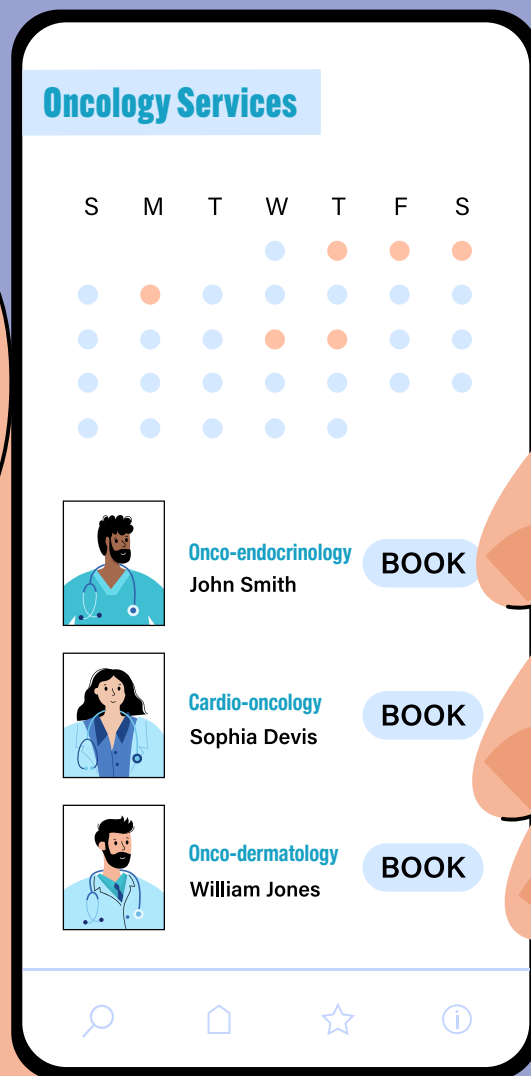


Citrus Oncology

Optimizing cancer care
by managing
side effects





Aabid Shariff, PhD



Afreen Shariff, MD, MBBS

The earliest written description of cancer dates to 3000 BC, immortalized in the Edwin Smith Papyrus, an ancient Egyptian textbook on trauma surgery. The parchment describes 8 cases of tumors or ulcers of the breast and its presumed author—a physician named Imhotep—believed there was no treatment for the disease.¹ It was a reasonable conclusion, given how complex cancer care remains more than 5000 years later. While cancer treatments continue to improve as medical and scientific advancements are made, progress is still needed to manage adverse events or side effects from treatment.

Every year, the FDA Oncology Center of Excellence hosts a Conversation on Cancer discussion in recognition of National Black Family Cancer Awareness Week. Its latest edition featured a compelling discussion on clinical trials with an emphasis on the adverse treatment effects experienced by patients from underserved communities. Laura Crandon, founder and president of Touch 4 Life, a breast cancer advocacy organization, was one of these patients. During the discussion, Crandon shared the story of her experience with a breast cancer medication that caused her hand and mouth to turn black while she was receiving treatment for the disease. “The side effects listed that patients taking this medication may turn red,” she said. “There weren’t enough people with melanated skin [in the clinical trial] to even document it. Out of 750 people in that trial, only 2 were Black.”

Underrepresentation in clinical trials is an issue across the oncology landscape. Recent studies of cancer clinical trials found that only 4%

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to 6% of participants are Black and 3% to 6% are Hispanic, despite these groups respectively representing 15% and 13% of the patient pool.² Of perhaps greater concern, however, is the apparent lack of due diligence in helping patients understand and potentially managing their side effects of cancer treatment.

To bridge this care gap, a married couple developed Citrus Oncology, a virtual clinic that connects patients with a range of medical experts that can help manage the full range of treatment-related side effects that include organ-specific toxicities. To learn more about this model, *Oncology Issues* interviewed Afreen Shariff, MD, MBBS, cofounder of Citrus Oncology, endocrinologist, member of the Association of Cancer Care Centers (ACCC) Board of Trustees, and expert in the field of managing hormone-related side effects; and Aabid Shariff, PhD, CEO and cofounder of Citrus Oncology.

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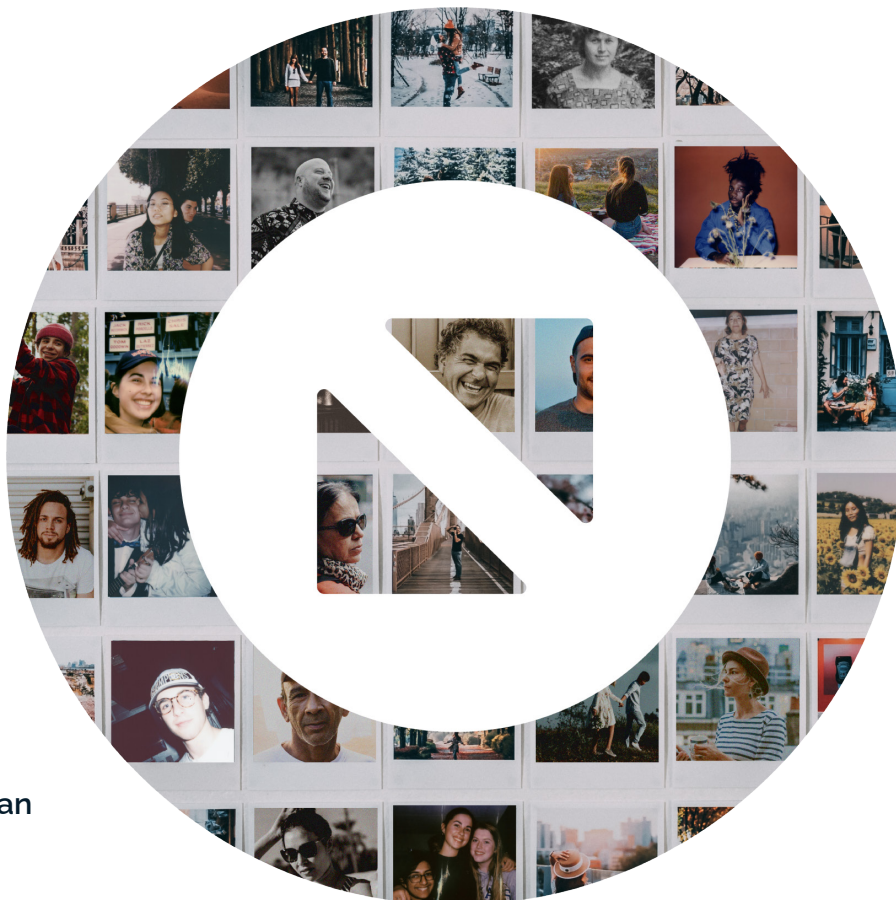
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OI. Can you share more about your background?

DR AABID SHARIFF. I have spent close to 2 decades in the biotechnology world working across human health and agriculture. I have a PhD in computational biology and computer science from Carnegie Mellon University. I have worked at many companies in the biotech[nology] space, but felt helpless when cancer struck our families, and I witnessed firsthand the challenges they faced managing the debilitating side effects of treatment. It was this personal experience that drove my decision to launch Citrus with Afreen.

DR AFREEN SHARIFF. I am an endocrinologist and expert in the field of endocrine disease in cancer. Over the past decade, I have led several national and international efforts, award-winning clinical operations, and educational programs around improving the quality of care for individuals experiencing side effects from cancer treatments. On the ground level, every day at work, I witness patients suffering from life-threatening adverse events. Beyond these events, I also support patients as they live with long-term side effects that impact them well beyond cancer and its treatments. Citrus Oncology is truly where passion meets purpose for us.

Even in clinical trials, where science and data are driving new treatments, adverse events need to be proactively managed in addition to being actively monitored.

OI. What is Citrus Oncology?

DR AFREEN SHARIFF. Citrus Oncology is the first virtual multi-specialty care clinic designed to help patients manage the side effects and organ toxicities from cancer treatment. These side effects could be simple like nausea, or complex ones that are severe or chronic like diabetes or cardiac issues that require a specialist comanaging the issue with the patient's oncologist. We offer access to a range of specialists, including endocrinologists, nephrologists, dermatologists, cardiologists, and other specialties who can provide expert opinions and care for managing side effects to oncology teams and patients directly. Our operations and evidence-based interventions are guided by nationally recognized experts in the field of cardio-oncology, onco-endocrinology, onco-dermatology, onco-nephrology, onco-rheum oncology, and survivorship care, and we continue to grow our strong leadership team.

At Citrus Oncology, our mission is to enhance treatment adherence and quality of life for those with cancer by addressing complex conditions that are severe and chronic such as diabetes, colitis, skin conditions, heart conditions, neuropathy, and other side effects which often arise because of cancer treatments like immunotherapy.

OI. How was the idea born?

DR AFREEN SHARIFF. As an endocrinologist caring for cancer patients for a decade, I see them in a different light. I do not see them during their cancer treatment or when they have just received their diagnosis; I see them on the other side, in the aftermath of treatment. Often, patients question why they developed the side effects they are experiencing or wonder if they could have done something differently—perhaps chosen a different drug or advocated more for themselves. I have spoken with many patients about side effects, hugged them, and eased their fears about treatment. Some patients waited months to see me, with treatments suspended during that time, which made me realize the importance of supporting patients and oncologists in managing side effects. We can no longer push side effects under the rug. Side effects are an unfortunate reality of cancer care and deserve to be discussed and managed with the same urgency as cancer itself. That's why we created Citrus Oncology—a clinic that can be accessed from anywhere in the country, dedicated solely to managing treatment-emergent adverse events.

DR AABID SHARIFF. Right now, some of the cancer drugs that are highly effective with improved progression-free survival are immunotherapy combinations. These treatments create an army of immune antibodies within a patient that bring on new kinds of side effects or adverse events. With the increased utilization of immunotherapy treatments, Afreen is seeing a rise in the number of patients who are experiencing unpredictable side effects. That realization led us to create Citrus Oncology.

OI. How does the Citrus Oncology model work?

DR AABID SHARIFF. At a high level, we are solving 2 problems: rapid access and high quality of care. When patients are diagnosed with cancer, side effects are often their primary concern. We want to ensure that patients know there are solutions available to address this issue and a national network of experts. Our virtual platform helps solve the access issue. To provide rapid, high-quality care, we've built Citrus Health AI to make care coordination efficient and allow our expert providers to quickly personalize and deliver the care that cancer patients deserve.

Patients have 2 options for obtaining rapid second opinions: asynchronously or through a live video visit with a specialist. The asynchronous option is available for patients who need an expert opinion delivered quickly without having to schedule a time with the specialist.

For oncology providers, we offer peer-to-peer electronic consultations (e-consults), where specialists advise oncologists on managing their patients' side effects. In the state of Florida, we have begun accepting referrals, allowing our onco-specialists to directly see patients while working closely with the referring oncologist.

Citrus Oncology is also a partner in clinical trials and value-based contracts with payers. We understand the financial burden of cancer treatments on patients. That's why we are embracing both value-based and fee-for-service models working with payers.

DR AFREEN SHARIFF. Because so much effort and financial support have focused on direct cancer outcomes and overall survival, access to quality of care is often lacking in the management of treatment-related side effects. As a result, other critical aspects of patient care, both during and after treatment, are overlooked. Nearly all the oncologists and oncology care teams that I work with prefer to have side effects managed by specialists so they can focus their efforts on keeping up with the frequent updates on trial results and personalizations specific to every patient to achieve no evidence of disease.

We offer solutions at various touch points, wherever the patient is seen. Even in clinical trials, where science and data are driving new treatments, adverse events need to be proactively managed in addition to being actively monitored. We're here to manage that aspect. By providing the support of Citrus Oncology, we can also encourage underrepresented communities, including those with preexisting conditions or concerns about side effects, to participate in clinical trials. We offer a much-needed layer of safety for managing side effects.

OI. Who do you think will be using this type of service? Providers? Payers? Others?

DR AFREEN SHARIFF. The Citrus Oncology model is designed around every touch point of an individual's cancer journey. We work with patients directly to give second opinions. We work with oncology teams seeking peer-to-peer advice and direct patient care for side effects. We collaborate with payers and employers to ensure their members with cancer are getting fast access to critical lifesaving opinions that can impact their members' quality of life, allowing them to return to work while managing their costs.

Lastly, a feature that is unique to Citrus Oncology is that our team of national experts can work with clinical trials to create an end-to-end toxicity management intervention. The biggest reason people do not enroll in clinical trials is because they are worried about side effects; 40% do not go on a clinical trial because they are afraid something is going to happen to them, and 10% drop off because of the side effects. So, we can help—right from protocol development, to recruitment, to side effect management, and outcome measurements specific to toxicities. Citrus Oncology is fully immersed in changing the narrative around side effects management.

OI. How do you see a model like Citrus Oncology helping a cancer program or practice that is experiencing workforce shortages or those in rural or underserved regions where access to subspecialists is limited?

DR AFREEN SHARIFF. Currently, when a side effect occurs, especially in a region with poor access to specialists like me, oncologists and their teams are managing conditions like diabetes on their own while their patients wait to be seen by an endocrinologist. The national average wait time for seeing a specialist is 26 days and to see an expert in side effects is about 90 days. This delay creates a significant burden on existing oncology infrastructure, forcing oncologists to triage, counsel, diagnose, and treat complex side effects. Most importantly, it compromises patient safety, as oncologists, who are not trained to

manage endocrine issues, are being asked to take on tasks outside their expertise. It's akin to me writing a chemotherapy prescription; I know how, but I have not done it in years. We are asking a lot of our cancer care teams, and that is creating burnout.

Citrus Oncology is designed to address workforce shortages and the mismatch between supply and demand, especially in community oncology practices. By partnering with Citrus, cancer programs or practices facing workforce shortages, particularly in underserved areas, can benefit from remote, fast access to a wide range of subspecialists. Our model allows oncologists and health care providers to consult with experts without the need for in-person visits, ensuring that patients receive comprehensive care regardless of their location. This approach not only provides additional support and expertise in managing complex side effects but also alleviates the burden on overworked health care providers. It's truly a win-win situation for us and the cancer patients we serve.

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DR AABID SHARIFF. There are already several organizations leveraging a virtual care model to address workforce shortages. Citrus Oncology does the same in cancer care by providing rapid virtual access to onco-subspecialists within 48 hours, enabling local oncologists to manage complex treatment side effects effectively. This model enhances care coordination, reduces patient travel burdens, and supports underserved regions by expanding access to specialized expertise without the need for on-site subspecialists.

OI. What does the end user experience look like? Can you discuss what happens when Citrus Oncology is contacted by a cancer program or practice? What are the costs?

DR AABID SHARIFF. The model is very flexible. Patients can call or go online to schedule an appointment or a second opinion. Oncologists and cancer programs can send in a referral easily if they want to hand off side effect care to us. We begin every referral as a peer-peer eConsult. So, in many cases, patients do not even need to see us. We have been very intentional in our design to avoiding adding workload to care teams. Oncologists can do it all on their EHRs.

OI. Citrus Oncology promises to connect patients with experts who can manage their side effects in less than 2 days. Why was it important to your team to create a space where patients can be seen as soon as possible?


DR AFREEN SHARIFF. The ability to connect patients with experts in less than 2 days has been shown to lower hospitalizations from side effects by greater than 70%.³ Timely management of side effects can significantly impact patients both in terms of immediate and long-term outcomes. When we think of short-term outcomes, getting an opinion in 2 days can prevent a hospital admission, ensure adherence to cancer treatment, and allows oncologists to move forward with treatments effective in treating cancer. In the long term, we are making an impact on quality of life. But most importantly, it is all about taking ownership of the safety of those with cancer who are undergoing treatment-related side effects.

QI. What proportion of patients live with side effects following cancer treatment and is enough being done to address these issues during survivorship care?

DR AABID SHARIFF. Our team at Citrus Oncology believes in the whole person approach to cancer. We consider survivorship an integral part of this holistic approach to cancer care. A significant proportion of patients with cancer experience side effects during and after treatment. Studies suggest that more than 40% of survivors face chronic health issues related to their cancer treatment, including endocrine disorders, cardiovascular problems, neuropathy, and rheumatic issues.⁴ Despite this, survivorship care often lacks a comprehensive approach to managing these long-term side effects. Citrus Oncology addresses this gap by offering specialized care focused on the unique needs of cancer survivors, ensuring that their side effects are managed effectively and improving their overall quality of life.

DR AFREEN SHARIFF. I think we should shift the focus in oncology from survivorship to “thrivership.” I think that should be the change in how we think of patients, because these are high functioning people that are being pulled down by cancer and its side effects and we really want to help them live their best lives again and handle the changes that every cancer survivor experiences.

QI. How can ACCC and other organizations support the effective management of cancer treatment-related side effects?

DR AFREEN SHARIFF. ACCC connects the science of oncology with the operation and implementation of cancer treatment. Eighty percent of patients with cancer receive treatment at community cancer centers and this represents a large part of the ACCC membership. The message of Citrus Oncology is relevant to community oncology programs and practices because it addresses the problems of poor access and extended wait times. So, the educational programs, the outreach ACCC has, the connections with financial entities, can all be used to advocate for improved side effect management. 

References

1. Lakhtakia R. A Brief History of Breast Cancer: Part I: Surgical domination reinvented. *Sultan Qaboos Univ Med J*. 2014;14(2):e166-e169.

2. Oyer RA, Hurley P, Boehmer L, et al. Increasing Racial and Ethnic Diversity in Cancer Clinical Trials: an American Society of Clinical Oncology and Association of Community Cancer Centers Joint Research Statement. *J Clin Oncol*. 2022;40(10):2163-2171. [doi:10.1200/JCO.22.00754](https://doi.org/10.1200/JCO.22.00754)

3. Diamond C, Patolia H, Phinney D, Shariff AI. e-Consults for immune-related toxicities improve patient access and reduce costs. *Oncol Issues*. 2024;39(1):30-35. [doi:10.3928/25731777-20240219-06](https://doi.org/10.3928/25731777-20240219-06)

4. Jiang C, Deng L, MD, Karr M, et al. Chronic comorbid conditions among adult cancer survivors in the United States: results from National Health Interview Survey, 2002 to 2018. *Cancer*. 2022;128(4):828-838. [doi:10.1002/cnccr.33981](https://doi.org/10.1002/cnccr.33981)

