



# CANCER CARE @ HOME

## EMERGING TELEHEALTH AND VIRTUAL CANCER CARE SOLUTIONS

Tufia Haddad, M.D.

Associate Professor of Oncology

Medical Director for Digital Product & Platform Strategy, Mayo Clinic Center for Digital Health

Director of Platform and Digital Innovation, Mayo Clinic Comprehensive Cancer Center

Breast Cancer Education Association

January 22, 2022

©2021 Mayo Foundation for Medical Education and Research | slide-1

1

## CANCER CARE @ HOME OVERVIEW

- Strategies and Use Cases
  - Electronic patient reported outcomes
  - Interactive care plans
  - Remote Patient Monitoring
  - Hospital at Home
- Opportunities to enhance 'Care @ Home' adoption and expansion

©2021 Mayo Foundation for Medical Education and Research | slide-2

2

## REMOTE TELEMONITORING FOR CHRONIC DISEASE MANAGEMENT

- Remote monitoring of patient generated health data to facilitate clinical decision making has been used in the management of chronic diseases other than cancer.
- Several studies have associated it with
  - Improved patient quality of and symptom control
  - Decreased emergency room visits and unplanned hospitalizations
  - Decreased overall health care costs

Can these findings be replicated to support patients with cancer across the care continuum?



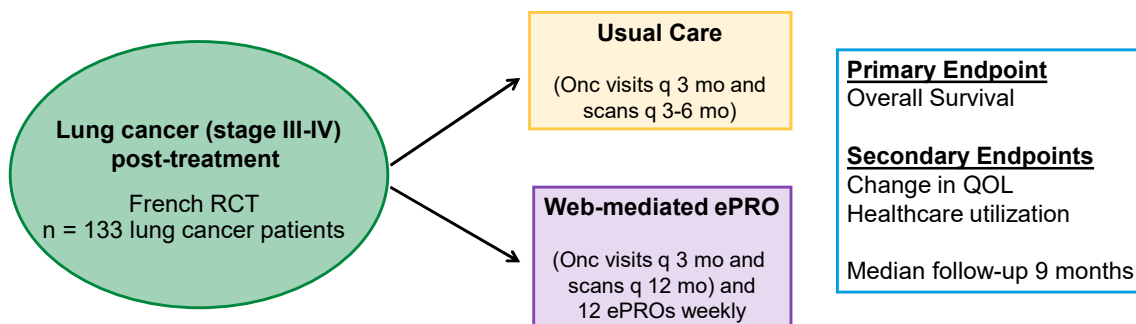
3

## ELECTRONIC PATIENT REPORTED OUTCOMES (ePROs)

©2021 Mayo Foundation for Medical Education and Research | slide-4

4

## WEB-MEDIATED FOLLOW-UP COMPARED WITH ROUTINE SURVEILLANCE IN LUNG CANCER



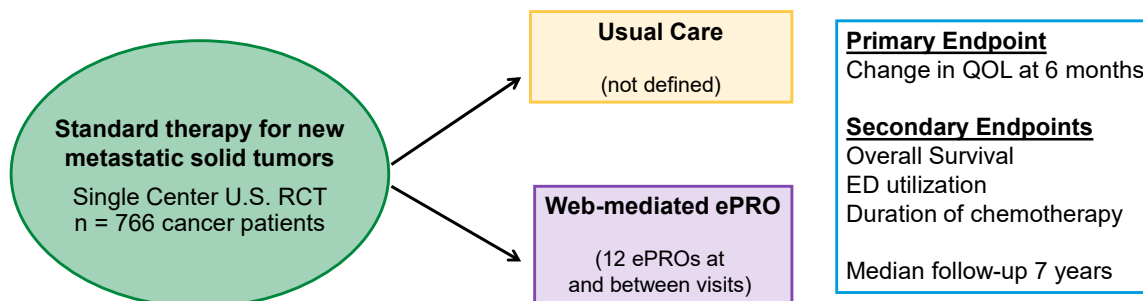
- Weekly ePRO monitoring improved average survival time by ~60%
- Additionally, it reduced the annual average cost of surveillance

Denis et al. J Natl Cancer Inst 2017;109(9)  
Lizee et al. J Thor Oncol 2019;14(6):1012-20

©2021 Mayo Foundation for Medical Education and Research | slide-5

5

## ePROS FOR SYMPTOM MONITORING DURING ROUTINE CANCER TREATMENT



Basch et al. J Clin Oncol. 2016; 34(6)  
Basch et al. JAMA 2017;318(2)

©2021 Mayo Foundation for Medical Education and Research | slide-6

6

## ePROs ASSESSED AND CLINICAL OUTCOMES

### Symptoms Monitored

- Appetite loss
- Constipation
- Cough
- Diarrhea
- Dyspnea
- Dysuria
- Fatigue
- Hot flashes
- Nausea
- Pain
- Neuropathy
- Vomiting

### METHODS

Email alerts to care team RNs when a PRO worsened by  $\geq 2$  pts or reached an absolute grade  $\geq 3$

### RESULTS

QOL improved more commonly among more participants those monitored

Patients receiving ePROs

- Were less frequently admitted to the ED
- Remained on chemotherapy longer
- Had a longer average survival time

Basch et al. J Clin Oncol. 2016; 34(6)

Basch et al. JAMA 2017;318(2)

©2021 Mayo Foundation for Medical Education and Research | slide 7

7

## CLINICAL IMPLEMENTATION OF ePROs

- The IMPACT consortium consists of 3 Research Centers (RCs) that are deploying integrated electronic systems to monitor and manage cancer symptoms in diverse practice settings
- Established in support of the Blue Ribbon Panel Report and a top 10 priority to **minimize cancer treatment's debilitating side effects**
- Mayo Clinic; Northwestern University; DFCI, Dartmouth, Baptist Memorial



L Finney Rutten et al. Trials. 2020 Jun 5;21(1):480

©2021 Mayo Foundation for Medical Education and Research | slide 8

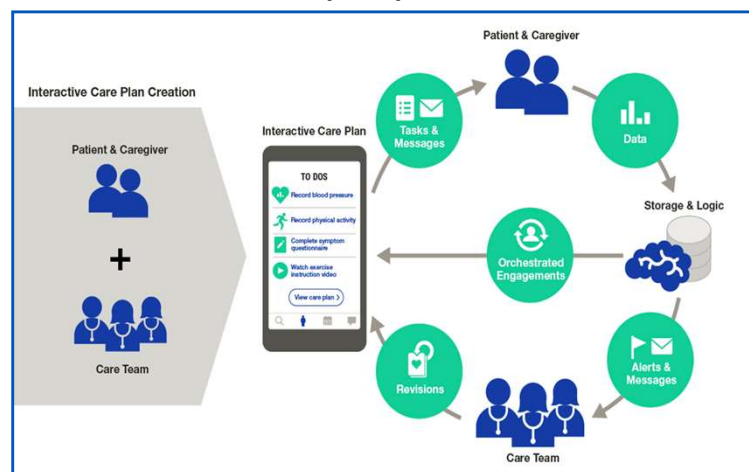
8

# FACILITATED SELF-CARE

©2021 Mayo Foundation for Medical Education and Research | slide-9

9

## TECHNOLOGY PLATFORM SUPPORTING THE INTERACTIVE CARE PLAN (ICP)






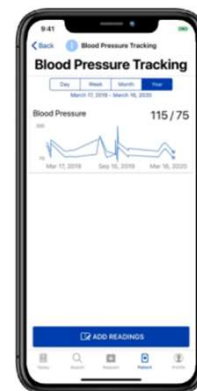
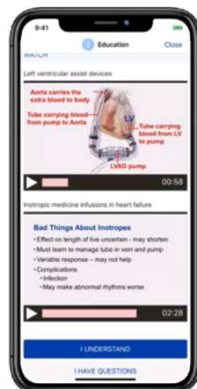
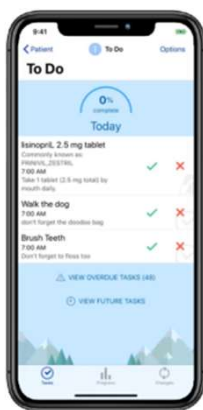
©2021 Mayo Foundation for Medical Education and Research | slide-10

10

## COMPONENTS

### INTERACTIVE CARE PLANS

-  To-Do List
-  Education
-  Questionnaires
-  Physiologic Data

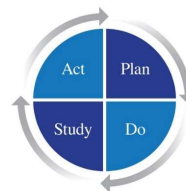


©2021 Mayo Foundation for Medical Education and Research | slide-11

11

## BREAST CANCER SURVIVORSHIP ICP

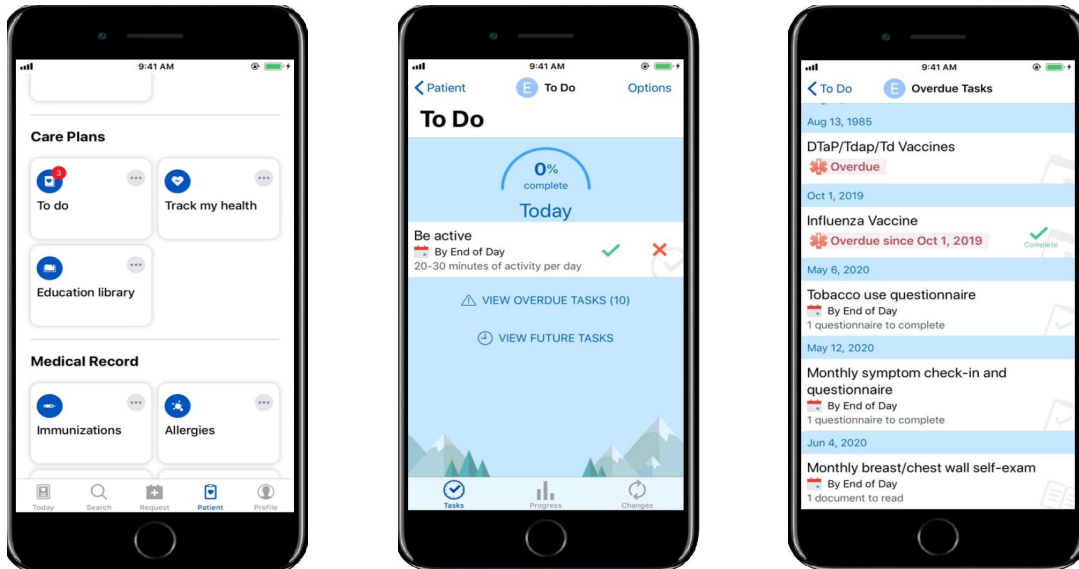
- Daily activity tracking
- Monthly surveillance
  - Self-exam breast/chest wall
  - Recurrence symptoms
- Monthly symptom assessments
  - ePRO for: hot flashes, fatigue, insomnia and sexual dysfunction
  - On demand education
- Quarterly QOL questionnaire
- Modules
  - Tobacco cessation
  - Mindfulness
- Pilot implementation August 2020
- Goal to enroll 100 patients
- Rapid PDSA cycles are ongoing for iterative product development
- Once usability and patient activation are optimized, efficacy will be assessed



©2021 Mayo Foundation for Medical Education and Research | slide-12

12

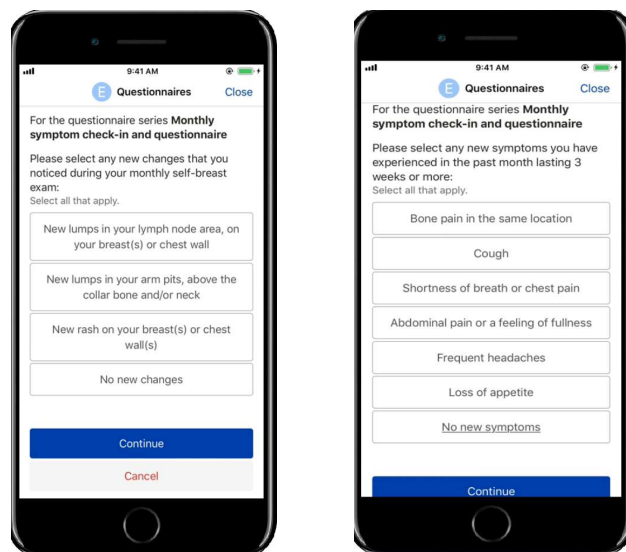
## MOBILE APP-BASED INTERACTIVE CARE PLAN



©2021 Mayo Foundation for Medical Education and Research | slide-13

13

## MONTHLY SURVEILLANCE - RECURRENCE SYMPTOMS & SELF-EXAM

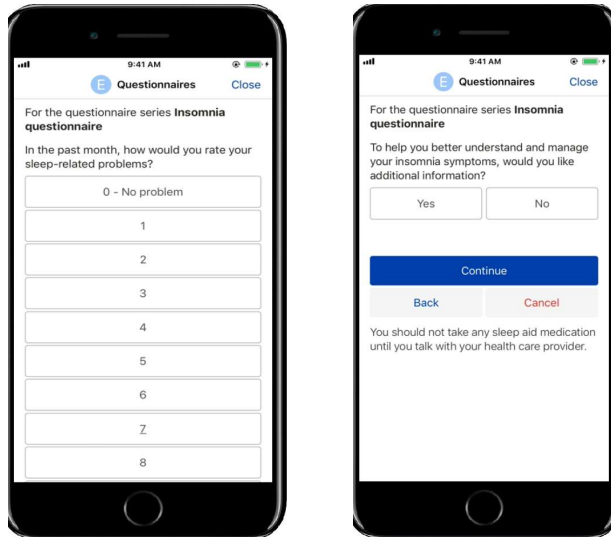


Embedded logic escalates concerning signs and symptoms to the care team inbox

©2021 Mayo Foundation for Medical Education and Research | slide-14

14

## MONTHLY MONITORING OF SIDE EFFECTS VIA ePROs



Educational content is made available for those who request it, and it's archived in Education Library

©2021 Mayo Foundation for Medical Education and Research | slide-15

15

## OTHER CARE PLANS IN DEVELOPMENT



### Oral Cancer Therapy Care Plans

- CDK 4/6 inhibitors

### Peri-operative Care Plans

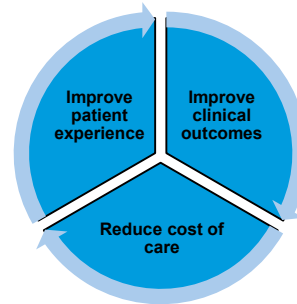
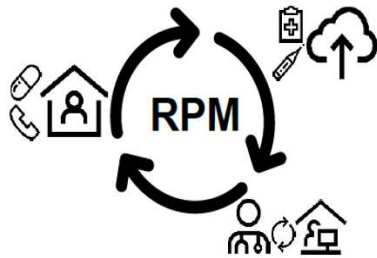
- Breast cancer surgery
- Breast reconstruction

©2021 Mayo Foundation for Medical Education and Research | slide-16

16



## REMOTE PATIENT MONITORING (RPM)



©2021 Mayo Foundation for Medical Education and Research | slide-17

17

## ELEMENTS IN THE RPM DIGITAL ECOSYSTEM

### • People

- Patients & Caregivers
- Clinical care teams – centralized nursing support

### • Technology

- Web or mobile patient-facing platforms
- Devices for monitoring, diagnostics, therapeutics
- Data integrated in the electronic health record

### • Operations

- Clinical Implementation
- Customer/Technical Support
- Regulatory/Compliance
- Data & Analytics



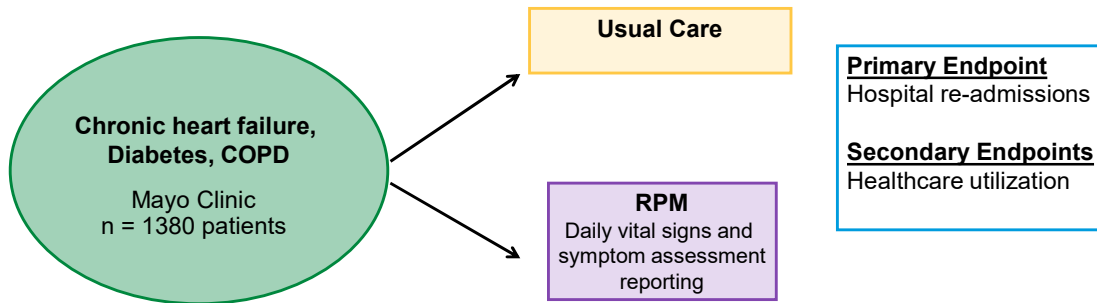
Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved



©2021 Mayo Foundation for Medical Education and Research | slide-18

18

## RPM FOR PATIENTS WITH CHRONIC CONDITIONS



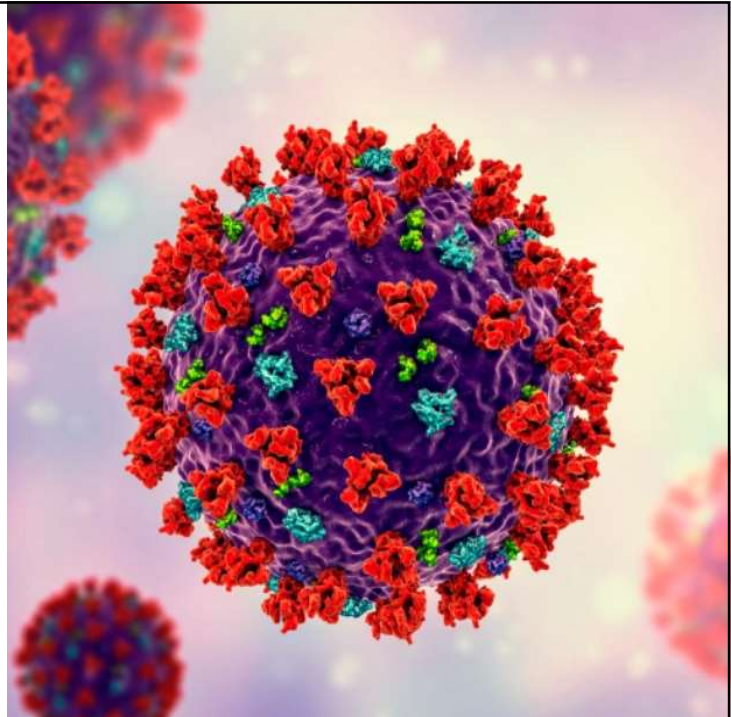
- Daily monitoring and centralized nursing reduced hospital re-admissions by 23%
- Additionally, it reduced the ED visits by 39%

Dawson NL, et al. J Gen Intern Med. 2021 Jan 27.  
©2021 Mayo Foundation for Medical Education and Research | slide-19

19

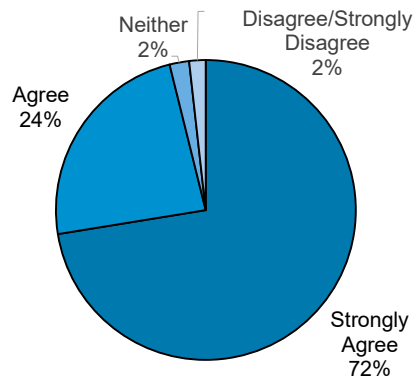
## RPM FRAMEWORK LEVERAGED TO RESPOND TO THE COVID-19 PANDEMIC

*Novel use case to support an acute condition*



20

## LIKELIHOOD TO RECOMMEND



96% of patients agree (72% strongly agree) that they would recommend the RPM program to someone else; very few disagree

Analyzed 1/15/2021  
Mayo Clinic Experience Research

N=684

©2021 Mayo Foundation for Medical Education and Research | slide-21

21

## PATIENT FEEDBACK

Felt like I had an "angel on my shoulder."

It's like having a nurse in my room every 2 hrs.

I'm almost 81 years old and it was so easy to use.

I was able to talk with someone if I had concerns.  
It was very hard to contact my doctor or nurse otherwise.

I would have died without this program. I have no idea how I was enrolled or chosen. Eternally grateful.

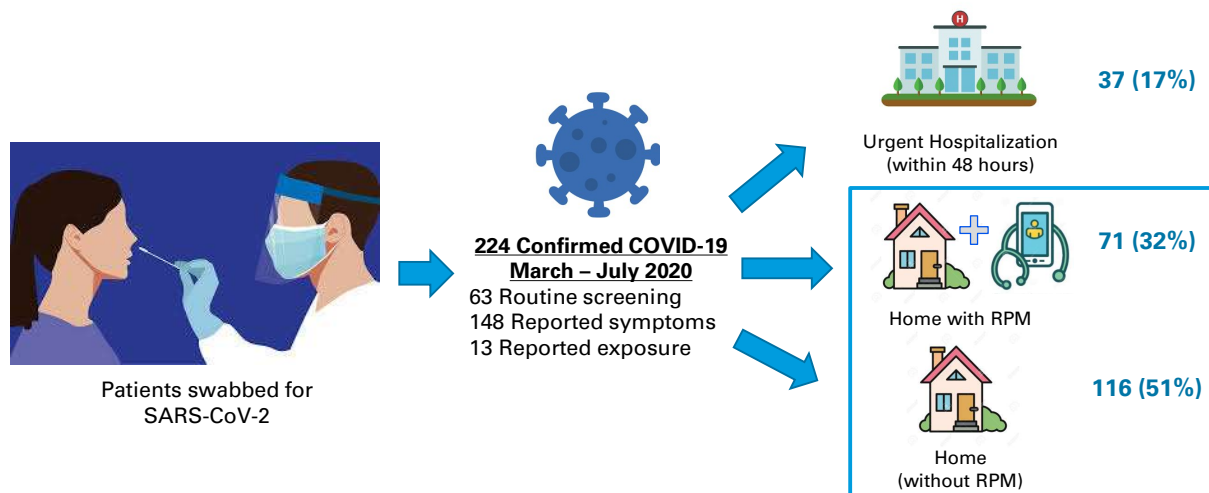
We purchased the identical equipment to continue ongoing care.

The speed that [the technology] came helped relieve my fears of COVID.

©2021 Mayo Foundation for Medical Education and Research | slide-22

22

## INITIAL MANAGEMENT AND DISPOSITION OF CANCER PATIENTS DIAGNOSED WITH COVID-19 AT MAYO CLINIC



J Pritchett and T Haddad et al. JCO Oncol Pract. 2021; 17(9); e1293-1302.

©2021 Mayo Foundation for Medical Education and Research | slide-23

23

## COMPARATIVE ANALYSIS: RPM VS NO MONITORING

- **30-day hospitalization rate significantly lower (78%) in the RPM group**

- When hospitalized, RPM pts had:

- Shorter length of stay\*
- Fewer prolonged hospitalizations\*
- Fewer ICU admissions\*
- Lower mortality\*

*\*trends did not reach significance*



Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved

©2021 Mayo Foundation for Medical Education and Research | slide-24

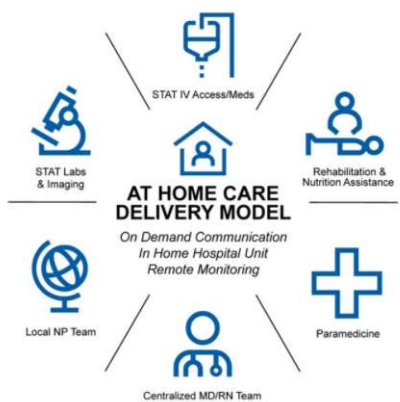
24

# HOSPITAL AT HOME

©2021 Mayo Foundation for Medical Education and Research | slide-25

25

## ADVANCED CARE AT HOME



### KEY COMPONENTS

- Command Center
- Supplier Network
- Internal Logistics
- Payment Model

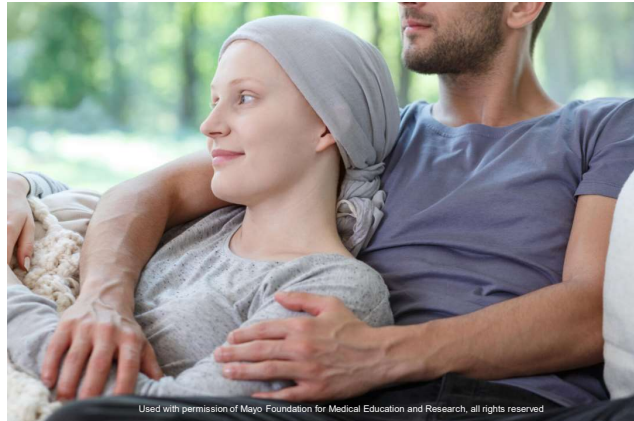


©2021 Mayo Foundation for Medical Education and Research | slide-26

26

## HOSPITAL @ HOME UNIVERSITY OF UTAH

- Primary goals for the home-based, oncology acute episode care model
  - Increase time at home for patients resulting in an improved patient and family experience
  - Expand hospital bed capacity
  - Reduce ED use

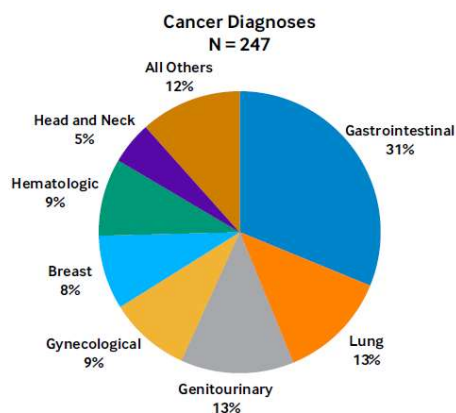


K Titchener et al. NEJM Catalyst 2021; 2(11)

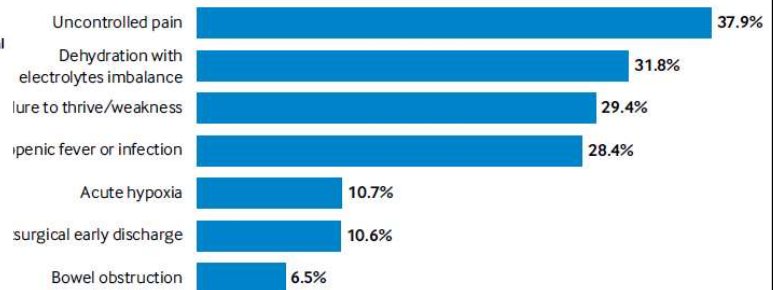
©2021 Mayo Foundation for Medical Education and Research | slide-27

27

## RESULTS – INITIAL COHORT



### Admitting Diagnoses\*



K Titchener et al. NEJM Catalyst 2021; 2(11)

©2021 Mayo Foundation for Medical Education and Research | slide-28

28

## RESULTS – 30-DAY OUTCOMES FOLLOWING HOSPITAL DISCHARGE

- Consecutive patients referred to Hospital @ Home (HH) program
  - Those meeting admission criteria – HH cohort
  - Those outside the 20-mile radius or declining participation - Usual Care (UC) cohort



### Care Utilization

55% reduction in the odds of unplanned hospitalizations



1.1 day reduction in hospital length of stay



### Cost of Care

47% reduction in costs

K Mooney et al. J Clin Oncol 2021;39:2586-93

©2021 Mayo Foundation for Medical Education and Research | slide-29

29

## OPPORTUNITIES TO ENHANCE VIRTUAL CARE ADOPTION AND EXPANSION

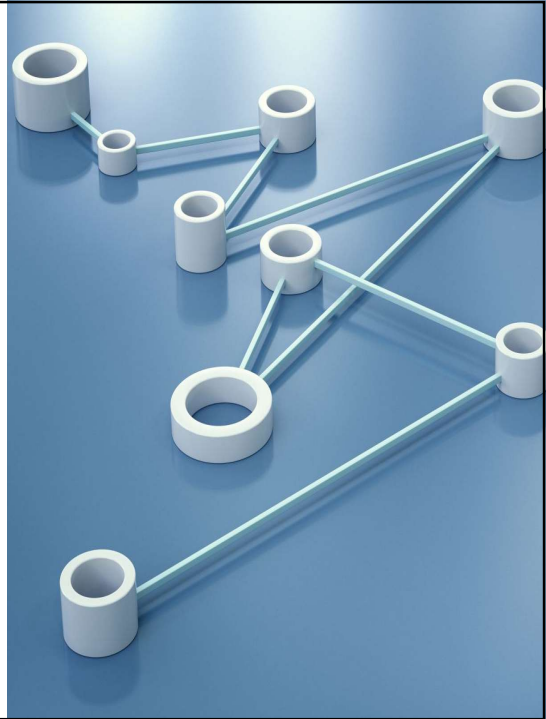
©2021 Mayo Foundation for Medical Education and Research | slide-30

30



## ENHANCING VIRTUAL CARE ADOPTION AND EXPANSION

- OPTIMIZE PATIENT USER EXPERIENCE
- PRESERVE THE HUMAN TOUCH FROM CARE TEAMS
- IMPROVE CLINICAL AND OPERATIONAL MODEL EFFICIENCY
- ADVANCE TECHNOLOGY

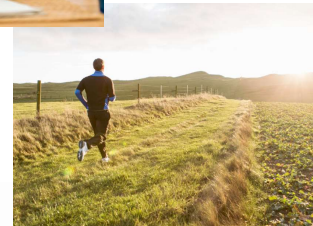


31

## ENHANCING VIRTUAL CARE ADOPTION AND EXPANSION

ADDRESS BARRIERS TO ACCESS

ACCESS ≠ ENGAGEMENT



All images used with permission of Mayo Foundation for Medical Education and Research; All rights reserved.  
©2021 Mayo Foundation for Medical Education and Research | slide-32

32

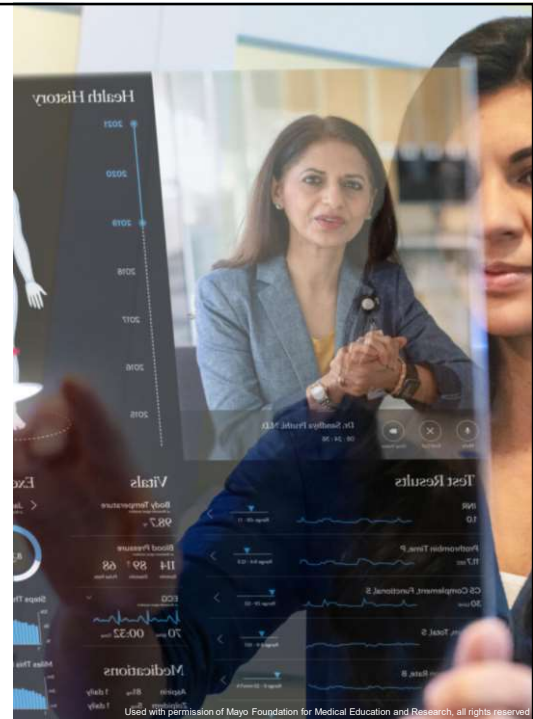




**THANK YOU**

*"I look through a half-opened door into the future, full of interest, intriguing beyond my power to describe."*

**- Dr. William J. Mayo, 1931**



33

**QUESTIONS  
& ANSWERS**



©2021 Mayo Foundation for Medical Education and Research | slide-34

34