Coronavirus disease 2019 (COVID-19) is a novel infectious disease that has spread worldwide. In the United States, COVID-19 disproportionately affects racial and ethnic minorities, particularly African Americans, with an observed 2-fold higher rate for hospitalization and greater than 2-fold higher rate for death as compared with White Americans. The disparity seen with COVID-19 is consistent with patterns of disparities observed for cancer; it is well documented that 5-year survival rates for multiple cancers are lower in African Americans compared with White Americans. Root cause contributions for the disparity overlap between COVID-19 and cancer. While cancer is a genetic disease that is influenced by tissue microenvironment, COVID-19 is an infectious disease that is enabled by cellular expression of angiotensin-converting enzyme 2 receptors. However, socioeconomic disadvantages, level of education, lifestyle factors, health comorbidities, and limited access to medical care appear to fuel underlying risk for both cancer and COVID-19 disparities. In addition to African Americans demonstrating higher risk of acquiring and dying from either disease, they are underrepresented in clinical trials involving cancer or COVID-19. Long-term disparities are present with survivorship from cancer and may be likely with survivorship from COVID-19; both have revealed untoward effects on postdiagnosis economic viability for African Americans. Collaborative strategies that include community engagement, diverse participation in cancer and COVID-19 clinical trials, providing insurance for affected persons who lost employment due to either disease, and supporting safety-net and public hospitals for health care access will be critical to stem these disparities.

Disparities in COVID-19 are consistent with patterns observed in cancer, particularly in African Americans where data are the most robust. Differences in cancer incidence, stage distribution, and morality for African Americans compared with White Americans are well documented. For example, 5-year stage-specific survival from breast, colorectal, esophageal, kidney, liver, lung, melanoma, lymphoma, ovarian, bladder, cervical, uterine, and head and neck cancer are lower for African Americans compared with Whites (4). Causes of cancer disparities are multifactorial and include germline genetic susceptibility, but this risk can be enhanced or moderated by the macro- (socioeconomic and living conditions) and micro- (local microbiome, inflammation, toxin exposures) environment (5–7).

Cancer results from cellular genetic alterations yielding advantage over other cells, and the acquired ability to metastasize. The development of cancer as well as its biological behavior are shaped by environmental influences such as lifestyle choices or exposures. For instance, ingesting a high-fat/high caloric diet, and prolonged use of tobacco and/or alcohol increase cancer risk by altering the lung and gut microbiome, thereby changing levels of systemic inflammation and immunity that ultimately influence genetic alterations in cells (5, 8, 9).

In addition to modifying cancer risk, these lifestyle factors cause physiologic changes increasing risk for various interrelated comorbidities such as obesity and diabetes; asthma and chronic obstructive pulmonary disease; as well as hypertension, cardiovascular, and kidney disease (5, 7, 10, 11). These comorbidities can influence cancer treatment (12, 13) and have been correlated with adverse outcomes from cancer surgery, impaired ability to deliver effective chemotherapy, and radiation toxicity. Primary prevention of selected cancers can be achieved by avoiding known carcinogens such as tobacco, or by utilizing chemoprevention such as tamoxifen for patients at high risk for breast cancer. Substantial reductions in cancer burden are also attained through screening modalities for early detection of cervical, breast, colorectal, and prostate cancer (7, 14).

COVID-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2. The virus enters respiratory (and other) cells via angiotensin-converting enzyme 2 (ACE2) receptors on the human cell surface (15). COVID-19 ranges phenotypically from completely asymptomatic to severe disease, with pulmonary,
COVID-19 and Cancer Disparity Similarities

Translational Relevance

Documented disparities in cancer incidence and mortality for racial and ethnic minorities and the medically underserved appear to be replicated with infection and survival outcome from coronavirus disease 2019 (COVID-19); the similarities are striking, with the underpinnings rooted in systemic structural socioeconomic disadvantages. Implementation of strategies to alleviate both cancer and COVID-19 disparities through governmental advocacy and action, hospital and community involvement, and provider and researcher participation must be proactively undertaken as a public health imperative. Adequate representation of racial and ethnic minorities in both cancer clinical trials and COVID-19 vaccine trials will boost confidence within those communities for uniform acceptance of results, enhance future clinical trial participation based on partnerships with the communities, and improve overall medical long-term compliance.

African American communities undermine social distancing efforts via reduced indoor space, limited open-air access, and smaller elevator sizes. These issues of increased residential housing density are particularly relevant in urban areas, where African American populations are more heavily concentrated. African Americans are more than three times as likely to use public transportation on a regular basis compared with White Americans (20).

While the genetic versus infectious etiologies of COVID-19 and cancer greatly differ, risk factors for outcome disparities in both diseases intersect with regard to comorbidities and socioeconomic disadvantage (Fig. 1). The history of African Americans is characterized by a plethora of human rights violations dating back to the slavery era but persisting today through the effects of implicit biases and systemically compromised educational, professional, and residential opportunities. In addition to the irrefutable association between impaired access to medical care and the 2-fold higher rates of poverty among African Americans compared with White Americans, the cumulative result of this history has been a pervasive negative impact on the overall health of African Americans. Housing disadvantages correlate with food deserts and lack of recreational park spaces, which ultimately affect nutritional and exercise practices. Optimal utilization of available medical care and clinical trial participation is further limited by long-standing fears and mistrust derived from past exploitation of African Americans, as with the Tuskegee Syphilis Study and nonpermissive utilization of Henrietta Lacks’ cells (21). In addition, African Americans are underrepresented in the physician workforce, and access to proper medical care among African American patients in the past was further compromised by restrictions placed on the few African American physicians that were available. For example, many hospitals denied admitting privileges to African American physicians and they were denied membership into the American Medical Association until 1964 (22). Implicit biases persist in contemporary health care and inequities in delivery of medical treatment as well as health education might also contribute to COVID-19 disparities (23).

This confluence of circumstances create conditions that allow comorbidities to develop disproportionately in the African American population. These comorbidities place African Americans at higher risk for poor cancer outcomes, as well as at increased risk and severity for COVID-19 infection (Fig. 1). Cancer survivorship for African Americans has also been associated with reduced health-related quality of life (24). Long-term effects of COVID-19 are uncertain; lingering symptoms including fatigue, dyspnea, cognitive impairment,
Strategies for collaborative advocacy designed to mitigate disparities related to the COVID-19 pandemic and cancer burden.

Table 1. Strategies for collaborative advocacy designed to mitigate disparities related to the COVID-19 pandemic and cancer burden.

<table>
<thead>
<tr>
<th>CANCER</th>
<th>CANCER and COVID-19</th>
<th>COVID-19</th>
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<tr>
<td>Race/ethnic minority populations should be targeted for aggressive cancer screening programs as access to these services return in the post-COVID-19 era to prevent deterioration of prior gains in screening.</td>
<td>Cancer clinical trials teams should leverage community engagement and patient navigator networks to ensure diverse accrual onto COVID-19 testing, treatment, and vaccine studies.</td>
<td>COVID-19 research proposals should be designed a priori with disparities-related research questions, such as correlative science studies looking at genetic ancestry.</td>
</tr>
<tr>
<td>The cancer community must work proactively to protect cancer disparity research projects and community outreach/education efforts in the post-COVID-19 era of budget constraints. Disparities in research and health education efforts targeting diverse communities must not be perceived as expendable items.</td>
<td>Public hospitals (which were disproportionately devastated by the costs of COVID-19 pandemic care) must be supported so that they can meet the safety-net health care needs of communities that are disproportionately represented among the medically underserved.</td>
<td>Health insurance coverage opportunities such as expanded Medicaid programs should be made readily available to financially constrained individuals that lost their employment-based coverage as a consequence of the COVID-19 pandemic.</td>
</tr>
<tr>
<td>Cancer-related advocacy organizations that provide community engagement activities addressing disparities should be supported.</td>
<td>Need for improved access to technologies and devices that support telehealth services to reach minority populations.</td>
<td>COVID-19 vaccine and treatment trials should be statistically designed to oversample racial/ethnic minority populations, so that results can be generalized with confidence.</td>
</tr>
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COVID-19 and Cancer Disparity Similarities

Authors’ Disclosures
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