



ePROs: Lighting the Way to Improved Outcomes, Efficiency, and Patient Experience

Patient-reported outcomes (PROs) and electronic patient-reported outcomes (ePROs) are not a new concept in healthcare. Until recently, a key obstacle to more widespread utilization of PROs in oncology was a lack of evidence of clinical benefit. Over the last 10 years, however, this situation has changed. Multiple studies, including large randomized trials, have demonstrated clinical benefit from the use of PROs and ePROs in patients with cancer.¹⁻¹⁰ Research has shown that asking patients undergoing anticancer treatment to self-report their symptoms and taking prompt action to address these patient-reported concerns has led to improved clinical outcomes, reduced emergency department utilization and unplanned hospitalization, and improved patient quality of life, when compared to non-PRO patients. An additional incentive for ePRO use in clinical practice is the Center for Medicare and Medicaid Innovation (the Innovation Center) Enhanced Oncology Model (EOM), released in August 2022, which requires that participants utilize ePROs and screen for health-related social needs.¹¹

Most of the research on ePROs in oncology has been conducted in academic medical centers and large health systems. Over the last several years that, too, has changed. Innovative independent oncology practices have launched ePRO platforms and engaged in studies that are yielding evidence of the feasibility, sustainability, and economic benefits to ePRO integration into their care delivery process.¹²⁻¹⁶ Highlands Oncology Group is an early contributor to this evidence base. An independent 25-physician oncology group in northwest Arkansas, the practice moved forward with implementation of the Canopy oncology-specific platform in June 2020. In collaboration with Michael Kolodziej, MD, head of Medical Oncology at Canopy, Highlands Oncology Group shared results from the practice's ePRO implementation with the wider oncology community in presentations at both the 2021 and 2022 ASCO Annual Meetings.^{12,13}

...the most compelling argument in favor of implementing patient reporting into oncology practice is that it allows patients to actively participate in their own care by providing the information they know best.¹

Founded in 1996, Highlands Oncology Group is a multispecialty oncology practice providing medical, radiation, and surgical oncology services and clinical trials access to a large geographic region that includes northwestern Arkansas, southwest Missouri, and southeast Oklahoma. This article details the impact of ePRO implementation on the practice's patients, providers, and clinic staff.

Evidence and Opportunity Align

Introducing a new ePRO platform to everyday clinical operations amid the unfolding uncertainties of the COVID-19 pandemic might seem counterintuitive. Yet, as the evidence of clinical benefit mounted and aligned with the opportunity to partner with Canopy, an "intelligent care platform,"¹⁷ Highlands Oncology Group CEO Jeff Hunnicutt said, "The decision to move forward was pretty easy." Compelling study data reported in 2017 by Ethan Basch, MD, MSc, and colleagues that demonstrated outcomes benefits and cost savings from ePRO utilization was the tipping point, Hunnicutt said.^{2,3} Further support for the decision derived from the practice's experiences as an Oncology Care Model

Highlights from Highlands Oncology Group's 2021 and 2022 ASCO Annual Meeting Presentations^{12,13}

From Highlands 2021 ASCO Poster Abstract

- From June 2020 through January 2021, 769 patients were offered ePRO enrollment
- 569 patients (73.9 percent) offered ePRO were successfully enrolled
- 89.1 percent opted to use the mobile app; 10.1 percent reported using the interactive voice response interface
- 73.6 percent of ePRO-enrolled patients were in an OCM episode

Engagement & Retention

- 88 percent of patients engaged with ePRO two or more times per month
- More than half of patients were still reporting after three months.

Alert & Intervention Rates

- 50 percent of reports exceeded the practice-defined notification threshold
- 78.8 percent of notifications were followed by a nursing phone call
- Only 7 percent of reports required an acute office visit

From Highlands 2022 ASCO Poster Abstract

- Observational study conducted from September 30, 2020, through November 30, 2021. Analysis includes all patient treatment at HOG during study period.

- From September 2020 through November 2021, 855 patients were enrolled in the ePRO system; non-ePRO patients totaled 1,773. Reasons for non-enrollment included patient's opting not to participate and timing (i.e., patients not yet offered ePRO option due to rolling enrollment)
- The non-ePRO cohort was slightly older (66.7 years vs. 63.3 years, $p < .001$), more commonly male (47.3 percent vs. 39.3 percent, $p < .001$), and less likely to be White (85.3 percent vs. 89.4 percent, $p = 0.003$).
- Cancer site distribution was comparable between cohorts, as was the proportion of patients with metastatic disease (ePRO 52.9 percent vs. non-ePRO 51.6 percent, $p = 0.55$).
- Health resource utilization rates were lower for patients in the ePRO cohort: ER visits: 1.72 vs 2.34 per 100 patient-months, rate ratio and 95 percent CI = 0.74 (0.60, 0.92), p -value = 0.005; hospitalizations: 4.76 vs 5.41 per 100 patient-months, rate ratio and 95 percent CI = 0.87 (0.77, 0.99), p -value = 0.04.
- Findings support the substantial benefits of using an ePRO tool in reducing healthcare resource utilization, and further the initial findings of previous publications in the academic clinical trial setting to the real-world community practice setting.

(OCM) participant; ePRO implementation appeared to be a next logical step in value-based practice transformation, fostering greater patient engagement with the potential to even further reduce avoidable ED and hospital utilization, lower the cost of care burden to patients, and improve outcomes.

With support from physician champion J. Thaddeus Beck, MD, Highlands Oncology Group, partnered with Canopy, in spring 2020 for integration of the ePRO platform into clinical operations. A deciding factor in vendor selection was the opportunity to collaborate with Canopy, "a development partner that was willing to work side-by-side with the practice to ensure that the product would work for patients but also for the workflow inside the clinic," Hunnicutt said.

Looking back, both Highlands Oncology and Canopy describe the ePRO implementation process as worth the commitment. Good communication and teamwork—between the practice and Canopy—were essential pieces of the two-to-three-month process. "It took a lot of teamwork, but [members of] the Canopy team were on site with us," said Tracy Thurow, RN, OCN, chief clinical officer at Highlands Oncology Group. "The Canopy team would take our feedback and make changes to the app or the [provider-facing] dashboard in real-time. They were part of our daily huddles. Canopy truly listened. They incorporated our needs and the needs of our patients into their technology, while taking into consideration our workflows."

Important takeaways for the Canopy team: The clinic needed an ePRO patient enrollment process that fit seamlessly into existing

clinical workflows, that did not create any additional burdens for providers or patients (and where possible further streamlined care), and that would be sustainable. “We worked closely with the team at Highlands, who were remarkable in their ability to truly conduct an open dialogue and a true sense of partnership, to explain their challenges and their workflows,” said Canopy Founder and CEO Lavi Kwiatkowsky.

Eligibility to Enroll

Highlands Oncology planned to implement the Canopy ePRO platform at three practice sites simultaneously. Initially, the option to enroll in the ePRO platform (i.e., download the app) would only be offered to patients receiving anti-neoplastic IV therapy.

Staff Training

One day was set aside for staff training before the ePRO launch. On-site Canopy staff trained the designated Highlands Oncology Group team members on the ePRO platform in one-hour sessions. Comprising the initial training groups were nursing supervisors, office managers, chemo receptionists, and infusion and triage nurses. This training was repeated at all clinic sites.

Launch: Engaging Patients

The Canopy platform launched the day after staff training. The initial focus was on enrolling established patients. To accomplish this, Highlands Oncology Group used a simple, three-step enrollment process that integrated into the practice’s existing clinical workflow:

1. Chemo receptionists briefly introduced ePROs when patients checked in.
2. Patients who agreed to reporting through the ePRO app were then educated on the app by their infusion nurse.
3. The infusion nurse taught the patient how to download the Canopy app and completed a trial run with the patient.

At first, the practice found that established patients were “somewhat hesitant” to use the ePRO app. “Most likely because they’d already gone through treatment without this option,” Thurow said.

To enroll patients new to the practice in the Canopy app, Highlands Oncology Group developed an efficient process that introduces ePRO earlier, before the start of treatment. The medical oncology practice is structured so that all new patients attend “chemo class” before beginning IV therapy. Now, ePRO is introduced to patients and their family members during “chemo class,” they are taught how to download the Canopy app, and practice using it. Highlands Oncology Group has a patient-friendly introduction to the Canopy platform on the practice website at highlandsoncology.com/canopy.

Transforming Triage

Patients report on Canopy’s app using a 10-point well-being scale, as well as a problem list that includes physical symptoms, emotional issues, and practical problems (i.e., health-related social

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needs). The frequency of patient reports is determined, at least initially, by the care team on the basis of the disease and treatment protocol. Patients can work with their care team to adjust their reporting interval. Self-reporting via the app can take as little as 30 seconds up to several minutes, depending on the patient’s circumstances, said Kwiatkowsky.

“When we talk about patient experience and driving higher quality care, we have to address accessibility. Different patients have different backgrounds and needs,” said Kwiatkowsky. “We want to meet patients where they are. So, we support both native iPhone and android apps, but also interactive voice response [IVR].” IVR is an option for patients who lack access to smart phones or a high-speed internet connection. To date, about 10 percent of Highlands Oncology Group’s patients have chosen to report via IVR. Canopy also has multi-language support. “We try to simplify reporting,” he said. “Instead of asking 100 questions, we ask: *How are you feeling today? 0–10 what is your sense of well-being? Are you suffering from any of the following issues?*” Patients can then select any issues they are experiencing: physical, practical, emotional, financial needs, spiritual, or other concerns.

When patients report through the app, the report is received by a Highlands Oncology Group triage nurse. The triage nurse views the report on Canopy’s practice-facing clinical dashboard. Each symptom has a threshold trigger that alerts the nurse based on severity. Symptoms are divided into three categories: physical, emotional, and spiritual/family. Patients rate what they are experiencing as *mild*, *moderate*, *severe*, or the *worst possible*. Patient-reported symptoms appear in the dashboard’s centralized work queue; symptoms rated as *severe* or the *worst possible* are elevated to the top of the triage dashboard.

The practice’s staff of five triage nurses monitor the dashboard in real-time during business hours (7 days a week, 8 am to 5 pm). Triage nurses will initiate interventions as needed, e.g., calling the patient, bringing the patient in for an urgent office visit, and, when necessary, referring the patient to an emergency department. After business hours, patients are asked to call Highlands Oncology Group and speak with the physician on call.

Since implementation of the ePRO platform, the practice has seen a slight increase in acute care visits, and a significant (22



Highlands Oncology Group triage nurses monitor the ePRO dashboard in real time.

percent) decrease in hospitalizations and ED visits, Kwiatkowsky said. The ePRO integration has not disrupted providers' workflow, Dr. Beck confirmed. When a triage nurse determines that a patient needs a same-day, acute care visit, they are seen by one of the practice's advanced practice providers (APPs). Highlands Oncology Group is well-equipped to handle most episodes of acute care—the practice has on-site lab, infusion, and imaging services—all under one roof, Thurow said. “We encourage patients to report what they are experiencing and discourage the use of the ER. We know our patients and can see, assess, work-up, and treat almost any issue they may be experiencing.”

ePRO Clinical Integration

Among obstacles to wider ePRO adoption, “alert fatigue” and lack of ePRO integration with patients' electronic health records (EHRs) are recognized concerns.¹⁰ The Canopy platform addresses both issues. “We think it is critical that everything is integrated, not only for the nurse to avoid any sort of double charting or manual entry or to keep the medical record complete and in sync, but also to bring information for clinical rich context from the medical record into the ePRO dashboard and system,” said Kwiatkowsky.

Working with Highlands Oncology Group and other oncology practices has taught Canopy: “It's not enough to just triage and have rules and alerts around ePROs. If you can't efficiently streamline the resolution of those problems, you've done nothing,” Kwiatkowsky said. Having a single clinical work queue streamlines information for the triage nurses so that they do not have to look at information in multiple places—the EHR, chat messages, emails, voicemails, etc. “What we strive to do is take the work and put it all in one place and prioritize it,” he said. “We try to

bring the critical items in full view...to reduce the visual and cognitive burden so staff is able to work more efficiently and, I hear, enjoy the work more.”


Using the triage tool, nurses can quickly determine the appropriate site of care for the patient—home, an urgent clinic visit, or the ED. The tool provides a standardized question list and decision support to guide the nurse's conversation with the patient. “The triage tool helps nurses chart, so they don't also need to take notes. They just click through,” Kwiatkowsky said.

A feature of the ePRO platform that Highlands Oncology staff appreciates is the power to show trends, which supports intervention before a patient's symptoms begin to escalate. “We like that ePRO is proactive. It prompts patients to report,” said Thurow. “When triage depends solely on patients to call [the practice], it is a reactive process.” Since implementing the ePRO platform, “we learned many patients were not reporting or were under-reporting their symptoms despite having access to triage nurses who can communicate directly with the patient's physician. The app opened up a line of communication with patients that we previously didn't have.”

At Highlands Oncology Group, ePRO is proving to be a patient and provider satisfier. “Our patients like this option. They

Select Oncology ePRO Resources

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can report on their time and on their terms,” said Thurow. “Our providers like it because patients are more forthcoming in reporting issues that they are experiencing—issues that may have caused treatment delays or hospitalization.” In this practice’s experience, ePRO enhances provider-patient communication, connection, and care. 

Amanda Patton, MA, is a freelance healthcare writer. She worked as a senior writer and editor for the Association of Community Cancer Centers for more than 15 years.

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