The Operational Effectiveness of Using a Machine Learning-Driven Patient Medical Record:
A Simulated Comparative Study Using Real-World Data

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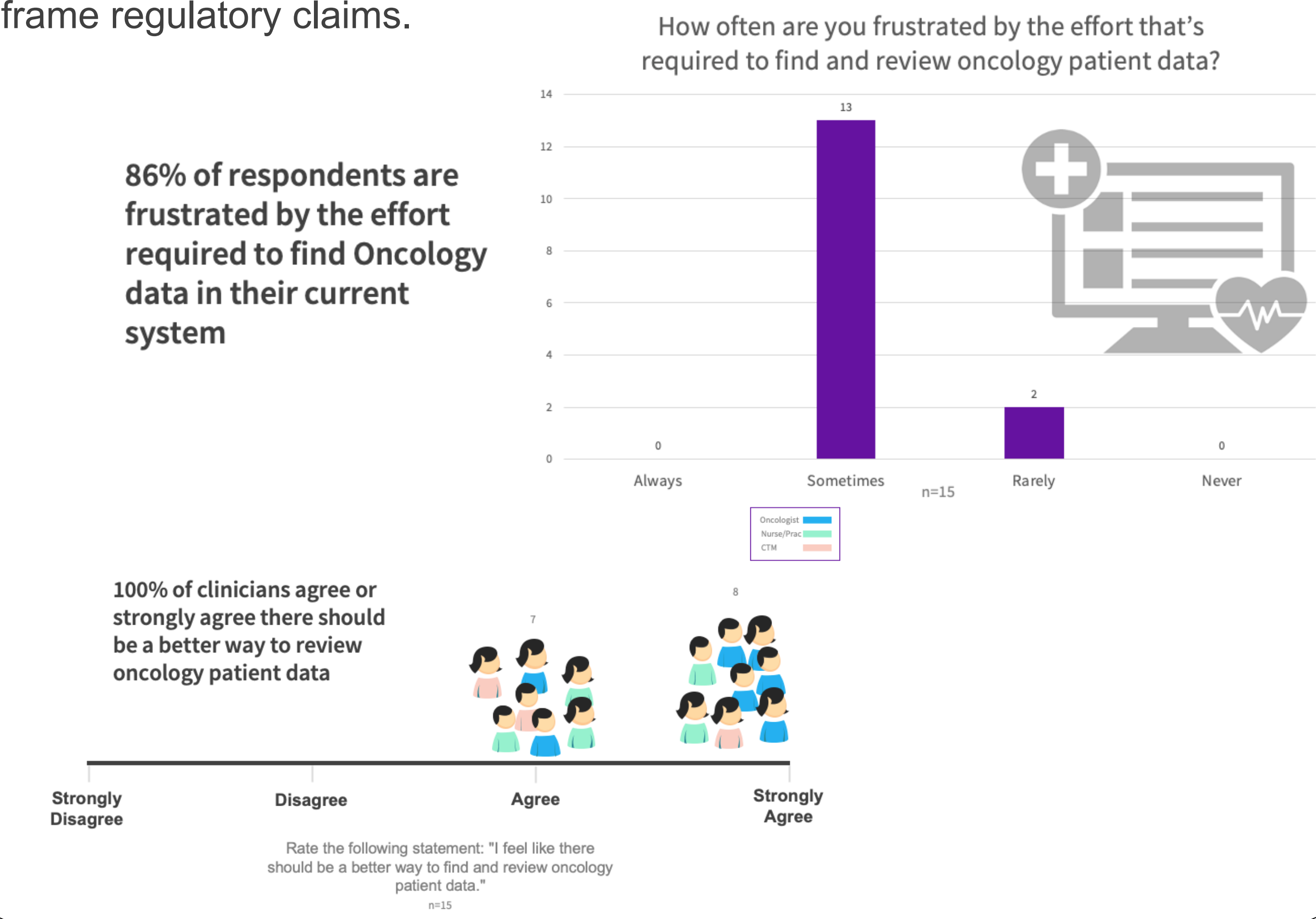SUAZIO NOW PART OF NAMSA®

Introduction

Although health information systems are constantly evolving, organizations continue to maintain their data in silos resulting in additional workflows and unnecessary delays that have the potential to impact timely care.

An initial survey investigation found that most oncology specialists at the investigational site struggled with finding the most relevant medical data to care for their patients.

One major healthcare vendor is developing an oncology decision support cockpit that analyses and organizes patient data into one complete view and provides advanced AI/ML tools that enable care teams to accelerate care and more effectively treat patients. This study aimed to provide quantitative and qualitative evidence to assist with further product development and frame regulatory claims.

How often are you frustrated by the effort that's required to find and review oncology patient data?

86% of respondents are frustrated by the effort required to find Oncology data in their current system

Always 0 — Sometimes 13 — Rarely 2 — Never 0   n=15

100% of clinicians agree or strongly agree there should be a better way to review oncology patient data

Strongly Disagree — Disagree — Agree 7 — Strongly Agree 8

Rate the following statement: "I feel like there should be a better way to find and review oncology patient data." n=15
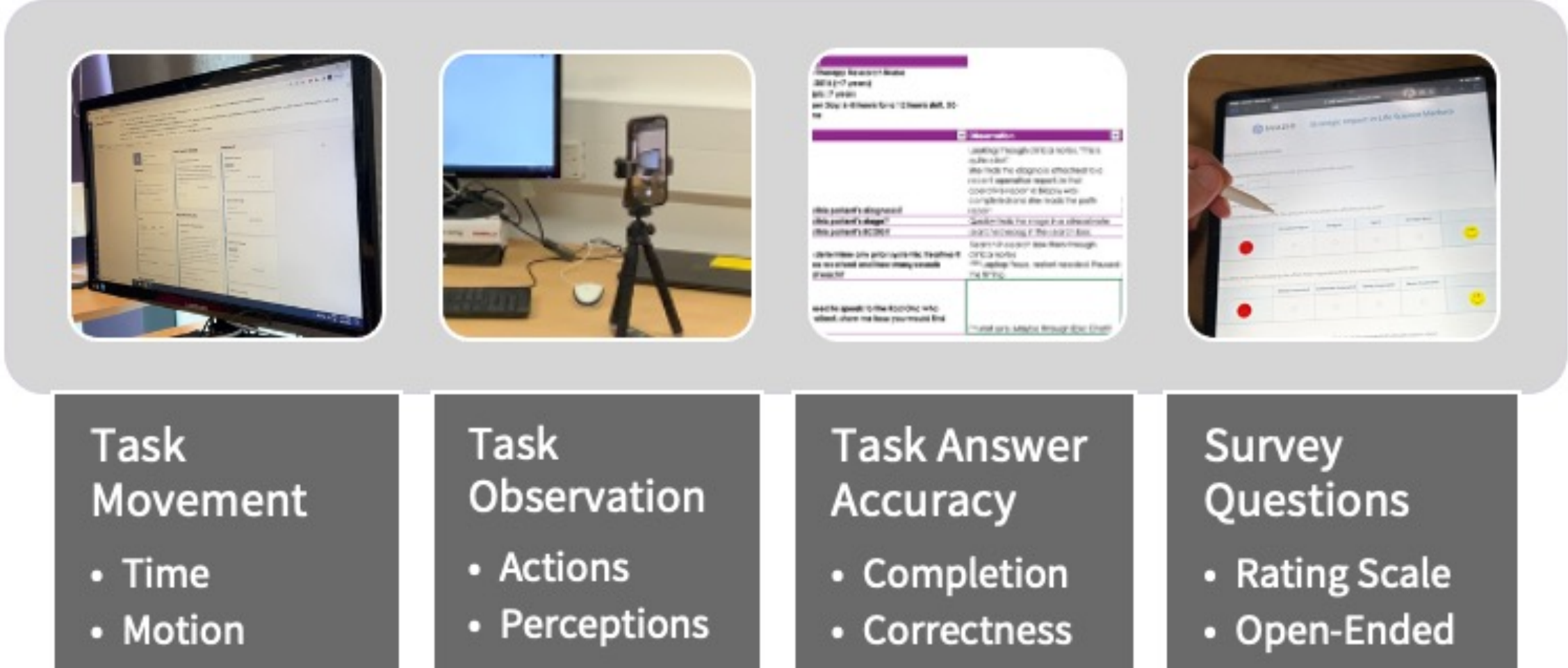
Methods

The study design leveraged a comparative simulation using real-world cancer patient data located at a large cancer treatment center in the UK. Eight oncologic patients' entire history of EMR data was collected and anonymized for use in this study and the evaluation was completed by 12 oncologists with experience ranging from 4 to 45 years. Each oncologist was presented with a simulated treatment task requiring them to use either their EMR or the healthcare vendor's new record system. Observational research captured aspects such as time & motion, task correctness, and behaviors of the participants. After each task, the participant was asked to complete a survey that contained both rating scales and open-ended questions to assess their perception.

Room Set-Up

Video Recording — Primary Monitor — Moderator — Participant — Note Taker — Audio Recording

Two separate task workflows were evaluated:

- Preparing for a new/referral patient and preparing for MDT: 18 tasks
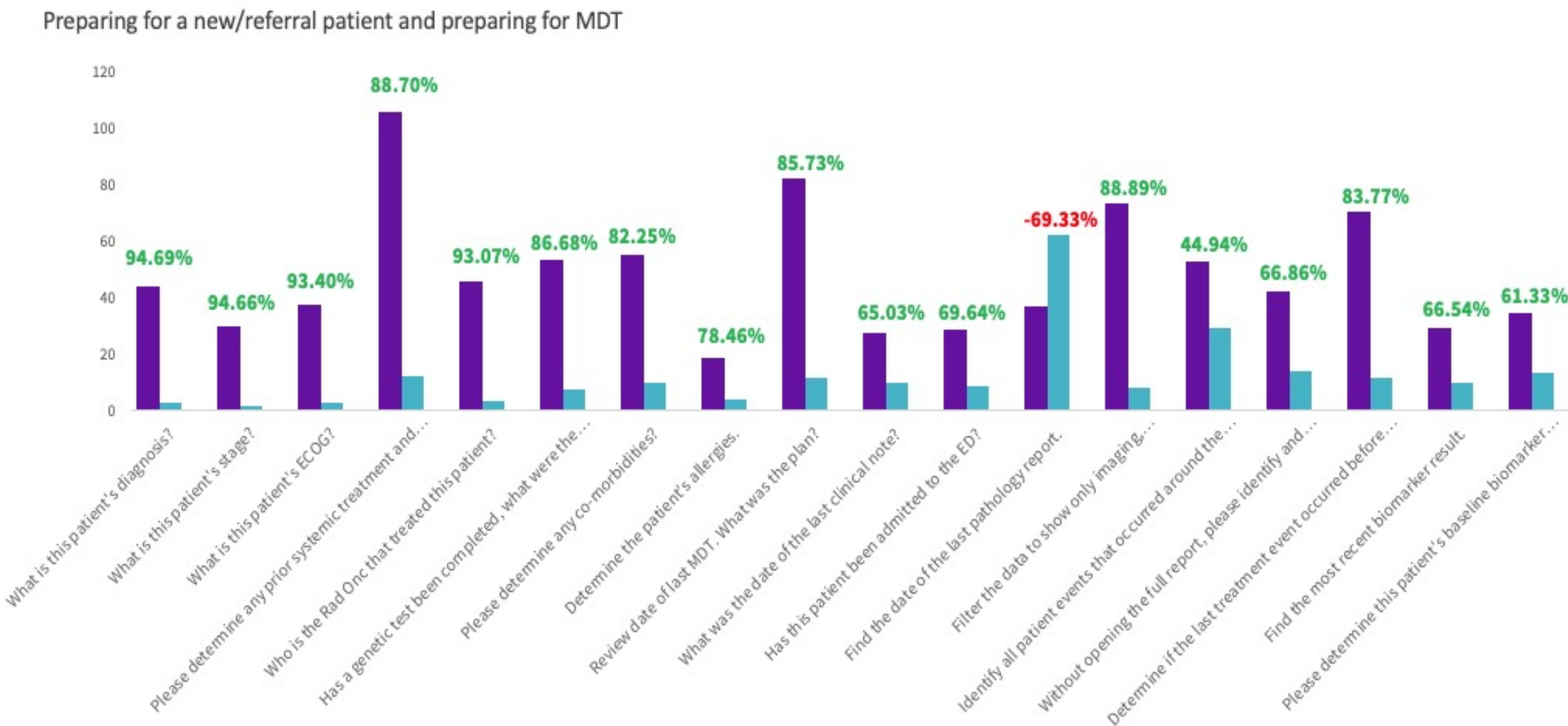- Pre-screening patients for clinical trials: 7 tasks

Variables in the Analysis

| Task Movement	Task Observation	Task Answer Accuracy	Survey Questions
• Time • Motion	• Actions • Perceptions	• Completion • Correctness	• Rating Scale • Open-Ended

Results

Time savings were able to be quantified on each task ranging from a 69% loss of time through a 95%-time savings. Additionally, through the time & motion data collection, a task complexity score was created. This demonstrated how complex each task was when completed on the oncologist's current EMR compared to the vendor's new record system.

Testing Times by Task
Preparing for a new/referral patient and preparing for MDT

Percentages shown: 94.69%, 94.66%, 93.40%, 88.70%, 93.07%, 86.68%, 82.25%, 78.46%, 85.73%, 65.03%, 69.64%, -69.33%, 88.89%, 44.94%, 66.86%, 83.77%, 66.54%, 61.33%

The task complexity score (TaCo) is a hypothetical complexity score that has been created for this study as a tool to assist in comparing the level of effort when performing clinical tasks.
The principle of the TaCo Score is based on the inverse correlation of time and clicks for a task while using multiple pre-defined thresholds.
The primary assumption is that more clicks during a shorter time period = more complexity

Overall Existing EMR TaCo Score (48 sec & 3 clicks)
Medium Complexity
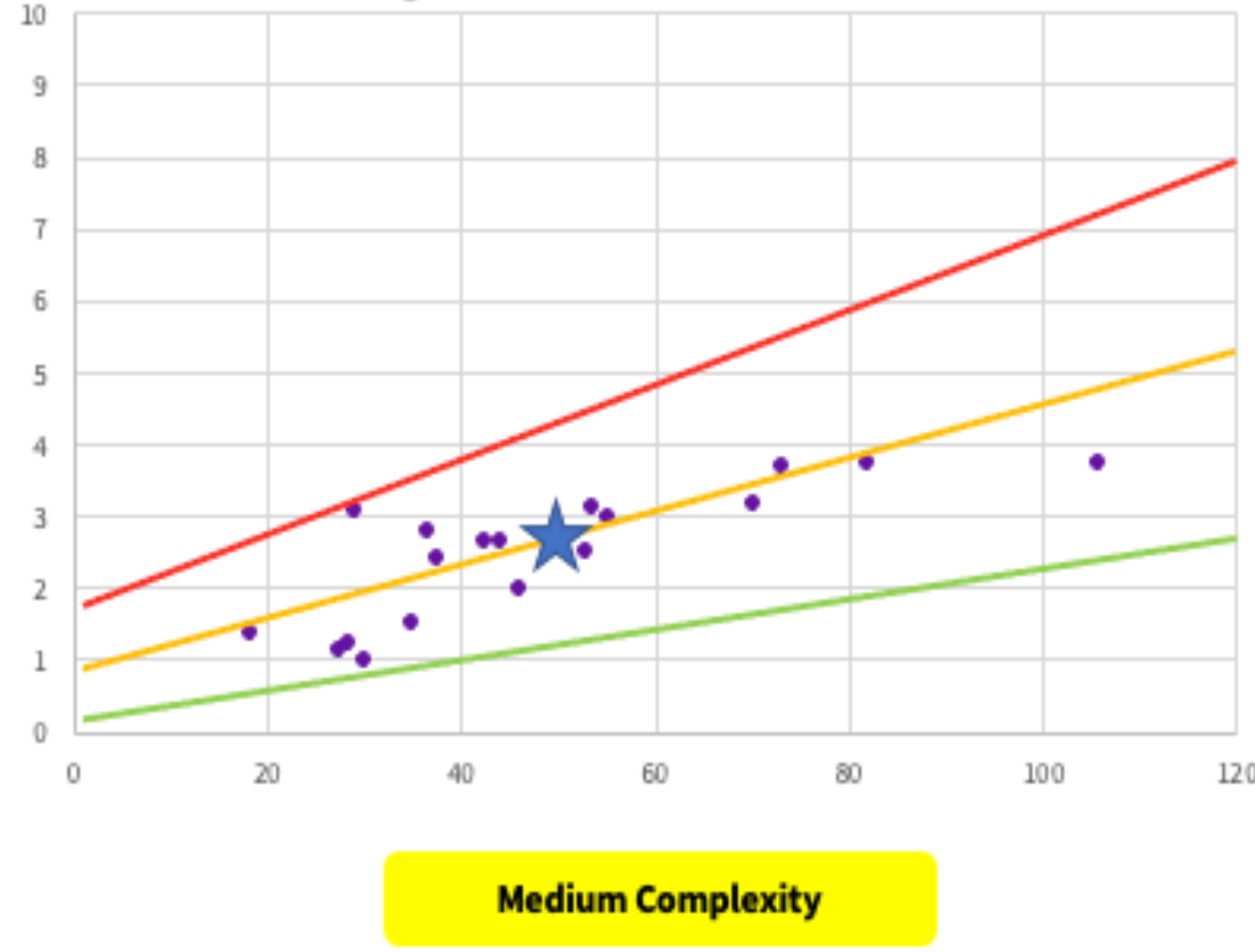
Overall New EMR TaCo Score (15 sec & 0.9 clicks)
Low Complexity
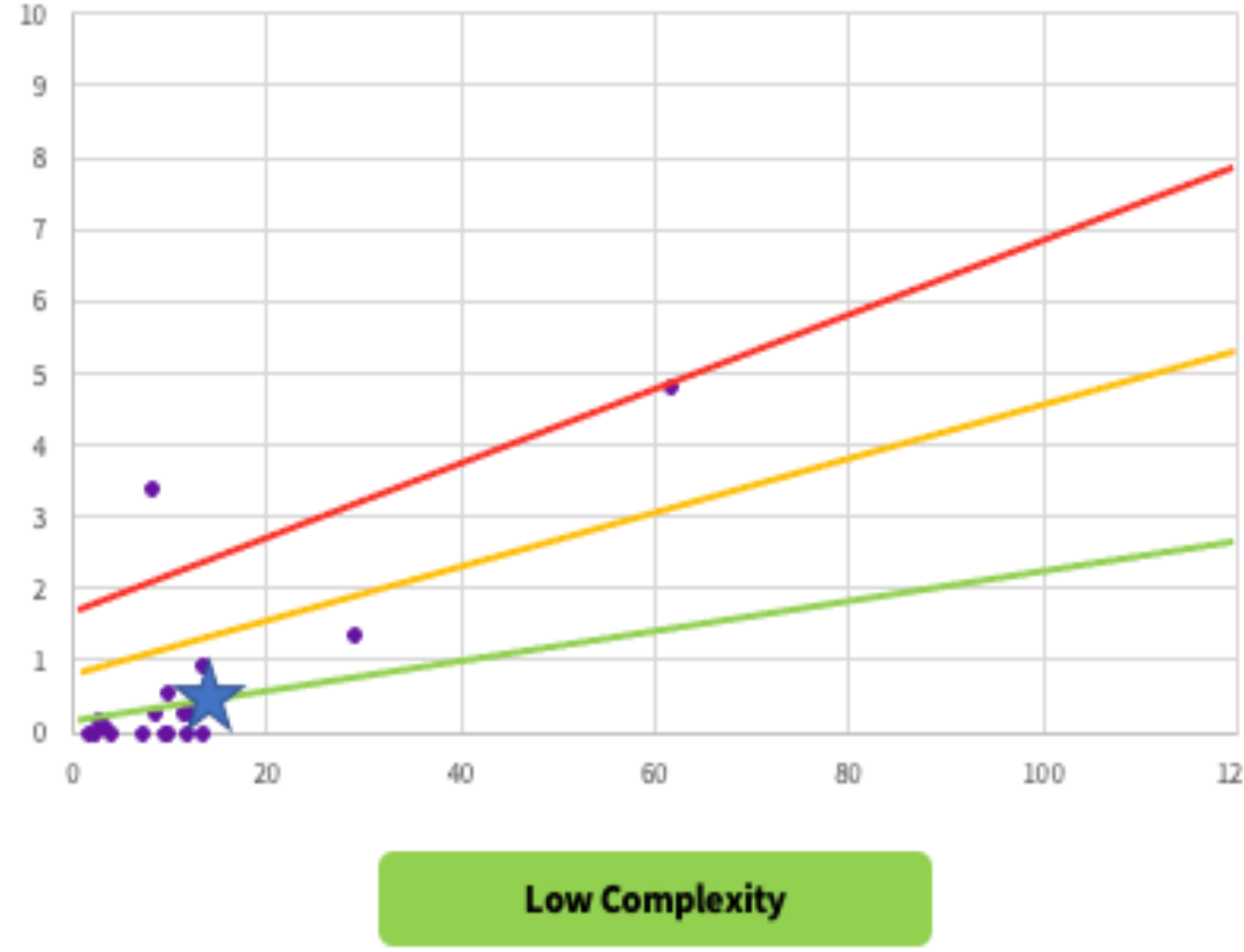
Conclusions

The findings from this research provided the vendor with quantified data pertaining to the use of their product, user perception of the data, and recommendations for future usability/UX changes.

Time Savings
- Oncologists using the new record system were able to find patient clinical data 78% faster compared to their current EMR.

Efficiency
- Clinicians streamlined their EMR workflow practice by reducing the number of chart locations from 18 down to 3 by using the new record system to obtain the data needed.

Perception
- When considering newly diagnosed oncology patients, 92% of clinicians would prefer to use the new record system to support their current work compared to using their EMR solely.