



Pirouette, Not Pivot: Tele-capability and Neurological Disease

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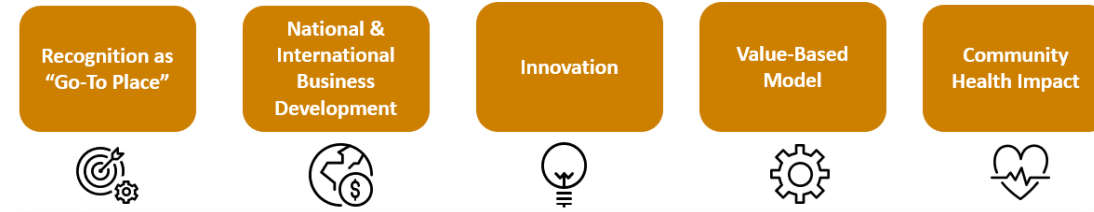
Disclosures

I have the following relevant financial relationship with a commercial interest to disclose:

- Scientific consultant regarding user interface design and usability to LifelImage (privately held teleradiology company)
- Co-I, The Impact of Telestroke on Patterns of Care and Long-Term Outcomes, NINDS (R01NS111952)
- Co-I, REACH-PC telepalliative care trial, PCORI (NCT03375489)

SUPPORTING THE SYSTEM STRATEGY VIA VIRTUAL DIGITAL TOOLS

There are five synergistic strategic priorities focused on broader impact, improved outcomes, and new revenue streams.



Seamlessly integrated systemwide virtual and in-person urgent care

Enhanced online second opinion and eConsult services to project our brand nationally/internationally

Integrated inpatient and outpatient specialty care access from within all enterprise locations

Advisory services to enable other health systems to implement virtual care solutions to manage their own populations as part of a portfolio of Mass General Brigham member services offerings

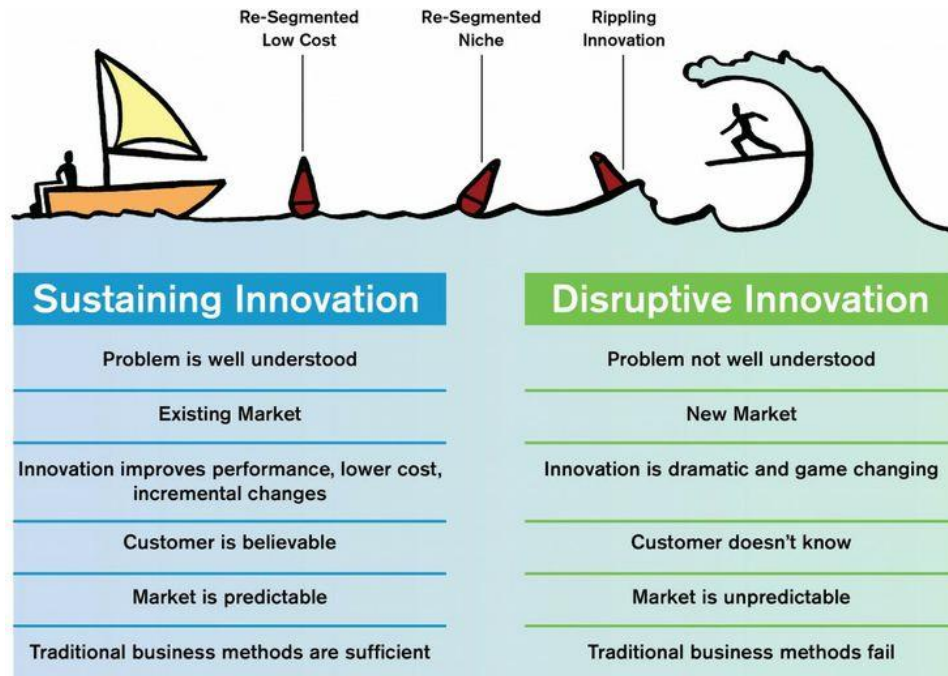
Partnerships with AI/ML teams within Mass General Brigham to help facilitate distribution of their innovations to enterprise scale, and with Research and Education Leaders to ensure well-supported virtual tools

Robust remote patient monitoring solutions that cross ambulatory and inpatient settings to collect patient-generated health data for

- clinical care (vital signs, lipids and other parameters for our navigator-driven programs and IPF and eCQM measures)
- research (mining human data for ML/AI and data sciences innovation and commercialization)



COVID-19 AS A DRIVING FORCE OF DISRUPTIVE INNOVATION



Innovation has outstripped support

- Many sites, especially community hospitals, lack the resources to adequately support these mission critical applications
- Due to COVID, many new applications and devices (iPads) have been deployed without the customary process of trainings, briefings, pilot adoption waves and formal launch
- There may be a need to reprioritize resources at sites to adequately support the clinical and administrative floor-based teams to ensure success
- Novel support models may be warranted, such as roving tech savvy teams, cross trainings of IS, Biomed and Epic-EHR personnel
- Apply quality surveillance to virtual care



Real-time

“Synchronous”

Store and Forward

“Asynchronous”

Hybrid

“Intermixed Temporal Modes”

Visits
(Provider to Patient)

Virtual Visits



**Real-time video interaction
Provider to Patient**

New or follow up video visits to patients at home or remote clinics for scheduled or unscheduled (urgent) care

eVisits



**Digital exchange of medical information
between Provider and Patient**

Provider or Patient initiated communication (e.g., secure text, portal) for ongoing care management

Machine to Patient)

Remote Monitoring



**Digital exchange of patient-generated health data between
Machine, Patient and Provider**

Provider- or Patient-initiated remote monitoring for ongoing care management

(Machine to Provider)

Virtual Consults



**Real-time interaction
Provider to Provider (+/- Patient)**

New or follow up consults to another Provider for Patients located in another facility (ED, ICU, SNF)

eConsults & Second Opinions



**Digital exchange of medical information
Provider to Provider (+/- Patient)**

eConsults (low complexity medical opinions to specialists) and 2nd Opinions (high complexity medical opinion with extensive record review)

Predictive Analytics



**Provider clinical decision support
and event prediction**

Provider data visualizations and actionable alerts leveraging AI + machine learning to support effective clinical interventions

Consults
(Provider to Provider)



TAXONOMY OF VIRTUAL CARE ENCOUNTERS

Vision

Bring patients and providers together in new ways, at new times, and from new places so that healthcare isn't something we *consume* but rather something we *embrace*.

Mission

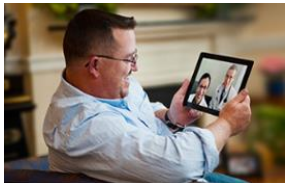
For every patient, enabling reliable access to world-class healthcare whenever, wherever and however it is needed

Phases of Work (No Margin, No Mission)

- Define business models for each area
- Identify key investments and true costs, and align with those to whom benefits accrue
- Map to increased productivity where possible
- Advocate for payment /regulatory reform and modernized payor contracts
- Maximize savings and revenue opportunities
- Build robust enterprise compliance framework



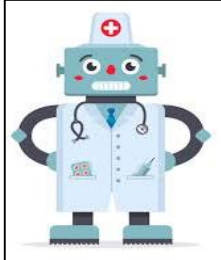
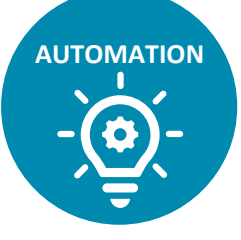
Virtual Consults,
Virtual Rounds
eConsults



Virtual Visits, Video Intercom
System, Virtual Urgent Care,
Remote Monitoring, eVisits



Patient Connect



Robotic Process
Automation and
ML/AI processes



ENSURING THE QUALITY OF VIRTUAL CARE ENCOUNTERS

Ensure Equity

Ensure dashboards can measure variation in adoption

Limited English proficiency, digital literacy or access to technology or Wi-Fi

Visual/cognitive/physical impairments

Integrate patient feedback and survey data into enterprise quality framework

Keeping the Patient in the Virtual Center



Adapted from a visual concept of *Keeping the Patient in the Virtual Center* by Lee Schwamm, MD. (2021). Massachusetts General Hospital, Boston.



BRINGING EXPERTS TOGETHER TO DRIVE CONSENSUS ON TEACHING COMPETENCY

A banner for a virtual care competency conference. The background is a blurred image of a doctor in a white coat with a stethoscope, holding a smartphone. The text is overlaid on this image. At the top left is a blue bar with 'Virtual Care' in white. To the right is a dark navigation bar with links: 'Home', 'Agenda', 'About', 'Speakers', 'Contributors', 'Resources', and 'Contact Us'. Below the navigation bar, on the left, are the logos for 'MASSACHUSETTS GENERAL HOSPITAL' and 'TELEHEALTH'. To the right of these is the 'DIGITALHEALTH' logo, followed by a vertical line and the 'PARTNERS HEALTHCARE' logo. The main title 'Crossing the Virtual Chasm:' is in large white font, followed by the subtitle 'Rethinking Curriculum, Competency, and Culture in the Virtual Care Era' in a smaller white font. Below the subtitle is a horizontal line, then the date 'Thursday, September 10th 2020' and the time '9:00-2:00 PM PST / 12:00-5:00 PM EST'. At the bottom is a blue bar with the text 'AAMC brief report on telehealth competencies' in white, underlined.

Virtual Care

Home Agenda About Speakers Contributors Resources Contact Us

MASSACHUSETTS
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HEALTHCARE

Crossing the Virtual Chasm:

Rethinking Curriculum, Competency, and Culture in
the Virtual Care Era

Thursday, September 10th 2020
9:00-2:00 PM PST / 12:00-5:00 PM EST

[AAMC brief report on telehealth competencies](#)

<https://www.virtualcarecompetency.com>



MAKING INFORMATION ABOUT VIRTUAL CARE EASILY ACCESSIBLE TO ALL PROVIDERS



Virtual Care Resource Center

 Not following  Share

The Virtual Care Resource Center is designed to help you navigate the various Virtual Care Program solutions: what they are, how they can support you, and how to incorporate them into your daily routine.



Provider Pathway



Practice Operations Tools



Program Updates & News



Regulatory & Compliance



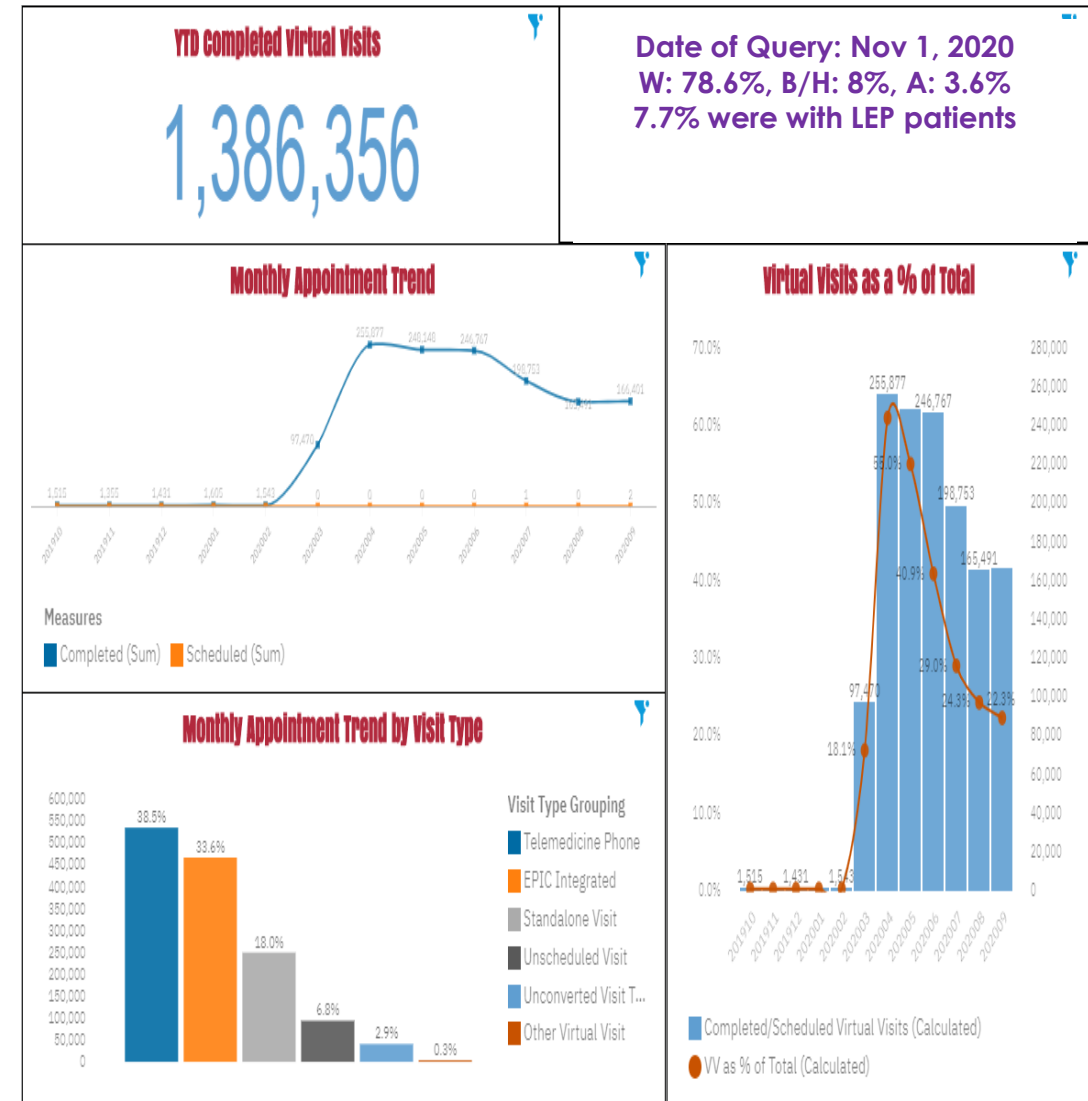
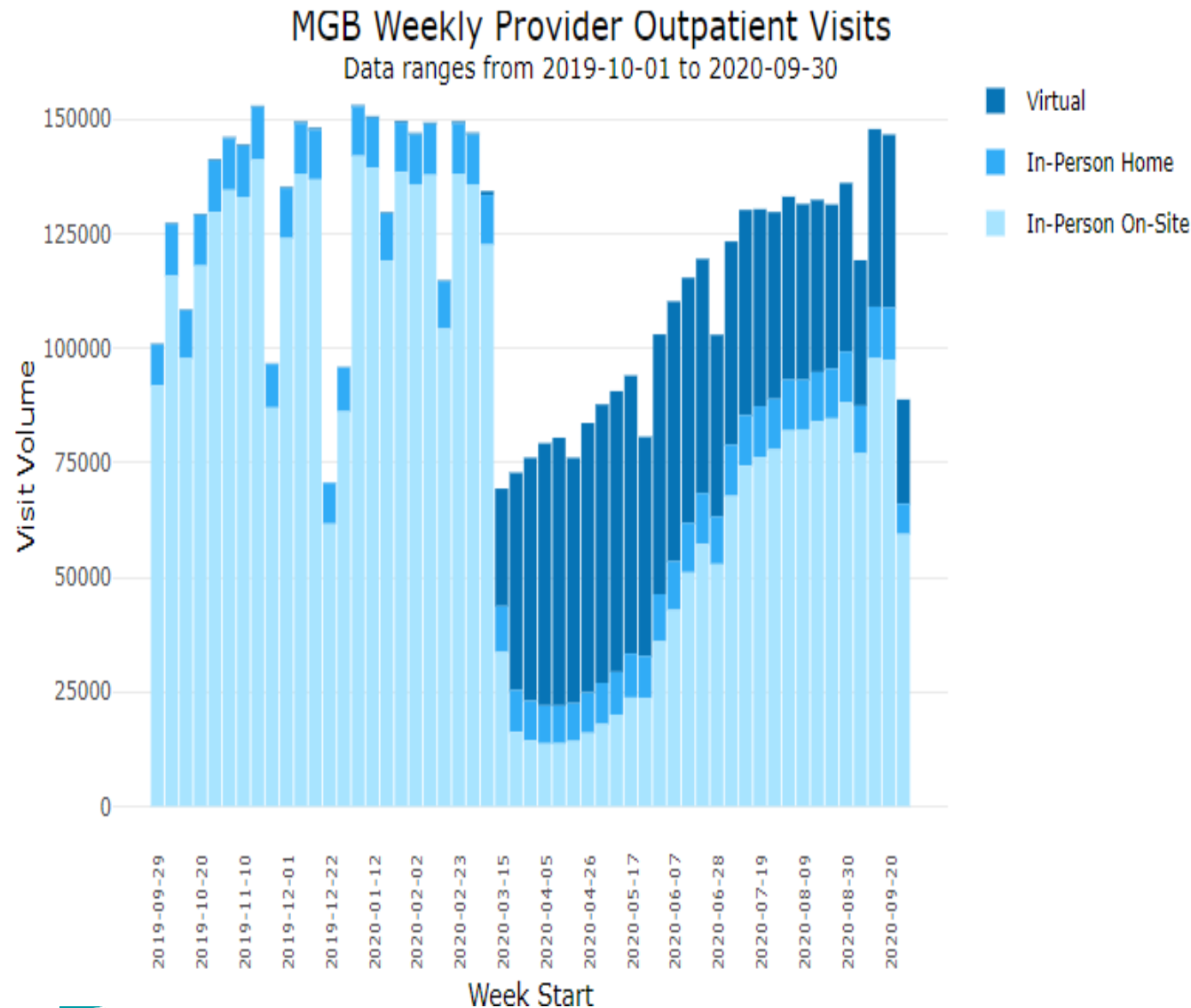
Support

[Get the mobile app](#)



VIRTUAL CARE IMPACT ON AMBULATORY ACCESS

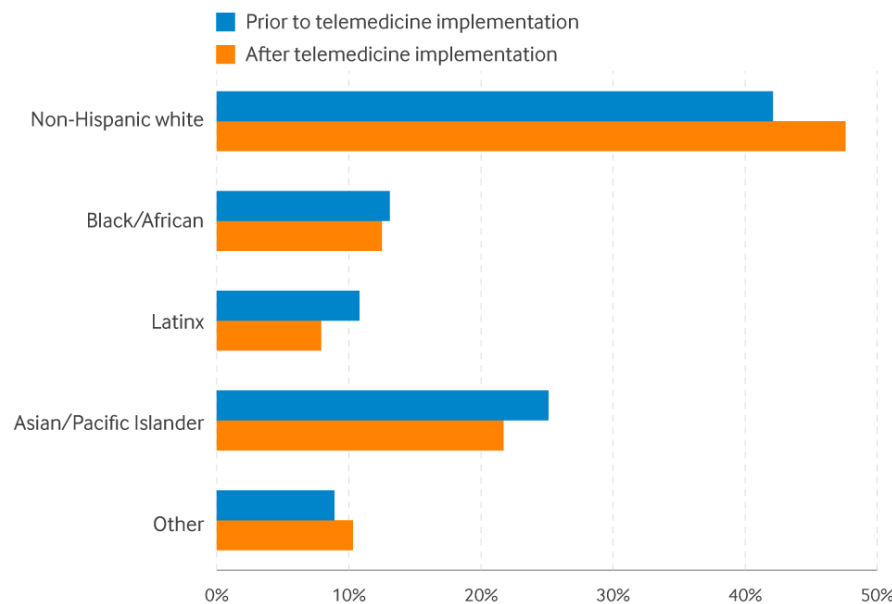
From 0.6% to 62% of Ambulatory Care in 6 Weeks.



SOCIAL DETERMINANTS OF HEALTH IMPACT VIRTUAL CARE ACCESS

Patient Visits by Race/Ethnicity Before and After Telemedicine Scale-Up

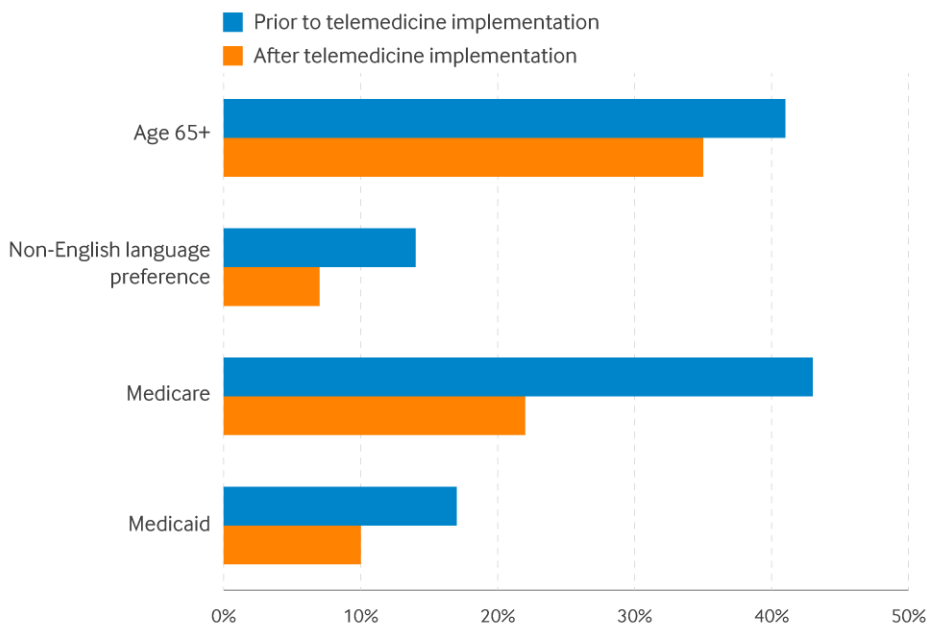
This chart shows the proportion of patient visits seen by patient race/ethnicity prior to (2/17–2/28/2020) and after (3/23–4/3/2020) scaled-up telemedicine implementation to address the Covid-19 pandemic at the UCSF General Internal Medicine Primary Care Practice (P=0.006 using chi-squared test). A smaller proportion of visits with vulnerable populations occurred after implementation.



Source: The authors
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Patient Visits by Age, Language, and Insurance Before and After Telemedicine Scale-Up

This chart shows the proportion of patient visits seen by age, language preference, and insurance type prior to (2/17–2/28/2020) and after (3/23–4/3/2020) scaled-up telemedicine implementation to address the Covid-19 pandemic at the UCSF General Internal Medicine Primary Care Practice (P=0.002 for age ≥65 and P<0.001 for other comparisons). A significantly smaller proportion of visits after scaled-up telemedicine implementation were with vulnerable patients.

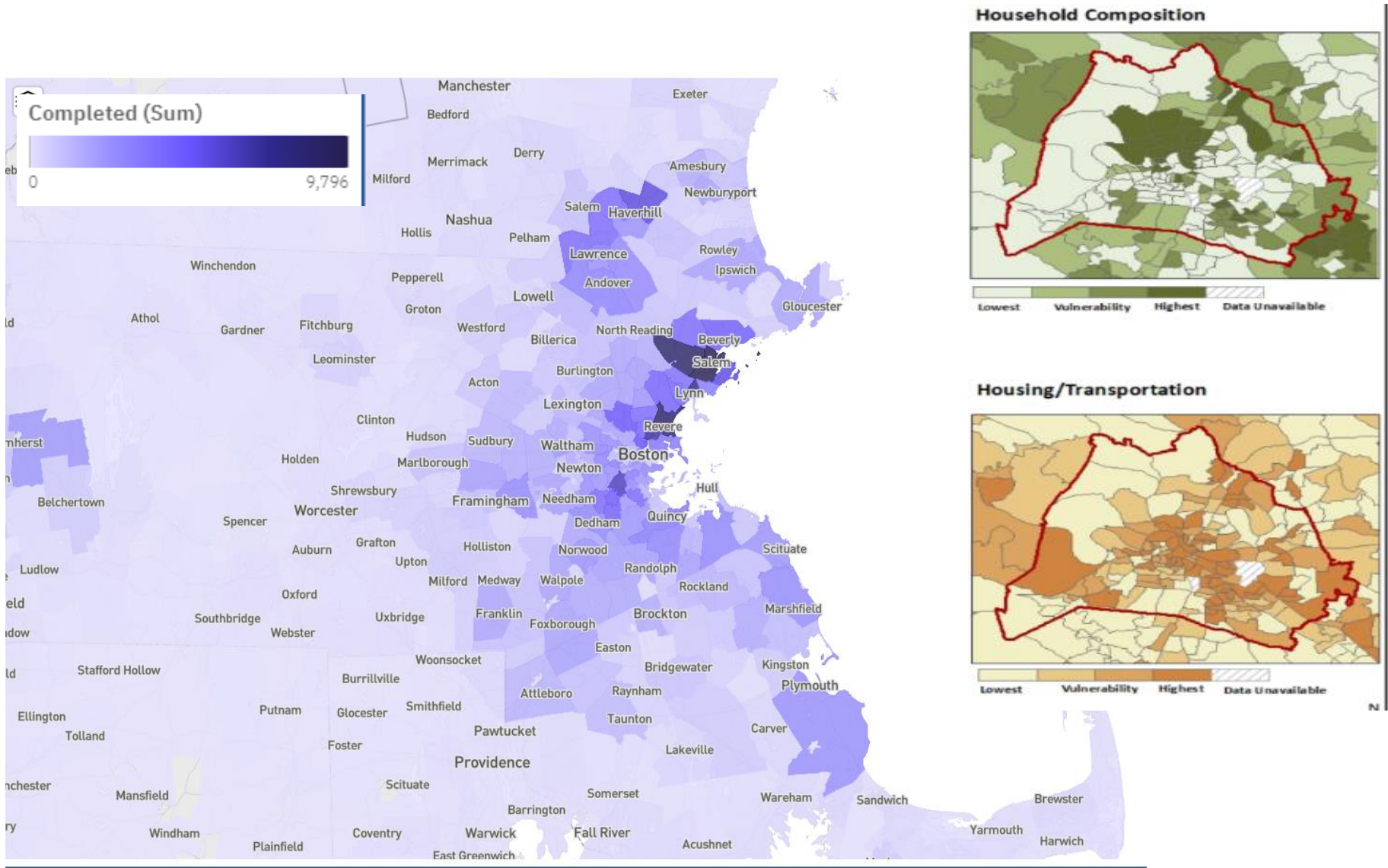


Source: The authors
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society




https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0123?fbclid=IwAR13vw5oqFlmEfH_xxi5VSDc-2P6xBQwcPeLJLZandhUUkNI9dcijh5sshk



VIRTUAL VISITS AND SVI BY GEOCODED LOCATION



MULTILINGUAL INTERFACE FOR PATIENT-FAMILY SUPPORT



FOUNDED BY BRIGHAM AND WOMEN'S HOSPITAL
AND MASSACHUSETTS GENERAL HOSPITAL

Resize font:  

Welcome to PatientConnect

Language / Idioma / لغة / 语言 / língua / langaj / Língua /
 /ភាសា / язык / Ngôn ngữ / Bahasa

English

We recognize the importance of feeling connected to your family, friends and loved ones during a hospital stay. When a visit to the hospital is not possible, we are happy to offer a secure, Zoom video program to virtually connect patients with visitors and loved ones.

To get started, enter the Meeting ID that was given to you by the patient's care unit staff in the field below to connect via your smartphone, computer or tablet. You may also connect via telephone, by dialing 1-888-475-4499, and then entering the Meeting ID. If you have questions about how to use Zoom, please call 1-800-745-9683.

Meeting ID Number/ Número de Reunión / هوية الاجتماع / 会议ID / Número de identificação da reunião / Nimewo ID Reyinyon an / Meeting ID Número /
 /លេខសម្គាល់ការប្រជុំ / Идентификационный номер встречи / Số ID cuộc họp / Nomor ID Rapat

* must provide value

Submit



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AND MASSACHUSETTS GENERAL HOSPITAL

Resize font:  

Welcome to PatientConnect

Language / Idioma / لغة / 语言 / língua / langaj / Língua /
 /ភាសា / язык / Ngôn ngữ / Bahasa

中文

我們認識到在住院期間夠與家人、朋友和親人保持聯繫的重要性。當無法親自去醫院探訪時，我們很樂意提供安全的 Zoom 視訊程式，透過網路將患者與探訪者及親人聯繫起來。

要開始使用，請透過您的智慧型手機、電腦或平板電腦連接，在下面的欄位中輸入患者病房工作人員提供給您的 Meeting ID（會議 ID）。您也可以透過電話連接，請撥 1-888-475-4499，然後再輸入 Meeting ID。如果您在 Zoom 的使用上有疑問，請造訪 <https://support.zoom.us>。

Meeting ID Number/ Número de Reunión / هوية الاجتماع / 会议ID / Número de identificação da reunião / Nimewo ID Reyinyon an / Meeting ID Número /
 /លេខសម្គាល់ការប្រជុំ / Идентификационный номер встречи / Số ID cuộc họp / Nomor ID Rapat

* must provide value

Submit



EPIC-INTEGRATED VIRTUAL CARE OFFERINGS

Partners
HEALTHCARE

PATIENT GATEWAY

Support

Welcome to **Partners Patient Gateway**

A convenient and secure way to manage your health
and communicate with your doctor's office online. [Learn more](#)

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Secure Log In

Forgot your username?

Want to sign up?

Enroll now

Learn more

Here's what you can do

Review Test Results

Manage Your Appointments

Message Your Doctor

Review Your Prescriptions

Pay Your Bill

DO NOT USE PATIENT GATEWAY FOR EMERGENCIES

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Member

Member

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Mass General Brigham

Patient Gateway

Veren Support

Partners HealthCare is now Mass General Brigham.

Soon you'll see this name across our systems.
As always, your health remains our first priority. [Read more](#)

Coronavirus Disease 2019 (COVID-19) - Stay up to date with information.

Communicate with your doctor

Get answers to your medical questions from the comfort
of your own home

Access your test results

Check lab results, reports, and letters from your
providers

Renew prescriptions

Review your prescriptions and request renewals

View and pay your bills

View past and current statements and pay outstanding
balances

Manage your appointments

View and schedule your appointments

Participate in research

Advance health care through medical discovery

Learn more about Mass General Brigham Patient Gateway
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[High Content Region](#)

Partners eVisits

partnersevisits.org/doctors/dermatology/surveys/1507

Please answer the following questions as accurately as possible. These questions are particularly important for your doctor to know.

Overall, how has your acne been since your last visit?

Better

The same

Worse

Where is your acne (check all that apply)?

Select all that apply. If none apply, select "None of the above".

Face

Upper chest

Upper back

Other

What is the appropriateness and utility of electronic consultations (e-consults)?

Hematology
2216

Infectious disease
1634

Rheumatology
287

Dermatology
1484

Psychiatry
891

Appropriateness: 70.2% met all 4 criteria

Clinical question

• not answerable using a point of
care resource

• not purely logistical

• appropriate urgency

• appropriate complexity

Utility: 81.2% avoided a visit

• no same specialty visit 120 days after
e-consult

Annals
of Internal Medicine

Altman S, Kelly TR, Behrens TR, et al. Utility, appropriateness, and content of electronic consultations across medical specialties: A cohort study from
Boston, MA. *J Gen Intern Med*. 2019;34(1):1-10. doi:10.1093/gim/kwz002
https://doi.org/10.1093/gim/kwz002
© 2019 American College of Physicians

Appointments

VIRTUAL ESTABLISHED

Monday, April 13, 2020

This is a video visit

Join by 7:00 PM

Starts at 7:05 PM

Cancel Visit

Join to
Calendar

Physician Family Medicine, MD

GET READY

Review Instructions

STARTING A VISIT NOW? Click the orange "Begin
Virtual Visit" button to enter the virtual waiting room
up to 15 minutes before your appointment. Your
provider will be notified and will join when available.

USING AN IPHONE OR IPAD? You must use the
Partners Patient Gateway App to conduct a Virtual
Visit. Click [here](#) to download the iOS app.

If you require technical support, call 866-410-3672
or schedule a [TECH SUPPORT CALL](#) online.

For additional information please review our [FAQ &
Best Practices](#).

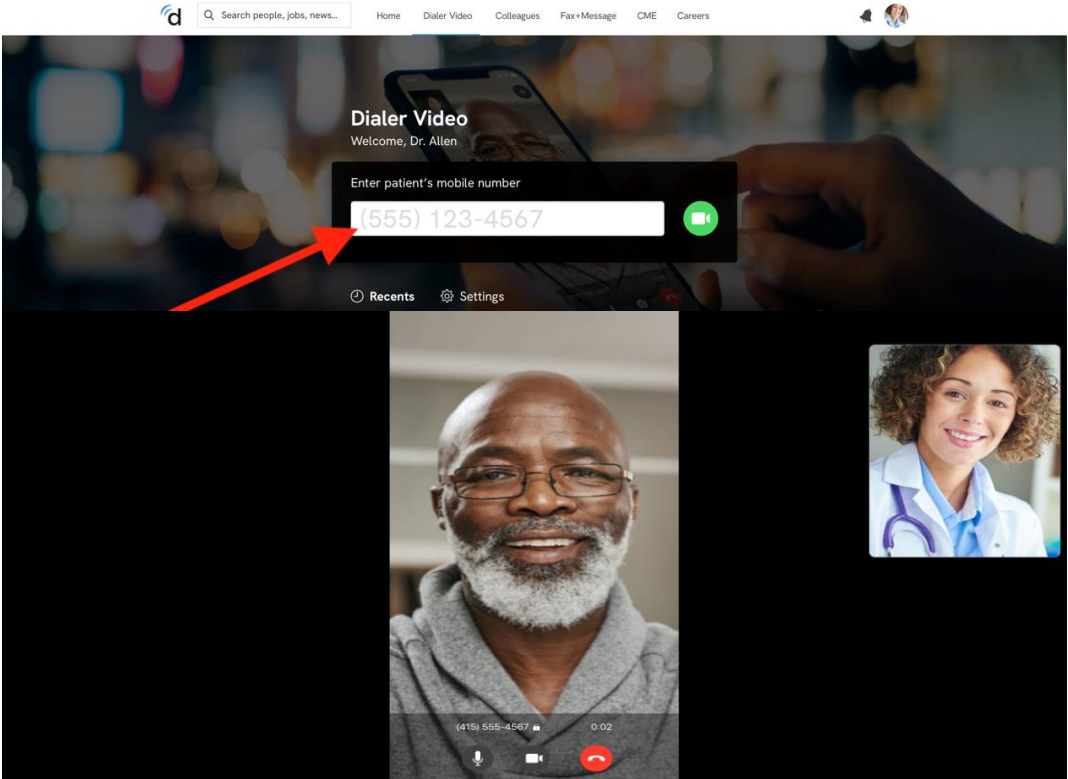
BEGIN VISIT

Digital Health | Virtual Care | Confidential—do not copy or distribute

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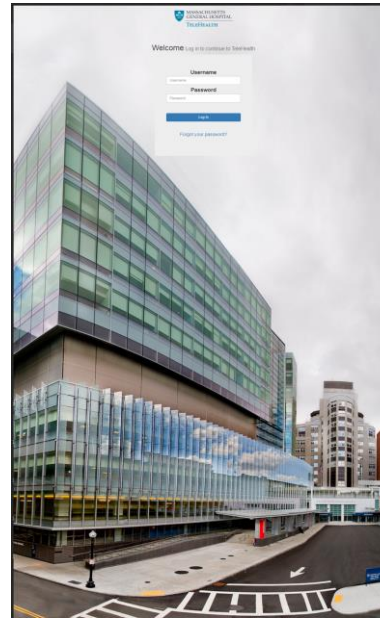
14

EPIC-INTEGRATED VS STANDALONE VIDEO CLIENT?

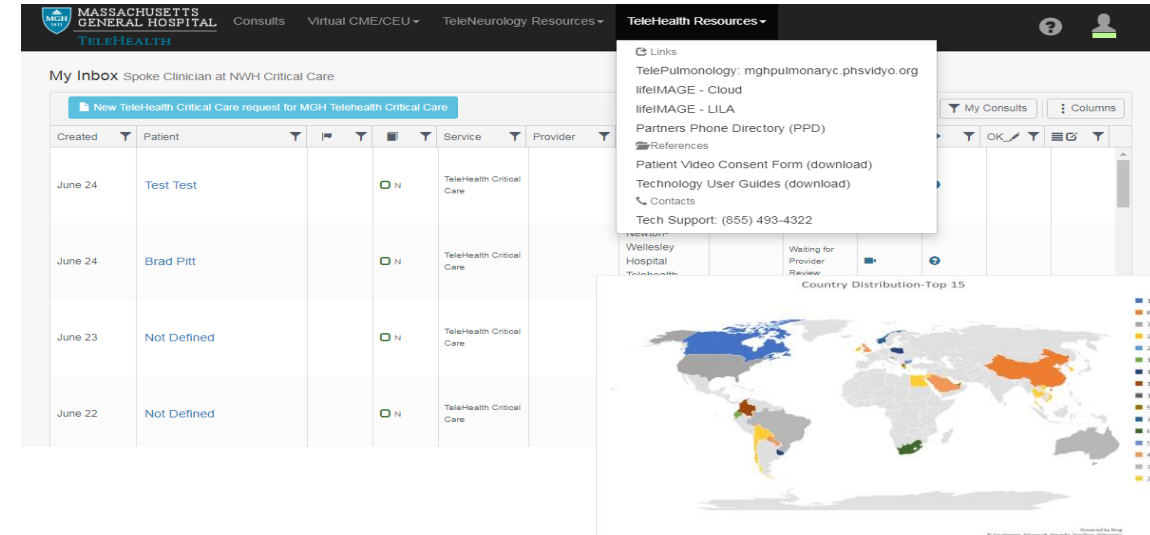


PROJECTING OUR EXPERTISE THROUGH ONLINE SECOND OPINIONS/ECONSULTS

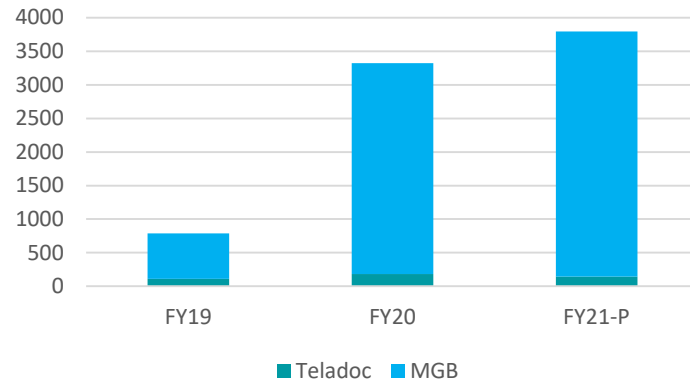
- Since 2002, MGH has developed a best-in-class, market differentiated TeleHealth Portal to support service-specific clinical consultations, transfers and 2nd opinions
- POSO is a robust platform that offers national and international second opinions direct to consumers or via aggregators, but lacks a sophisticated administrative back end to support scalability
- An informal market review and RFP identified a hybrid integration of the TH Portal and POSO as the best solution for Mass general Brigham
- As digital health solutions / offerings become an increasingly prominent aspect of care delivery, our institution recognizes the need for an integrated platform for all providers



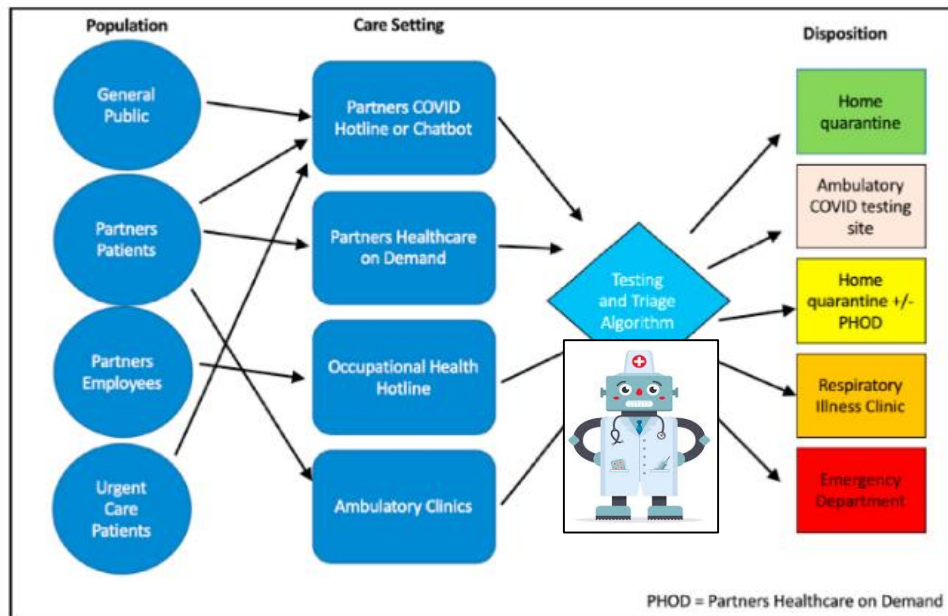
29,000+ consults
10,500+ via
videoconference and
18,500+ via telephone,
with over 20,500
remaining in their local
community hospital



Healthcare on Demand Volume Trend



VIRTUAL URGENT CARE



Partners HealthCare On Demand

HELP ?

Log In

Username

Password

LOG IN

[Forgot your username or password?](#)

CREATE YOUR ACCOUNT

Virtual urgent care for COVID-19 and minor illnesses and injuries is available to established Partners HealthCare patients in Massachusetts and all commercially insured AllWays Health Partners members (ages 3+). Many insurers are currently waiving cost-sharing for COVID-19 related care.

Also available on:

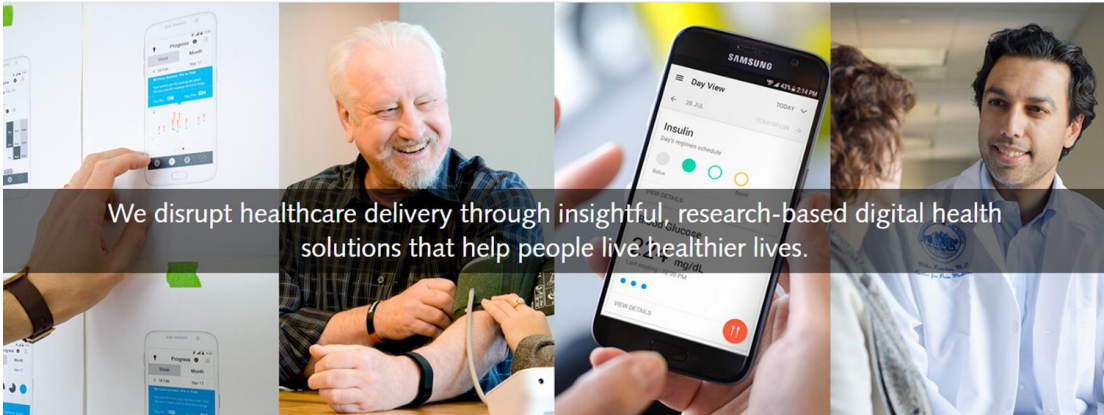
Powered by **TELADOC**

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REMOTE MONITORING OF HEALTH CONDITIONS



We disrupt healthcare delivery through insightful, research-based digital health solutions that help people live healthier lives.

Commercial/Wellness	Device Only	Reimbursement	VBP/Outcome/ Home Health	Extended Service Lines

PGHD Connect Workflow



INVITATION

- Provider initiates invitation in EHR and selects data type(s) for sharing.
- Sends Smart Phrase invitation with instructions on how to share data to patient portal (PPG).
- Provider has option to send patient SMS message with link to download PGHD Connect mobile app.
- Provider can stop the flow of data by uninviting the patient from within the EHR.

MOBILE APP

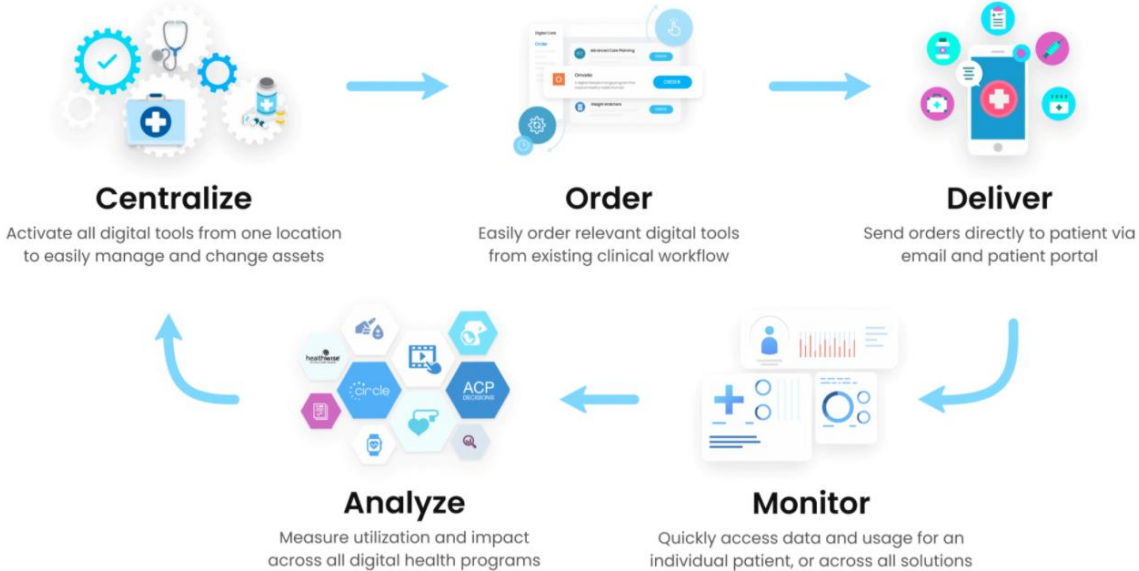
- Patient receives invitation and instructions via PPG.
- Patient downloads PGHD Connect mobile app, creates an account and connects their device(s).
- Patient takes a reading.
- A patient can stop the flow of data by removing their device from the mobile app.

READINGS

- Readings are viewable by the provider in the EHR.
- Patient data can be accessed individually or through the PGHD Connect Patient List.
- Patients can view their data in the mobile app and PPG.

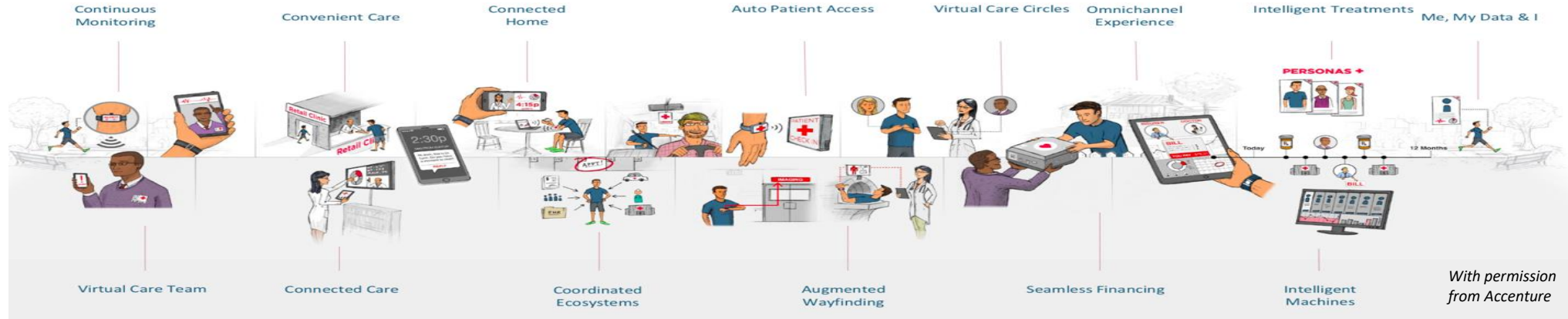
REPORTS

- Providers can automatically request a weekly raw data report of their patient(s) data via email.
- Data can be presented by provider or practice.



CREATING A “DIGITAL BIOBANK” WITH PATIENT GENERATED HEALTH DATA

THE TECHNOLOGY BEHIND THE MGB DIGITAL PATIENT JOURNEY



Health Providers Engage Appropriate Patients

Device Vendors and Technology Support Vendors

Primary Patient Sensors/Devices Medical and Consumer Grade

- Activity motion sensors
- GPS location mapping
- Vital Signs (BP, HR, O2Sat, Weight) Capture Devices
- Glucometers
- Sleep sensors
- Digital phenotyping
- Novel sensors

Device Connectivity Interfaces and Channels

Connecting to:

- Smartphone Hub, Vendor Hubs or Agnostic Servers

Via

- Bluetooth
- NFC
- Cellular/LTE
- WiFi
- POTS
- IVR/SMS/Photos

Digital Navigators Interact w/Patients

Data visualization apps/services

Data Aggregators or Integrators

Apple Health Kit
Google
CommonHealth

3rd Party Device
App/Cloud Servers
(Fitbit, Omron)

MGB Developers,
ML/AI Labs

Epic
Care Companion

Agnostic Servers
(Validic, Bridge
Connector)

Integrators
(Xealth, Phillips)

Digital Health Teams Interact w/Data

Middleware & Venture Devt

Open Standards Interface Engine

Data and
MetaData Inputs

Data and MetaData
Outputs

FHIR and Other APIs, HL7
Read/Write-Back Capabilities

“Digital BioBank” Data Lake

Read/Write-Back To Interface Engine

Advanced AI/ML
Analytics

Data Curation

Broad Interaction w/Patients via EHR Integration and Clin Decision Support

EHR APIs | CDS | Predictive models

EPIC Data Ecosystem

Selected Flowsheet Data and
Externally Generated Action Writeback

Data Visualizations
and IPF/eCQM
Reporting Tools

Clinical Decision
Support and
Actionable Alerts

Epic Predictive
Analytics

RPDR / Genetics
Data Linkage

CareTeam Connect
VICS

 Lee H. Schwamm | [Logout](#)

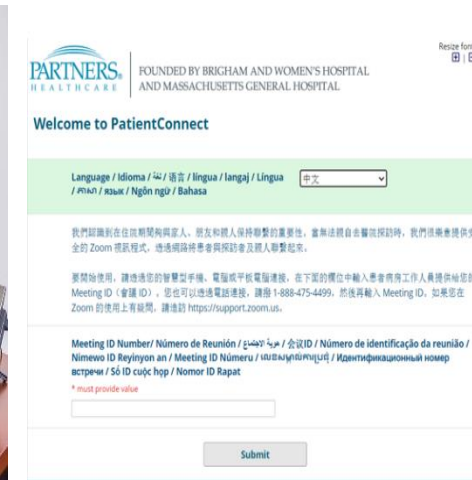
- > ☐ MGH Chelsea Health Center
- > ☐ MGH Danvers
- > ☐ MGH Home Hospital
- > ☒ MGH Main Campus
- > ☐ MGH Waltham 52 Second Ave.
- > ☐ MVH Main Campus
- > ☐ NCH Main Campus
- > ☐ NSM Danvers 104 Endicott St
- > ☐ NSM Salem Campus
- > ☐ NSM Union Campus

	<p>MGH Main Campus / MGH BIGELOW 13 RACU / G1322 / G1322 A PHS50062</p> <p style="text-align: right;"></p> <p style="text-align: right; background-color: #007bff; color: white; padding: 5px 10px; border-radius: 5px;">START MEETING</p>
	<p>MGH Main Campus / MGH EMERGENCY / ED ACUTE 01 / 01 PHS50074</p> <p style="text-align: right;"></p> <p style="text-align: right; background-color: #d3d3d3; color: #666; padding: 5px 10px; border-radius: 5px;">START MEETING</p>
	<p>MGH Main Campus / MGH EMERGENCY / ED ACUTE 01 / 01 PHS014630</p> <p style="text-align: right;"></p> <p style="text-align: right; background-color: #007bff; color: white; padding: 5px 10px; border-radius: 5px;">START MEETING</p>

Mass General Brigham
Send Feedback



-



IMAGINE YOU'RE A PATIENT IN THE HOSPITAL...



I Want to See My Loved Ones

- *You can video call your loved ones or virtually include them in your care plan*

I'm Hungry

- *Online ordering makes mealtime easy and convenient*

It's Game Time!

- *Connect over video, and you can watch the game with your spouse/friends, just like you always do*

I Need an Escape

- *You have lots of time on your hands. You can access your favorite shows on Netflix*

I Forgot What My Clinician Said During Rounds

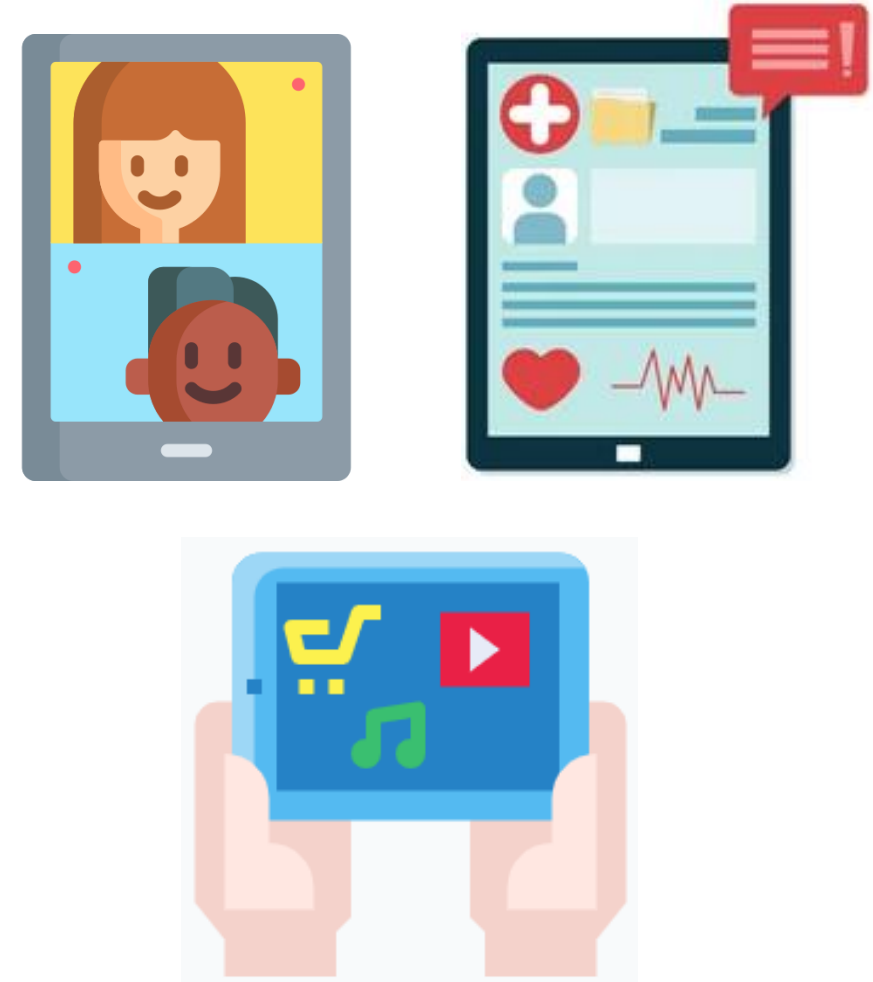
- *You can access your health information with MyChart bedside to review your care plan and what comes next*

How can an in-room connected device help you?



Inpatient Virtual Care Vision and Strategy

- **Future vision:** A connected device integrated into every room
- **Low-cost retrofit solution:** an iPad in every room
- **Current Application Suite:**
 - CareTeam Connect for care team interactions, family meetings, friends & family calls, interpreter services, PCP followup and expanded presence at rounds
 - Epic integration via MyChart Bedside
- **Future Use Cases**
 - Digital navigation, Education and Entertainment
 - TeleSitters and Video Rapid Response
 - Biotelemetry hub with digital phenotyping and early event detection



Inpatient Vision and Strategy

