

# Developing a Virtual Equity Hub: Adapting the Tumor Board Model for Equity in Cancer Care

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## Abstract

We define cancer equity as all people having as the same opportunity for cancer prevention, treatment, and survivorship care. However, marginalized populations continue to experience avoidable and unjust disparities in cancer care, access to clinical trials, and cancer survival. Racial and ethnic minorities, and individuals with low socioeconomic status, Medicaid insurance, limited health literacy, disabilities, and mental health disorders are more likely to experience delays to cancer diagnosis and less likely to receive guideline-concordant cancer care. These disparities are impacted by the social determinants of health including structural discrimination, racism, poverty, and inequities in access to healthcare and clinical trials. There is an urgent need to develop and adapt evidence-based interventions in collaboration with community partners that have potential to address the social determinants of health and build capacity for cancer care for underserved populations. We established the Virtual Equity Hub by developing a collaborative network connecting a comprehensive cancer center, academic safety net hospital, and community health centers and affiliates. The Virtual Equity Hub utilizes a virtual tumor board, an evidence-based approach that increases access to multi-specialty cancer care and oncology subspecialty expertise. We adapted the tumor board model by engaging person-centered teams of multi-disciplinary specialists across health systems, addressing the social determinants of health, and applying community-based research principles with a focus on populations with poor cancer survival. The virtual tumor board included monthly videoconferences, case discussion, sharing of expertise, and a focus on addressing barriers to care and trial participation. Specifically, we piloted virtual tumor boards for breast oncology, neuro-oncology, and individuals with cancer and serious mental illness. The Virtual Equity Hub demonstrated promise at building capacity for clinicians to care for patients with complex needs and addressing barriers to care. Research is needed to measure the impact, reach, and sustainability of virtual equity models for patients with cancer.

## Introduction

Despite rapid advances in cancer treatment, cancer disparities persist. Marginalized populations, including racial and ethnic minorities, and people with limited health literacy, Medicaid insurance, disabilities, and mental health disorders, experience disproportionate preventable deaths from cancer. These disparities are primarily influenced by the social determinants of health, including structural racism and discrimination, and the downstream impact on patients, clinicians, and healthcare systems. Underserved patient populations with cancer are less likely to be able to access multidisciplinary care and potentially life-saving clinical trials which are frequently available only at comprehensive cancer centers and associated with significant out-of-pocket costs.<sup>1,2</sup> Additionally, the legacy of discrimination, particularly racism, and coercion of marginalized populations impacts trust in academic institutions and attitudes toward research.<sup>3</sup>

## Cancer Disparities Experienced by Patients Cared for in Safety Net Hospitals

According to the Institute of Medicine, the healthcare safety net comprises hospitals and providers that deliver a significant proportion of healthcare to patients with Medicaid or no insurance.<sup>4</sup> Providing high-quality healthcare to all patients regardless of their ability to pay is a core part of the mission of the health safety net. Nearly 30 million US adults remain uninsured, and millions more are underinsured, and therefore lack access to needed specialty care.<sup>5</sup> This population relies on the health safety net to access inpatient, emergency, and outpatient services for cancer and mental health care. Safety net hospitals commonly serve a substantial proportion of patients who are Black and Latino/a and live in areas of concentrated scarcity in urban and rural settings. Individuals served in safety net settings are more likely to be diagnosed with advanced stage cancers; the lack of insurance coverage accounts for a significant portion of this disparity.<sup>6</sup> Populations served

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in health safety net settings with Medicaid insurance have lower rates of participation in cancer clinical trials, particularly among Black and Latino patients.<sup>7,8</sup> The Covid-19 pandemic has compounded the risk of delays in cancer diagnosis and treatment for underserved populations given higher rates of Covid-19 infection and job loss, increasing the disproportionate burden of care on clinicians and systems caring for populations in safety-net settings.<sup>9,10</sup> At the same time, safety net hospitals are trusted care settings with unique expertise in the population served including shared culture, language, illness understanding, and a history of adversity and collective action.<sup>11</sup> Access to multidisciplinary tumor boards may protect against cancer disparities in safety net settings.<sup>12</sup>

### Cancer Disparities Related to Serious Mental Illness

Adults with serious mental illness, including schizophrenia and bipolar disorder, confront the double disparity of both poverty and mental illness. Individuals with serious mental illness are more than twice as likely to die from breast, lung, and head/neck cancers than people without serious mental illness, in part due to delays in cancer diagnosis and inequities in cancer treatment.<sup>13-15</sup> Mental health care is fragmented from cancer care and primarily delivered in the community mental health safety net and community health centers. Mental health stigma has downstream impact on patients, leading to internalized stigma that can delay seeking care; clinicians, contributing to implicit bias and assumptions about inability to tolerate cancer treatment and consent to trials; and healthcare system design leading to inadequate investment in mental health services. Individuals with mental health disorders are systematically excluded from cancer clinical trials, frequently without a clear rationale.<sup>16</sup> Access to psychiatry care at the time of cancer diagnosis may protect against cancer care disruptions for individuals with serious mental illness<sup>17</sup>; however, access to psycho-oncology care remains inadequate.<sup>18</sup> Importantly, inequities in cancer care may be modifiable through connection to person-centered teams and mental health consultation at the time of cancer diagnosis.<sup>19</sup>

### Promising Technology-based Interventions

Technology-based interventions, including virtual tumor boards and tele-mentoring models, can strengthen clinician capacity to deliver expert care for marginalized populations. Tumor boards incorporating multi-disciplinary teams have consistently been associated with increased access to multi-specialty oncology consultation and guideline-concordant cancer care.<sup>20</sup> Bringing together clinicians from hospitals that primarily serve populations from different socioeconomic and cultural backgrounds can foster discussion about shared challenges and differences in cancer care delivery. Furthermore, virtual tumor boards utilizing videoconferencing have been implemented successfully before and during the pandemic across cancer types and settings.<sup>21,22</sup> Virtual tele-mentoring models such as Project Extension of Community Health Outcomes (ECHO) use a bidirectional “all teach, all learn” philosophy of case discussion that benefits from the combination of specialty expertise and deep knowledge of the local community. The Project ECHO model increases clinician self-efficacy in care for complex populations and has demonstrated promise at increasing access to guideline-concordant care.<sup>23-25</sup> Data are limited, but needed, regarding the impact of this model on patient outcomes, particularly in the oncology setting.

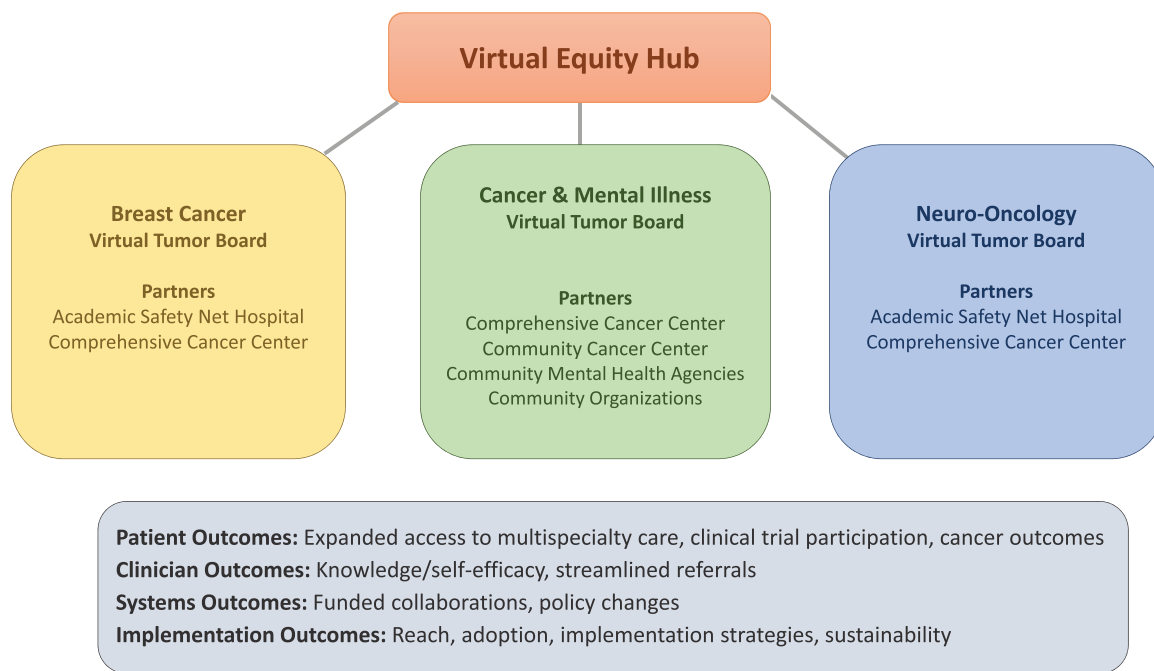
Key limitations of tumor board and tele-mentoring models include focusing on increasing clinician knowledge without addressing patient-level barriers to cancer care. Additionally, little is known about the impact of virtual models on structural barriers to cancer care and clinical trial participation. Despite increasing recognition of the need for equity interventions to be person-centered, tumor boards rarely involve patient navigators or mental health clinicians whose expertise may be needed to increase access to person-centered cancer care.<sup>26</sup> To promote cancer equity, tumor boards need to be person-centered and engage collaborators beyond the comprehensive cancer center. In this commentary, we describe how we developed the Virtual Equity Hub and adapted the tumor board model for cancer equity.

### Developing the Virtual Equity Hub

The Virtual Equity Hub aims to build a community network with the potential to address patient, clinician, and structural barriers to cancer care and research (Fig. 1). We collaborated with colleagues based at an academic safety net hospital, community cancer affiliates, and mental health agencies to identify shared priorities and develop virtual tumor boards that could address barriers to care and increase capacity to care for patients with cancer and complex needs. Key adaptations to the virtual tumor board included expanding the team beyond oncology specialists based on patient and caregiver needs, assessing the social determinants of health, establishing multi-sector partnerships, and fostering co-learning. We held monthly hour-long video conferences to engage a person-centered multi-specialty team for case discussion, consideration of the intersectionality of social determinants, and sharing of expertise across roles and hospital systems.

Our approach was guided by health equity principles and implementation science frameworks, specifically the Consolidated Framework from Implementation Research,<sup>27</sup> the Reach, Effectiveness, Adoption, Implementation Strategies, and Maintenance (RE-AIM) model and adaptations for health equity and sustainability.<sup>28</sup> Health equity researchers have emphasized the need for the CFIR and RE-AIM models to examine the impact of structural discrimination.<sup>29</sup> Core components of the Virtual Equity Hub and designing for equity include: applying community-based participatory research principles, focusing on marginalized populations and their clinicians, using a person-centered lens to expand the team beyond oncology specialists, building cross-sector partnerships, and designing pragmatic interventions with potential to impact patients, clinicians, and healthcare systems.

- 1) Apply Community-Based Participatory Research principles to engage stakeholders as collaborators throughout the research process, build capacity for person-centered care and research and strengthen a shared commitment to social justice in oncology
  - Foster co-learning and bidirectional teaching through all teach, all learn format<sup>13</sup>
  - Co-design interventions in partnerships with stakeholders
- 2) Examine context: assess structural drivers of inequities including the intersection of historical, social, and economic factors and link measures of structural discrimination to health outcomes.



**Figure 1.** Virtual Equity Hub model.

- 3) Design pragmatic and person-centered interventions: develop and evaluate pragmatic models in real-world settings, build person-centered teams based on patient needs and values.
- 4) Build cross-sector partnerships: engage collaborators across disciplines and outside of hospital systems.
- 5) Create process and space to reflect on impact of structural racism and discrimination on patients, clinicians, and systems.

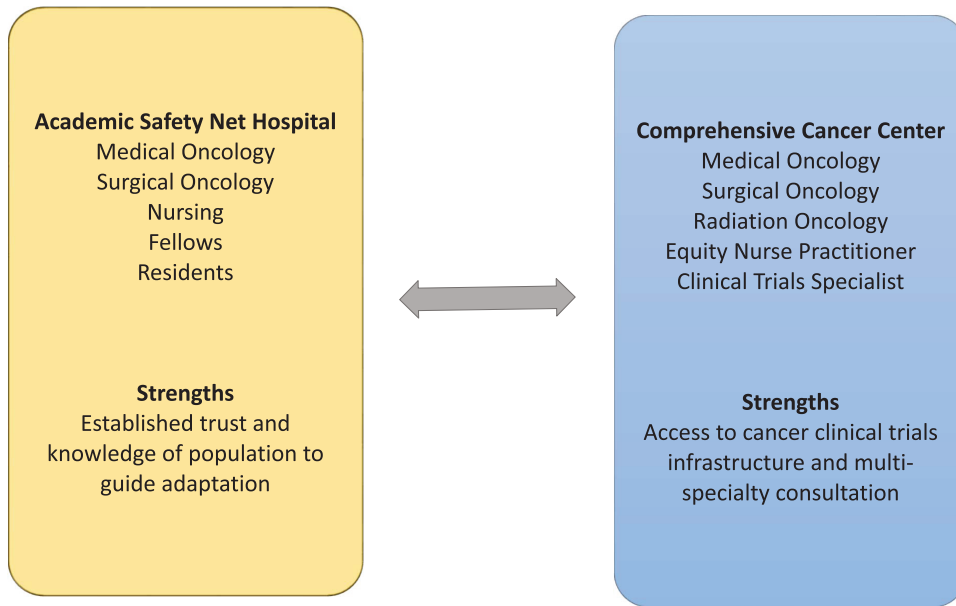
### Partnering with an Academic Safety Net Hospital: Targeted Approaches in Breast and Neuro-oncology

Leadership from the comprehensive cancer center and the academic safety net hospital jointly wished to establish a formal collaboration to improve cancer care for underserved populations, expand access for these patients to a broader range of cancer clinical trials and provide a forum for the sharing of expertise. An existing relationship between the breast cancer teams at both institutions with mutual goals of improving cancer care for underserved populations led to the implementation of the disease-specific virtual tumor board. Medical and surgical oncology physicians submitted brief case descriptions including clinical information and a screen of the social determinants of health for each monthly hour-long video conference. Cases were discussed by multidisciplinary disease-specific oncology teams that initially included medical and surgical oncology and nurse navigators, and expanded to include radiation oncology, clinical trial specialists, trainees, and psychiatric oncology (Fig. 2). Clinicians demonstrated a shared commitment to a person-centered model and bi-directional discussion that was informed by deep expertise in caring for the populations served and multi-specialty care and research. Open discussions included clinical management strategies, addressing the social determinants of health (building trust, addressing logistic/resource-related barriers), and a

shared commitment to enrolling diverse patients with breast cancer in clinical trials.

The first session of the virtual tumor board for breast cancer was piloted in March 2020 immediately prior to the first Covid-19 surge in Boston. Over 18 monthly video-conferencing sessions, 56 patients were discussed. Clinician engagement and attendee participation increased and expanded steadily throughout the pandemic and now encompasses medical, surgical, and radiation oncologists, nurse navigators, advanced practice clinicians, and oncology and surgical oncology physician trainees. At the end of the first year of collaboration, 9 patients were referred for clinical trial enrollment. The team submitted 3 collaborative grant proposals focused on reducing breast cancer disparities and received one federal grant.

After piloting the breast oncology tumor board, oncologists at the academic safety net hospital and comprehensive cancer center expressed interest in expanding the collaboration to neuro-oncology. Priorities included the need for increased access to multidisciplinary neuro-oncology consultation that incorporated neurosurgery, neuroradiology, neuropathology, radiation oncology, and mentorship of trainees. Beginning in January 2021, the Virtual Equity Hub was expanded to build a partnership between neuro-oncology at the academic safety net hospital and comprehensive cancer center. Ensuring confidentiality and capacity to share and review images together with involvement from neurosurgery, neuroradiology, radiation oncology, and neuropathology were essential steps for partners at the academic safety net hospital and comprehensive cancer center to adapt the virtual tumor board for neuro-oncology. Over the course of a year, 15 complex neuro-oncology cases were reviewed and consensus recommendations for treatment were developed. In addition, 3 patients from the academic safety net hospital were referred to the comprehensive cancer center for specialized neuro-oncology care including clinical trials (1), intensive inpatient chemotherapy for primary CNS lymphoma and (2), evaluation of a



**Figure 2.** Breast and Neuro-Oncology Virtual Tumor Board.

hypothalamic mass/cyst. At the end of the first year of collaboration, both teams committed to continuing the joint conference with a renewed focus on increasing access to clinical trials for patients at the academic safety net hospital.

**Increasing Access to Care for Individuals with Serious Mental Illness**

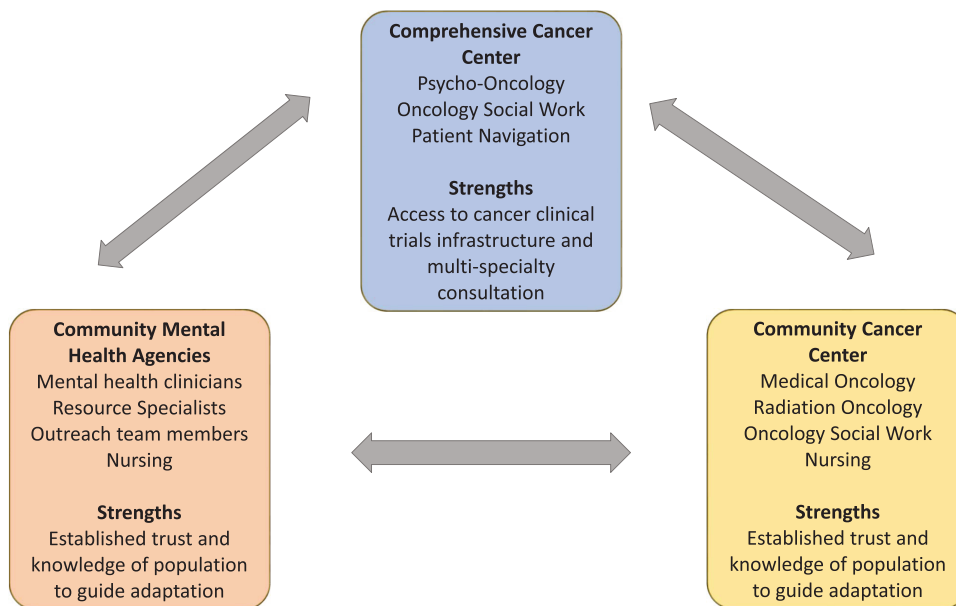
To increase access to integrated mental health and oncology consultation, the team established a virtual tumor board for cancer and mental illness. The virtual tumor board aimed to increase access to integrated cancer and mental health care in an underserved region by establishing a partnership connecting a community cancer affiliate, community mental health agency, and the comprehensive cancer center’s collaborative care team including psychiatry, social work, and navigation. Clinicians and staff members from a community mental health agency identified patients experiencing barriers to accessing cancer care, ensuring that patients with schizophrenia and bipolar disorder who had not been linked to a cancer center could be identified and connected to specialty consultation. To identify mental health champions, we built from existing clinical relationships and participation in trainings and advocacy events. The team used a population-based registry to screen the electronic health record to identify patients with serious mental illness and a new cancer diagnosis and prioritized patients experiencing challenges accessing cancer care. Additionally, the community mental health agency and community cancer center submitted cases for joint discussion.

Over 15 months, the team discussed 50 cases involving patients with cancer and serious mental illness. Participants included a person-centered collaborative care team with expertise in psycho-oncology, medical oncology, nursing, oncology social work, advanced practice clinicians, social work, navigation, outpatient mental health clinicians, leadership of community-based teams (eg, outreach teams, mental health nurses, and managers of group living environments), representatives from a local shelter/medical respite, psychiatry and advanced practice nursing trainees, and clinicians from other community mental health agencies (Fig. 3). Case discussion

led to increased access to oncology care for individuals with serious mental illness who had previously not been able to access cancer care. Additionally, collaborative discussions led to changes in treatment recommendations based on complex psychiatric and oncologic care needs, increased understanding of patient goals, and sharing of best practices across disciplines. Discussions increased awareness of community resources and strengthened relationships among organizations serving a shared population. Key strategies included follow-up joint consultations that engaged the community mental health agency, psychiatry, oncology, the patient, and caregiver.

**Next Steps: Measuring Impact, Applying Implementation Science, and Health Equity Frameworks**

Future research is needed to establish metrics, examine the impact of the Virtual Equity Hub on clinicians and patient outcomes and to identify promising implementation strategies. To move the needle, pragmatic trials are needed that are grounded in the intersectionality of cancer disparities and examine the impact of patient outcomes, clinicians, and health care systems. Community-engaged research design that combines the expertise of safety net settings and comprehensive cancer centers has unique potential to advance social justice in oncology. Adapting an implementation science framework for cancer equity can support sustainability and dissemination across settings<sup>30</sup> (Table 1). Key implementation metrics include Reach (proportion of underrepresented patients discussed), Effectiveness (impact on patient, clinician, and healthcare systems), and Adoption (proportion of clinicians referring to equity hub). It will be important to identify multi-level metrics to assess impact on timeliness and quality of cancer care, patient outcomes including cancer mortality, and impact on academic-community partnerships. Equally important metrics could include enrollment rate of diverse patients onto clinical trials (race, ethnicity, language, socioeconomic status, and history of mental illness or disability), increased job satisfaction/decreased moral injury, and



**Figure 3.** Cancer and Mental Illness Virtual Tumor Board.

**Table 1.** Applying the RE-AIM implementation framework for equity to the virtual equity hub.<sup>30</sup>

Implementation science: pragmatic questions <sup>30</sup>	Designing for cancer equity: recommended guidelines and metrics
<b>Reach: Who?</b> Who did you hope would benefit vs. who has participated?	Prioritize populations experiencing barriers to cancer care and clinical trials, their clinicians, and care settings - Track representation of target populations - Develop cross-sector partnerships outside of healthcare
<b>Effectiveness: What?</b> What are most important benefits for patients, clinicians, healthcare systems?	Patients - Assess social determinants of health and link to health outcomes: quality of life, survival - Track rates of specialty consultation and guideline concordant care - Assess satisfaction with care, perceived discrimination Clinicians: measure self-efficacy, knowledge, implicit bias System/policy: track impact on policies, funded collaborations, barriers to insurance coverage and trial accrual
<b>Adoption: Where?</b> Where was the intervention applied and who applied it?	Assess number and source of referrals by role and care setting (proportion of clinicians who participate in tumor board or refer patients)
<b>Intervention Strategies: How?</b> How was the intervention delivered and adapted? What intervention strategies might worsen disparities? Examine context with attention to structural discrimination	Conduct assessments of needs and strengths at safety net hospitals, community affiliates and mental health agencies Identify champions from oncology and mental health teams in community settings serving marginalized populations Adapt culturally tailored, pragmatic models in real-world settings, co-design adaptations with input from academic and community partners Assess social determinants and mental health comorbidities, engage person-centered teams including navigation and psychosocial oncology to address barriers to care and streamline referrals, measure structural discrimination (eg, neighborhood deprivation index, Everyday Discrimination Scale)
<b>Maintenance: When?</b> <b>Adaptation for sustainability</b> What resources are available? How integrated into current roles?	Assess strength of academic-community partnerships throughout collaboration and institutional support - Assess impact on funding - Assess strength of partnership using validated scales Track time spent and expertise needed to sustain and grow model

increase in recruitment and promotion of under-represented minority physicians in academics. Emerging collaborations have the potential to expedite clinical care, address structural barriers to research and care delivery, and inform joint grant proposals and policy change that can support growth, sustainability, and health equity.

**Conclusion**

Virtual interventions have the potential to address multi-level barriers to cancer care for marginalized populations when designed and adapted for cancer equity. Pragmatic, collaborative models are needed that combine the strengths of safety net care settings with access to multispecialty cancer care and

clinical trials. In addition to leveraging technology to build a collaborative network to increase access to robust specialty expertise, the Virtual Equity Hub model has the potential to create communities of practice that can address the complexity of intersecting patient, clinician, and structural barriers to cancer care. To be most impactful, interventions need to be (1) guided by a deep understanding of the target population and community partnership, (2) informed by a theoretical framework for implementation science and health equity, (3) be person and caregiver centered, and (4) address multi-level barriers to care. Perhaps most important is the need to come together with a commitment to building a culture of collaboration, building mutual trust, and a shared purpose of advancing social justice in oncology. Investing in partnership building is critical to build from community strengths, create a shared agenda for person-centered research, and develop sustainable approaches that can mitigate cancer disparities.

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## Conflict of Interest

The authors indicated no financial relationships.

## Author Contributions

Conception/design: K.E.I., N.K., E.P.W., V.D., S.R.P., E.G., B.M. Provision of study material/patients: N.K., E.P.W., I.A.-R., J.F. Collection and/or assembly of data: All authors. Data analysis and interpretation: All authors. Manuscript writing: all. Final approval of manuscript: All authors.

## Data Availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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