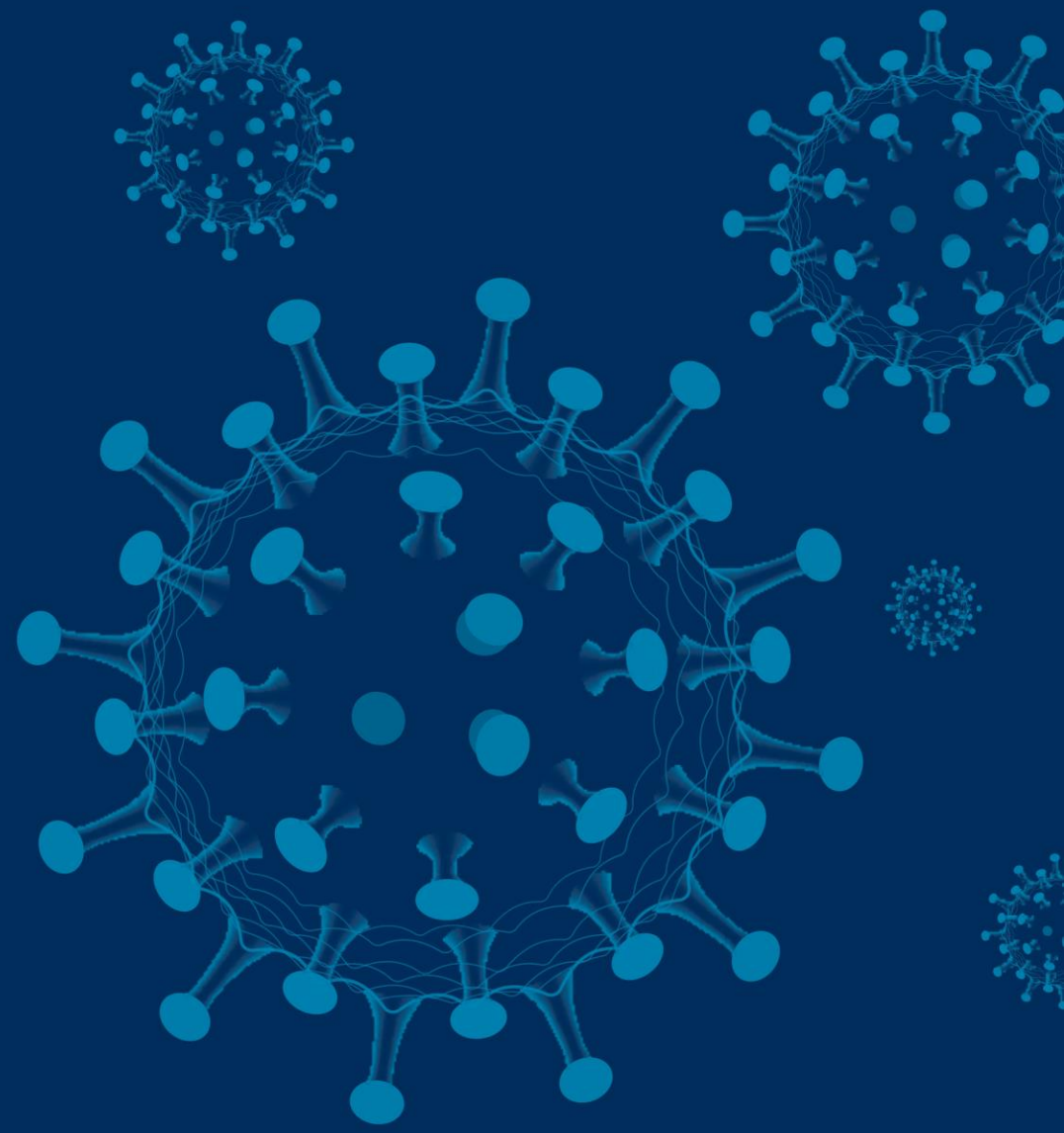
AMERICAN COLLEGE of CARDIOLOGY

COVID-19

Operationalizing Longitudinal Virtual Care



Recorded on 6/22/2020

AMERICAN COLLEGE of CARDIOLOGY

COVID-19

Speakers

Ameya Kulkarni, MD
Mid Atlantic Permanente Medical Group, McLean, VA

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Faculty Cardiologist, Principal Investigator, Healthcare Innovation and Practice Transformation Laboratory, Scripps Clinic & Research Foundation, La Jolla, CA

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Associate Professor, Section of Cardiovascular Medicine, Specialty Lead, Yale Medicine Population Health, Center for Outcomes Research and Evaluation,
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Presenter Disclosure Information

Ameya Kulkarni, MD
Nothing to disclose

Sanjeev P. Bhavnani, MD
Sanjeev Bhavnani is a scientific advisor to Analytics 4 Life and Blumio; consultant to Bristol Meyers Squibb and Pfizer; data safety monitoring board chair at Proteus Digital; has received research support from Scripps Clinic and the Qualcomm Foundation, and is member of the innovation advisory boards at the American College of Cardiology, American Society of Echocardiography, and BIOCOM (all non-profit institutions with all positions voluntary).

Erica S. Spatz, MD, MHS, FACC
Nothing to disclose

AMERICAN COLLEGE of CARDIOLOGY

COVID-19

Making Virtual Care Vital

Sanjeev Bhavnani MD
Division of Cardiology – Healthcare Innovation Laboratory
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AMERICAN COLLEGE of CARDIOLOGY

COVID-19

Learning Objectives

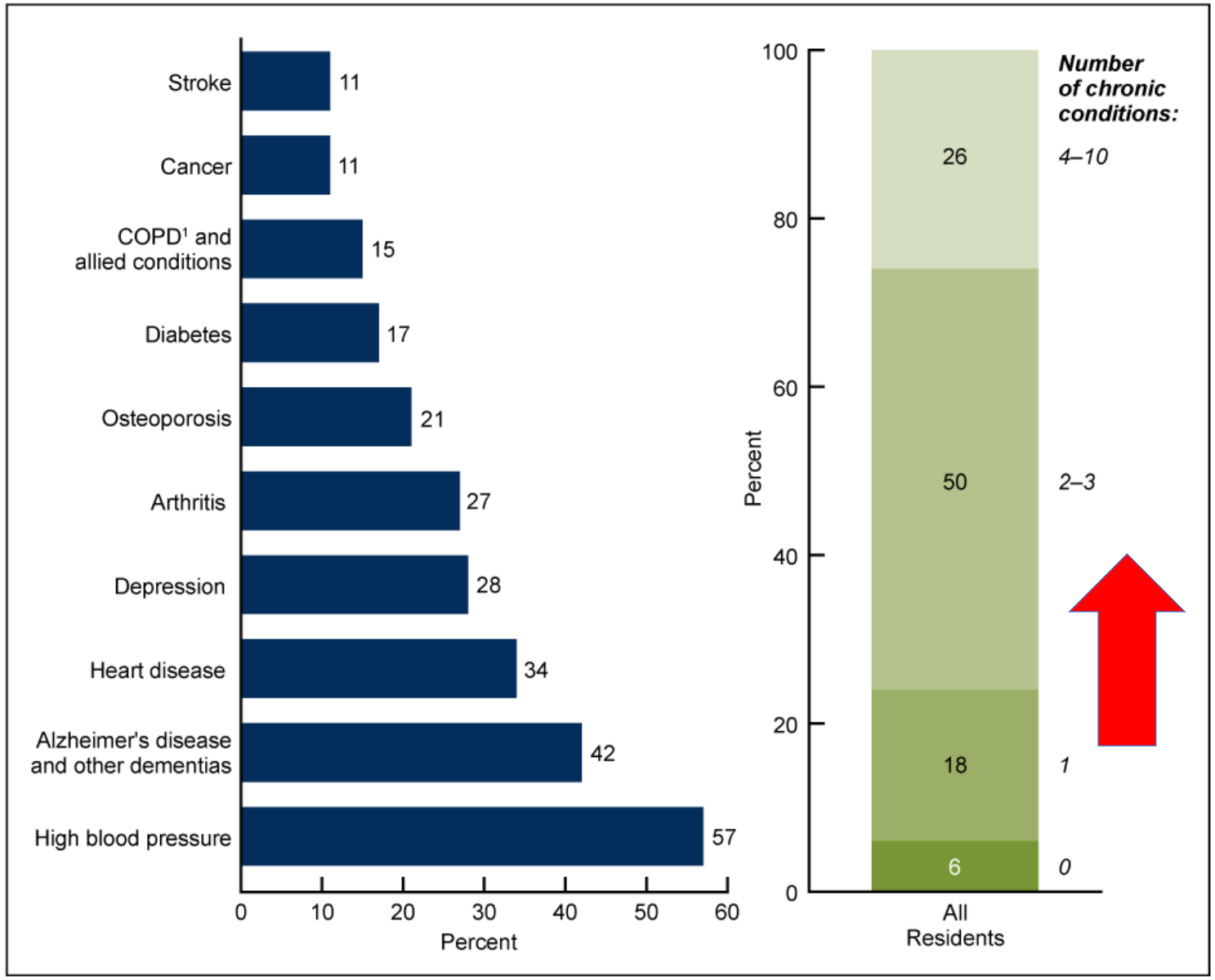
1. Learn about virtual care and digital health transformation
2. Become familiar with the functionalities of a modern remote monitoring virtual care program
3. Real world evidence examples of hypertension and arrhythmia monitoring
4. Leave knowing that virtual care is an integrated model to improve the quality and costs of care

Virtual Care :

"The tools, processes, and procedures allowing organizations to create, manipulate, and manage patients in a individualized approach using new data sets"

Not just devices and technologies …
Moves from device to data to knowledge and aims to answer clinically meaningful questions leading to improved efficiency and outcomes

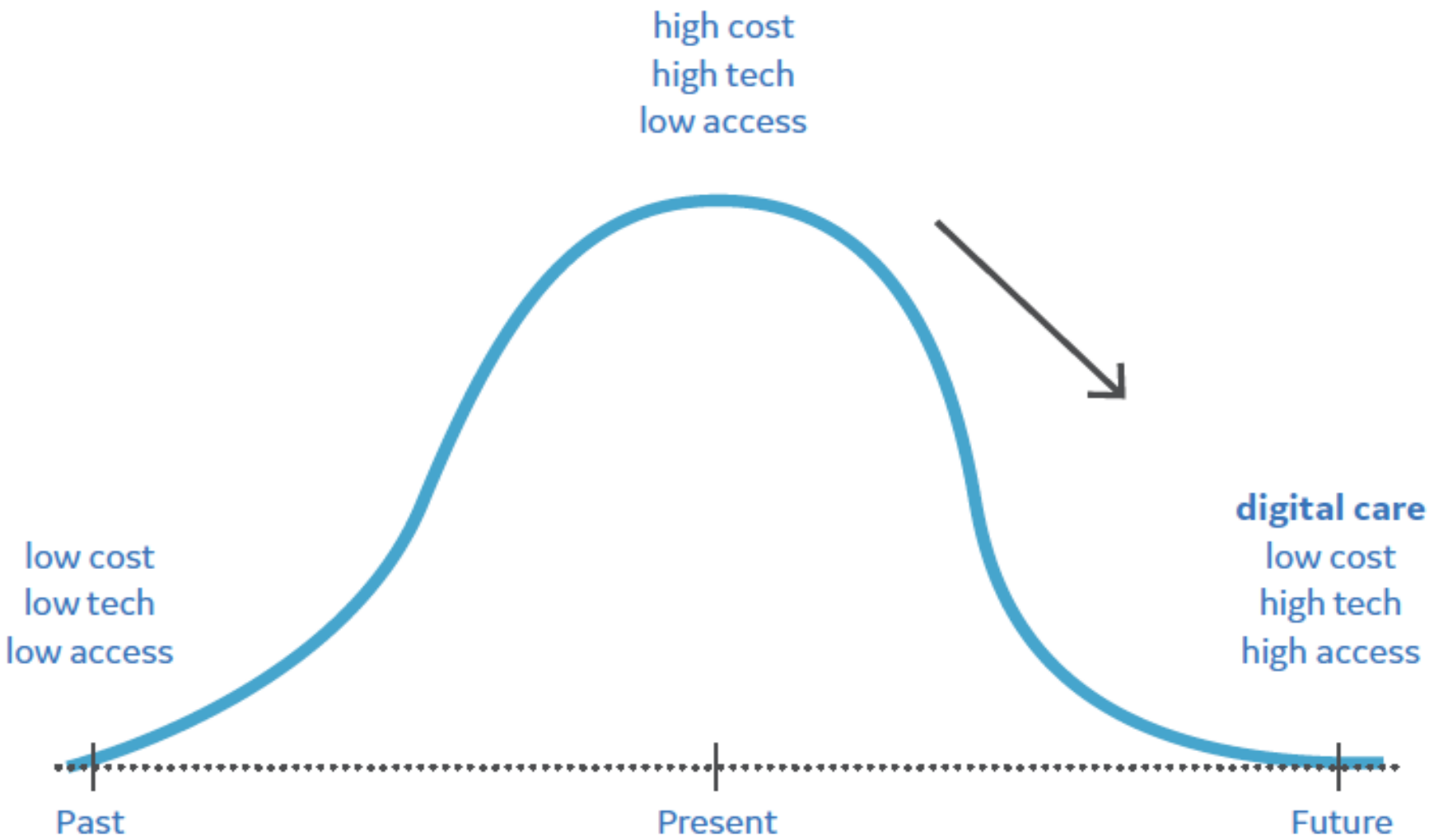
Why Virtual Transformation?



The Scope of the Problem

- The average North American above the age of 50 has **2-3** chronic medical conditions
- This population will rise to **100 million** by 2030
- Cost of > **4 trillion** dollars per year

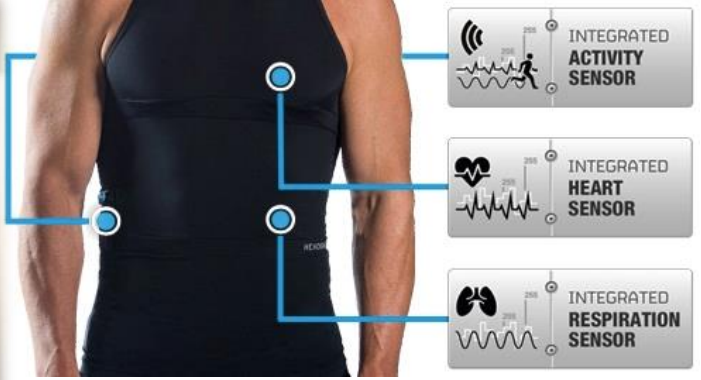
Rand Corporation 2019


high cost
high tech
low access
low cost
low tech
low access
digital care
low cost
high tech
high access
Past
Present
Future

Smart Ring

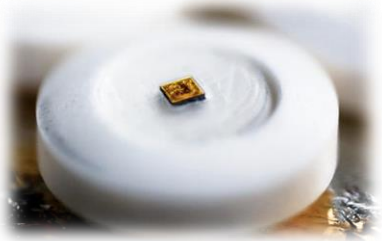
Smart Computer

Smart Skin



Smart Clothing

Smartphone Exam



Smart Pills

Smartphone Ultrasound

Smartphone ECG

Smart Necklace

Smartphone Lab Testing

Smart Genome Sequencing

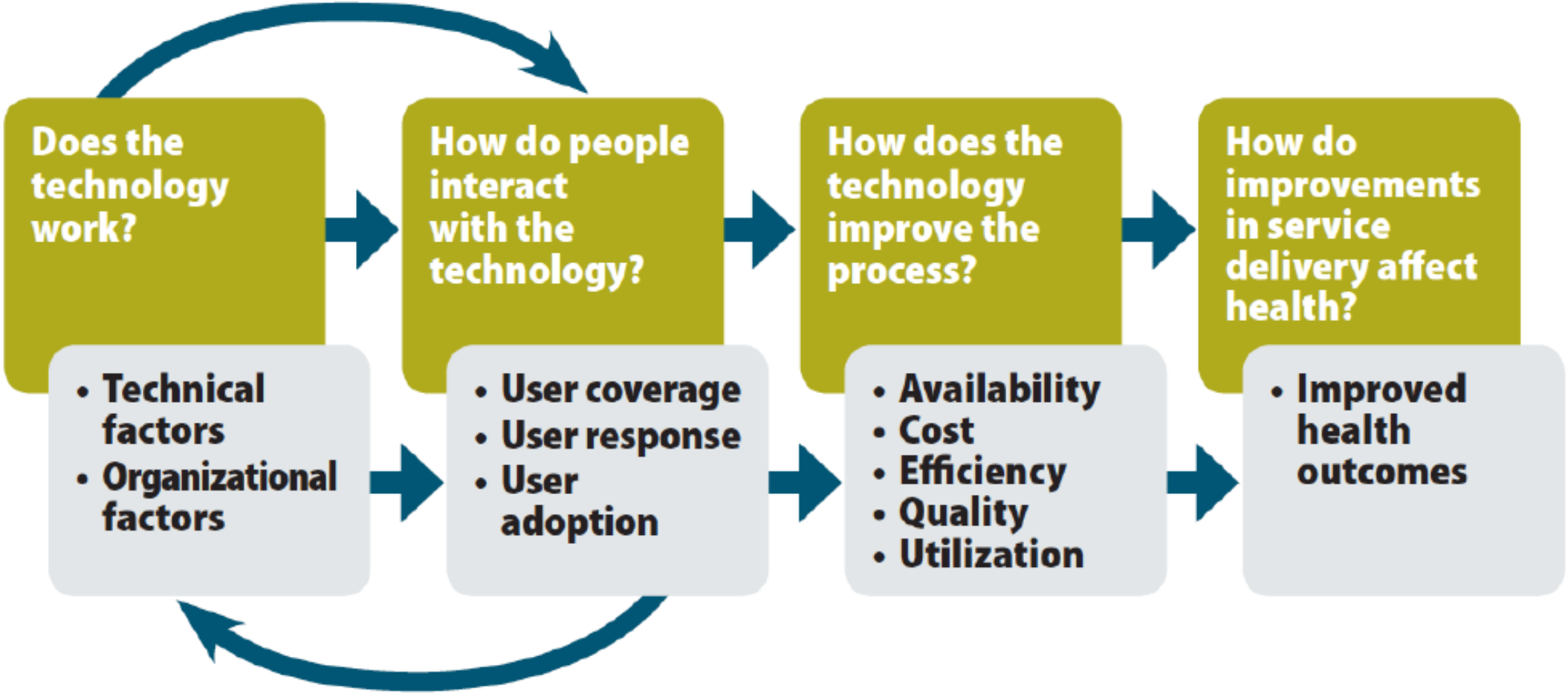
Blood Pressure

Glucose

SmartWatch

Bhavnani S. Mobile Technology and the Digitization of Healthcare. Eur J Heart 2016

Health Technology Assessment



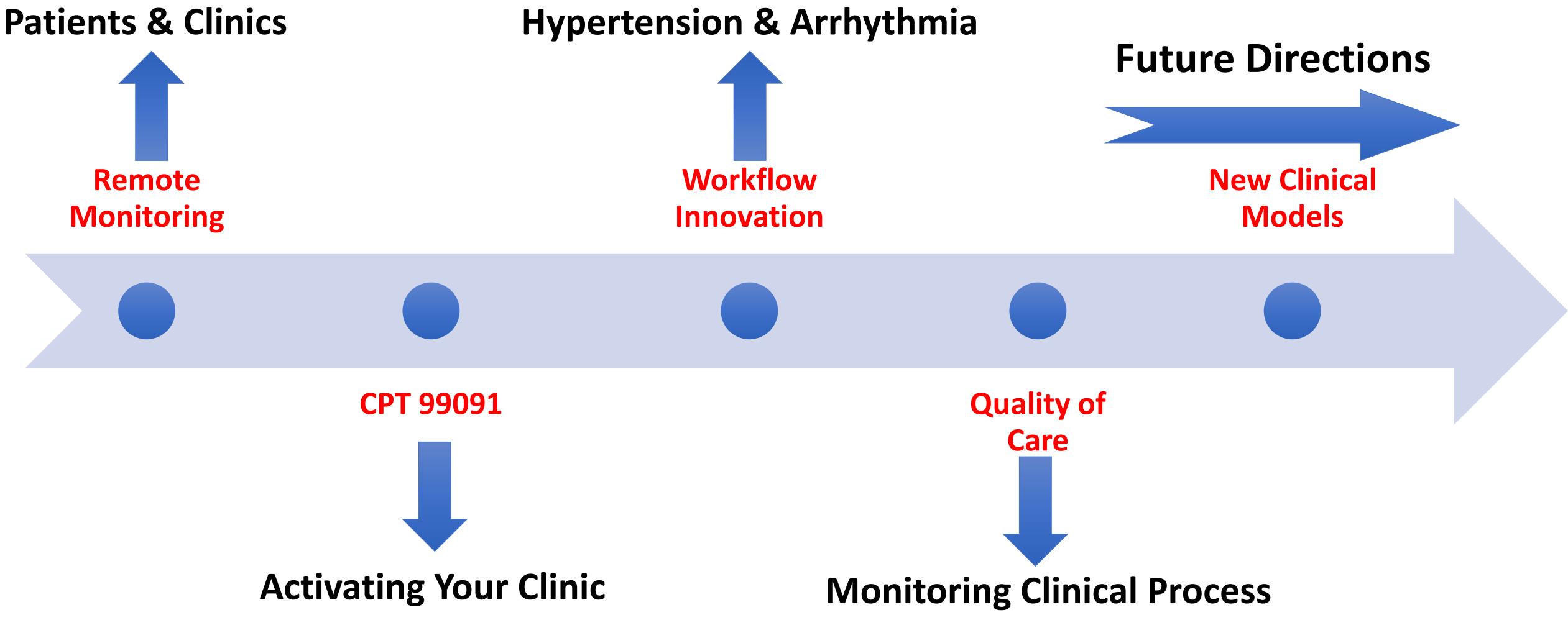
Device Usability → User Factors → Clinical Integration

HTA stakeholders: physicians, non-MD, administration, data science, informatics, business development, patient & caregiver

2017 ACC Roadmap for Innovation

From Technology → Data → Knowledge

Motivating Example: *Virtual Care - Remote Patient Monitoring*



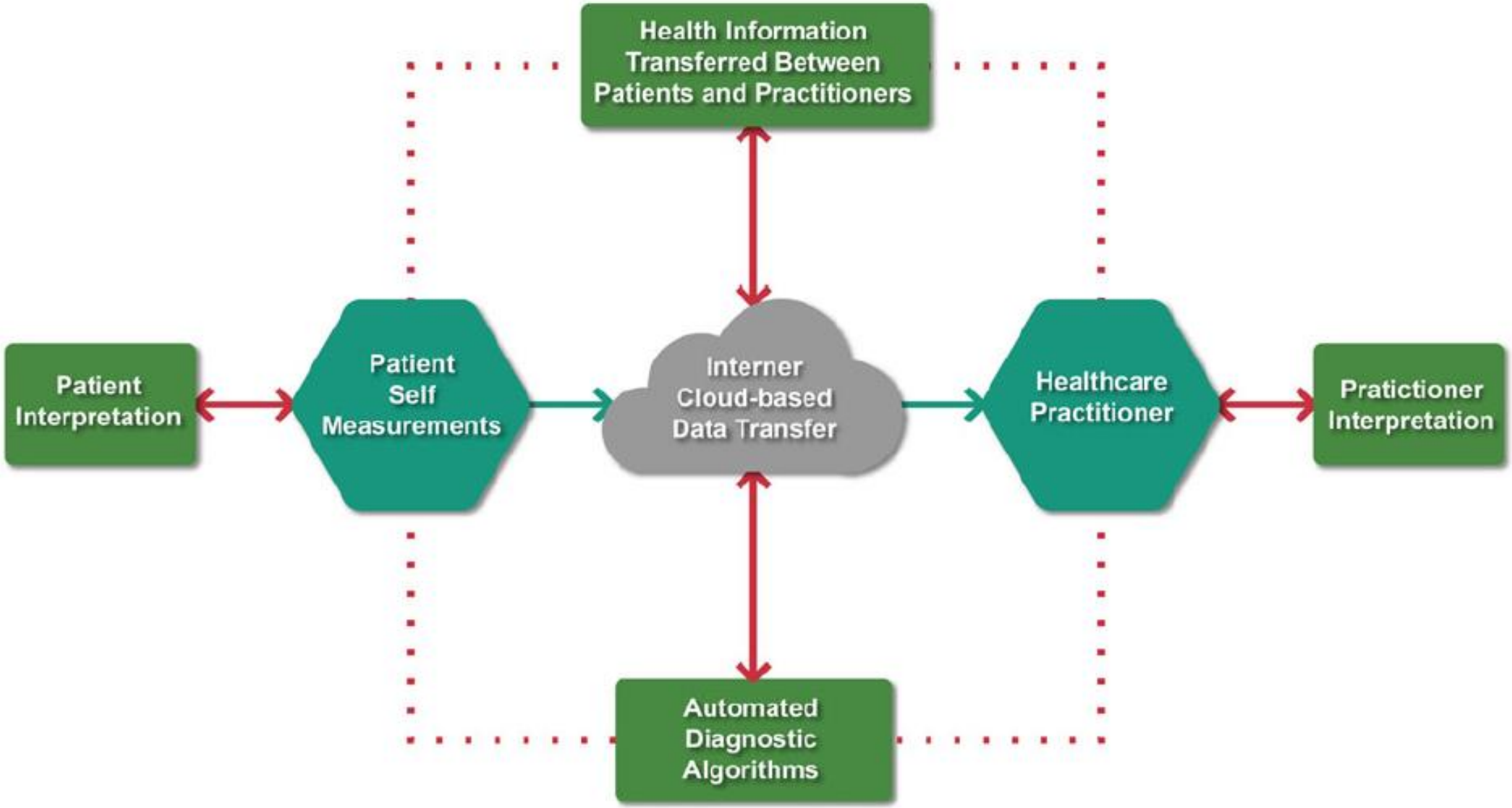
Remote Monitoring

Workflow Innovation

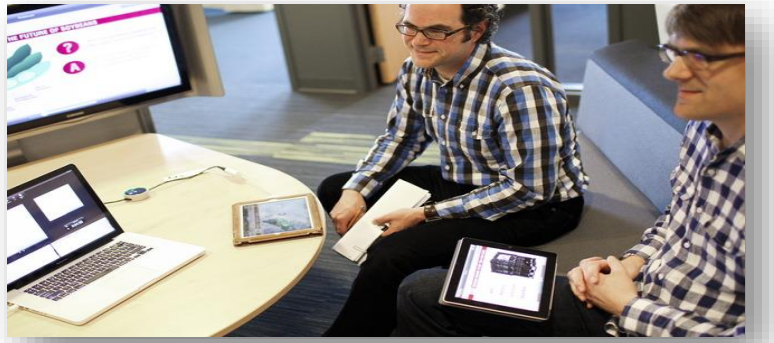
New Systems

CPT 99091

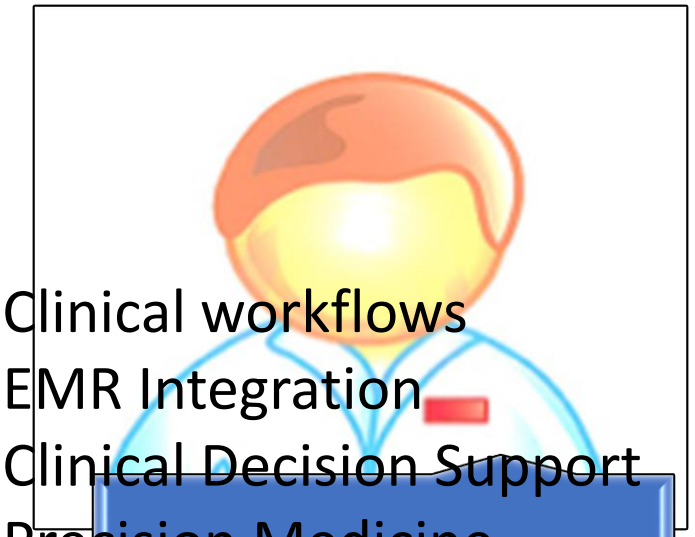
Quality of Care



These Are Not Our Patients …



Our Patients are More Like This …

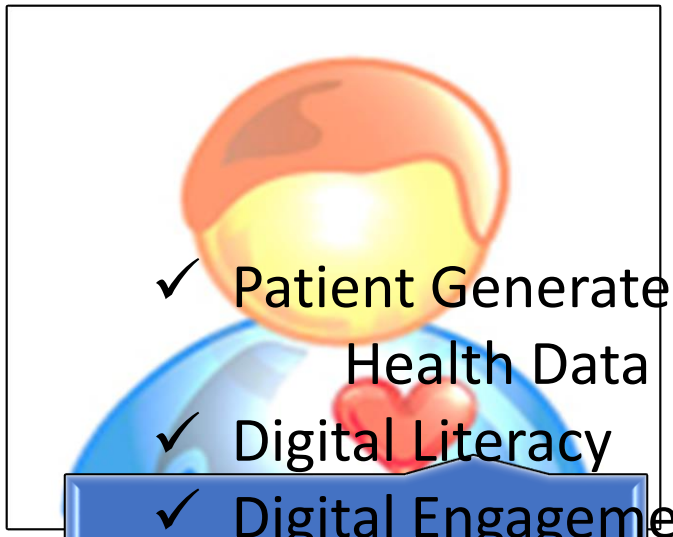


Digital Doctors

- ✓ Clinical workflows
- ✓ EMR Integration
- ✓ Clinical Decision Support
- ✓ Precision Medicine
- ✓ Population Medicine
- ✓ Informatics
- ✓ Regulation
- ✓ Reimbursement

Digital Devices

- ✓ Device Designs
- ✓ Apps
- ✓ Wearables
- ✓ Wireless Devices
- ✓ Sensors
- ✓ Robotics
- ✓ Implantables
- ✓ Handheld Imaging
- ✓ Interoperability



Digital Patients

- ✓ Patient Generated Health Data
- ✓ Digital Literacy
- ✓ Digital Engagement
- ✓ Digital Retention
- ✓ Social Media
- ✓ Senior Care
- ✓ Caregiver Engagement

Bhavnani S. Mobile Technology and the Digitization of Healthcare. Eur J Heart 2016

Scripps

Remote Monitoring

Workflow Innovation

New Systems

CPT 99091

Quality of Care

● ▲	CPT Code	Description
▲	99091	Collection and interpretation of physiologic data (e.g., ECG, blood pressure, glucose monitoring) digitally stored and/or transmitted by the patient and/or caregiver to the physician or other qualified health care professional, qualified by education, training, licensure/regulation (when applicable) requiring a minimum of 30 minutes of time, **each 30 days**

This is one of several RPM CPT codes

99091 - Patient Onboarding

Patient Education in Clinic (face to face) → Device Onboarding → **MyChart-HealthKit Flowsheet Ordering** → **CPT 99453 Initial set-up and education on use of equipment** → **CPT 99091 monthly review**

MYSCRIPPS | Search

After visit | Clinic-Administered Medications

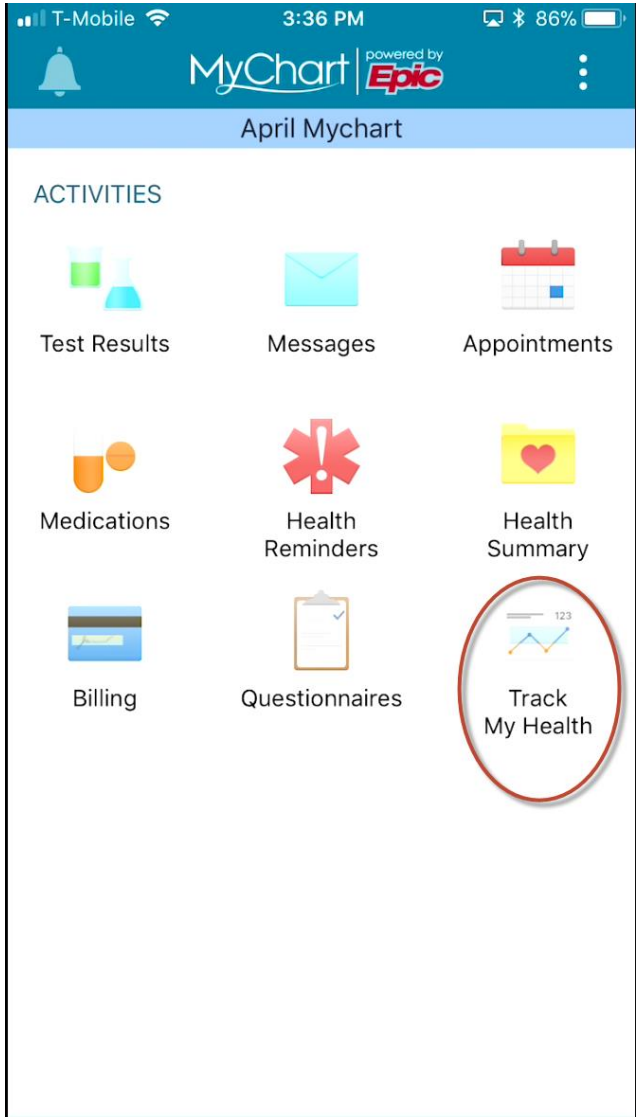
Mod	Name	Type	Pref List	Code
OP	MyScripps BP Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC3
OP	MyScripps CHF Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC7
OP	MyScripps Exercise Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC6
OP	MyScripps Glucose Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC2
OP	MyScripps Home Dialysis Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC9
OP	MyScripps Peak Flow Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC5
OP	MyScripps Weight Flowsheet	Proc	SH AMB FACILITY PROCEDURES	MYC4

99453 | Search

Name	Type	Pref List	Px Code
RPM SET UP	PR Cl	BHAVNA	99453

99091 – EPIC MyChart Activation

HealthKit



Remote Monitoring

Workflow Innovation

New Systems

CPT 99091

Quality of Care

Chart Review

Synopsis

History

Allergies

Problem List

Immunizations

Demographics

Select Encoun...

Place Amb Ord...

Write Note

Send Letter

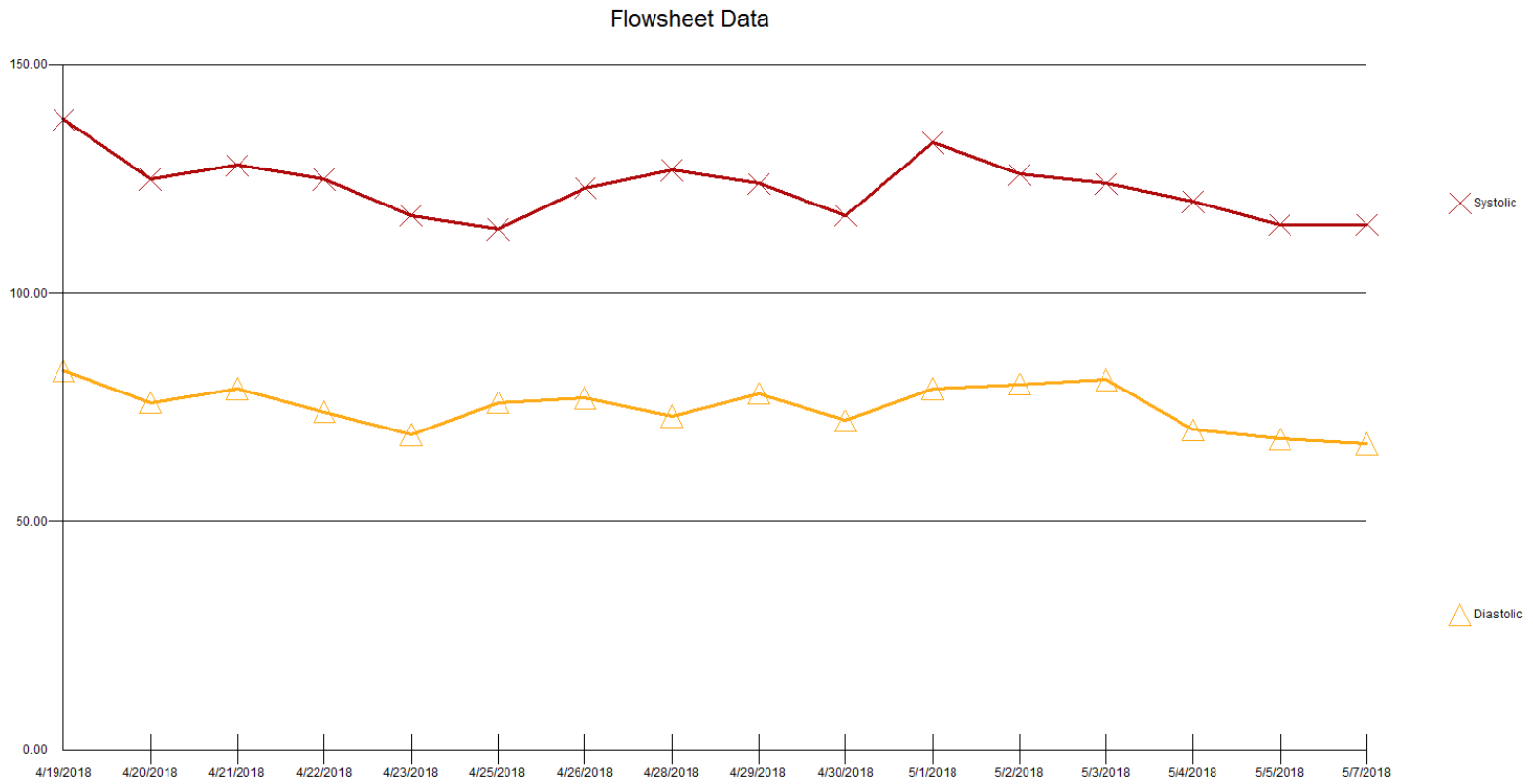
Call Patient

Create Encou...

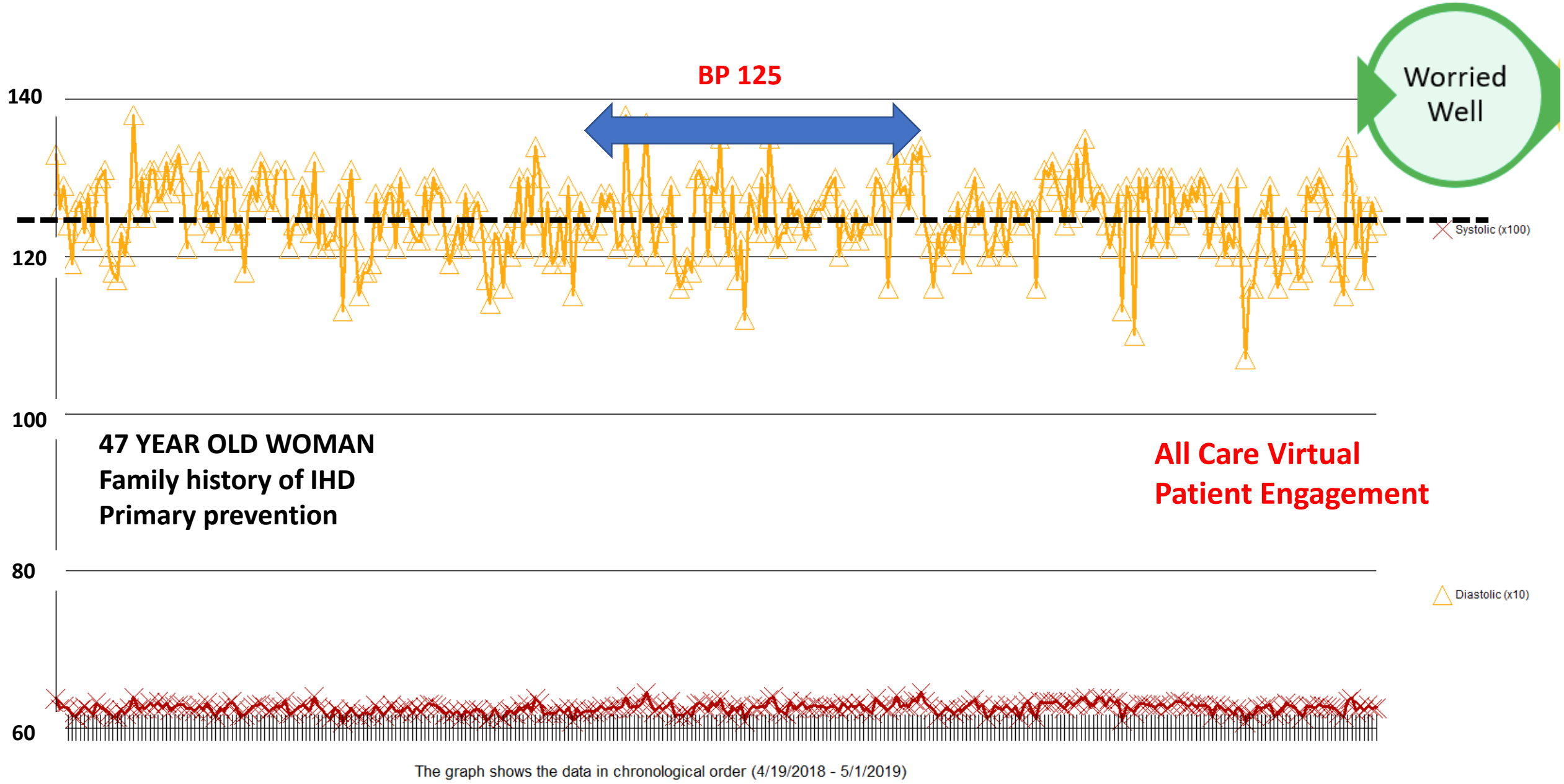
Episode Flows...

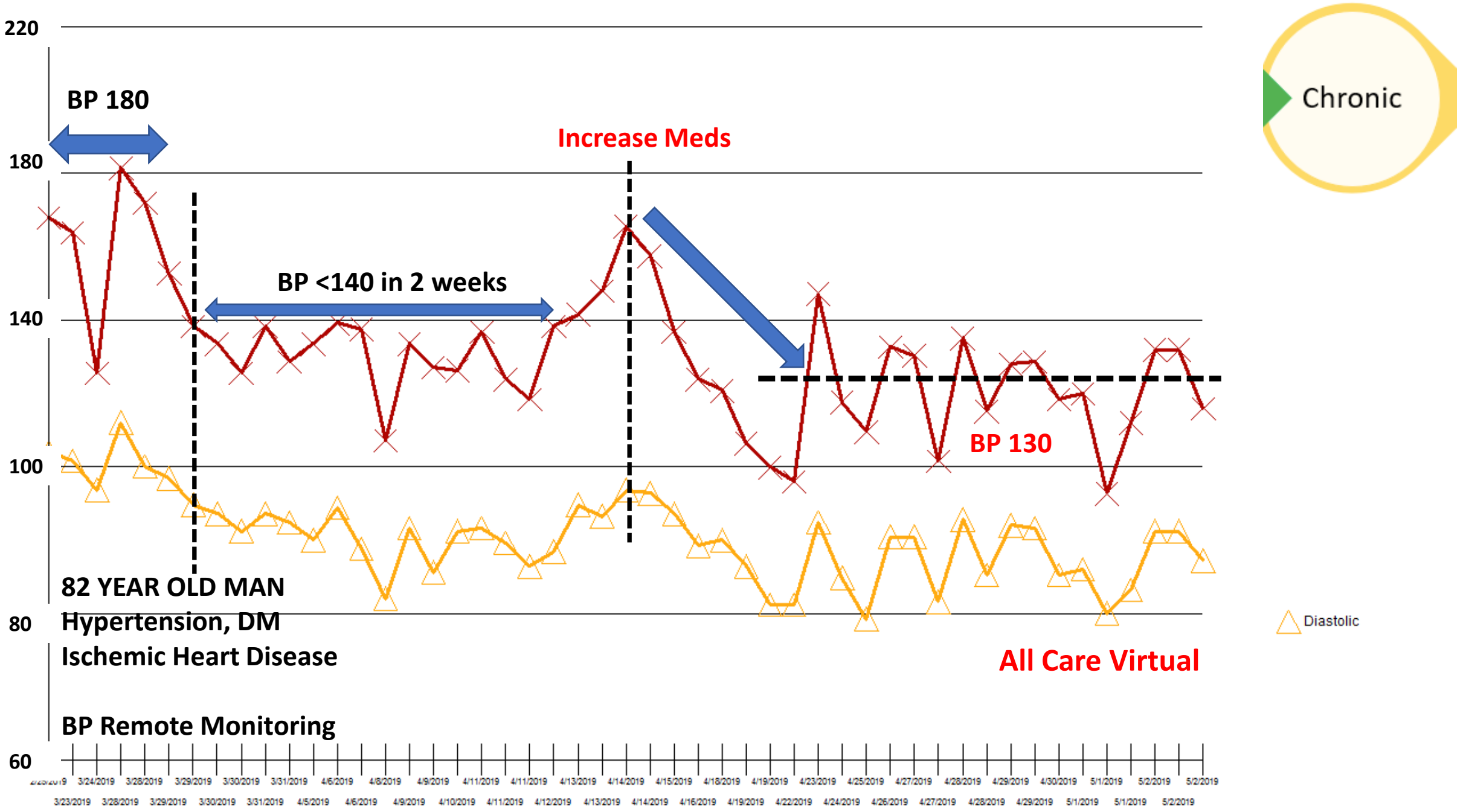
Flowsheet Report

	4/19/2018	4/20/2018	4/21/2018	4/22/2018	4/23/2018	4/25/2018	4/26/2018	4/28/2018	4/29/2018	4/30/2018	5/1/2018	5/2/2018	5/3/2018	5/4/2018	5/5/2018	5/7/2018
Time	7:56 PM	9:28 PM	9:45 PM	10:12 PM	7:52 PM	5:51 AM	10:51 PM	9:17 PM	9:55 PM	8:01 PM	7:59 PM	8:08 PM	9:03 PM	9:39 PM	9:07 PM	8:25 PM
Systolic	138	125	128	125	117	114	123	127	124	117	133	126	124	120	115	115
Diastolic	83	76	79	74	69	76	77	73	78	72	79	80	81	70	68	67



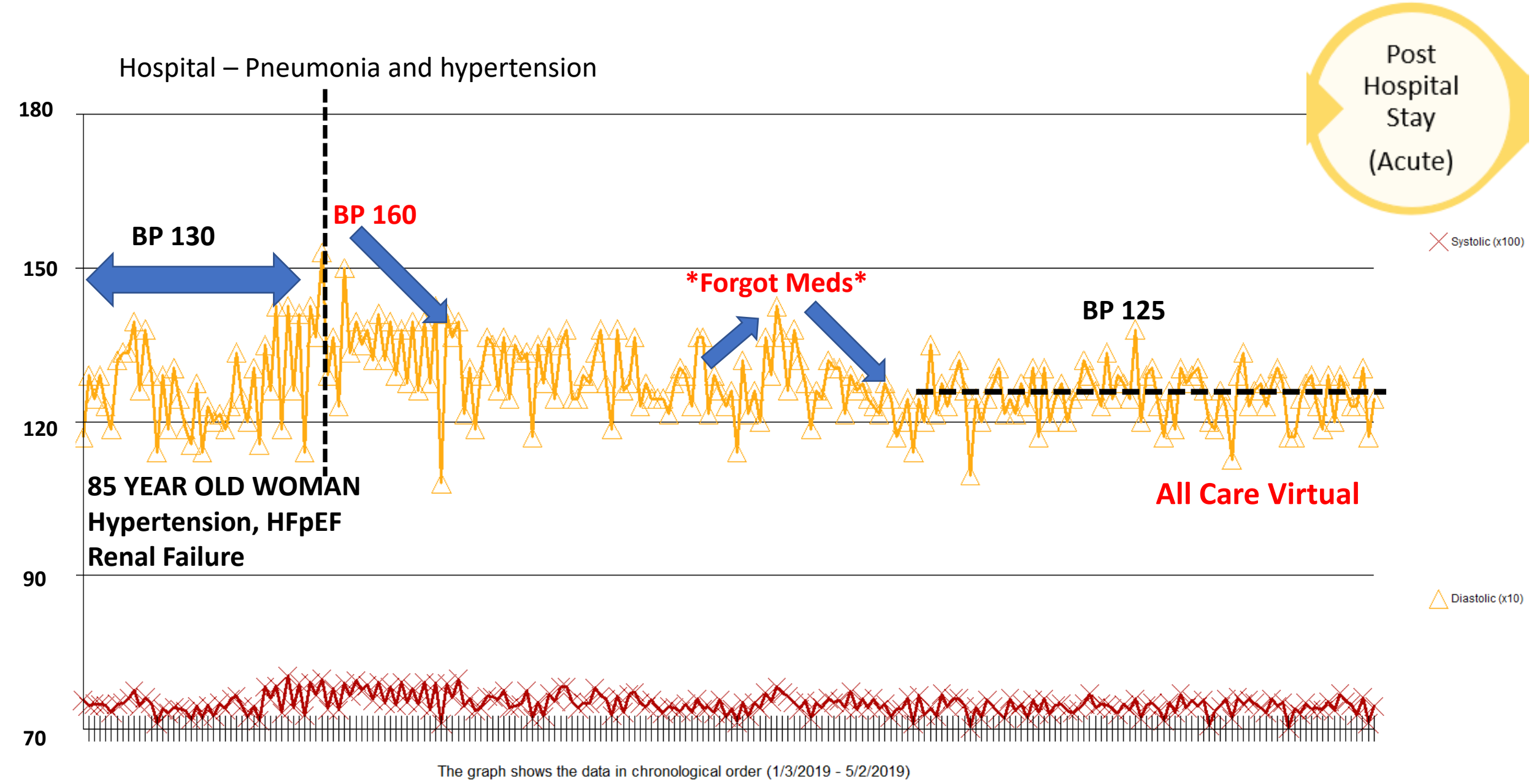
The graph shows the data in chronological order (4/19/2018 - 5/7/2018)

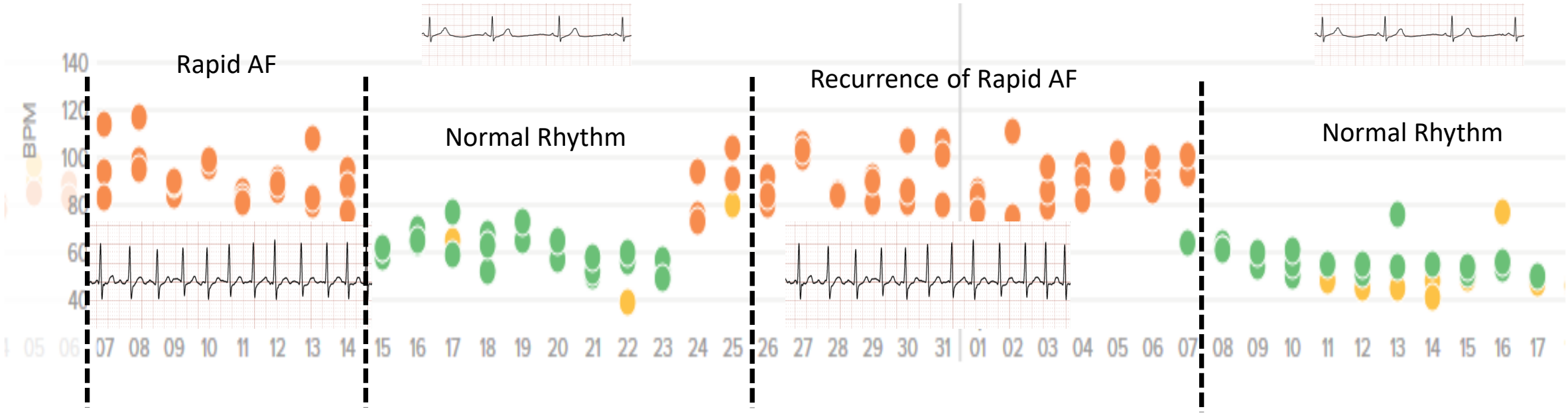

BP 125
Worried
Well
140
120
100
80
60
Systolic (x100)
Diastolic (x10)
47 YEAR OLD WOMAN
Family history of IHD
Primary prevention
All Care Virtual
Patient Engagement
The graph shows the data in chronological order (4/19/2018 - 5/1/2019)



Chronic

The graph shows the data in chronological order (2/25/2019 - 5/2/2019)


Hospital – Pneumonia and hypertension
Post Hospital Stay (Acute)
180
150
120
90
70
BP 130
BP 160
Forgot Meds
BP 125
All Care Virtual
85 YEAR OLD WOMAN
Hypertension, HFpEF
Renal Failure
Systolic (x100)
Diastolic (x10)
The graph shows the data in chronological order (1/3/2019 - 5/2/2019)



Increase Meds

Change Meds

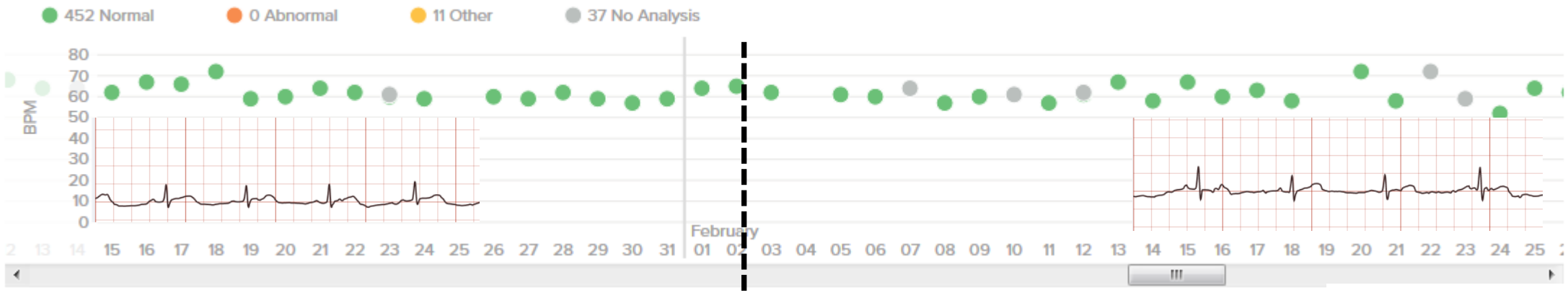
Referral
Cardioversion
Ablation

69 YEAR OLD MAN
Paroxysmal AF, Ischemic Heart Disease

All Care Virtual

Normal Rhythm

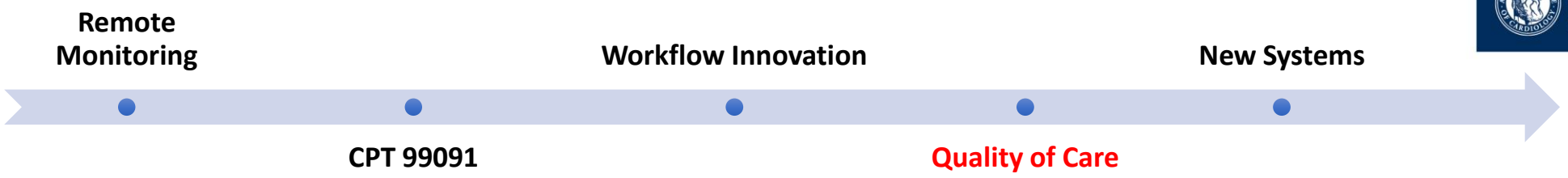
Normal Rhythm



45 YEAR OLD WOMAN
Palpitation Monitoring

All ECGs normal over
12 months

All Care Virtual
Did not require MCT, Holter Monitoring Devices



1. Collection & interpretation of digitally stored and transmitted patient generated physiologic data
2. Summary review of physiologic data
3. Plan
4. Total time spent in review of patient generated data of 30 minutes
5. Monitoring vital metrics (BP control, HF symptoms and QoL), costs of care, ongoing patient engagement

Remote Monitoring

Workflow Innovation

New Systems

CPT 99091

Quality of Care

Badgeley M. EHDViz: BMJ OPEN 2016

Miotto R. Deep Patient: Nature 2016

Remote Monitoring

Workflow Innovation

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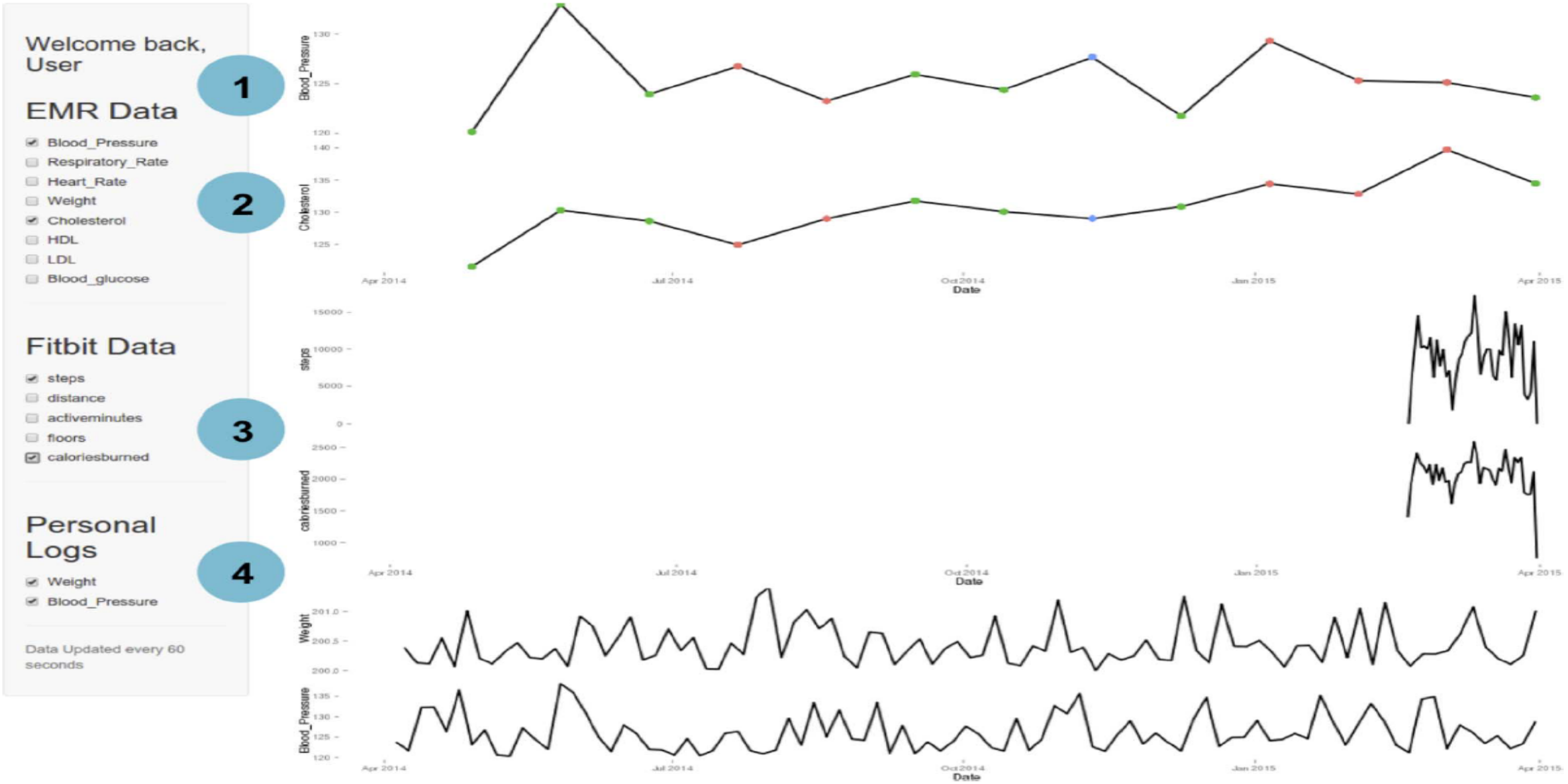
Quality of Care



Center for Next Gen Healthcare

Remote Monitoring

Workflow Innovation

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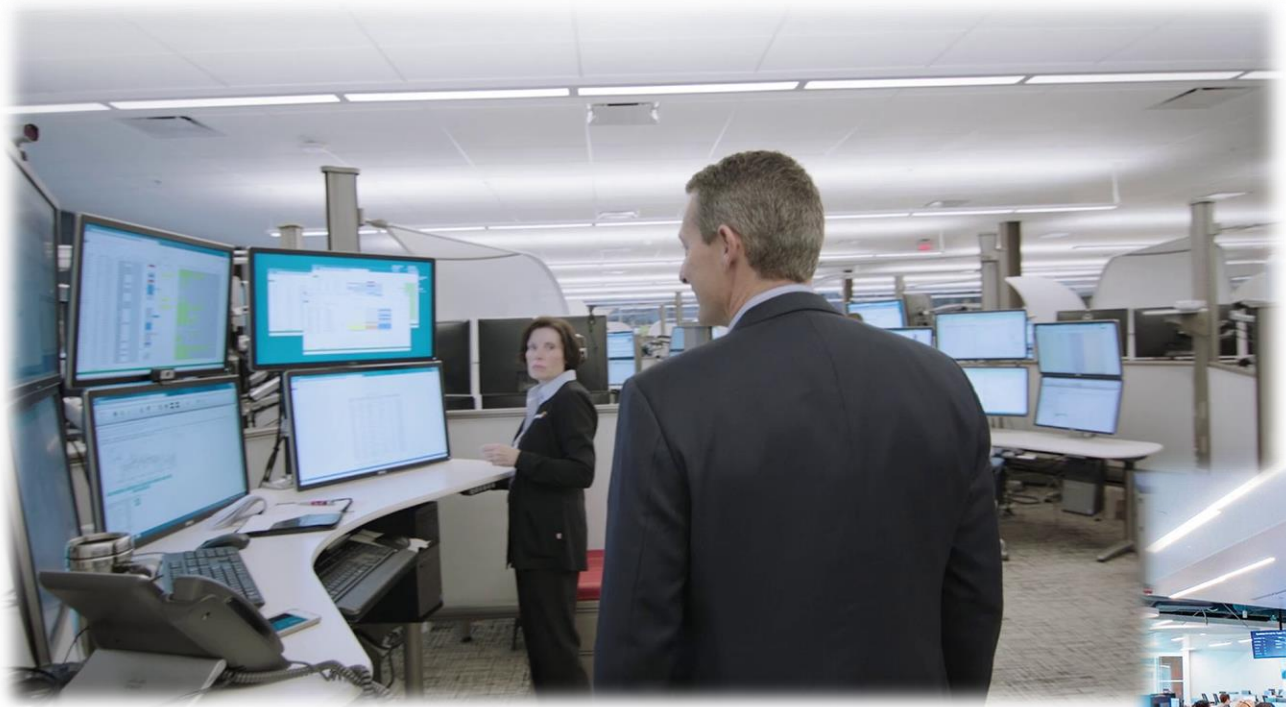
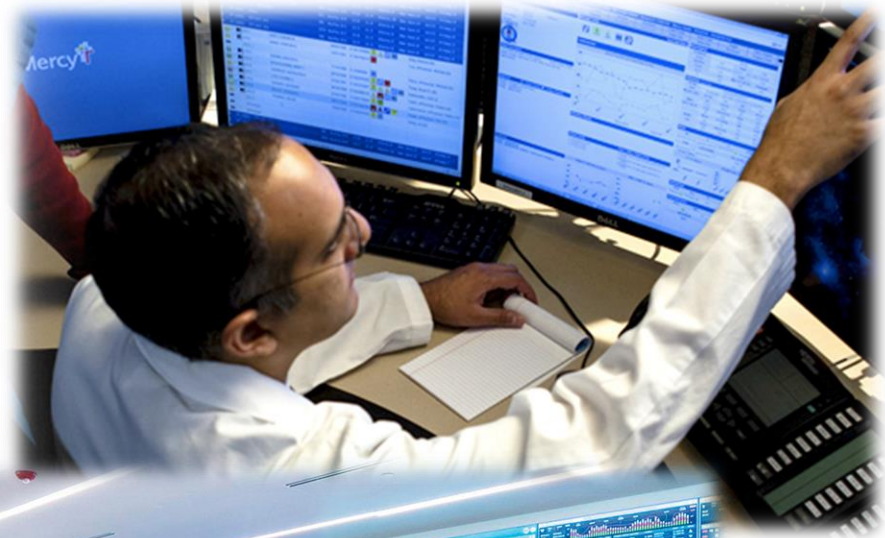
Quality of Care





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COVID-19 Hub

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Panel Discussion

Moderator: Ameya Kulkarni, MD

- **Sanjeev P. Bhavnani, MD**
- **Erica S. Spatz, MD, MHS, FACC**

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COVID-19

Telemedicine to Enhance Cardiovascular Care

Erica S. Spatz, MD, MHS

Associate Professor, Section of Cardiovascular Medicine

Yale School of Medicine

June 22, 2020

No disclosures.

Telemedicine: Potential to optimize ambulatory care and reduce health disparities

- Improve patient-centered care
- Enhanced disease management
- Elimination of health disparities

*Opportunity to reimagine high-value ambulatory care

Telehealth Overview: Integration across HealthCare

Tele-ICU

Remotely and continuously monitor patients in the ICU, augmenting bedside clinical insight and care
InSight Tele-ICU

Tele-Stroke

Enhance and enable stroke diagnosis by virtually connecting patients and bedside providers with board-certified neurologists

Acute Care (Hospital) at Home

Manage post discharge and critically and chronically ill patients from home utilizing audio/visual and peripheral devices

EHR Identification and Virtual Management

Identify patients not meeting guideline directed therapy, or in need of care management or further support for functional ability and return to work

Tele- and Asynchronous Specialty Consults

Leverage expert specialty services to triage, assess, and support System and non-System clinicians
eConsults – outpatient and inpatient

Video Visits

Urgent care and specialty appointments via audio/visual devices, replacing the need for in-person appointments

Condition Management

Coordinate health interventions for high-risk members with CHF, COPD, asthma, diabetes, high-risk maternity and mental health issues

Remote Monitoring/Wellness Support

Engage and empower members management of their health through connected medical devices, and mHealth modalities

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Hurdles to telemedicine

- Lack of business model: ⬇ reimbursement
- IT investment
- Clinician buy-in and training
- Patient capacity – tech access and literacy
- Support staff

COVID: a disaster of Titanic proportions

- Within days/weeks, incumbent to turn this ship
- Defer visits vs convert to telemedicine

Encounter trends during COVID

Cardiovascular Medicine

Month	# Telehealth	In Person	% of Telehealth
March	1246	1869	40.0%
April	3398	245	93.3%
May	1956	231	89.4%

Yale Medicine

What about for vulnerable populations?

Study of digital uptake in low-income population

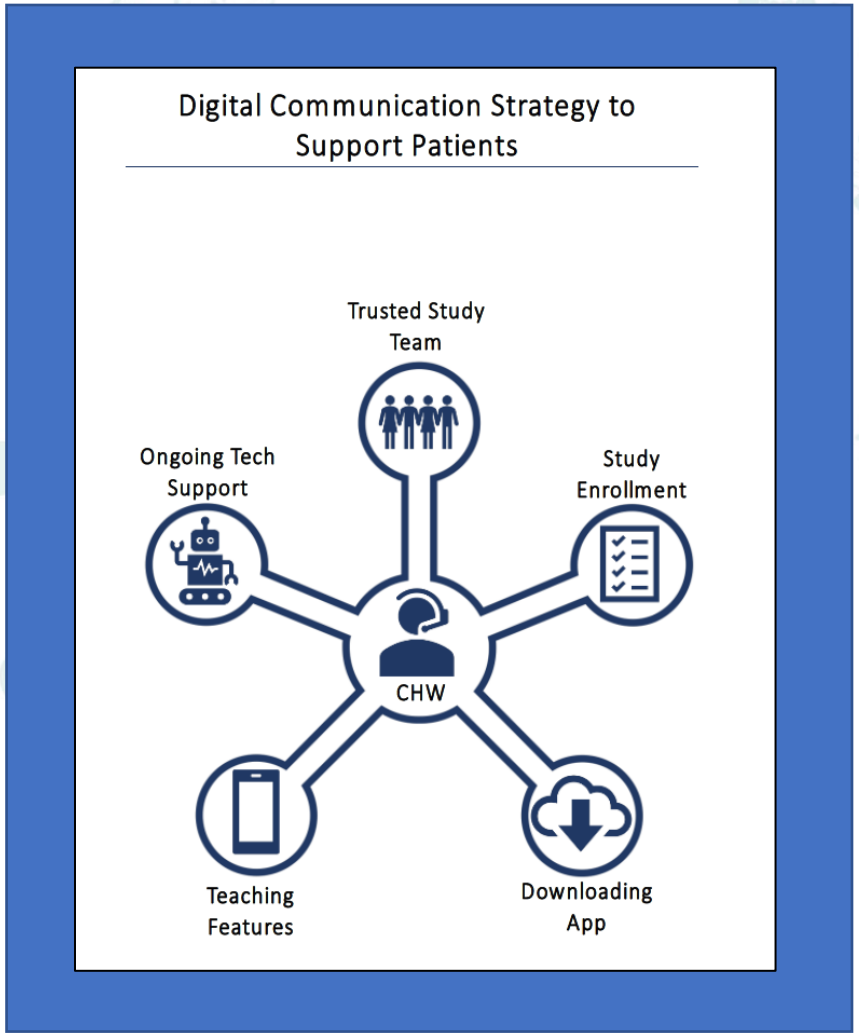
AIMS:

- Assess barriers (implementation; attitudes/beliefs) in the uptake of MyChart and a digital health app
- Identify features and adoption supports integral for ensuring success of a digital health intervention
- Assess feasibility and success of a community health worker in supporting digital health uptake

Liu P…Spatz ES, Use of mobile health apps in low-income populations: a prospective study of facilitators and barriers. Accepted for publication: Circ CQO. 2020

Study Design

- Enrolled 80 English- and 50 Spanish-preferred speaking patients
- CHW assisted with MyChart and Hugo (digital health app) downloads, instruction of features and ongoing support in first month
- Bi-weekly surveys sent to participants for 3 months



Implementation barriers

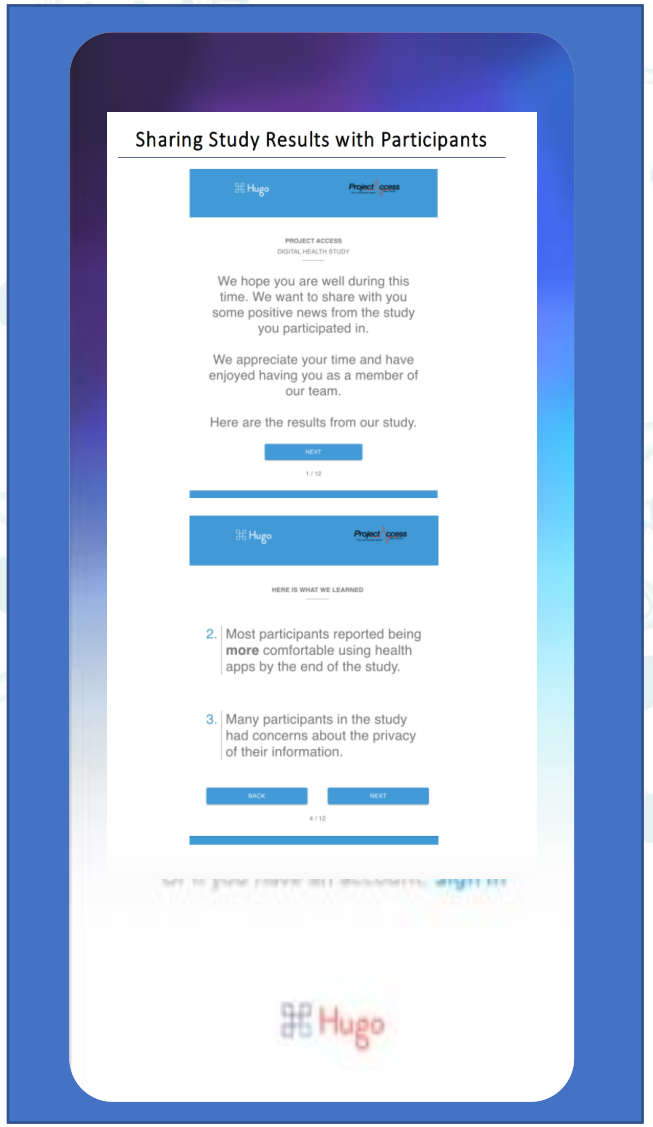
- Phone out of battery
- WiFi connection not strong
- Forgotten passwords – don’t know how to access email
- No storage/memory to download platform

Beliefs/Attitudes

	English	Spanish
Interested In:		
Owner of health records	>90%	>95%
View records on phone/device	100%	100%
Interested in participating in research with their phone	88%	>90%
Addt'l assistance from community health worker	30%	50%
Concerned about:		
Comfortable sharing data through digital platform	78%	50%
Concerned about privacy	82%	>90%

Learnings

Feature	Implication
Design	Thoughtful design, pilot tests
Implementation	Address structural needs for digital connectivity; SDOH
Adoption	Supports (CHWs)
Value	Patient-reported experiences and outcomes; crossing the digital divide to reduce disparities

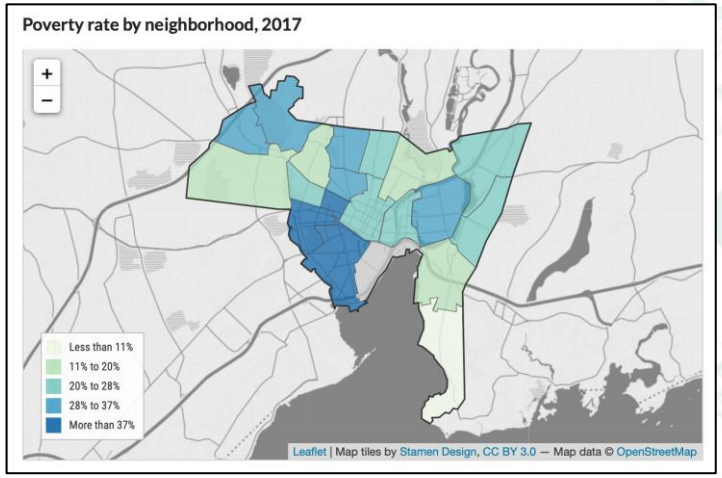


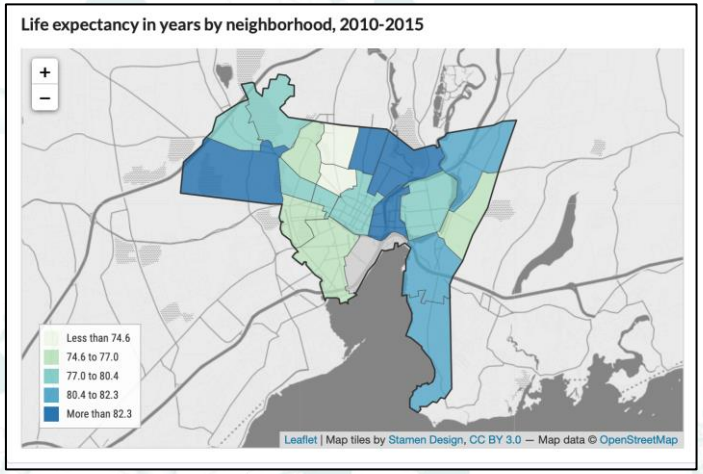
Clinical Application

- Cardiology-Pharmacy Blood Pressure Control Program
  - Patients referred to pharmacist for uncontrolled BP
  - Pharmacists assessing CV risk, adherence, implementation barriers
  - Implements remote monitoring of home-blood pressure monitoring
  - Telehealth visits to titrate medications and support lifestyle modifications

Population health-

- Targeting high-risk communities
- Highlighting digital connectivity as a social determinant of health
- Reducing barriers to care





Telemedicine: Opportunity for high-value care

*Business model – reimbursement now at level of in-person visits, but may change in the future

- Improve patient-centered care
- Enhanced disease management
- Elimination of health disparities

Future

- Studies of patient experiences and outcomes
- Identify patients and visit types most appropriate for telemedicine
- Integration of remote monitoring into clinical care
- Re-envision what highly-coordinated, patient-centered ambulatory care looks like 10 years from now

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