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# Efficiency of EHR Use & Management in Creating an Ideal Workspace & Presentation of Critical Data for Oncology-specific Care Providers

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Every system always operates at its capacity. As soon as there is some improvement, some new technology, we stretch it...

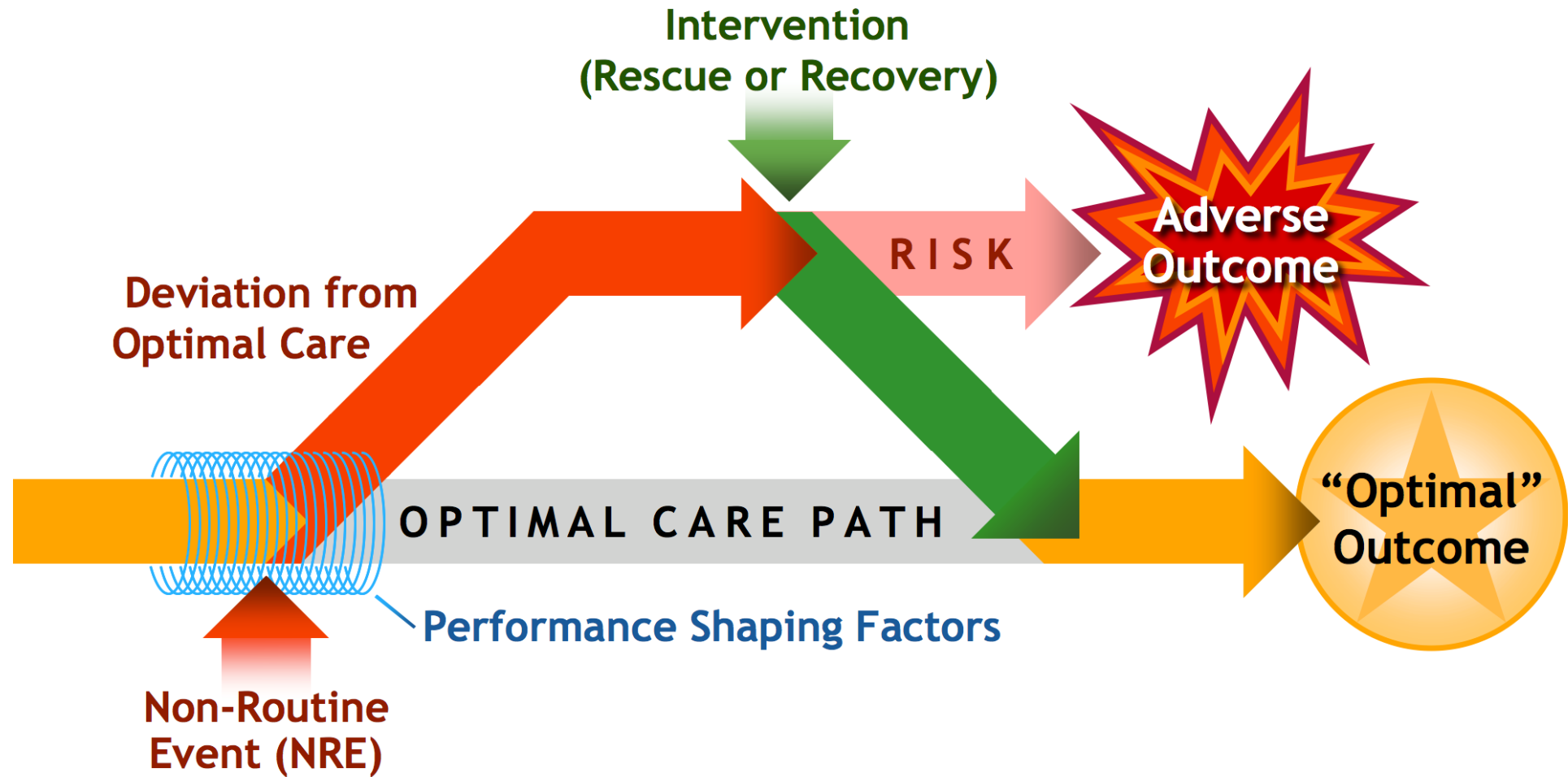
- Larry Hirschhorn, 1997

# Priority in care

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# Non-routine Event



# Cancer Patient NREs

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- **Equipment or technology issue example**

Patient was having his feeding tube adjusted and the care team involved forgot to clamp the tube resulting in a leakage. Patient's advice about clamping the tube was not heeded by care team involved.

- **Consequences of treatment**

Patient experienced severe nausea and cramping with chemotherapy. Began to question faith and had very dark thoughts, to the point of considering suicide. Patient waited out the nausea and pain and prayed to deal with his suicidal thoughts. Said he had sent a message to his doctors via MyHealth. As a result, patient was waiting to see his doctors to discuss stopping chemotherapy treatments.

# Cancer Patient NREs

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- **Patient factors**

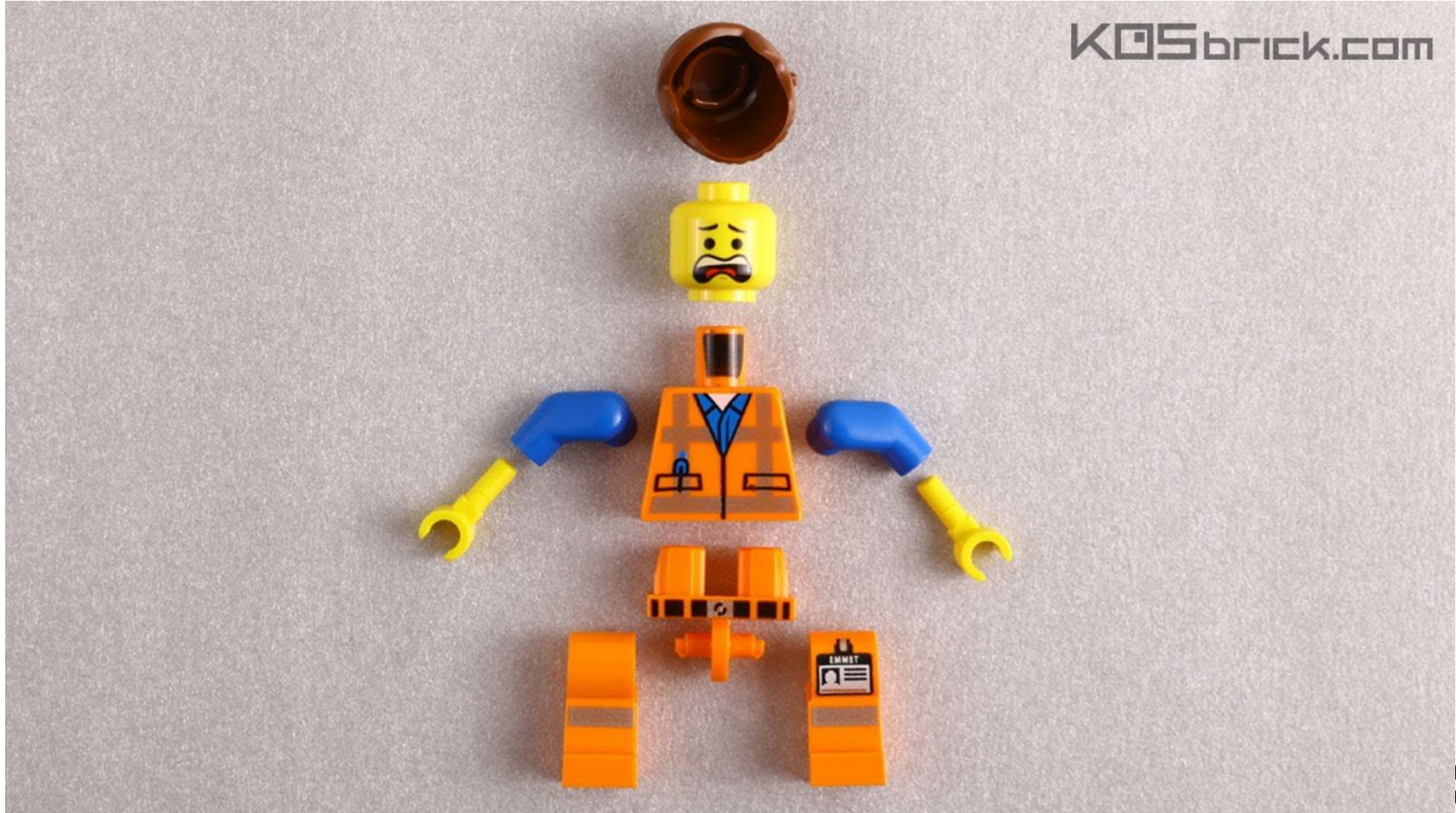
Patient had increasing soreness and pain over the course of a weekend, but forgot they had pain medicine that they could take. Even though this event occurred over the weekend, they did not alert their clinician about their uncontrolled pain until the following Tuesday.

Patient takes ropinirole for restless legs but forgot to take this medication before chemotherapy. Patient had an adverse response to chemotherapy involving involuntary spasms while sitting in the chair at infusion clinic. The reaction was due to the Benadryl in the infusion.



# Work as imagined versus work as found

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# 106 Non-Routine Events

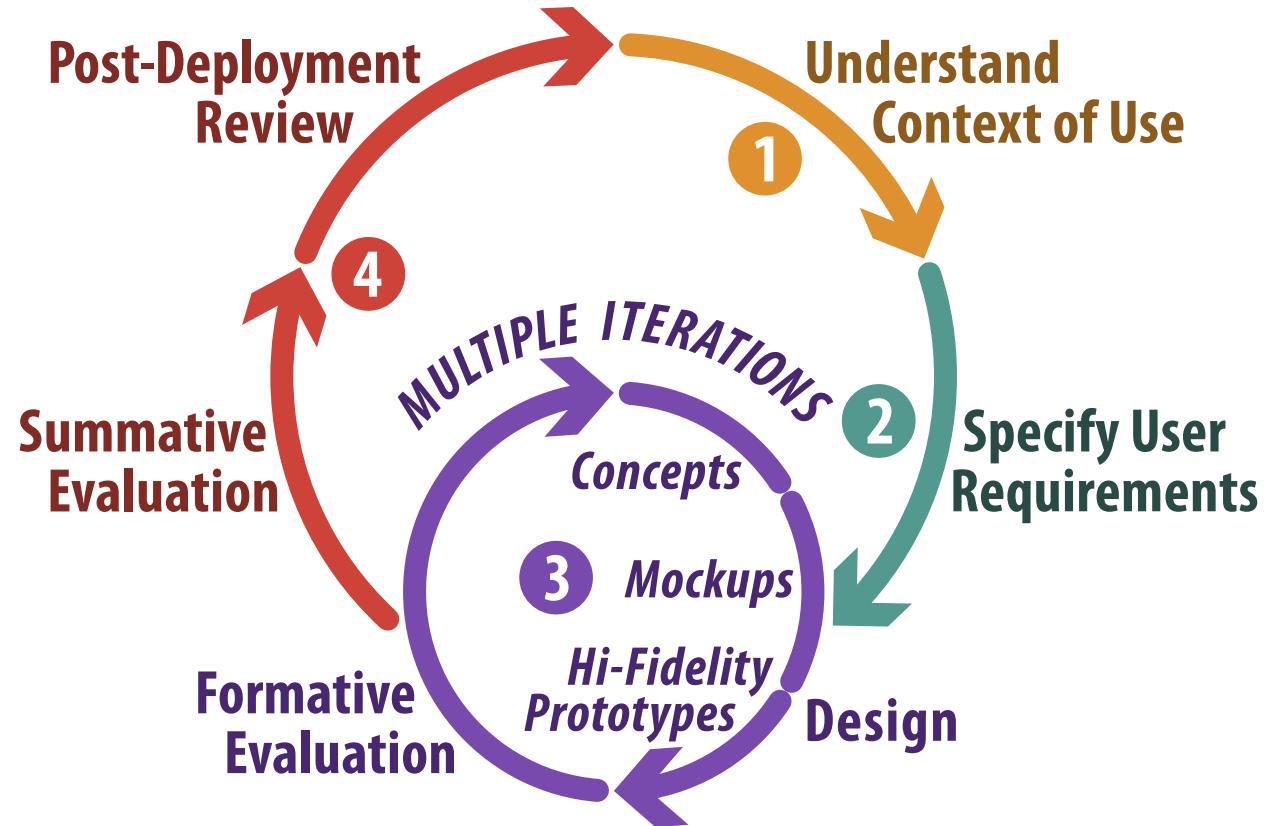
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- **86% occurred at home, 14% in HC facilities**
- **Majority related to side-effects of treatment**
  - 38% associated with chemo, 32% with radiation, 7% with surgery, and 24% unclear association
- **Majority not reported to clinical staff**
- **Often multifactorial with complex etiology**



# Human Centered Approach

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# Acknowledgements

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# Thank you!

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# Extras

# Opportunities for EHR improvement

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- How to best get new information to clinicians.  
How should patient reported outcome measures (PROMS) be visualized and provided to clinicians? When? How? What data?
- Better understand and design for latent failures in the system.
- Understanding additions to EHR:  
Do machine learning (ML) outputs really improve diagnostic accuracy and reduce clinicians' workload? Or are they simply another data point that adds complexity and another set of decisions that need to be evaluated?
- How should ML outputs be represented with patient data? What changes are needed, if any to conventional displays, and why?
- How are ML errors and unintended consequences detected and resolved?
- What role do conversations with patients play into conversations with EHRs for more integrated digital information?



# Accrual to Date

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- **56 eligible patients contacted**
- **38 patients consented (68% yield)**
  - 4 patients withdrew**
  - 26 have completed the study**
  - 8 patients currently enrolled**

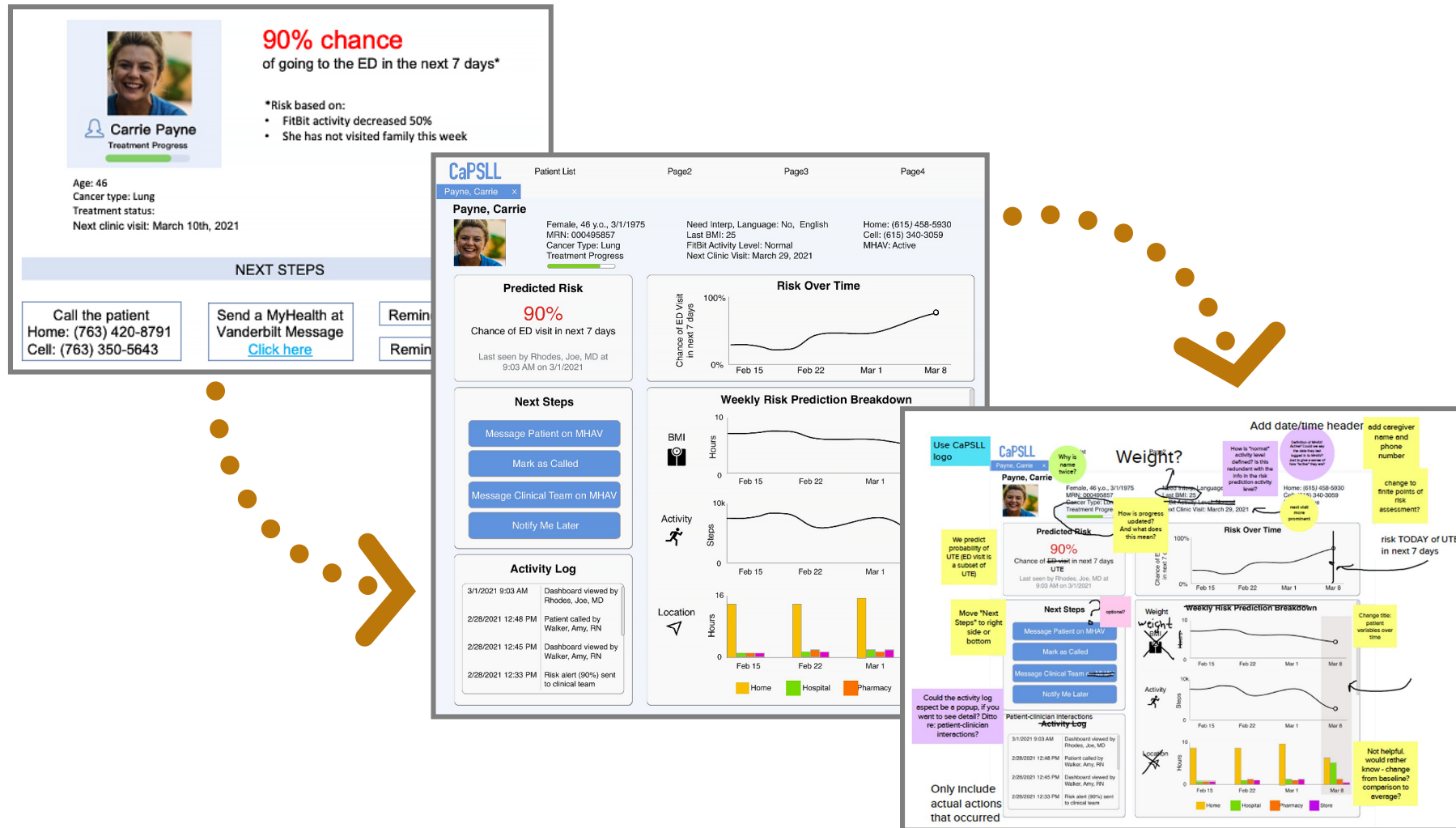
\* According to our original (pre-COVID) projections, we would have enrolled ~140 patients by now.

# Data Capture Success

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FitBit	34 (100%)
EHR data	34 (100%)
PROMs ( $\geq 1$ survey)	32 (94%)
Reported $\geq 1$ NRE	28 (82%)
At least 1 weight (6 have FitBit scales)	21 (62%)
Geolocation data	14 (41%)

# Iterative Design



# Clinician's Single Patient View

