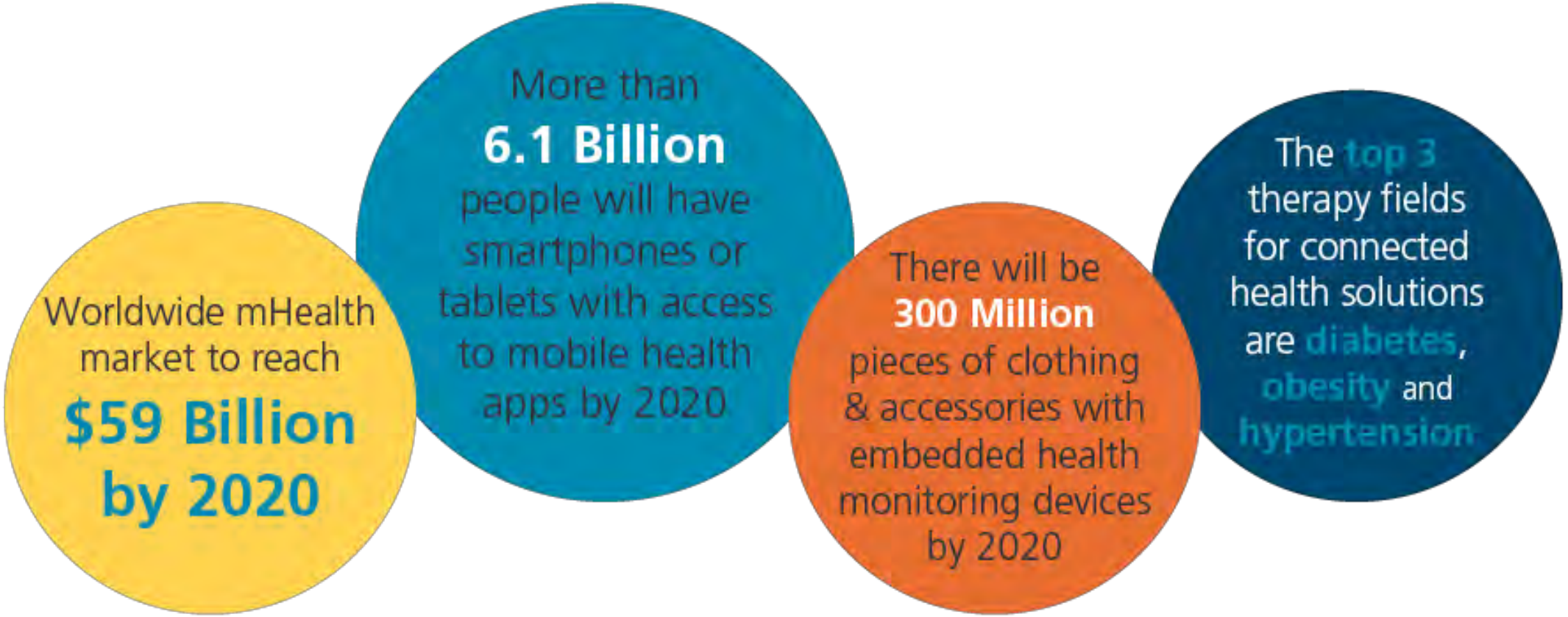
DIGITAL HEALTH IS MOVING MAINSTREAM: How Can We Harness the Opportunity?

Joseph C. Kvedar, MD
Vice President, Connected Health, Partners HealthCare
Professor of Dermatology, Harvard Medical School

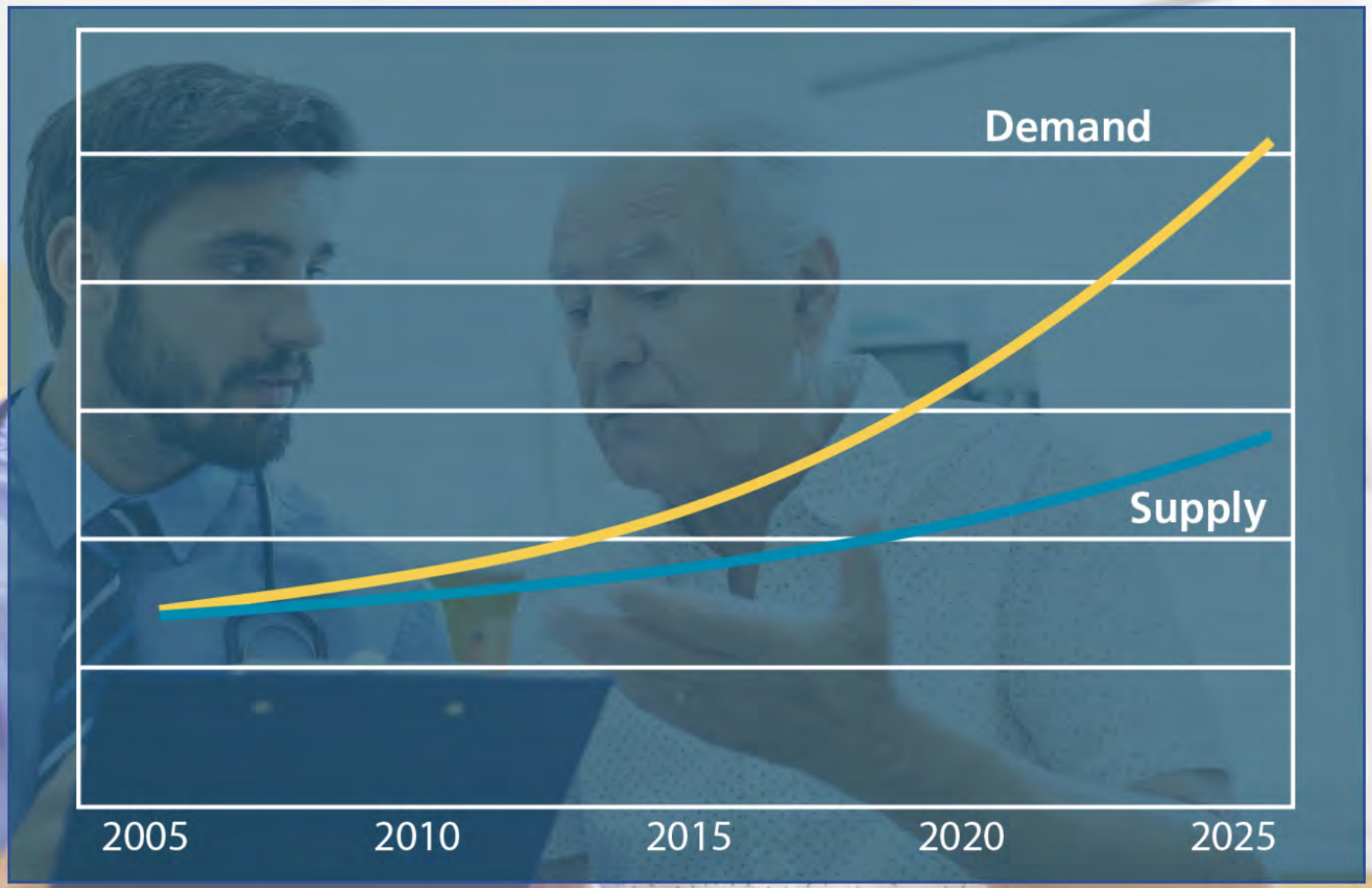
THE DIGITAL HEALTH VISION

Care delivered outside of a traditional setting that is not dependent on specific time and place restrictions. It integrates technology, often includes Patient Generated Health Data and seeks to include the patient in the process and help them become more engaged.

DIGITAL HEALTH BY THE NUMBERS



We Must Get it Right!



THE DIGITAL HEALTH LANDSCAPE

Telehealth

Remote Monitoring

Digital Therapeutics

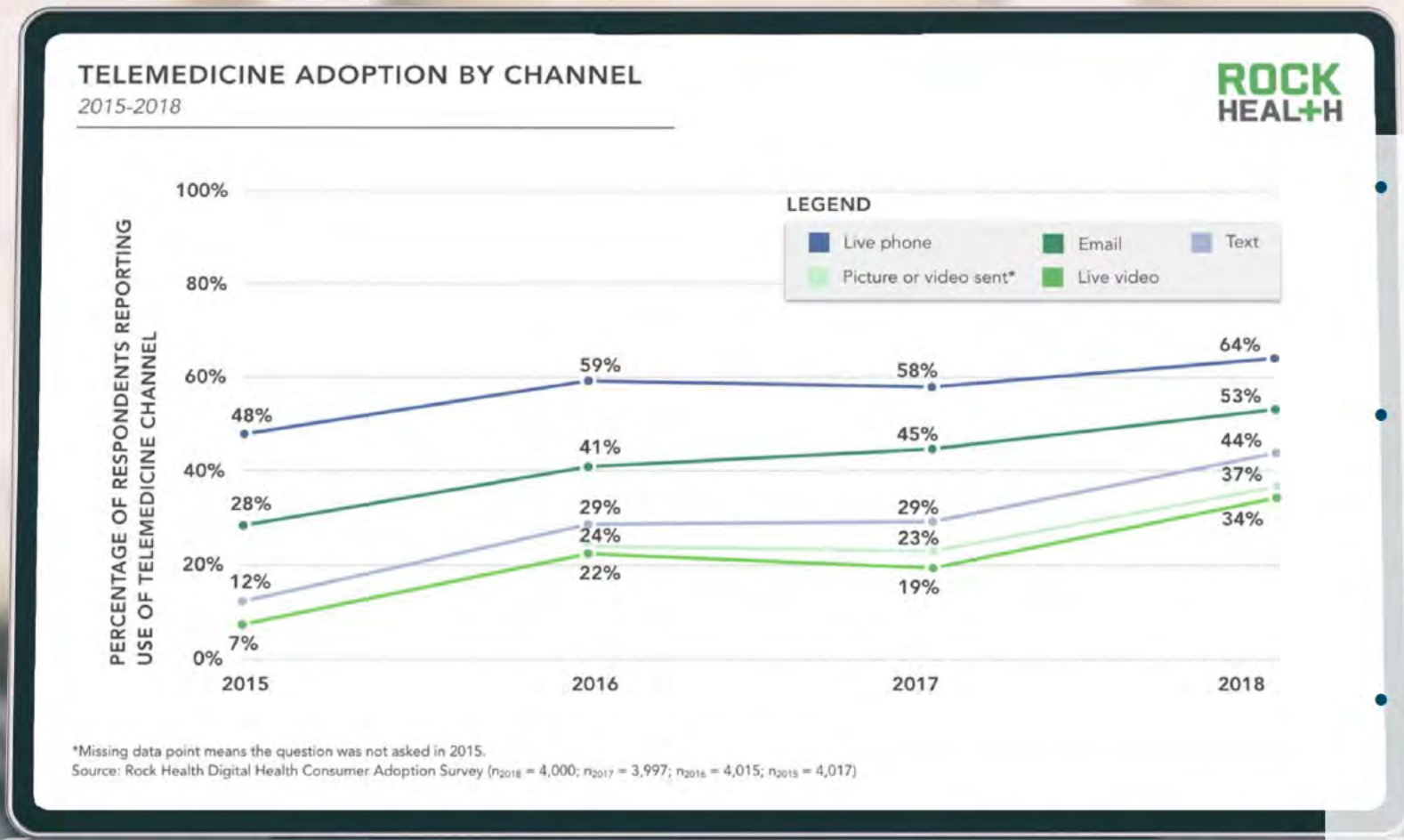
Artificial Intelligence

TELEHEALTH TAXONOMY

	Real Time "Synchronous"	Store and Forward "Asynchronous"
Visits (Provider to Patient)	**Virtual Visit**  Video visit between MGH MD and patient[1]	***e*Visit**  Online exchange of medical info between MGH MD & patient[1]
Consults (Provider to Provider)	**Virtual Consult**  Video consult from MGH MD to patient's MD[2]	***e*Consult**  Online exchange of medical info between two Providers

[1] Exchange where the provider gives the patient medical advice, or determines if travel to MGH for in-person encounter is advisable
[2] Exchange where the MGH consultant "Expert" gives referring provider medical advice

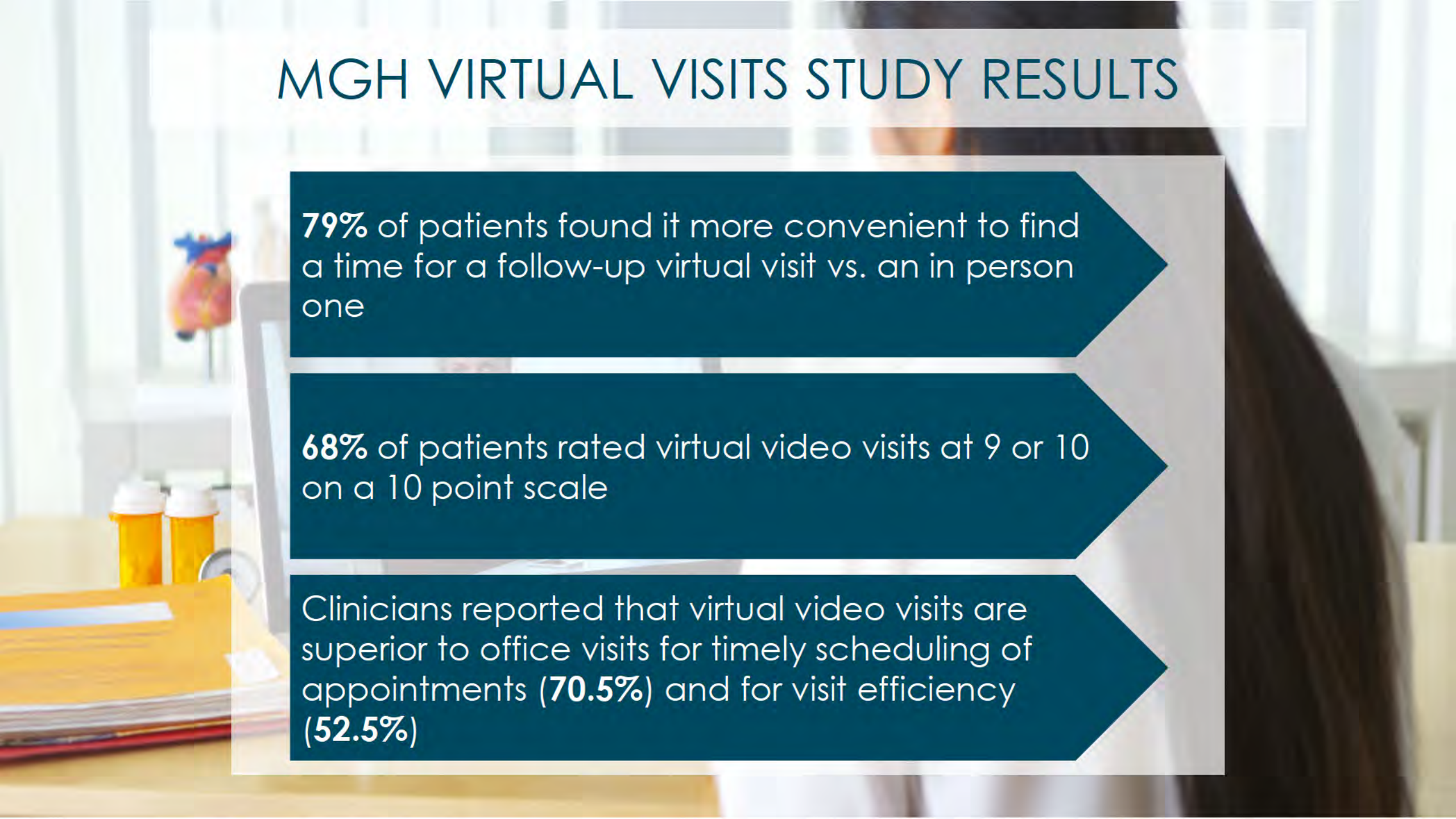
TELEMEDICINE ADOPTION TRENDS



- Wearable use shifting from fitness to managing health
- Urban patients twice as likely to use video telemedicine than rural
- Currently only capturing 0.5% of a 400+ million patient addressable market

Data from 2018 Rock Health Digital Health Consumer Adoption Report

MGH VIRTUAL VISITS STUDY RESULTS



79% of patients found it more convenient to find a time for a follow-up virtual visit vs. an in person one

68% of patients rated virtual video visits at 9 or 10 on a 10 point scale

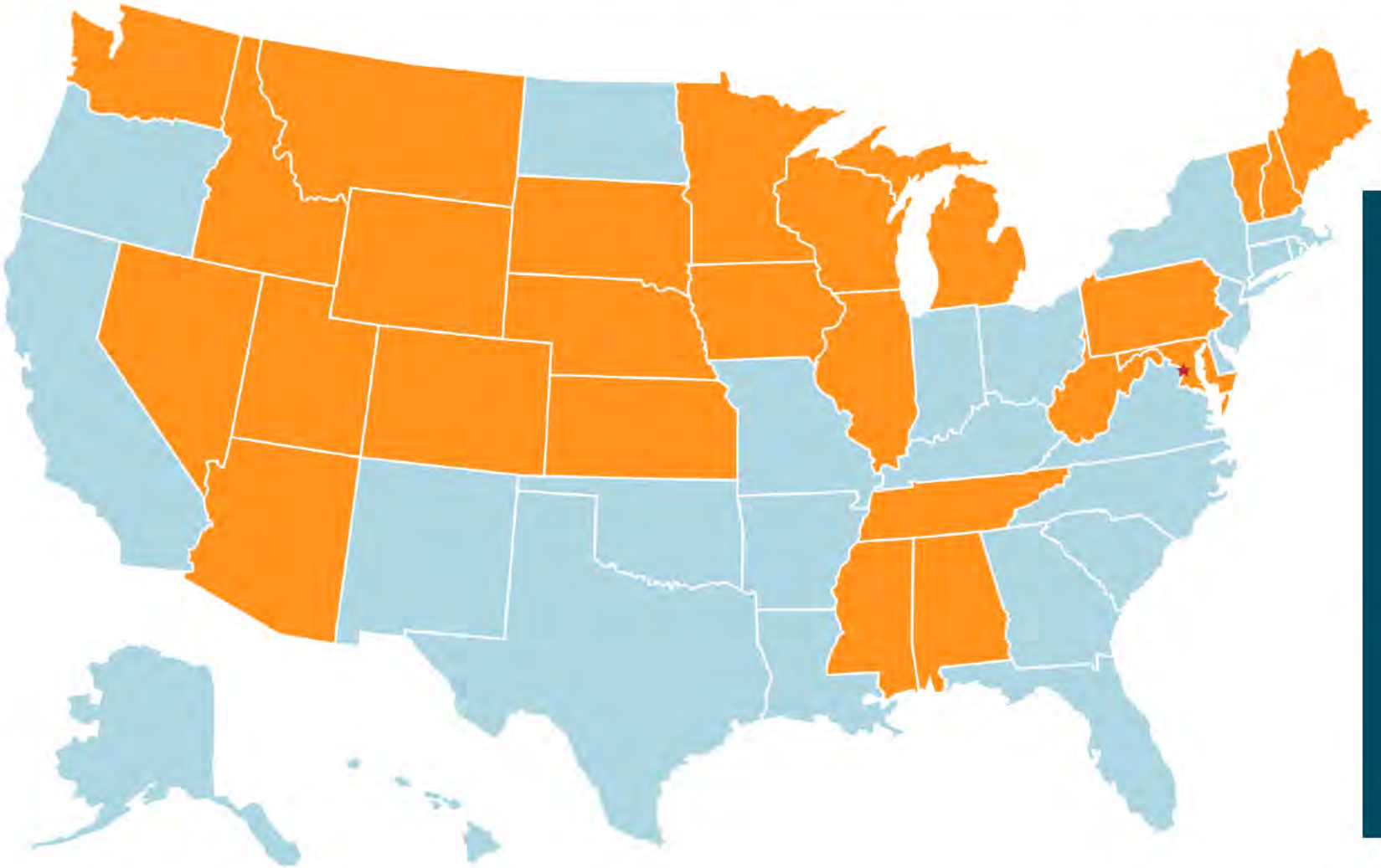
Clinicians reported that virtual video visits are superior to office visits for timely scheduling of appointments (**70.5%**) and for visit efficiency (**52.5%**)


SWEET
HEART

ISSUES WITH FRAGMENTED APPROACH

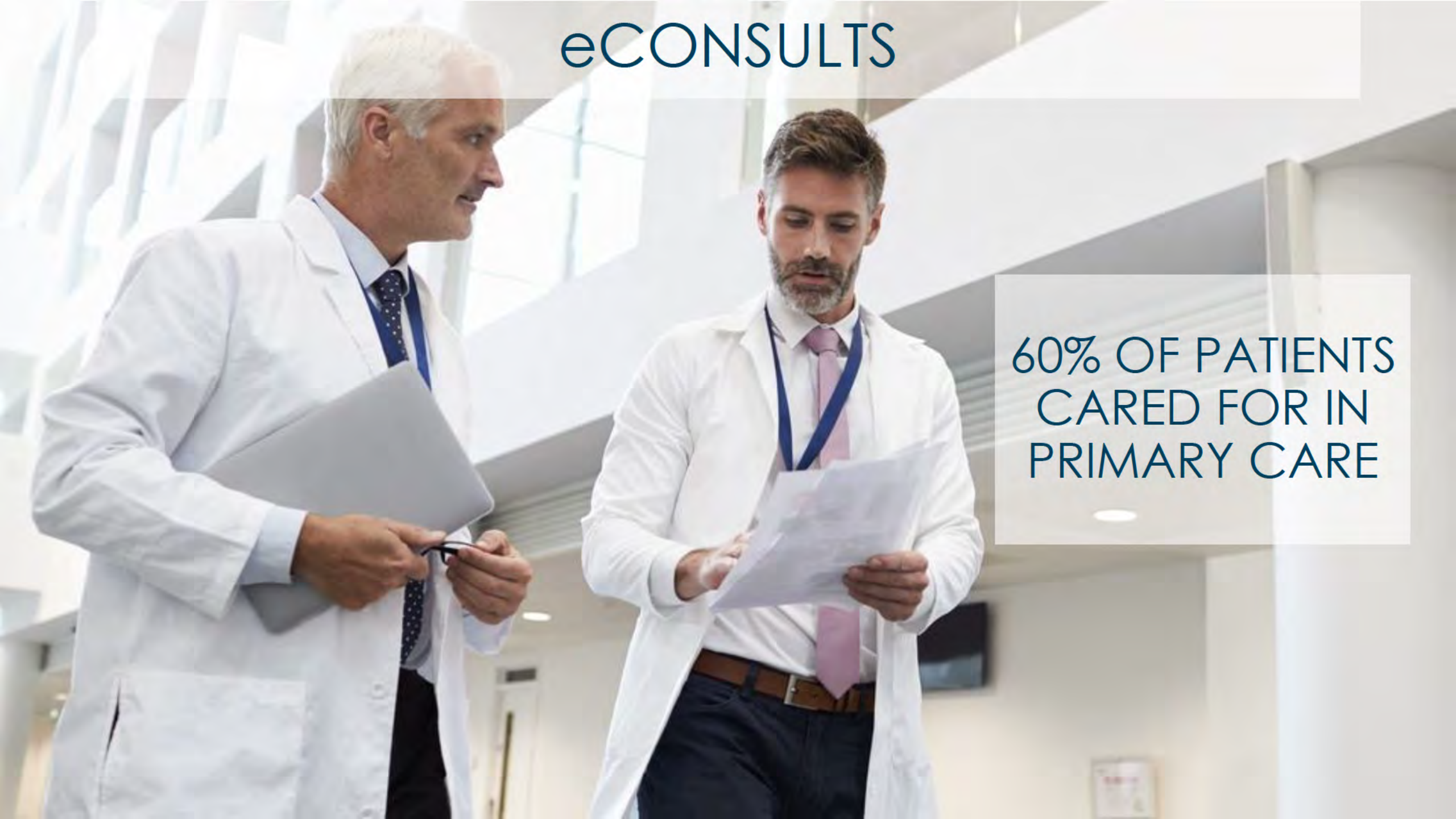
- Patient Confusion & Dissatisfaction
- Reimbursement & Revenue Differences
- Increased Legal Exposure
- Inefficient Use Of System Resources

INTERSTATE MEDICAL LICENSURE COMPACT



- Launched in 2014 by the FSMB
- 25 States are current members (District of Columbia & Guam as well)
- As of December 31, 2018, 4,511 medical licenses have been issued to providers to practice telehealth in multiple states

eCONSULTS



60% OF PATIENTS CARED FOR IN PRIMARY CARE

ONLINE SECOND OPINIONS

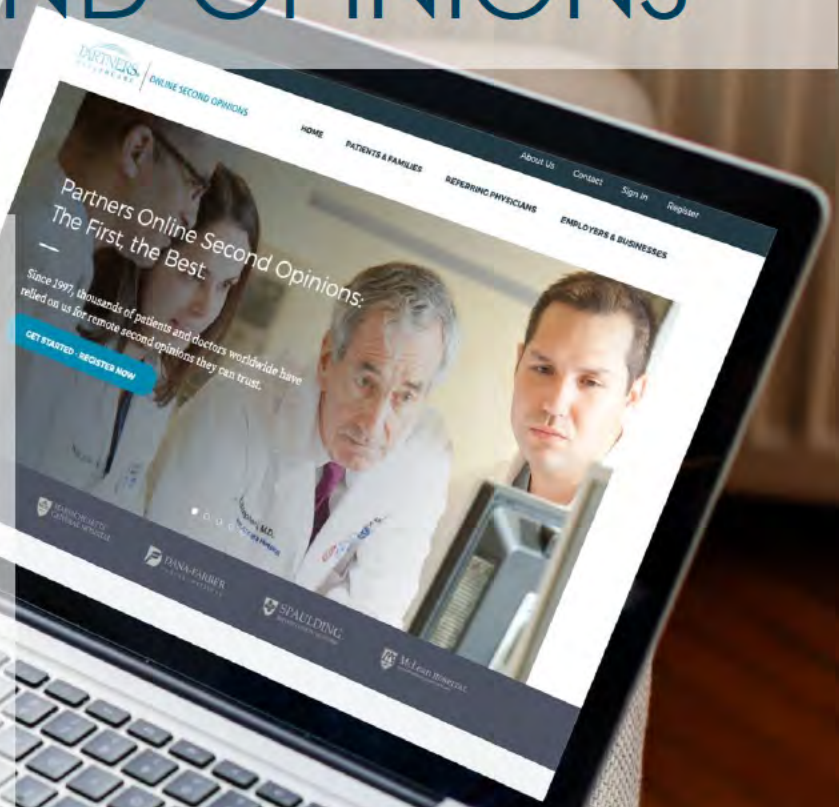
ONLINE SECOND OPINIONS

THE ADDRESSABLE MARKET FOR ONLINE SECOND OPINIONS IS ESTIMATED TO REACH **$3.4 BILLION** BY 2020

PARTNERS ONLINE SECOND OPINIONS

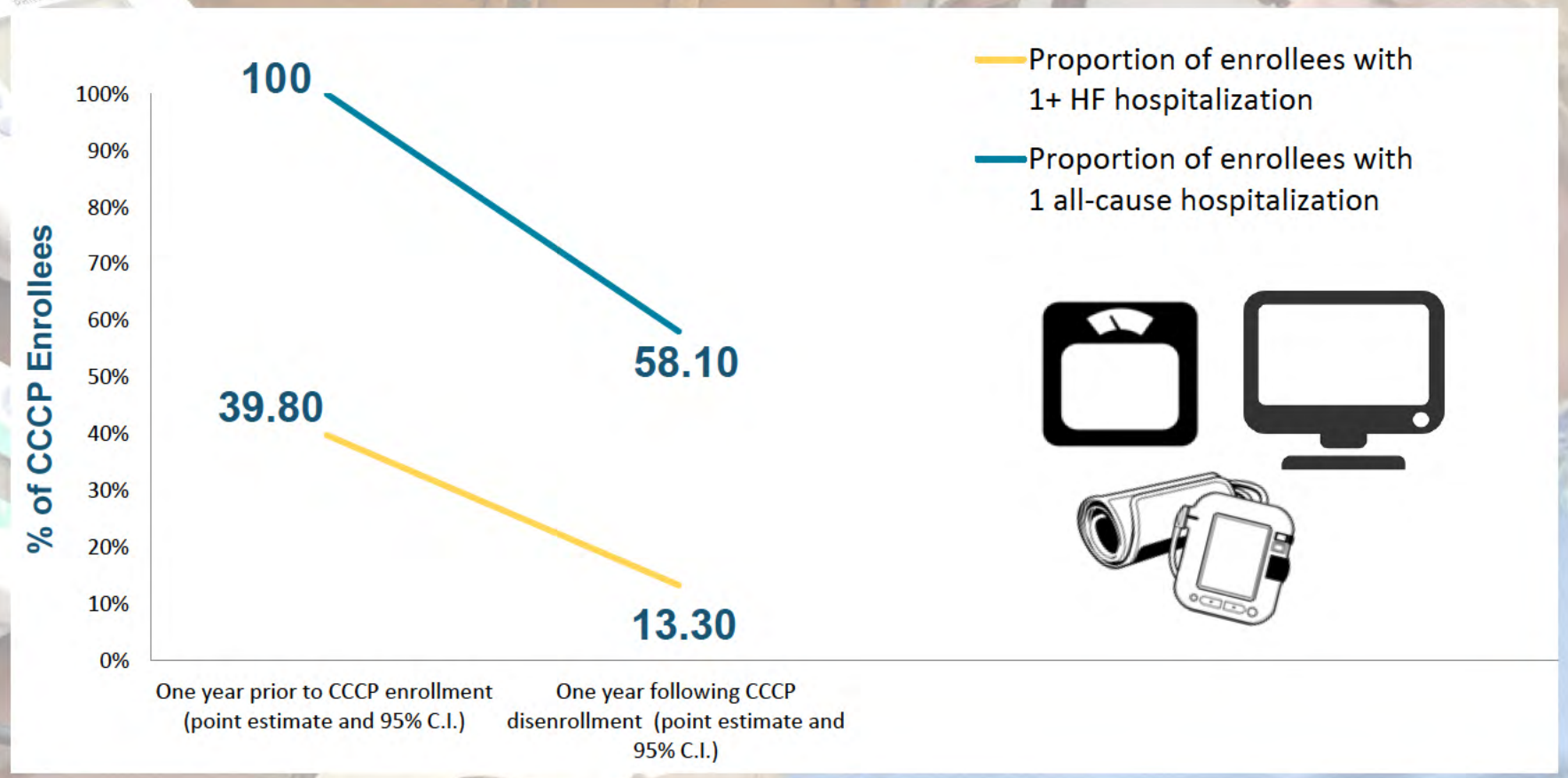
A 2003 study in the British Journal of Medicine documented the significant impact online second opinions have had on improving patient outcomes

- **90%** of patients over the year studied received a new recommended treatment plan
- **5%** of patients had a change in diagnosis

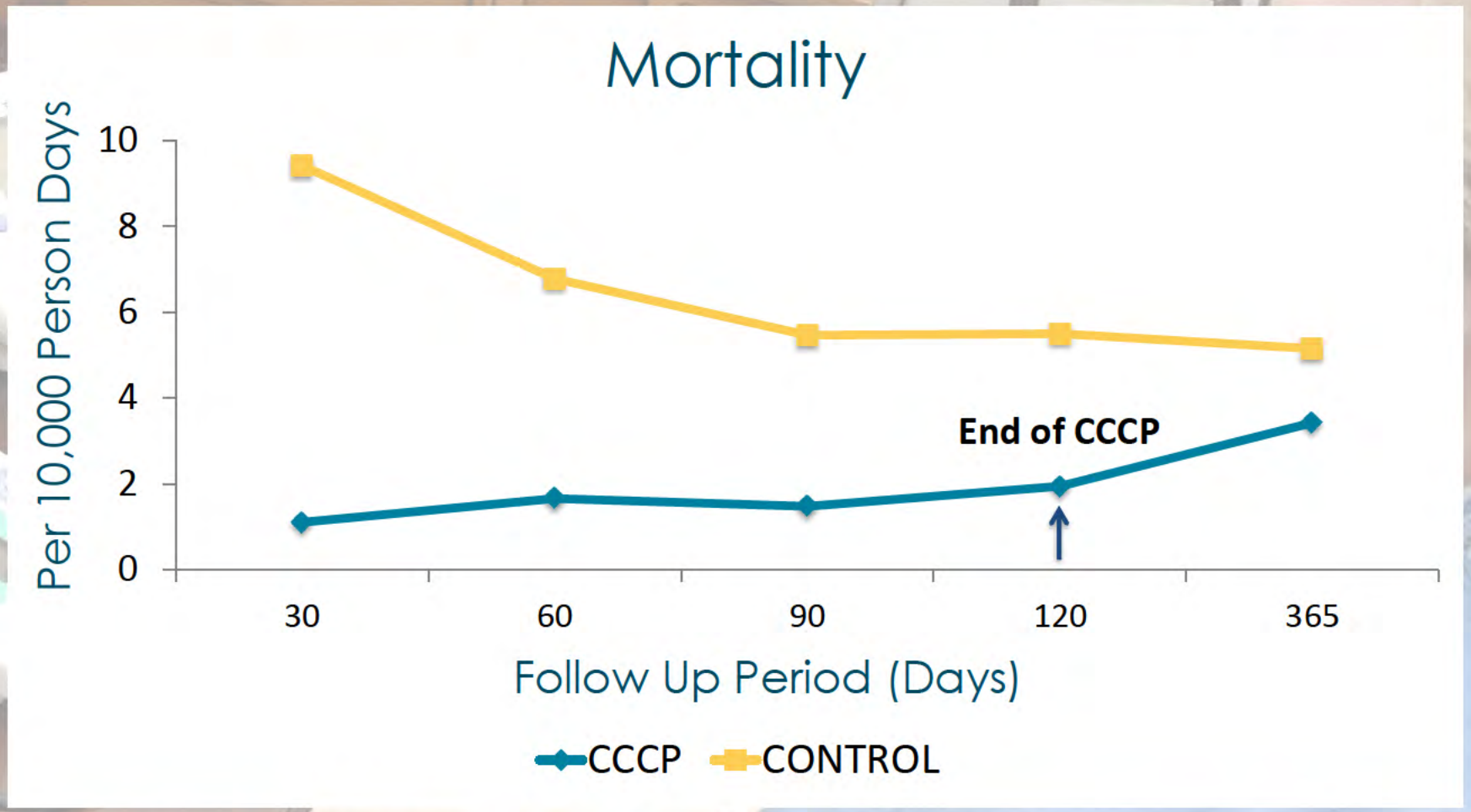


REMOTE MONITORING

CONNECTED CARDIAC CARE



ONE YEAR MORTALITY IN CCCP



Data Includes 303 CCCP patients and 252 controls seen at Partners Healthcare in 2012.

Ref: J Med Internet Res. 2015 Apr 22;17(4):e101. doi: 10.2196/jmir.4417.

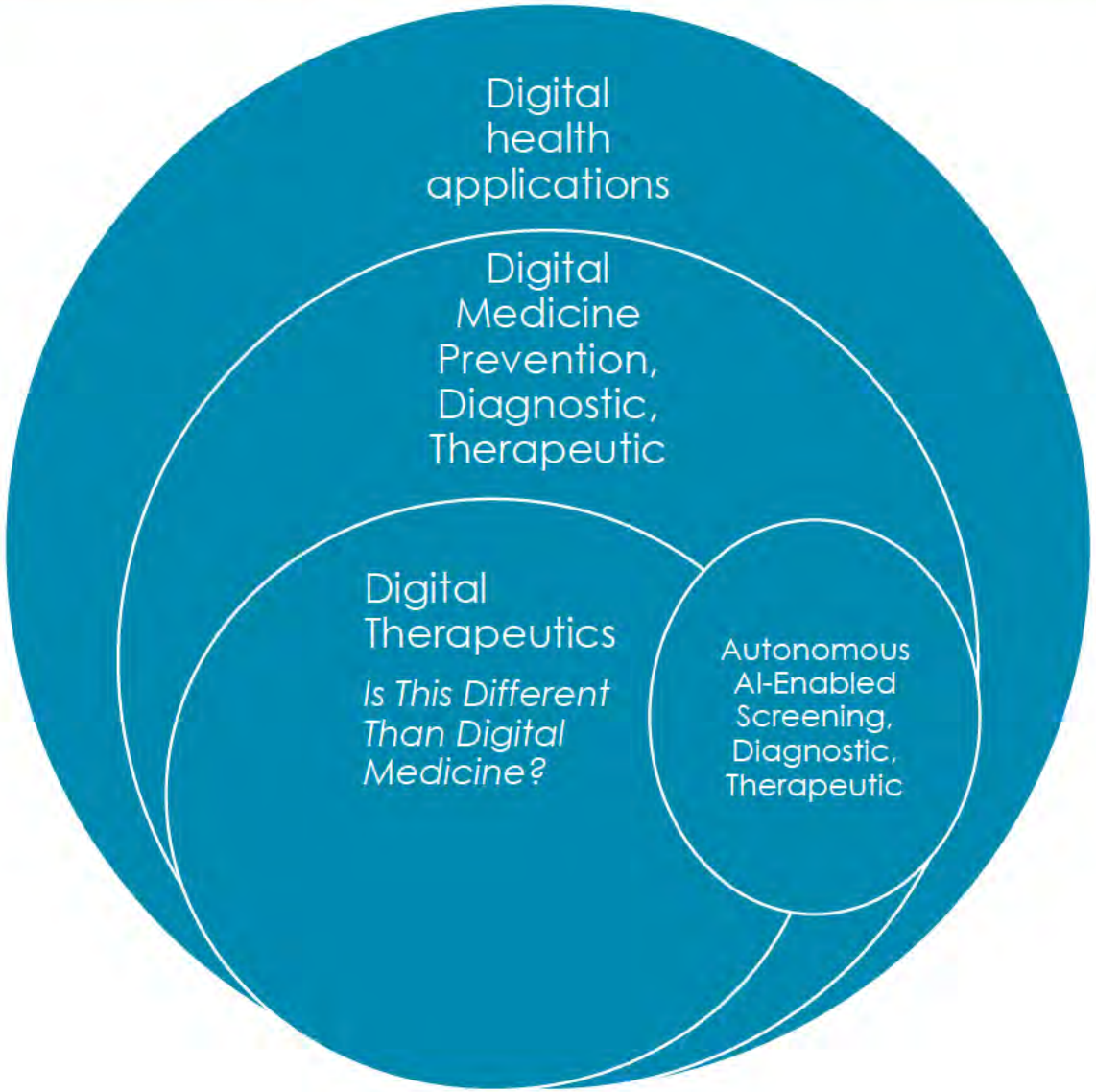
PGHD*Connect* is a cloud-based digital health platform that provides a link to securely share patient generated health data between patients and providers.

Members of the patient's care team can view the data via MyChart and Epic.

THE NEW PGHDConnect MOBILE APP

DIGITAL THERAPEUTICS

CONTEXTUAL PERSPECTIVE



FEATFORWARD

Activity Goals

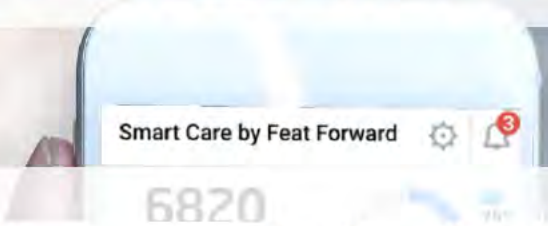
Alerts

Weather

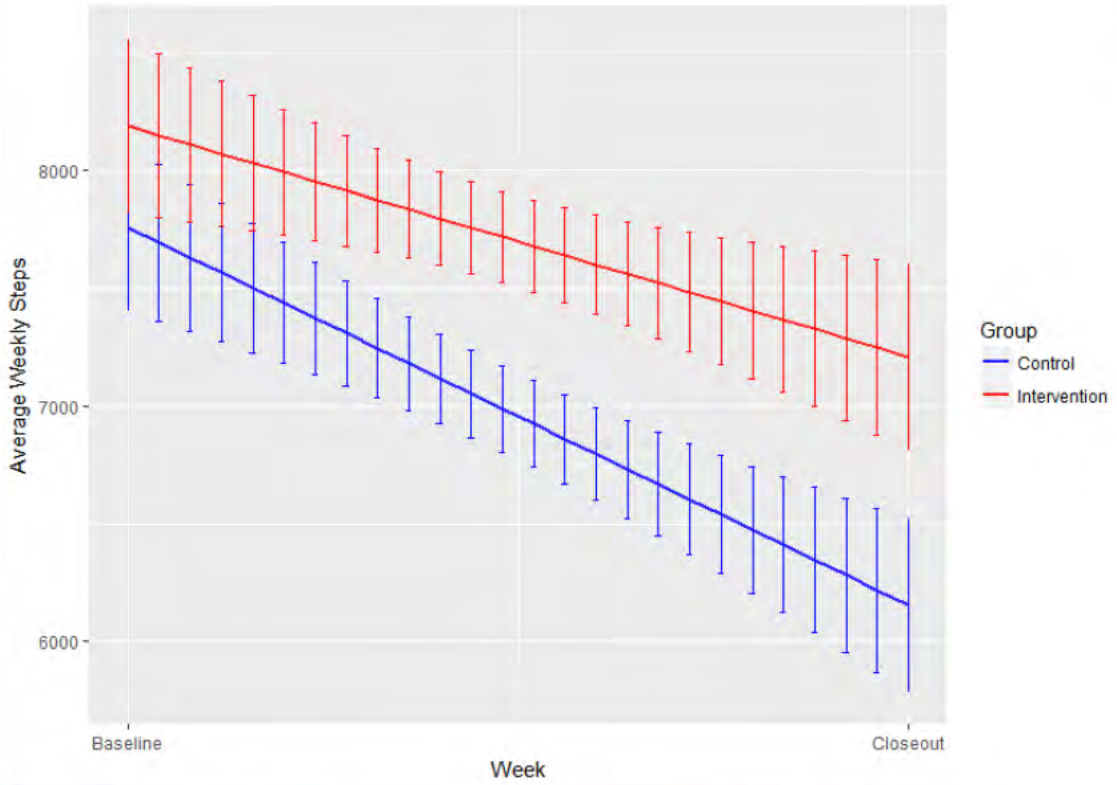
Messaging

Biometric Tracking

WEEKLY AVG DAILY STEPS (WDS)



Change in WDS by group over time *(unadjusted)*



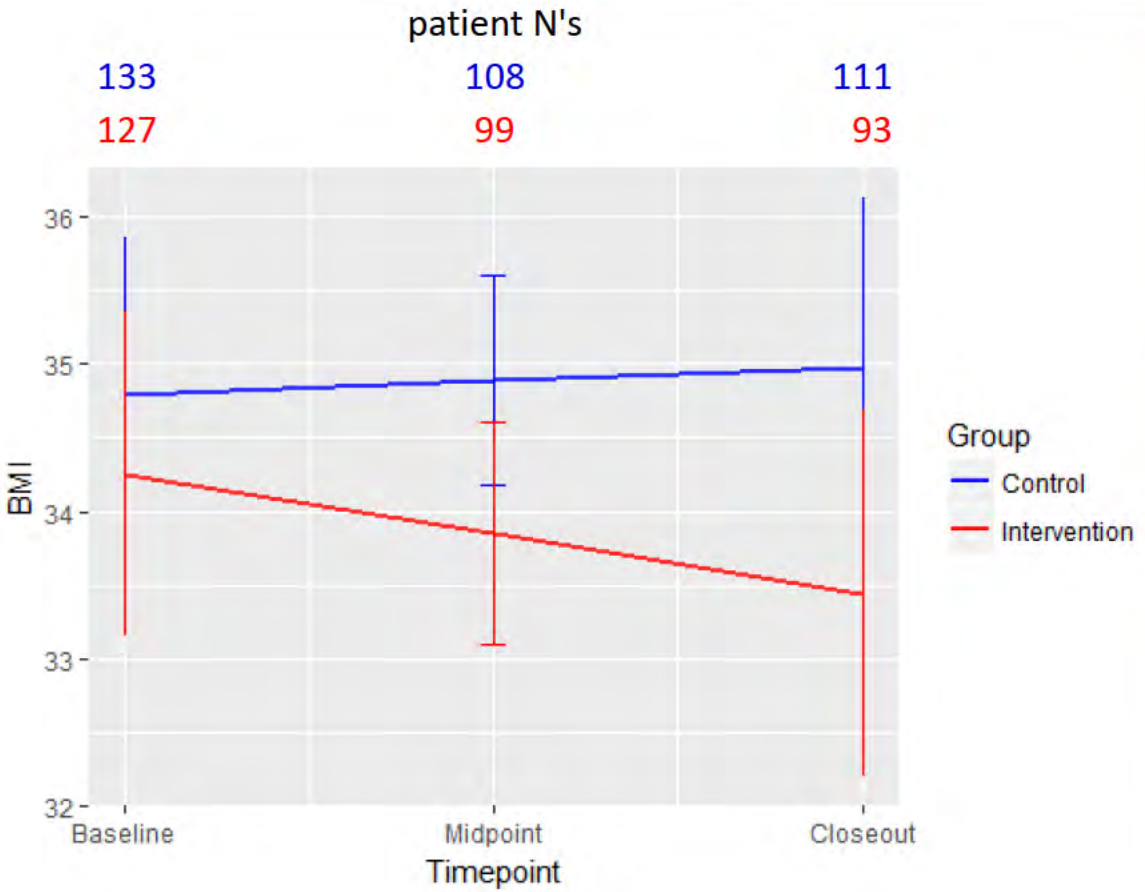
Baseline-adjusted slopes for WDS by cohort

	Control [n]	Intervention [n]	p-value
Overall	-57.94 [110]	-29.29 [100]	***0.015****
Obesity	*-90.23 [59]*	*0.95 [52]*	***<0.001****

BMI

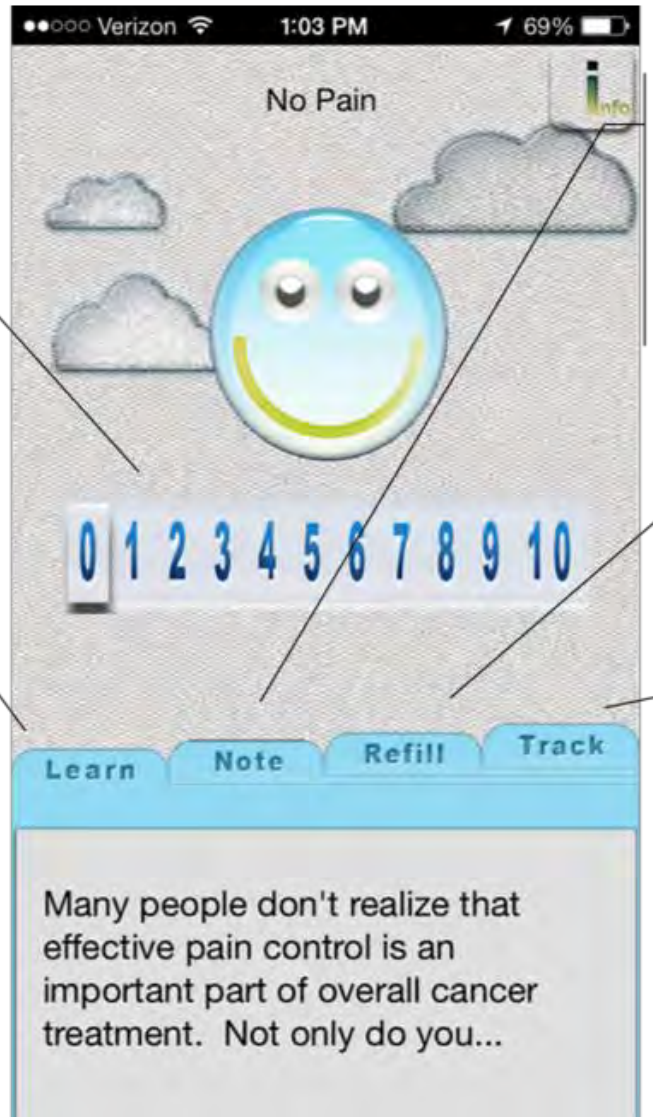
Baseline-adjusted slopes for BMI by cohort

	Control [n]	Intervention [n]	p-value
Overall	*-0.025* [133]	*-0.232* [128]	***0.041****
Obesity	-0.086 [68]	-0.236 [67]	0.362
Hypertension	*0.056* [74]	*-0.253* [75]	***0.002****



(Unadjusted)

ePAL



Sliding pain scale

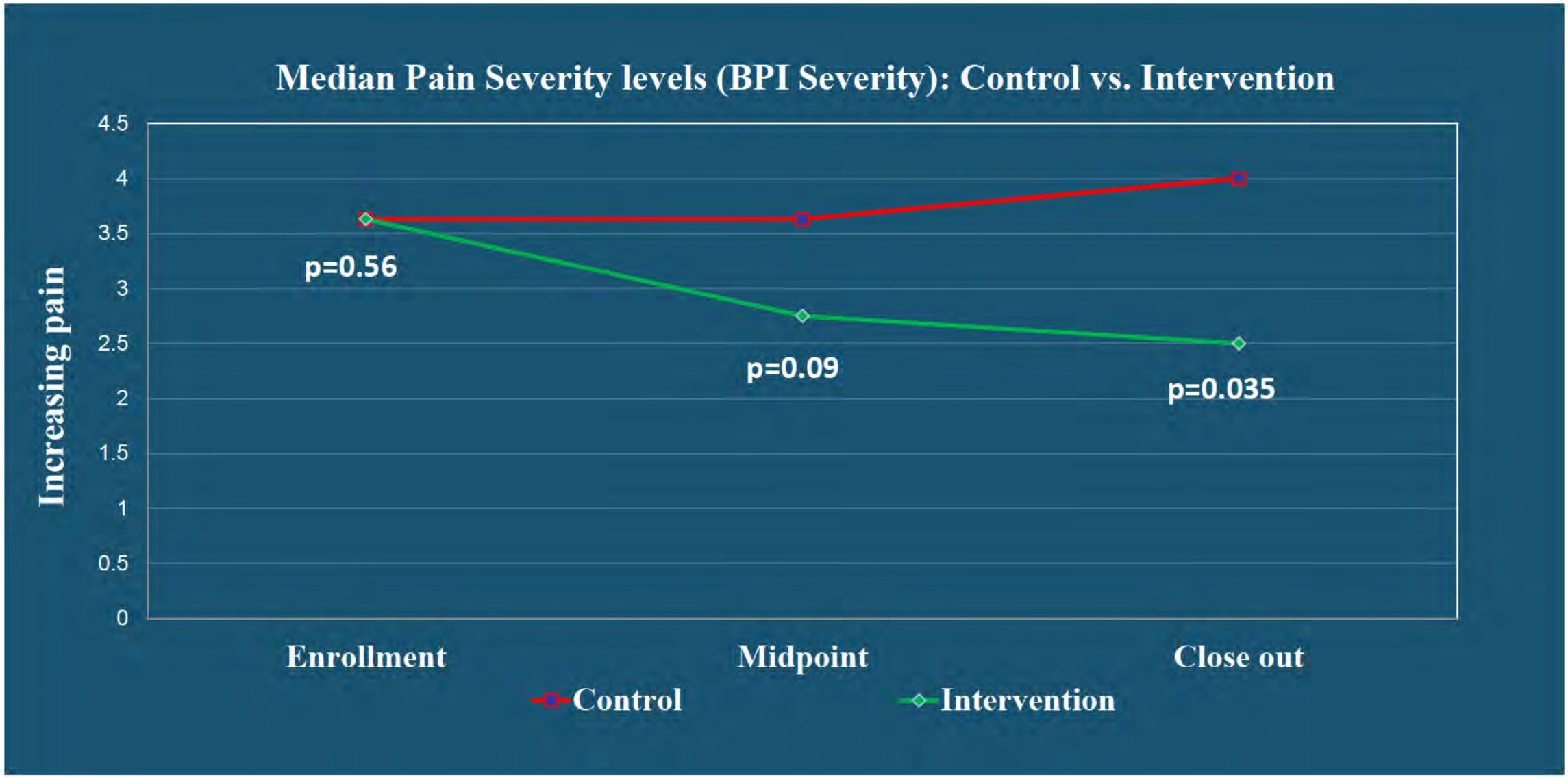
Learn tab features multi-media educational content w/ daily tip

Users make notes & keep track of questions for their provider

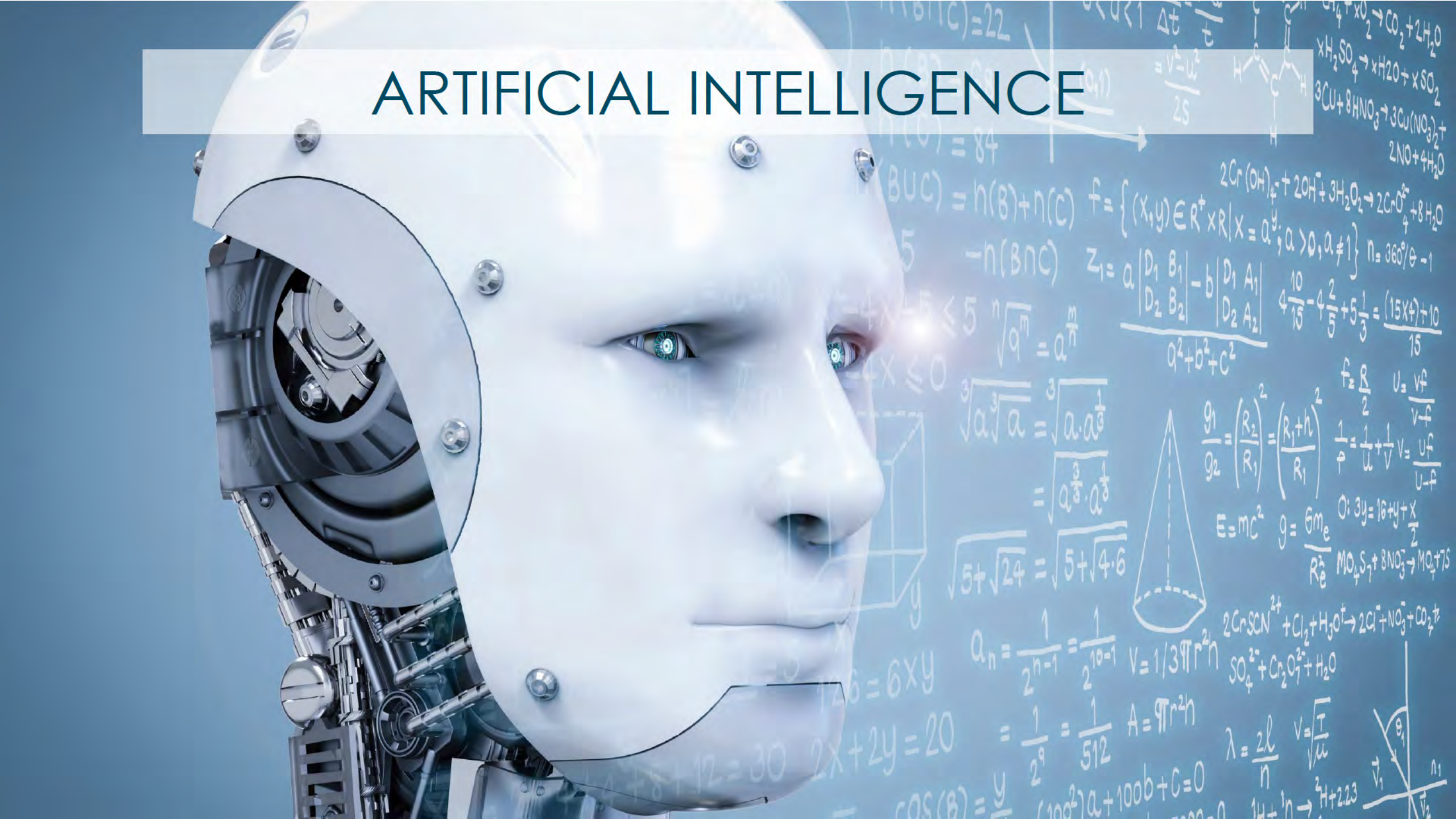
Easy rx re-fill requests

Calendar feature tracks pain trends

ePAL CLINICAL RESULTS



ARTIFICIAL INTELLIGENCE



BIGGER THAN WHAT HUMANS OR TECHNOLOGY CAN ACHIEVE ALONE

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AI ALONE: 92%

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HUMANS ALONE: 96%

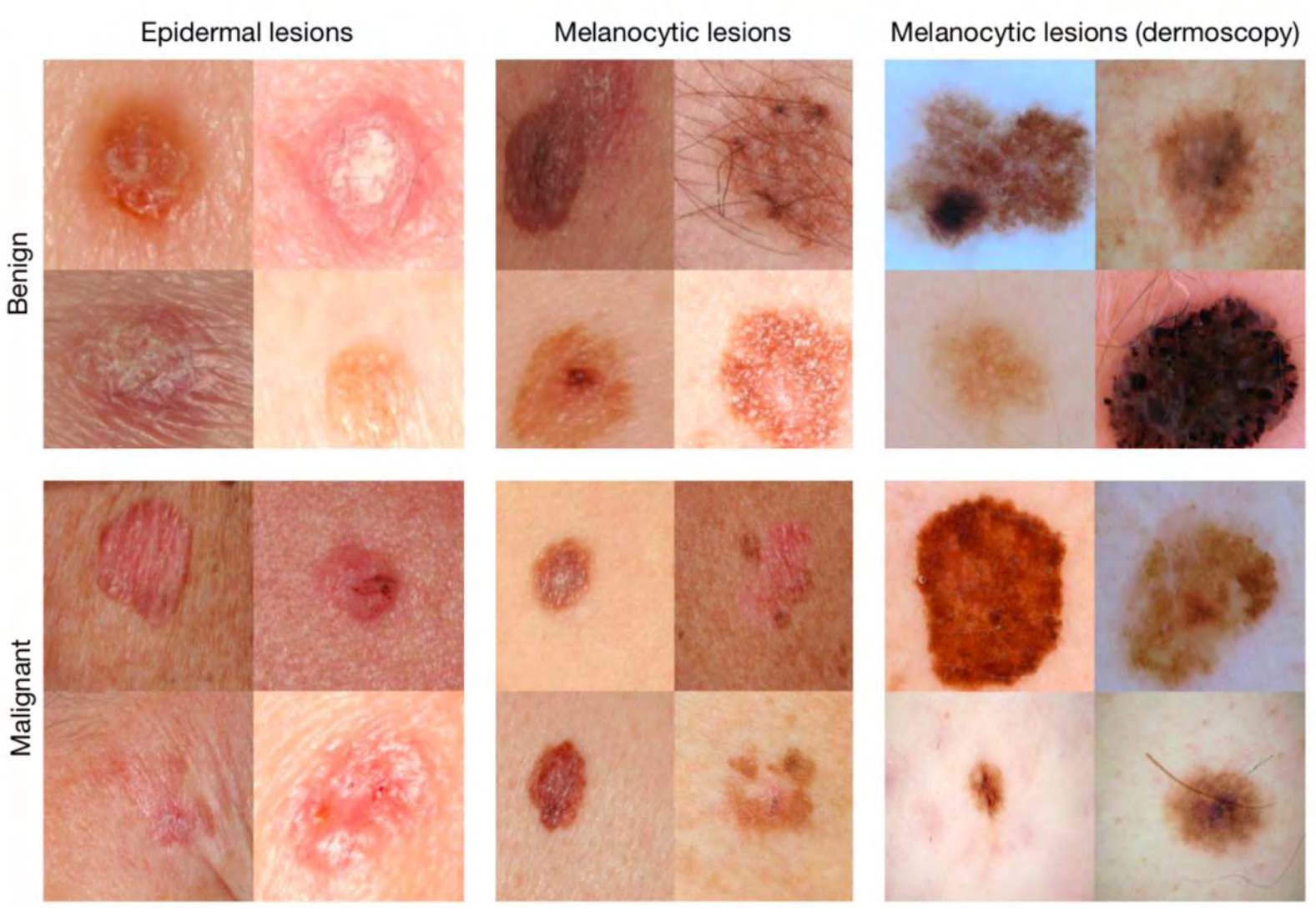
BIGGER THAN WHAT HUMANS OR TECHNOLOGY CAN ACHIEVE ALONE

AI ALONE: 92%

HUMANS ALONE: 96%

AI + HUMANS: 99.5%

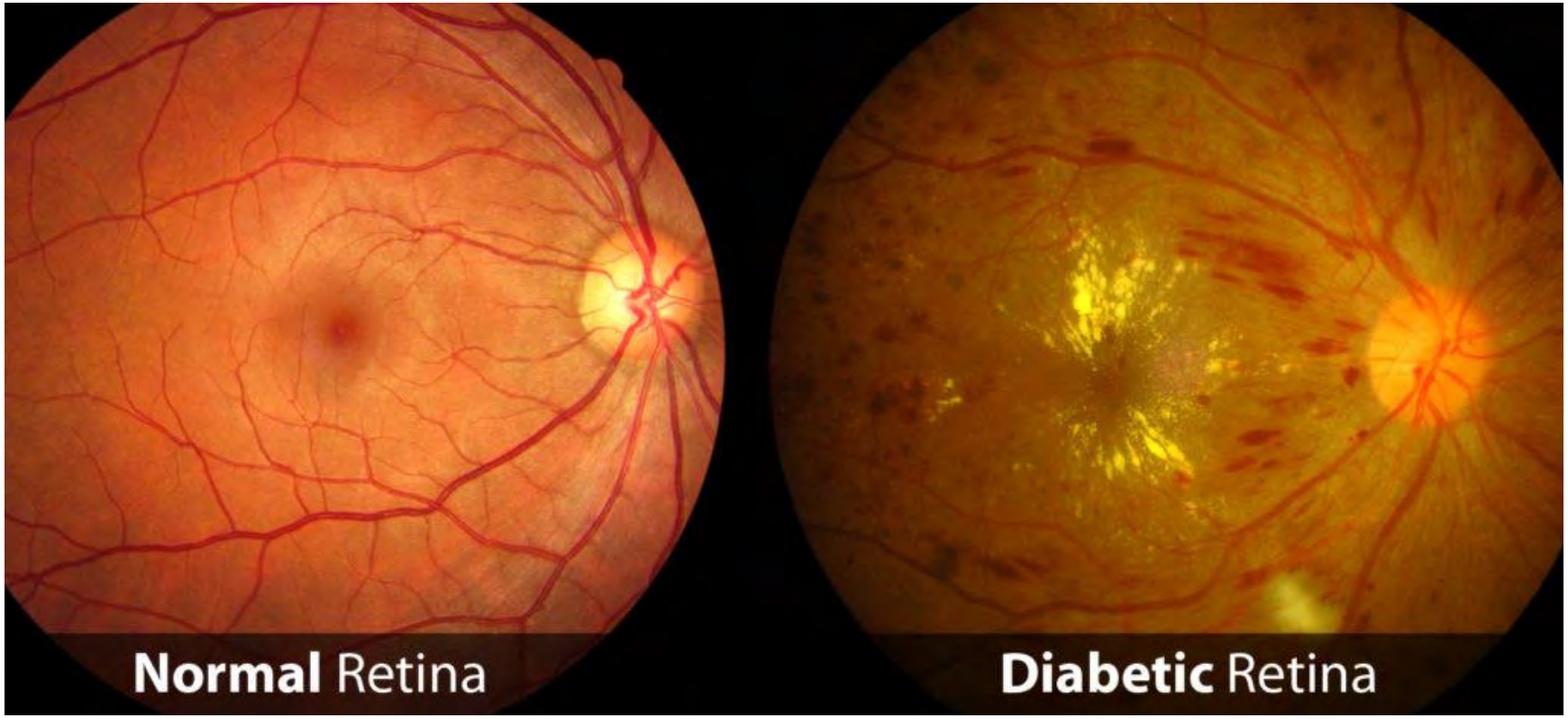
Dermatology: Deep neural network classifies skin conditions *as well as* a dermatologist



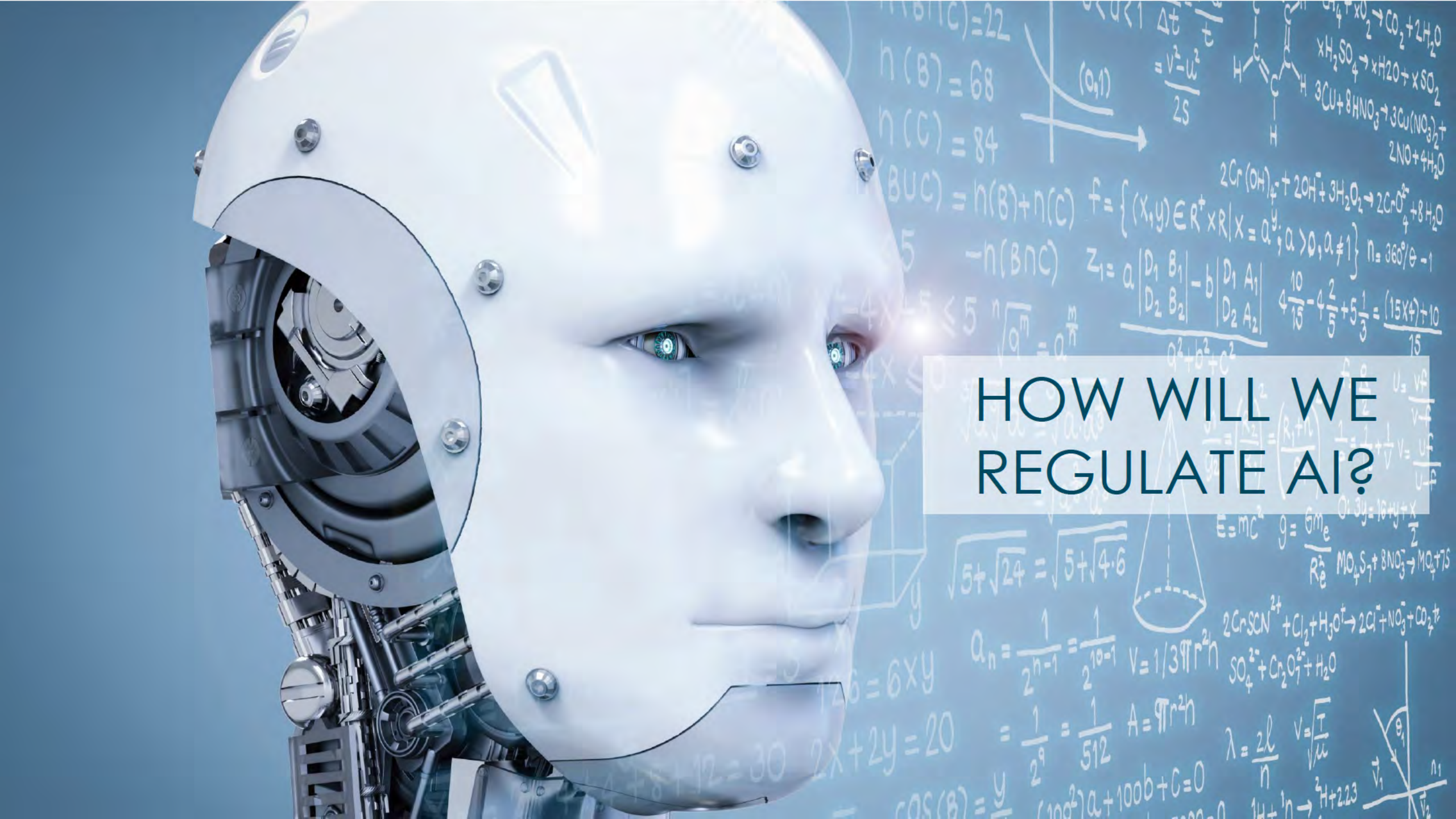
Esteva et al, *Dermatologist-level classification of skin cancer with deep neural networks*, Nature, VOL 542, 2 February 2017

Ophthalmology: Deep learning system detects diabetic retinopathy across multiethnic population

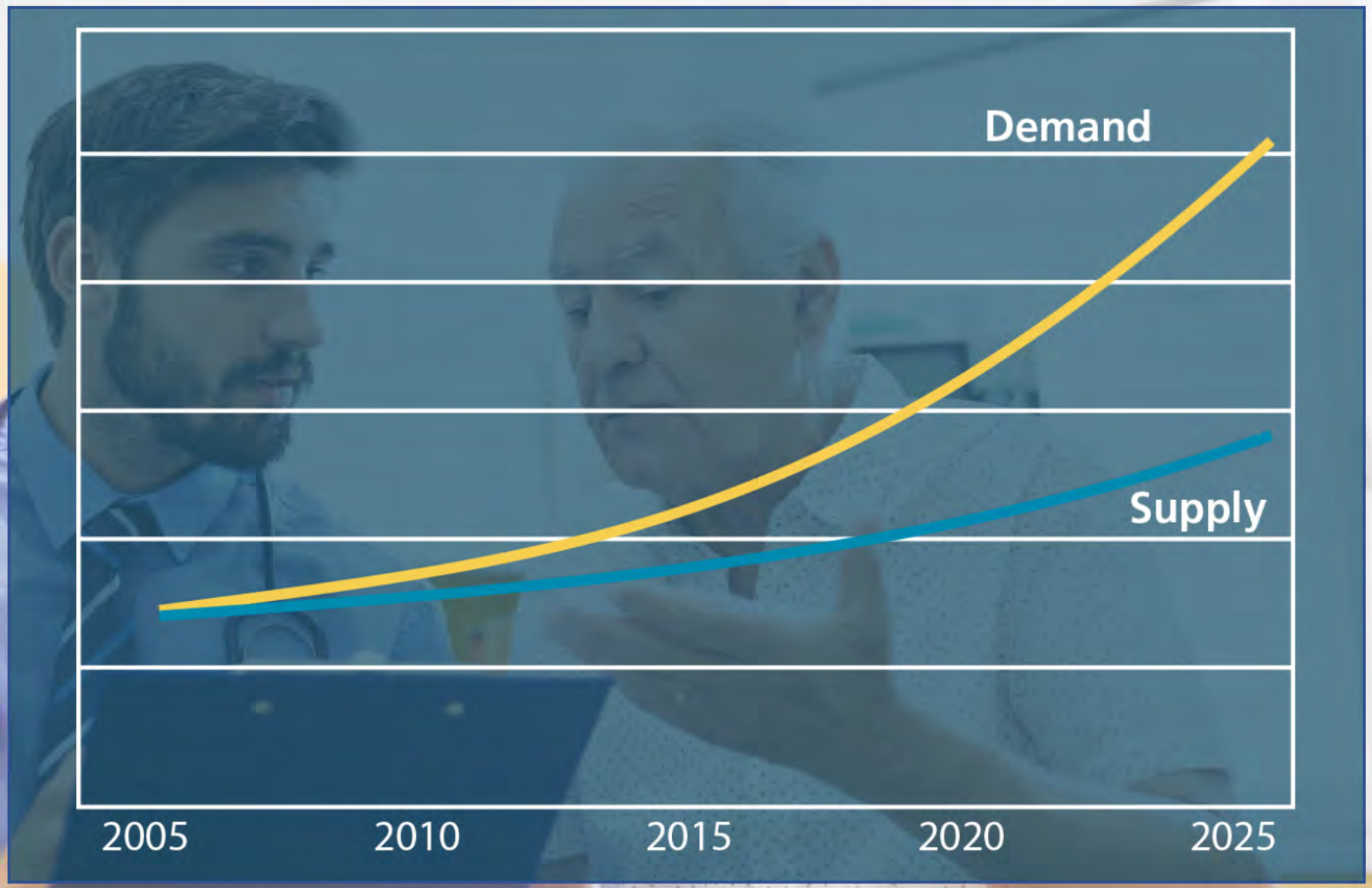
The Deep Learning System had high sensitivity and specificity for identifying diabetic retinopathy and related eye diseases using retinal images from multiethnic populations with diabetes.



Ting et al, *Development and Validation of a Deep Learning System for Diabetic Retinopathy*, JAMA. 2017;318(22):2211-2223.


HOW WILL WE
REGULATE AI?

RATIO OF PROVIDERS TO PATIENTS




THE TECHNOLOGY GENIE IS
OUT OF THE BOTTLE

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A new regulatory framework that accepts time and place independent care delivery, but maximizes patient safety is required

CONNECT WITH ME

Author of 2 Books
- The Internet of Healthy Things
- The New Mobile Age

Available at Amazon.com

The cHealth Blog:
chealthblog.connectedhealth.org
partners.org/connectedhealth

LinkedIn Group:
@PartnersConnectedHealth
@JoeKvedar

Twitter:
@connectedhealth
@jkvedar

Contact Me:
jkvedar@partners.org