COVID-19; the most frequently affected care was screening mammogram, ultrasound, or MRI (97.2%, N=104). 20.6% (N=13) of women in active treatment reported delayed or canceled surgery, chemotherapy, or radiation visits. 22.3% (N=90) of respondents reported that an in-person visit was changed to a phone call or videoconference, and 39.1% (N=158) said they had discussed COVID-19 with a health care provider. 29.1% (N=51) of those with

breast cancer were worried or very worried that the COVID-19 pandemic would make it harder for them to get cancer care; among those without breast cancer, 34.9% (N=80) were worried that COVID-19 would make it harder to obtain health care, including breast cancer screening and diagnosis.

**Conclusions:** The COVID-19 pandemic continues to disrupt breast cancer-related care, primarily screening. Planning and coordination are necessary to ensure the timely return of these patients to care. Most participants agreed to be contacted for follow-up, allowing us to investigate the long-term effects of delayed breast cancer screening, diagnostic evaluation, and treatment on health outcomes.

**S11-03 Impact of COVID-19 on breast and prostate cancer screening and early detection in a large health care provider group.** Mara M. Epstein<sup>1</sup>, Devi Sundaresan<sup>2</sup>, Meagan Fair<sup>2</sup>, Lawrence Garber<sup>2</sup>, Mary Charpentier<sup>2</sup>, Jerry H. Gurwitz<sup>1</sup>, Terry S. Field<sup>1</sup>. <sup>1</sup>The Meyers Primary Care Institute; University of Massachusetts Medical School, Worcester, MA, <sup>2</sup>Reliant Medical Group, Worcester, MA.

**Purpose:** Massachusetts has been heavily impacted by the COVID-19 pandemic with new cases rising from 6,621 in March to 55,584 in April and 34,760 in May 2020. Most clinics and hospitals stopped performing elective procedures and reduced the volume of patients seeking in-person care starting in mid-March. This abstract quantifies the rates of mammography and PSA testing, both for screening and diagnostic purposes, as well as breast and prostate biopsies performed during the first five months of 2020 as compared to the same months in 2019 for a large health care provider group in central Massachusetts.

**Methods:** Men and women aged 30-85 without a history of breast or prostate cancer who were active patients of the provider group between January 2019 and May 2020 were included in this analysis. We compared the monthly rates per 1,000 people of mammography, total PSA, and breast and prostate biopsy for the period of January-May 2019 and January-May 2020 overall and by age and race/ethnicity. Procedures were identified by CPT codes in the group's electronic health record.

**Results:** In total, 65,312 men and 80,629 women were included in the analysis of 2019 data and 66,396 men and 82,695 women in 2020. About 70% of the population was non-Hispanic white, 3% non-Hispanic Black, 4% Hispanic, 4% Asian, and 18% other/unknown. The median age was 53 for men and 52 for women. The monthly number of mammograms declined significantly between January-May 2019 and the same months in 2020 from an average of 13.6 mammograms per 1,000 women per month in 2019 to 6.1 in March, 0.25 in April and 1.1 per 1,000 women in May 2020. Digital tomosynthesis also declined from an average of 34.7 per 1,000 women in 2019 to 14.6, 1.4, and 1.5 across March through May of 2020. The level of decline increased with age and was greatest among the oldest women, aged 75-85. Parallel declines occurred among all racial/ethnic groups. Breast biopsies declined steadily from an average of 0.9 per 1,000 women per month in 2019 to 0.8 in March, 0.4 in April and 0.1 per 1,000 women in May 2020. PSA testing was conducted in 2019 with an average of 34.4 men tested per 1,000 per month. Declines in PSA were slightly less than mammography with 17.6 tests completed per 1,000 men in March, 6.1 in April, and 11.3 in May 2020. Prostate biopsies were infrequent in 2019 with an average of 0.15 per 1,000 men per month and did not decline in 2020. Declines were slightly greater in younger men aged 30-54 and similar across racial/ethnic groups.

The greatest single-month change in test rates occurred between April 2019 and April 2020 in both women (screening mammogram rate declined 98%, tomosynthesis 96%) and men (PSA testing rate declined 83%), reflecting the peak of the COVID-19 surge in Massachusetts.

**Conclusions:** The observed decline in these common screening and diagnostic procedures reflects the impact of the COVID-19 pandemic on cancer prevention and early detection, signaling possible downstream effects on the timing and staging of future cancer diagnoses.

**S12-01 High mortality among hospital-acquired COVID-19 infection in patients with cancer: An observational cohort study from Quebec and British Columbia.** Arielle Elkrief<sup>1</sup>, Antoine Desilets<sup>1</sup>, Neha Papneja<sup>2</sup>, Lena Cvetkovic<sup>1</sup>, Catherine Groleau<sup>2</sup>, Yahia Abdelali Lakehal<sup>1</sup>, Layla Shbat<sup>2</sup>, Corentin Richard<sup>2</sup>, Julie Malo<sup>1</sup>, Wiam Belkaid<sup>1</sup>, Erin Cook<sup>2</sup>, Stephane Doucet<sup>3</sup>, Thai Hoa Tran<sup>4</sup>, Patrice Savard<sup>3</sup>, Kevin Jao<sup>5</sup>, Nathalie Daaboul<sup>6</sup>, Eric Bhang<sup>7</sup>, Jonathan Loree<sup>7</sup>, Wilson Miller<sup>2</sup>, Donald Vinh<sup>8</sup>, Nathaniel Bouganim<sup>9</sup>, Gerald Batist<sup>2</sup>, Caroline Letendre<sup>10</sup>, Bertrand Routy<sup>1</sup>.

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**Background:** Studies suggest that patients with cancer are more likely to experience severe outcomes from COVID-19. Therefore, cancer centers have undertaken efforts to care for patients with cancer in COVID-free zones. Nevertheless, nosocomial transmission of COVID-19 in patients with cancer likely occurs, but the frequency and relevance of these events remain unknown. The goal of this study was to determine the incidence and impact of hospital-acquired COVID-19 in this population and identify prognostic factors for COVID-19 severity in patients with cancer.

**Methods:** Patients with cancer and a laboratory-confirmed or presumed diagnosis of COVID-19 were prospectively identified using provincial registries and hospital databases between March 3rd and May 23rd, 2020, in the provinces of Quebec and British Columbia. Patients' baseline characteristics including age, sex, comorbidities, cancer type, and type of anticancer treatment were collected. The primary outcome was incidence of hospital-acquired infection defined by diagnosis of SARS-CoV-2 5 days after hospital admission for COVID-unrelated cause. Co-primary outcomes were death or composite outcomes of severe illness from COVID-19 such as hospitalization, supplemental oxygen, intensive-care unit (ICU) admission, and/or mechanical ventilation.

**Results:** A total of 253 patients (N=250 adult and N=3 pediatric) with COVID-19 and cancer were identified, and the majority were residents of Quebec (N=236). Ninety patients (35.6%) received active anticancer treatment in the last 3 months prior to COVID-19 diagnosis. During a median follow-up of 23 days, 209 (82.6%) required hospitalization, 38 (15%) required admission to ICU, and 71 (28%) died. Forty-seven (19%) had a diagnosis of hospital-acquired COVID-19. Median overall survival was

shorter in those with hospital-acquired infection, compared to a contemporary community-acquired population (27 days vs. 71 days, HR 2.2, 95% CI 1.2-4.0,  $p=0.002$ ). Multivariate analysis demonstrated that hospital-acquired COVID-19, age, ECOG status, and advanced stage of cancer were independently associated with death.

**Conclusion:** Our study demonstrates a high rate of nosocomial transmission of COVID-19, associated with increased mortality in both univariate and multivariate analysis in the cancer population, reinforcing the importance of treating patients with cancer in COVID-free zones. We also validated that age, poor ECOG, and advanced cancer were negative prognostic factors for COVID-19 in patients with cancer.