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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

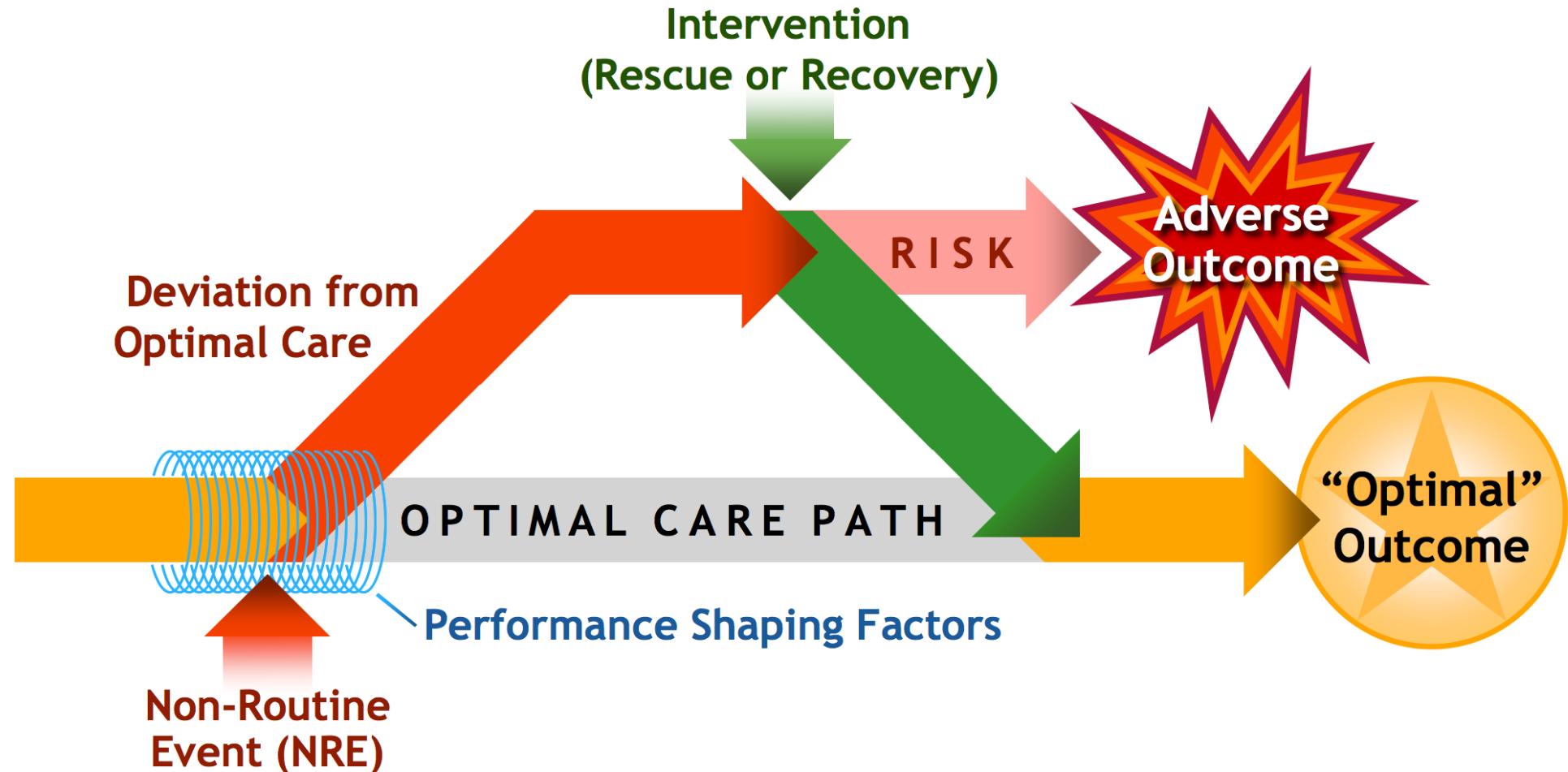
# Priority in care

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# Non-routine Event

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# 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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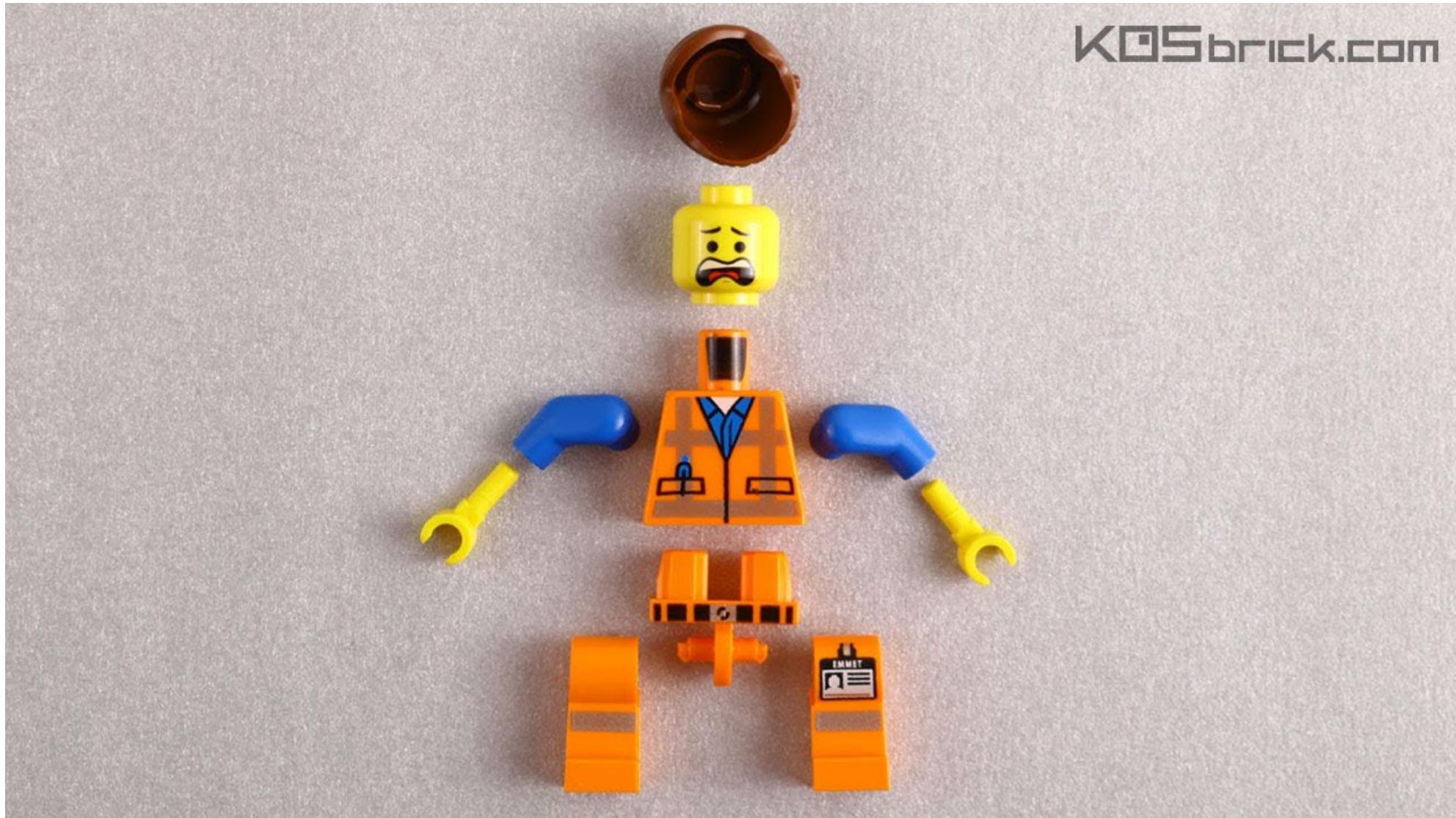
- **Patient factors**

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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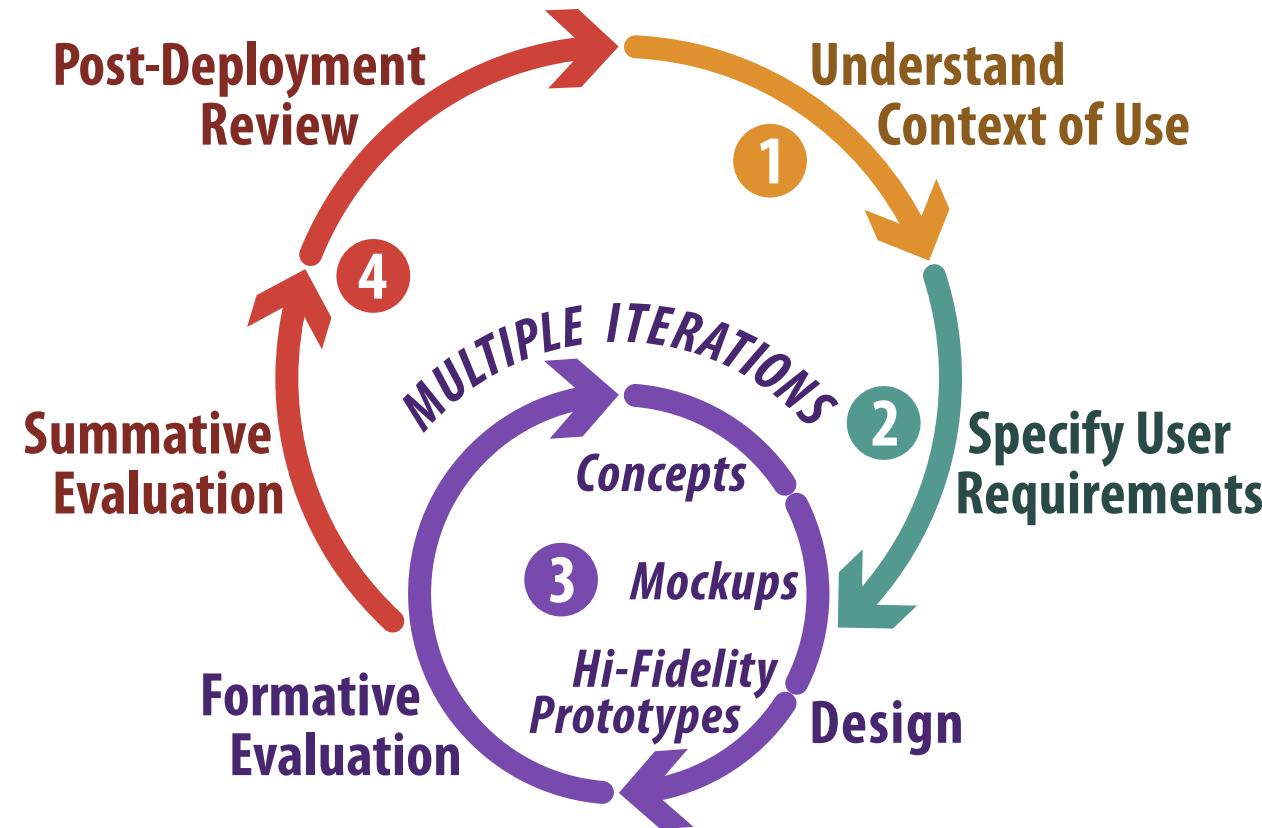
# 106 Non-Routine Events

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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

**90% chance**  
of going to the ED in the next 7 days\*

\*Risk based on:  
• FitBit activity decreased 50%  
• She has not visited family this week

Carrie Payne  
Treatment Progress

Age: 46  
Cancer type: Lung  
Treatment status:  
Next clinic visit: March 10th, 2021

**NEXT STEPS**

Call the patient  
Home: (763) 420-8791  
Cell: (763) 350-5643

Send a MyHealth at Vanderbilt Message  
[Click here](#)

Reminder

Reminder

**Patient List**  
Payne, Carrie x  
**Payne, Carrie**

Female, 46 y.o., 3/1/1975  
MRN: 000485957  
Cancer Type: Lung  
Treatment Progress

Need Interp. Language: No, English  
Last BMI: 25  
FitBit Activity Level: Normal  
Next Clinic Visit: March 29, 2021

Home: (615) 458-5890  
Cell: (615) 340-3069  
MHAV: Active

**Predicted Risk**  
**90%**  
Chance of ED visit in next 7 days

Last seen by Rhodes, Joe, MD at 9:03 AM on 3/1/2021

**Next Steps**

- Message Patient on MHAV
- Mark as Called
- Message Clinical Team on MHAV
- Notify Me Later

**Activity Log**

3/1/2021 9:03 AM Dashboard viewed by Rhodes, Joe, MD  
2/28/2021 12:48 PM Patient called by Walker, Amy, RN  
2/28/2021 12:45 PM Dashboard viewed by Walker, Amy, RN  
2/28/2021 12:33 PM Risk alert (90%) sent to clinical team

**Risk Over Time**

Chance of ED Visit in next 7 days

Feb 15 Feb 22 Mar 1 Mar 8

**Weekly Risk Prediction Breakdown**

BMI  
Hours  
Activity  
Steps  
Location  
Hours  
Activity  
Steps  
Location  
Hours  
Activity  
Steps  
Location

**Use CaPSLL logo**  
**CaPSLL**  
Payne, Carrie x  
Payne, Carrie

Female, 46 y.o., 3/1/1975  
MRN: 000485957  
Cancer Type: Lung  
Treatment Progress

Why is name twice?  
How is "normal" defined?  
Definition of MHAV is redundant with the info in the risk prediction level?  
Home: (615) 458-5890  
Cell: (615) 340-3069  
MHAV: Active

Weight?  
Add date/time header  
add caregiver name and phone number  
change to finite points of risk assessment?

Only include actual actions that occurred

Could the activity log expect be a popup, if you want to see detail? Dicto re: patient-clinician interactions?

Move "Next Steps" to right side on bottom

Next Steps  
Message Patient on MHAV  
Mark as Called  
Message Clinical Team on MHAV  
Notify Me Later

Patient-clinician interactions  
Activity  
3/1/2021 9:03 AM Dashboard viewed by Rhodes, Joe, MD  
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Change title: patient variables over time

Not helpful, would rather know - change from baseline? comparison to average?

**Risk Over Time**

Chance of ED Visit in next 7 days

Feb 15 Feb 22 Mar 1 Mar 8

**Weekly Risk Prediction Breakdown**

Weight  
Hours  
Activity  
Steps  
Location  
Hours  
Activity  
Steps  
Location  
Hours  
Activity  
Steps  
Location

# Clinician's Single Patient View

**CaPSLL Cancer Patient Safety Learning Laboratory** *Patient Overview* [Patient List](#) [Help](#) [Log Out](#) Logged in as: Test Provider

**Payne, Carrie**



MHAV: Active  
Language: English  
MR# 110100010  
Age: 58 y  
Sex: Female

Primary Cancer: Head & Neck  
Stage: 2 tonsil + lymph node cancer  
Completed Period of Treatment: 10 months  
Completed Period of CaPSLL: 10 months

**Risk Score**  
**95%**  
Chance of Unplanned Treatment Event (i.e. ED visit) in next 7 days

**Past NRDs® & UTEs for Nov**

S	M	T	W	T	F	S
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

\*NRDs are self-reported data  
6 UTEs total

**Weekly Distress Thermometer**

**Symptom Tracker**  
7 symptoms reported in the past week

01/23/20 05:25 PM	Patient reported swallowing problems, weight (more...)
01/23/20 05:25 PM	Patient reported pain in mouth and throat (more...)
01/23/20 05:25 PM	Patient reported nausea, pain, fatigue (more...)

**Actions**

- Message Patient on MHAV
- Mark Having Called Patient
- Message Clinical Team
- Notify Me Later

Weight (lbs) 07/5/21 07/12/21 07/19/21 07/26/21 08/02/21

Heart Rate (bpm) Maximum (daily) Minimum (daily) Average

