WHITEPAPER

# *Clinician Experience:*
# The Missing Link Between High-Efficiency and High-Tech Healthcare

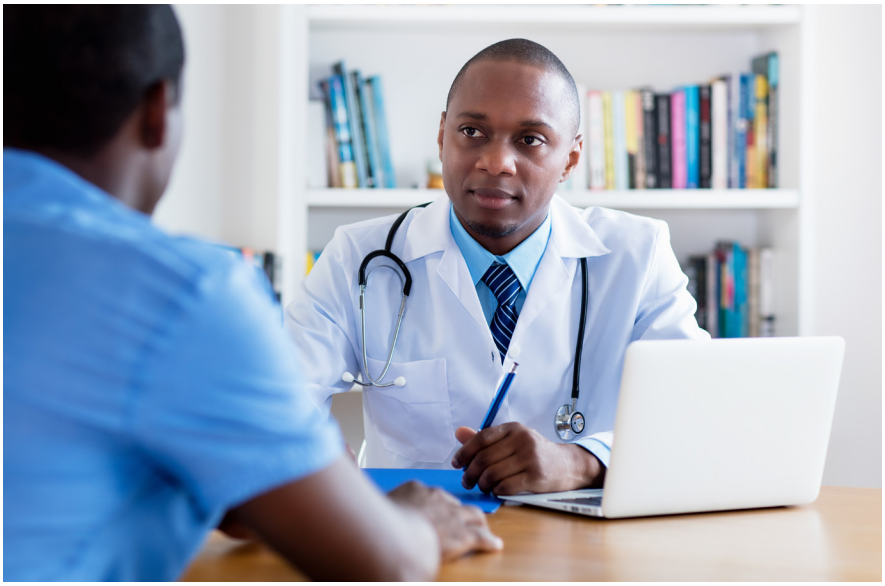
RŌNIN

When tech mogul, Steve Jobs, was diagnosed with pancreatic cancer at age 49, he turned to his oncologist, Dr. David Agus, an esteemed biomedical researcher and specialist in pancreatic cancer. Dr. Agus was able to extend Jobs' life but ultimately could not cure him. In the wake of Jobs passing at age 56, Dr. Agus was determined and motivated to challenge the status quo of cancer treatment to improve patient outcomes.

As a clinician, he inherently understood that by supporting clinicians with the right technology and efficient workflows, they can focus on what they do best - prioritizing personalized patient care. In collaboration with Larry Ellison, founder of Oracle and Job's best friend, and Dave Hodgson, seasoned technology executive, the three founded Project Ronin, a disruptive technology company with a single mission - radically improve cancer care. The disruptive nature of Ronin lies in the company's guiding principle: to construct a solution that streamlines the complexity of cancer and supports oncology clinicians so they can focus on what matters most - caring for their patients.

## Electronic Health Records–Failing Physicians at the Point of Care

Oncology clinicians are the conduit between the patient and the healthcare system. Some of their duties include administering care, lending an empathetic ear, making life-and-death treatment decisions, and documenting a patient's journey for insurance reimbursement. Despite clinicians' importance in treating patients, healthcare technology has failed to consider their experience, gather their feedback, and build tools to support their unique workflows.



While interviewing clinicians during the development of Ronin, clinicians noted overwhelming frustration with the technology available to them. Many report burnout, depression[2], attrition, and working longer hours than those in other specialties[6] due to the increasing demands of reporting, administrative tasks, and the expanding complexity of cancer care. The implementation of EHRs meant to alleviate reporting pressures, support billing, and improve operations. However, it has resulted in physicians spending an average of 1.84 hours daily[1] on documentation outside work hours and has decreased the time spent with patients.

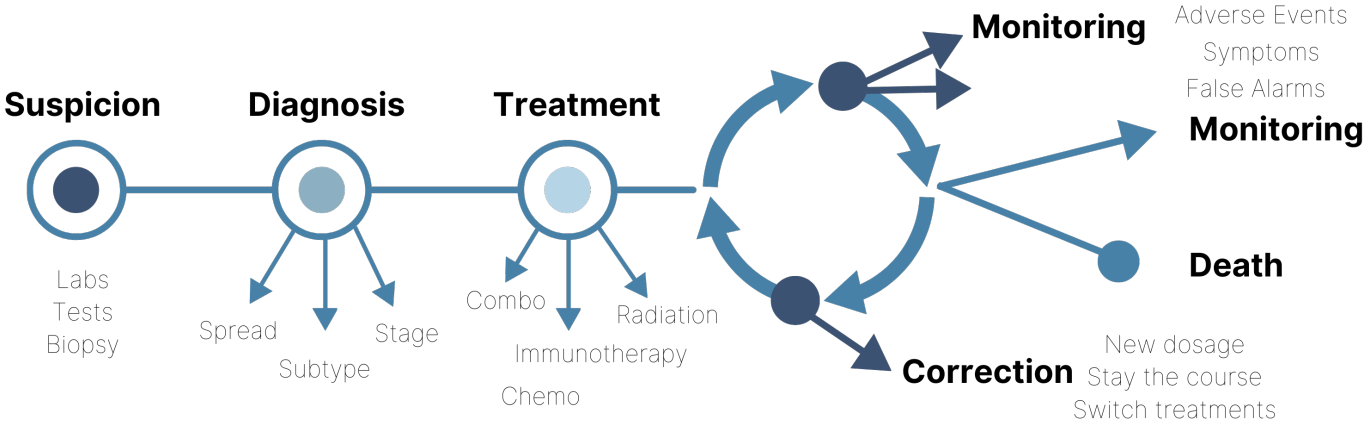
To fill a gap in an increasingly digital environment, EHRs have moved beyond billing support to become digital warehouses for clinical data on which oncologists rely to make time-sensitive treatment decisions. Poor data organization and availability increases clinical administrative burden, delays patient care, and diminishes patient outcomes. While established vendors are making efforts to improve EHR technologies, redesigning to support clinical workflows and care planning is not feasible.

EHRs are here to stay. To ease the pressing challenges that face healthcare, healthcare IT vendors must develop novel solutions that challenge the status quo by designing around the way clinicians work and integrating technology into the existing clinical workflow.

# The Unique Requirements of Cancer Care

Oncology comes with a set of unique challenges that don't exist in other chronic diseases:

1. ***Multi-disciplinary Provider Collaboration:*** To develop a comprehensive treatment plan, specialists must gather and analyze historical data, including clinical notes, lab results, scans, and vitals. However, the overwhelming amount of data and its disorganized structure can lead to a fragmented understanding of the patient, leading to sub-optimal courses of treatment. The need for interoperability between EHRs further complicates this requirement.
2. ***Treatment Sides Effects:*** Side effects from cancer treatments are severe, resulting in patient anxiety, adverse reactions, and toxicity events. Patient-reported outcomes (PROs), gathered during patient encounters, provide essential information on treatment tolerance and effectiveness. Disorganized data structure leads clinicians to spend 62% of patient visits searching for data within the EHR[7], giving healthcare workers less time to capture critical PROs.




3. ***Disease Complexity:*** There are over 200 cancer types[5] , each with individual guidelines, biomarkers, and treatment options. Despite treatment guidelines, patients' preferences and specific clinical needs require a personalized approach. Very few tools are available that mine the data necessary to support these customized care decisions.

Despite their passion for delivering high-quality care and their evident impact on patient lives, clinicians struggle with attrition[6] due to the burden of tools that fail to support how they work. Even more concerning, due to the nature of cancer care, oncology physicians work longer hours than those in other specialties, which further contributes to their growing levels of burnout.[6]

# A Complete Patient Profile to Improve Clinical Decision-Making

The reality of cancer care is that patients get sicker before they get better. Patient-reported outcomes (PROs) are data points that can improve survival results of cancer patients[11] and help clinicians understand a patent's status outside the clinic, identify patients at risk for adverse events, and enable productive in-person conversations during patient appointments.

In Ronin's interviews with clinicians, they report PROs (patient-reported outcomes) as instrumental in treatment decisions but lack the technology to capture the real-world patient experience. Instead, clinicians triage a large volume of calls from worried patients experiencing a wide range of symptoms making it difficult to prioritize patients that require immediate attention.

Hearing this complaint from clinicians, Ronin set out to facilitate the collection of real-time PROs to streamline increased data collection while reducing clinician burden and improving the patient experience. Through in-depth user research, Ronin developed an app tailor-made for cancer patients and their care team: large, high contrast buttons for easy selection even when they are experiencing neuropathy, 6th-grade reading level for accessibility, disease-specific surveys, carefully selected survey questions that provide the necessary information clinicians need to treat patients, viewable symptom history, personalized education for patients based on their reported symptoms, intelligent triaging of patients based on symptom severity, and bi-directional communication between patients and clinicians for convenient connection withall reported data written back into the EHR and efficiently delivered to clinicians within the patient chart.

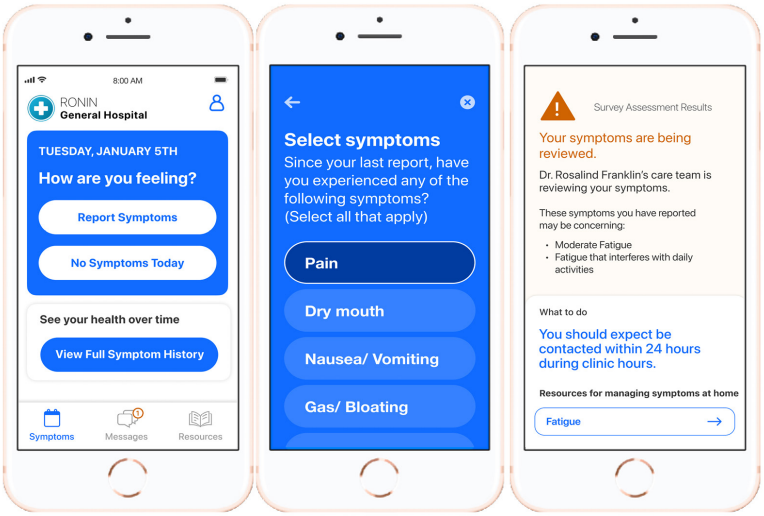



Figure 1: Patient Engagement ePRO+ patient app. Collect real-time PROs that allow clinicians to efficiently triage patients, improve patient engagement, and reduce call volume.

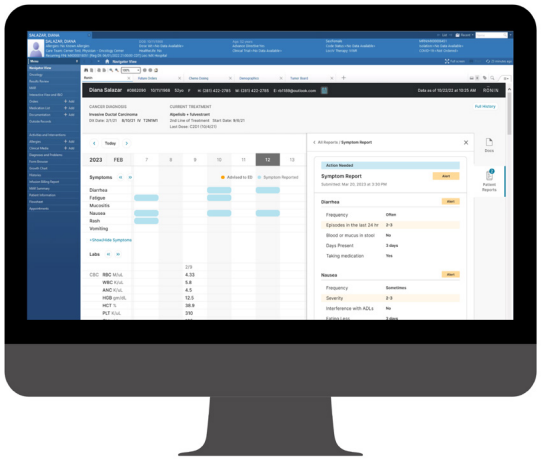


***Figure 2:*** ePRO+ Workflow displays patient's symptom history, detailed account of their current symptoms, and symptom alerts based on clinician expertise in a dashboard that allows clinicians to efficiently triage at-risk patients.

The results were extraordinary. Clinicians saw a 35% decrease in patient-initiated calls, increasing their bandwidth and allowing them the time to check on patients who reported symptoms in that app, were intelligently triaged with criteria set by the clinicians, and identified as high-risk for adverse events. Additionally, the app received high satisfaction ratings from patients, with 88% reporting they were satisfied with Ronin and 84% seeing a positive impact on their healthcare experience.

## Patient Satisfaction with the Ronin ePRO App

A

**88%**
*of patients were satisfied with the app*


B

**90%**
*of patients found the app easy to use*

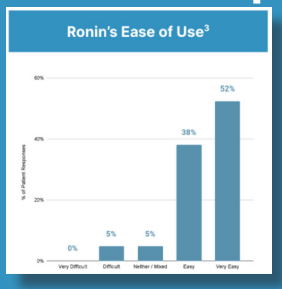



***Figure 3a & 3b:*** Research conducted December 2021. A. Patient satisfaction using the Ronin App B. Patient reported ease of use of the Ronin App

In cancer care, adverse events lead to Emergency Department (ED) visits, which are the main contributor to disruptions in treatment, increased healthcare costs for patients and hospital systems, and decreased patient satisfaction. Unfortunately, most ED visits are avoidable with timely, tailored outpatient care[12]. Not only does the effortless capture and availability of PROs with Ronin's ePRO patient app enable productive communication between patient and clinician, but real-time symptom monitoring gives clinicians the power to respond quickly to troublesome or worsening symptoms and potentially prevent adverse events.

## “They’re very responsive. I wasn’t expecting a call back and I heard from a nurse in 15 minutes.”

**-Janice Sherod, Glioblastoma patient at Providence Saint John’s**

Patient satisfaction, safety, and clinician administrative burden are pervasive roadblocks with financial consequences[9,10]. Poor patient satisfaction and high ED admissions lead to low patient retention and uncompetitive HCAHPS scores. High clinician workload leads to burnout, attrition, and turnover, costing organizations $500,000 - $1,000,000 per physician[13]. With delicately researched and intentionally designed technology like Ronin’s ePRO patient app, hospitals can increase their competitiveness in the market, elevate clinical efficiency by reducing workload and liberating clinician bandwidth, improve the patient experience while improving outcomes, and increase profitability.

## Longitudinal Timeline: Packaging Patient Data to Boost Clinician Efficiency

Successful patient outcomes hinge on the clinician’s ability to gather relevant data to inform the optimal clinical decision. Although three or four care pathways may exist for a given diagnosis, physicians rely on training and data to make personalized treatment decisions. When data availability is poor, clinicians lose their most powerful tool for effectively treating patients.

The chief complaint of oncology clinicians is the lack of accessibility and organization of data within the EHR. Providers can spend 20-45 minutes searching through the EHR in preparation for patient visits. Searching for data is an added burden that distracts from interacting with patients and increases time spent on unbillable activities. These inefficiencies boil down to one issue: inadequate tooling to access and analyze patient data efficiently.

decisions about patient treatment.

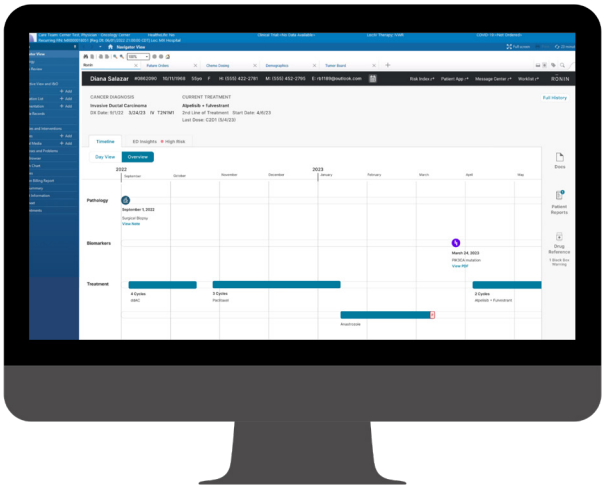


***Figure 1:*** Longitudinal Timeline rendered in Cerner. Visualize patient history in a single click. By rendering all the data required for decision-making in a single view (patient-reported data captured in the symptom monitoring app (ePRO), treatment events, labs/biomarkers, vitals, etc.) care teams can save time and effort spent on clicking and scrolling through different tabs in the EHR.

Driven by the clinician experience, Ronin developed the Longitudinal Timeline, a comprehensive dashboard that displays all available patient data organized over time and accessible in a single click. The Timeline addresses the challenges of chart review by providing a contextualized, intuitive view of a patient’s past and present, complete with treatment events, labs, vitals, symptoms, and biomarkers–– efficiently embedded in the EHR. This optimized dashboard, often met with awe when presented to clinicians, eliminates the need for clinicians to piece together information from different parts of the EHR and turns a 45-minute activity into a 5-minute task.

By correlating and organizing patient-specific data, Longitudinal Timeline arms clinicians with the data they need to make quick, confident, fully-informed decisions about patient treatment.

Beyond capturing and presenting the relevant data efficiently, Ronin provides instant access to primary documentation, NCCN treatment guidelines, and patient symptom history captured from the ePRO patient app within the interface - eliminating the need for clinicians to navigate away from the EHR to gather external information. By centralizing the critical information required to make informed decisions, Ronin's Longitudinal Timeline streamlines cancer care operations and improves patient safety and care quality while reducing clinical burden.

Oncology clinics report the EHR, staffing issues, and operational costs as top pressures[14]. Designing for the clinician experience produces tools like the Longitudinal Timeline that alleviate the headwinds in healthcare. With Ronin's Timeline, oncologists are maximizing the investment of existing technologies, saving valuable time and effort on repetitive administrative tasks and suboptimal workflows, and streamlining clinical operations. Additional bandwidth and improved data accessibility empowers clinicians to take advantage of the wealth of data stored in EHRs to make personalized care decisions tailored to each patient's unique cancer journey.

***Why should healthcare institutions choose technologies built for the clinican experience?***

**Reduced Clinician Burden**

**Better patient outcomes**

**Improved operational efficiency**

**Greater collaboration among healthcare providers**

**Increased patient satisfaction**

## Transparent, Explainable AI for Healthcare

With the ePRO patient app and Longitudinal Timeline, clinicians can access the past and present of a patient's data instantly. The last frontier of healthcare data is understanding the future. Predictive insights are a capability made possible by safe and ethical AI. Because ED visits are a critical factor in increasing costs and reducing treatment adherence, Ronin set out to create an AI tool for predicting the risk of an ED visit.

In collaboration with the top cancer center in the US, Ronin developed and trained a first-of it's-kind AI system that compares an individual's historical data to that of other patients with similar characteristics to provide insight into the likelihood of preventing these events.

By utilizing the information stored in EHRs and advanced data science, Ronin's team developed a model that demonstrates exceptional performance at predicting the risk of 30-day ED visits[15]. The system includes proactive monitoring of the model's indicators of bias and drift to ensure its equity and stability over time, maintaining the model's safety.

Understanding the apprehension to use AI models, Ronin intentionally designed an interpretable user interface (UI) that presents the model's results and methodology in accessible terms. By clearly displaying the inherent biases, breaking down the cohort used to deliver the individual assessment, and highlighting the clinical factors that had the most considerable impact on the findings, Ronin aims to instill trust among clinicians.

Armed with explainable insights, clinicians better understand where their patients lie on the risk spectrum. This glimpse into the future allows for course-corrective action to keep patients out of the emergency department and prevent adverse events that disrupt treatment and lead to patient suffering and system cost.

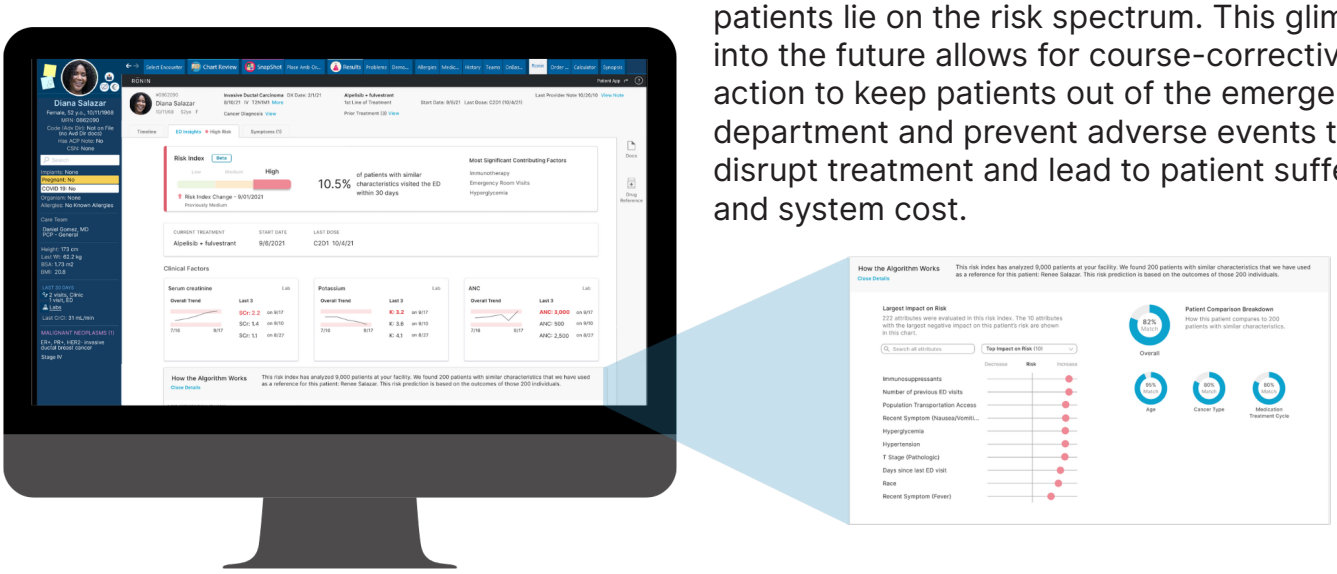
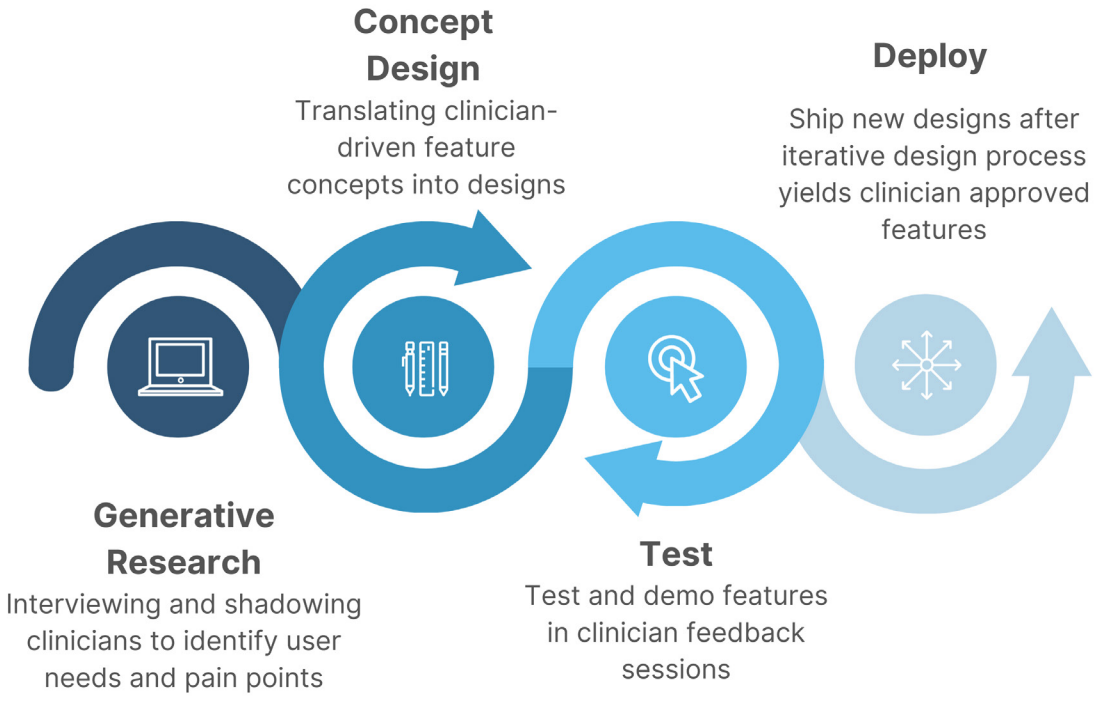


***Figure 5:*** Ronin's Comparative Insights interface transparently presents AI models outputs allowing clinicians to take confident, decisive action.

## The Role of Clinician Experience in Software Design

Clinician experience is central to Ronin's approach to design, and we intentionally embed our solution in the EHR to fit into the existing clinical workflow.

Ronin employs an iterative, collaborative design process that includes generative research or "shadowing" clinicians to understand points of friction deeply. This research-design-iterate approach allows concept development, testing, and refinement alongside clinicians until desired they achieve the desired results. Our human-centered feedback loop fuels every new design decision and feature update, resulting in a technology that clinicians enjoy using, with high rates of adoption and increases in clinical efficiency.



# Elevating the Clinician Experience to Improve Outcomes

Any clinician-facing technology used in managing and treating a patient must consider how clinicians think and work. The current systems to aid decision-making inadequately perform this function, resulting in an overwhelming amount of data, 1000s of clicks within the EHR interface[3], and wasted time hunting for information. Without the ability to personalize care decisions based on real-time data, patients can experience unnecessary pain and suffering, delays in care, and direction to undergo ineffective treatments.

To improve clinical efficiency and decision-making at the point of care, cancer care teams need at-a-glance access to complete and real-time patient information, accomplished through engineering technology around the clinician experience. Technology should afford physicians and nurses the mental space to do what they love–providing quality care–not forcing them to shape their workflows around an unoptimized tool.

At Ronin, our objective when developing technology is to radically improve the clinician experience to empower them to save patient lives. By listening and building for clinicians, we have streamlined PRO tracking through a user-friendly mobile app for patients and a clinician-facing dashboard, allowing cancer care teams to identify and proactively intervene when potential issues arise. By aggregating data and delivering personalized insights to clinicians, Ronin enables highly efficient, evidence-based care decisions that improve patient outcomes and reduce clinician burnout. There is no technology to replace humans when it comes to cancer care. However, by expertly engineering a positive clinician experience and removing the friction points via technology, we can empower them to fully utilize their expertise to impact patient lives on a large scale.

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