# Virtual Toxicity Team Johns Hopkins University

## Managing Immunotoxicities in a Virtual Space

*This article explores Johns Hopkins University's unique approach to recruiting specialists outside the field of oncology to participate in its virtual immune-related Toxicity Team.*

In 2015, when Jarushka Naidoo, MBBCh, began working at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins University, she joined one of the first institutions to use immunotherapies to treat intractable cancers. As she began treating her patients with immune checkpoint inhibitors, Dr. Naidoo—an assistant professor of oncology within the Bloomberg-Kimmel Institute of Cancer Immunotherapy—observed that after starting immunotherapy, select patients developed autoimmune disorders that required expertise outside the realm of oncology.

'It became obvious that there was a critical need to work closely with organ specialists," says Dr. Naidoo. "Many autoimmune diseases affect organs that oncologists don't specialize in."

Given the significant number of immunotherapy patients who were developing arthritis, Dr. Naidoo and her oncology colleagues, including Joanne Riemer, RN, BSN, senior research nurse within the Upper Aero-digestive Team at Sidney Kimmel Comprehensive Cancer Center, enlisted the expertise of Hopkins' rheumatologists to help diagnose and treat patients who were manifesting rheumatic immune-related adverse events (irAEs). This experience led the group to publish its first "algorithm" to help providers outside of Hopkins diagnose and manage patients who develop this side effect from immunotherapy. But since immunotherapies can affect any organ system, Hopkins' oncologists needed to tap into the expertise of other specialists as well. "We recognized the tremendous value a multidisciplinary team of organ specialists could bring to the treatment of patients experiencing adverse events," says Dr. Naidoo. She helped recruit other specialists, and the Johns Hopkins Immunotherapy Response Toxicity Team (IR-Tox Team) was born.

### The Evolution of a Team

Hopkins' original toxicity team had representatives from eight medical specialties. Over the years, Dr. Naidoo helped recruit additional specialists, and the team grew. In addition to medical oncologists and oncology nurses, the team has specialists in rheumatology, endocrinology, cardiology, dermatology, neurology, hematology, pulmonology, ophthalmology, gastroenterology, and infectious disease. Each specialty is represented by two to four clinicians. Dr. Naidoo adds that her team also recognized the importance of adding allied health professionals—including pharmacists, radiologists, and pathologists—to the team. Team members help field the diagnostic and treatment questions posed by nurses and physicians who encounter irAEs in their patients.

The virtual element of Hopkins' toxicity team is a unique and important component of the group. Both referring oncology providers and IR-Tox Team members recognized at the outset that IR-toxicities can occur at unpredictable times. Given the size of the team, members needed an efficient method of triaging clinical questions as they were received. An electronic system would provide the flexibility and capability needed to call on individual organ specialists only when their specific expertise was required.

"At first, we just started adding to this group of people who we could call when necessary," says Dr. Naidoo. "Access to specialists and an ongoing dialogue between them and oncologists is critical. But we needed an easy-to-use method for matching queries with the team members who had the expertise necessary."

### Going Virtual

Dr. Naidoo and Laura Cappelli, MD—assistant professor of medicine in the Division of Rheumatology at Johns Hopkins School of Medicine—created an electronic referral template that could be used by clinicians seeking consultation from Hopkins' IR-Tox Team. The form requests relevant patient information, including demographics, tumor type, immunotherapy regimen, and clinical course. Referrals are first accessed by the IR-Tox Team's oncologists, who either answer the question themselves or triage it to the appropriate specialist(s).

Members of Hopkins' virtual IR-Tox Team access questions and conversations via a password-protected email listserv. "Anybody who is part of the cancer center—any oncologist, oncology nurse, nurse specialist, physician assistant, or trainee—can refer to us," says Dr. Naidoo.

Hopkins' IR-Tox Team receives up to four referrals per day, totaling approximately 250 to 300 patients per year. Once a referral request is entered into the system, members

of the toxicity team make recommendations or leave comments, often leading to virtual discussions as different team members weigh in on individual cases.

Twenty-four hours after a referral has been submitted, the IR-Tox Team leaders send a summary of the recommendations or comments left by the team's members to the referring provider. Discussion about particularly complex cases may continue for longer than a day, in which case the team follows up with the referring provider. Dr. Naidoo says she is currently exploring how to formalize the team's responses so recommendations can be captured in patients' electronic medical records.

In a 2019 study, Dr. Naidoo and her colleagues evaluated the effectiveness of Hopkins' virtual toxicity team.[1] During an eight-month period in 2018, the team received 122 referrals, all of which they responded to within 24 hours. All surveyed providers who contacted the team said they used all or some of the team's recommendations, and most (74%) said they changed their patient management based on those recommendations.

## Face to Face

Hopkins' IR-Tox Team complements its virtual interactions with monthly in-person meetings. There, members of the team discuss complex cases they previously addressed in the virtual environment. The gathering is also an opportunity for members to bring up clinical or research initiatives that may be relevant to the team's work. Riemer says team members educate one another on the immunotoxicities they see in their specialty areas. "We have offered CME-accredited irAE master classes," says Riemer, "in which each of the toxicity team specialists gives an overview of organ-specific toxicities and how they should be managed."

But while in-person meetings can be an effective platform for exchanging information and ideas, they are not always practical for a large multidisciplinary team. "And since many cases we receive are happening in real time, time is of the essence," says Riemer. "A monthly meeting won't help an acute patient. We need our electronic system to bridge that gap."

## Current Limitations

Dr. Naidoo says the electronic referral system she has helped create can address potential adverse events quickly, with the referring physician making the ultimate patient care decision after receiving feedback. Although she believes telemedicine is an "obvious next step" for toxicity teams, Dr. Naidoo acknowledges that significant barriers remain. These include the uncertain availability of specific specialists, the difficulty of convening specialists on complex cases, and the unpredictability of irAE timing.

Ultimately, telemedicine may be the only method through which smaller cancer programs can access the expertise of a multidisciplinary toxicity team. "Many of our community colleagues do not have access to a pulmonologist who can perform a bronchoscopy or a GI specialist who can perform a colonoscopy at the drop of a hat," says Dr. Naidoo. "And many immunotherapy-treated patients need those services."

Dr. Naidoo recommends that cancer programs with fewer resources identify their most pressing needs and then seek out the specific specialists who can address them. "Perform a comprehensive audit by assessing your past referrals and hospitalizations and identifying the specific irAEs your patients develop," says Dr. Naidoo. "This can help prioritize which specialists can most help your patient population."

Dr. Naidoo also advises practices to reach out to specialists in their local areas and try to incentivize them to treat their patients. "That could take the form of hiring a specialist for a certain number of hours or giving them a clinic slot in your center," she explains.

## Long-term Goals

As the number of immunotherapies increase and more patients are able to access them, more people will recognize the importance of multidisciplinary toxicity teams in cancer care. "The only way to adequately address this issue is to develop a critical mass of experts in irAEs and hire them to manage these patients," says Dr. Naidoo. "We need more organ specialists to service the needs of a growing group of patients. We need to create educational opportunities, such as immune-related toxicity fellowships."

But Dr. Naidoo admits that this long-term solution will take time. "We have to think outside the box for now," she says. The first step is to educate patients, providers, and family members about irAEs and the importance of multidisciplinary toxicity teams in cancer treatment. "To truly make this a practice-changing approach, we need to spread the word," Dr. Naidoo says. "By capturing our own program's data and examining our outcomes, Hopkins is taking steps to do just that." ▲

## References

1. Naidoo J, A multidisciplinary toxicity team for cancer immunotherapy-related adverse events. *JNCCN*. 2019;17(6):712-720.

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