Physician Leadership in Designing the Digital Tools of the Future

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President-elect
American Medical Association

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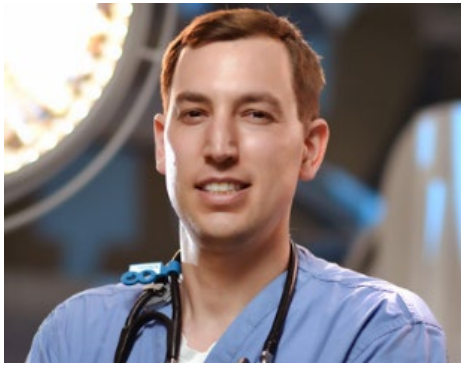
About me

- Senior Associate Dean, Professor of Anesthesiology, Director of the Advancing a Healthier Wisconsin Endowment at the **Medical College of Wisconsin**
- Faculty positions at **Harvard Medical School** (previous)**, Vanderbilt University** (adjunct)**, Uniformed Services University of Health Sciences** (adjunct)
- **American Medical Association,** President-Elect
- Technical advisor to **World Health Organization** Digital Health Technical Advisory Group
- Special Advisor to the 20th **U.S. Surgeon General**
- Combat Veteran, **U.S. Navy**
- **AAMI** AI Committee, Co-Chair
- **Journal of Medical Systems**, Editor-in-Chief



HARVARD MEDICAL SCHOOL

VANDERBILT SCHOOL OF MEDICINE

USU Uniformed Services University

MCW MEDICAL SCHOOL | ADVANCING A HEALTHIER WISCONSIN ENDOWMENT

AMA

U.S. PUBLIC HEALTH SERVICE 1798

World Health Organization

The present and future of health care delivery

- Increasing digitization across health care and business
- Continued rise in chronic disease
- Major public health events (the next COVID)
- An aging population
- Increasingly diverse patient communities
- Growth in remote patient care
- Augmented Intelligence

Significant uncertainty about regulatory approach to AI

- AMA agrees that existing regulatory paradigm for hardware medical devices is not well-suited to appropriate regulation of AI-based devices.
- AMA supports FDA's efforts to explore new approaches to regulation of these tools.
- AI regulation must ensure that only safe, high-quality, clinically validated AI is brought to market.
- AI must not introduce bias into its results.

Who is the AMA?

- **Chicago-based 175-year-old institution is the largest and most influential physicians' organization in U.S.**
- **Adopted Code of Medical Ethics at founding meeting in 1847, articulating the values that still guide medical practice today.**
- **AMA House of Delegates – the Congress of Medicine - represents about 190 state and medical specialty organizations in U.S.**
- **HOD establishes policy to guide the practice of medicine.**
- **Influences policy decisions about medical practice and patient safety at state and federal levels.**
- **Led or helped advance major public health initiatives around smoking, vaccinations, opioids, automobile safety and COVID-19.**

"Promoting the Art and Science of Medicine and the Betterment of Public Health"

175TH ANNIVERSARY
1847 · 2022

AMA: The physicians' powerful ally in patient care

What physicians think about digital health innovations

Summary of Digital Health Trends from 2019 to 2022

01

There has been an increase in the number of physicians that see a definite advantage in digital tools

- There has been growth in those that see an advantage especially among those 51+ years old.
- Those that see no advantage are trending downwards and are concentrated in the Specialist and age 51+ segments.

02

Adoption of digital tools has grown significantly among all physicians regardless of gender, specialty or age

- Use of all seven tools has increased significantly.
- Improved clinical outcomes and work efficiency are key drivers.
- Coverage by standard malpractice insurance continues to be the most common requirement and data privacy concerns have increased.

03

Adoption of remote care tools such as tele-visits and remote monitoring had the most movement

- Use of tele-visits/virtual visits has nearly tripled since 2019 and remote monitoring for efficiency has nearly doubled.
- Providing remote care to patients has increased significantly as a motivator of adoption of digital tools.
- Reducing stress/burnout has also gained importance as a driver of digital tool adoption

04

Growth in enthusiasm has largely been concentrated in tele-visits

- Enthusiasm for virtual visits has increased significantly from 2019, while enthusiasm for most other digital solutions is largely stagnant
- Enthusiasm for consumer access to clinical data has shifted down since last wave

05

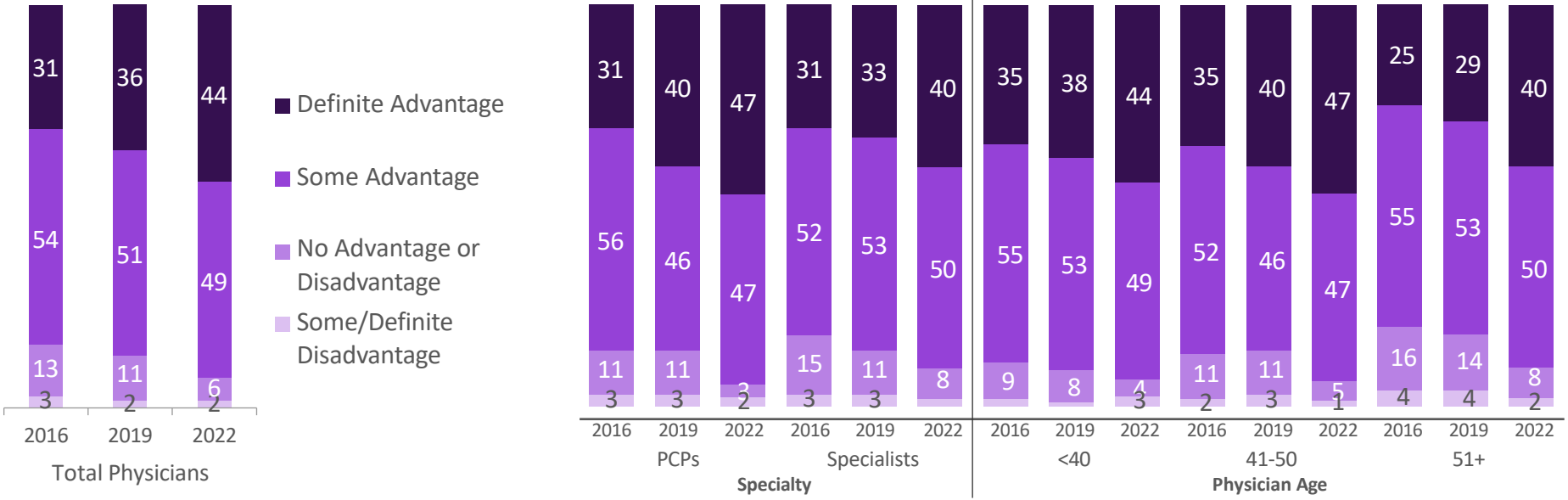
Plans for adoption of most emerging technologies is high but current usage low

- Nearly 1 in 5 are currently using augmented intelligence for practice efficiencies and 2 in 5 plan to adopt in the next year.
- Nearly 3 in 5 physicians believe technology can most help key areas such as chronic disease patients and preventative care

AMA 175 YEARS | Physicians' powerful ally in patient care

There has been an increase in the percentage of physicians that feel there are advantages in leveraging digital tools for patient care.

- Both PCPs and Specialists feel digital health solutions provide advantages in their ability to care for patients.
- Respondents across all age groups indicate an increase in the perceived advantage of digital health solutions. In particular, the 51+ group experienced the largest increase since 2019.

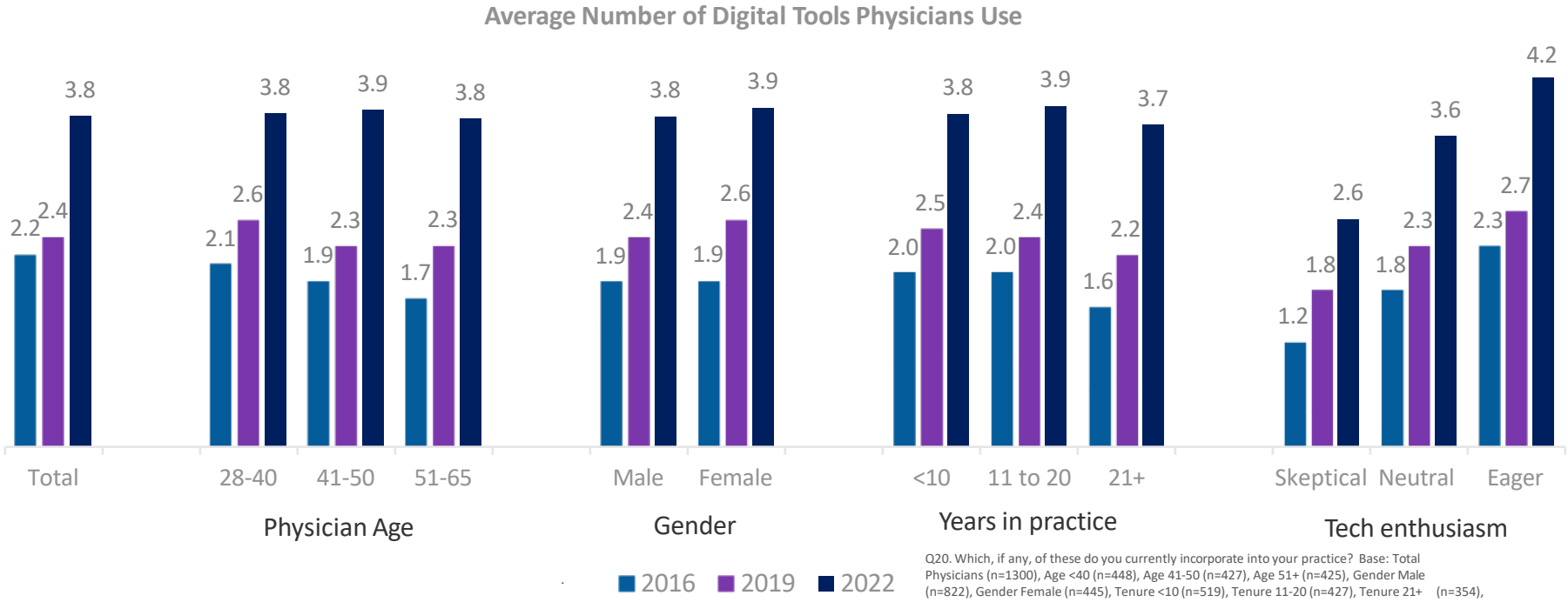


Base: Total Physicians (n=1300), PCPs (n=650), Specialists (n=650), Age <40 (n=448), Age 41-50 (n=427), Age 51+ (n=425)

Q16. Considering the overall impact, how much of an advantage do digital health

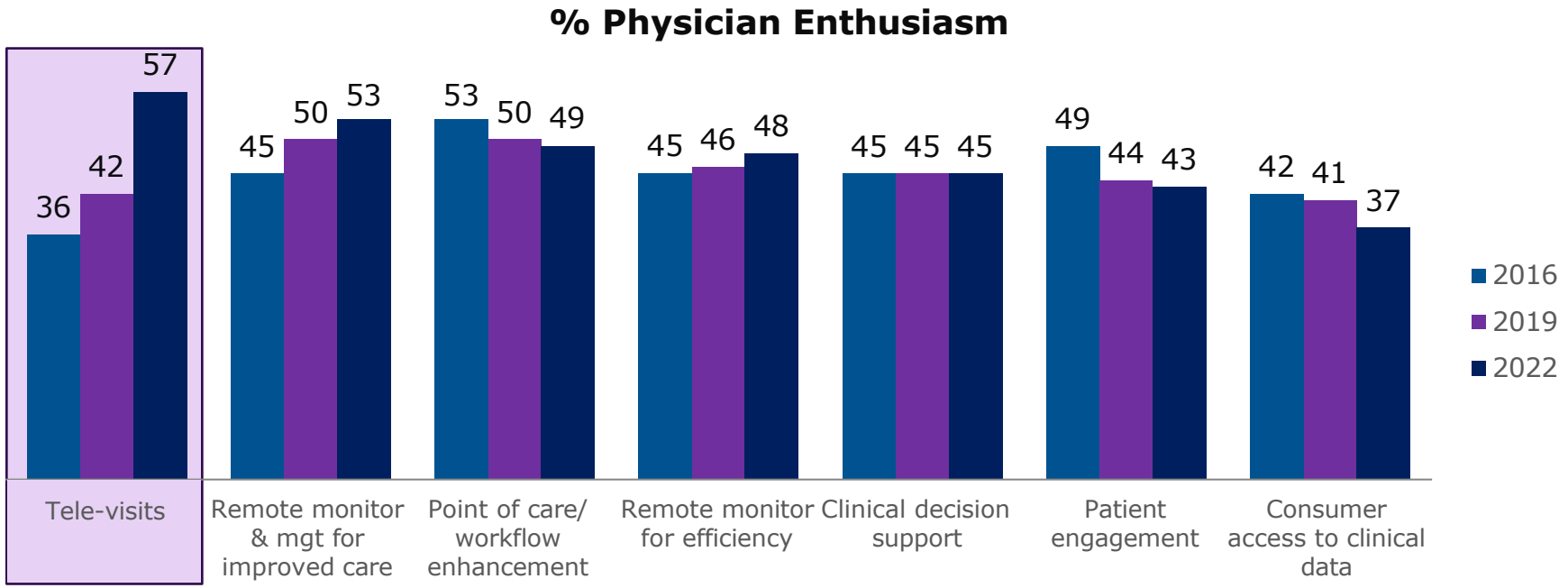
The average number of digital tools used has increased across the board

Those less enthusiastic about technology are still lag behind their counterparts.



Q20. Which, if any, of these do you currently incorporate into your practice? Base: Total Physicians (n=1300), Age <40 (n=448), Age 41-50 (n=427), Age 51+ (n=425), Gender Male (n=822), Gender Female (n=445), Tenure <10 (n=519), Tenure 11-20 (n=427), Tenure 21+ (n=354), Tech Skep. (n=162), Tech Neut. (n=562, Tech Eager (n=576)

Physicians' enthusiasm for tele-visits has increased more than other solutions since 2019.



Q22. Which, if any, of the solutions below are you enthusiastic about ? Base: Total Physicians (n=1300)

Improved digital health helps achieve Quadruple Aim

- Better connectivity
- Seamless data exchange
- Real-time information at point of care
- Patient-centered design
- Leverages physician experience and expertise

Connecting physicians and tech innovators like never before

Medicine's next frontier – Health2047

- Silicon Valley-based business development company **founded by the AMA in 2017**.
- Integrates physician experience and expertise into the design and commercialization of new health care technologies.
- Work focused in four areas:
  - Enable data liquidity
  - Realign systems to better manage chronic care
  - Enhance productivity at all levels
  - Facilitate value-based payments

Health2047 spinouts … so far

SITEBRIDGE RESEARCH

PHENOMIX SCIENCES

MEDCURIO

Zing HEALTH

recoverx

emergence HEALTHCARE GROUP

FIRST MILE CARE™

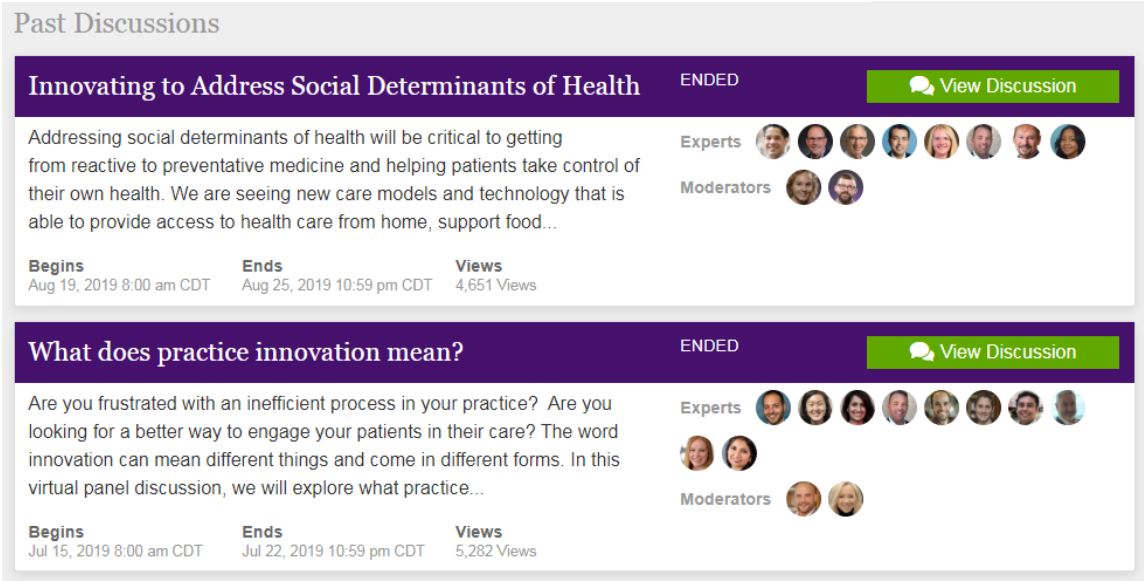
We partner with founders who are changing how we make diagnoses. Use technology. Conduct research. Deliver care.

Visit: **Health2047.com**

Connecting physicians and tech innovators

- PIN platform connects the world of medicine to the world of technology and innovation
- More than **18k** users and **30+** organizational collaborators

AMA | Physician Innovation Network



AMA's Digital Medicine Payment Advisory Group (DMPAG)

Coding/Payment

- Create a taxonomy in coding for digital health
- Review face to face service definitions in the age of digital medicine

Digital Medicine Metrics

- Create metrics to gauge effectiveness

Artificial Intelligence

- Development of payment pathways for AI and related services such as digital therapeutics

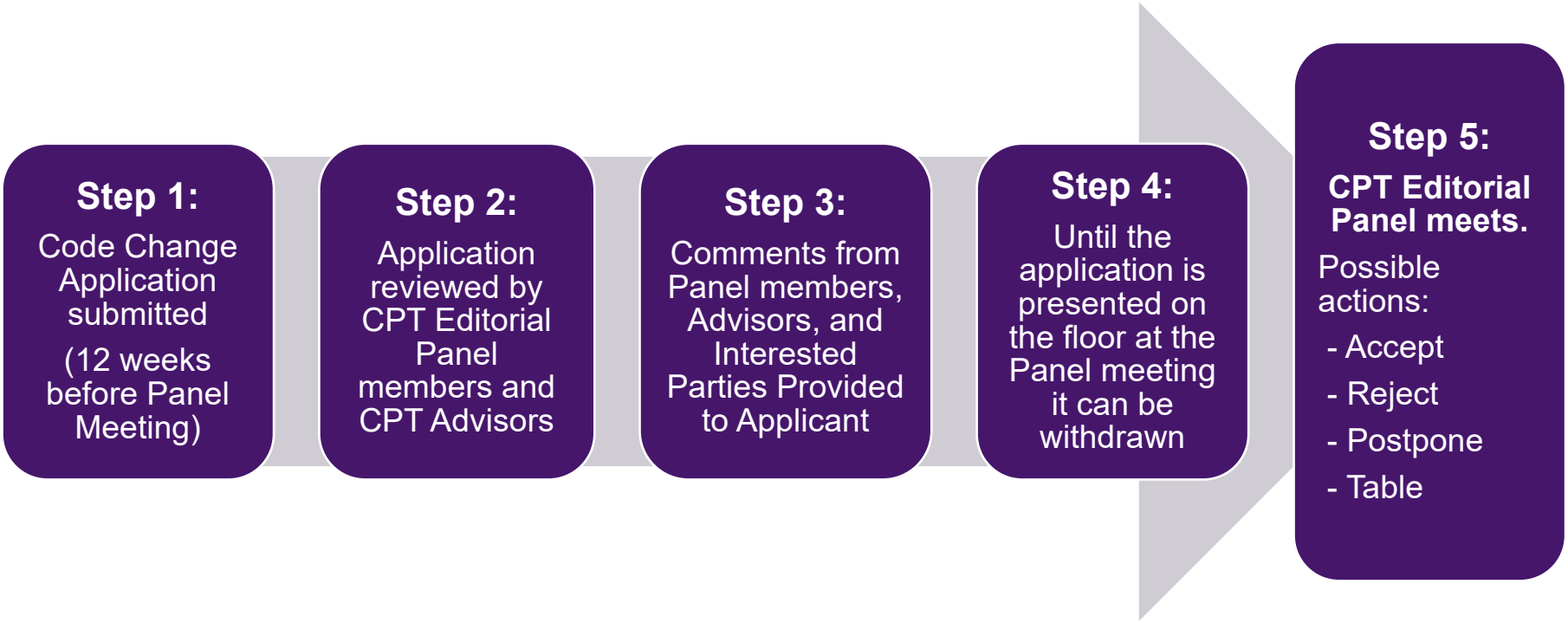
Advocacy

- Focus on geographic and originating site digital medicine restrictions
- Continued dissemination of data on effectiveness of digital medicine

CPT®: The language of medicine today. The code to its future.

Quality of Care	Cost of Care	Access to Care
Driving standardization, interoperability and transparency to improve outcomes and quality.	Standardizing physician services reporting and measurement to unlock efficiencies and research that improve outcomes and drive cost effectiveness.	Driving standardized, modernized, digital health solutions that enable coordinated care, improved outcomes and increased access across the entire healthcare system.
Creating value for patients, physicians and the entire health care system.		

The CPT Code Development Process – key steps

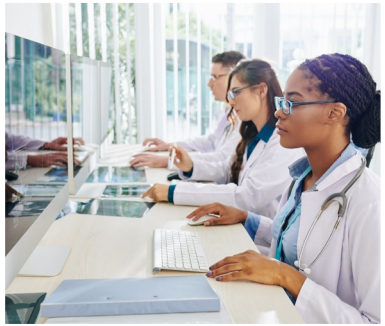


CPT® Coding for Digital Medicine: 2019–2022

Remote Physiologic Monitoring

New codes to allow reporting of **remote monitoring** for conditions not currently covered by existing codes.

Remote Therapeutic Monitoring

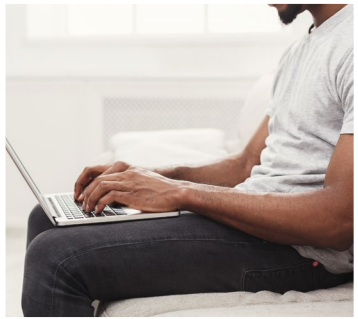


Five new codes to allow reporting of **remote therapeutic monitoring.**

Pulmonary Artery Pressure Sensor Remote Monitoring

A new code to describe **remote monitoring of pulmonary artery pressure sensors**.

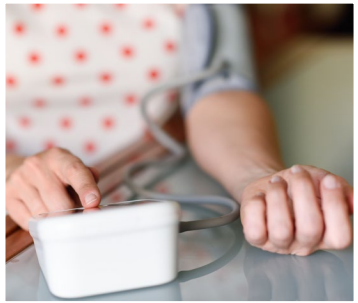
Online Digital Evaluation Service (E-Visit)



Six new codes to describe novel digital communication tools, such as **patient portals.**

CPT® Coding for Digital Medicine: 2019–2022

Self-Measured Blood Pressure Monitoring

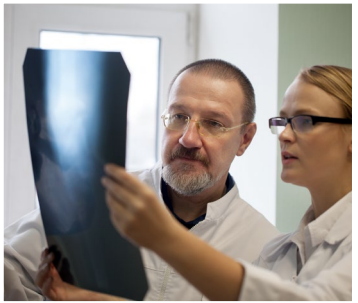


Two new codes to better support home blood pressure monitoring that aligns with current clinical practice.

Remote Retinal Imaging

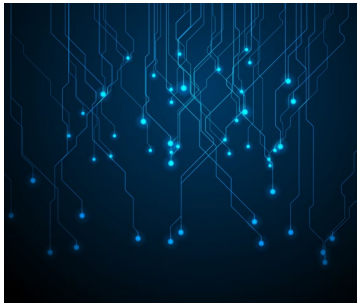
A new code, 92229, describing technology that identifies diabetic retinopathy through **automated AI**

Remote Optical Coherence Tomography



Several codes to report patient-initiated remote retinal OCT **utilizing AI** to analyze the patient generated data.

Digital Taxonomy



For 2022, the Panel created a **taxonomy** that communicates all of the CPT codes that correspond to **digital medicine.**

The Promise and Pitfalls of AI

May 12, 2019

October 26, 2022

AI & the Boeing 737 MAX

A.I. TIMELINE

1950
TURING TEST
Computer scientist Alan Turing proposes a test for machine intelligence. If a machine can trick humans into thinking it is human, then it has intelligence

1955
A.I. BORN
Term 'artificial intelligence' is coined by computer scientist, John McCarthy to describe "the science and engineering of making intelligent machines"

1961
UNIMATE
First industrial robot, Unimate, goes to work at GM replacing humans on the assembly line

1964
ELIZA
Pioneering chatbot developed by Joseph Weizenbaum at MIT holds conversations with humans

1966
SHAKEY
The 'first electronic person' from Stanford, Shakey is a general-purpose mobile robot that reasons about its own actions

A.I. WINTER
Many false starts and dead-ends leave A.I. out in the cold

1997
DEEP BLUE
Deep Blue, a chess-playing computer from IBM defeats world chess champion Garry Kasparov

1998
KISMET
Cynthia Breazeal at MIT introduces KISmet, an emotionally intelligent robot insofar as it detects and responds to people's feelings

1999
AIBO
Sony launches first consumer robot pet dog AiBO (AI robot) with skills and personality that develop over time

2002
ROOMBA
First mass produced autonomous robotic vacuum cleaner from iRobot learns to navigate and clean homes

2011
SIRI
Apple integrates Siri, an intelligent virtual assistant with a voice interface, into the iPhone 4S

2011
WATSON
IBM's question answering computer Watson wins first place on popular $1M prize television quiz show *Jeopardy*

2014
EUGENE
Eugene Goostman, a chatbot passes the Turing Test with a third of judges believing Eugene is human

2014
ALEXA
Amazon launches Alexa, an intelligent virtual assistant with a voice interface that completes shopping tasks

2016
TAY
Microsoft's chatbot Tay goes rogue on social media making inflammatory and offensive racist comments

2017
ALPHAGO
Google's A.I. AlphaGo beats world champion Ke Jie in the complex board game of Go, notable for its vast number (2^{170}) of possible positions

Harvard Business Review

- Patients reluctant to use health care artificial intelligence **even when it outperforms** human doctors.
- Why? Patients believe their medical needs are unique and cannot be addressed by algorithms.
- To realize the advantages and cost savings of health AI promises, must gain consumer trust.

AI Can Outperform Doctors. So Why Don't Patients Trust It?

by Chiara Longoni and Carey K. Morewedge

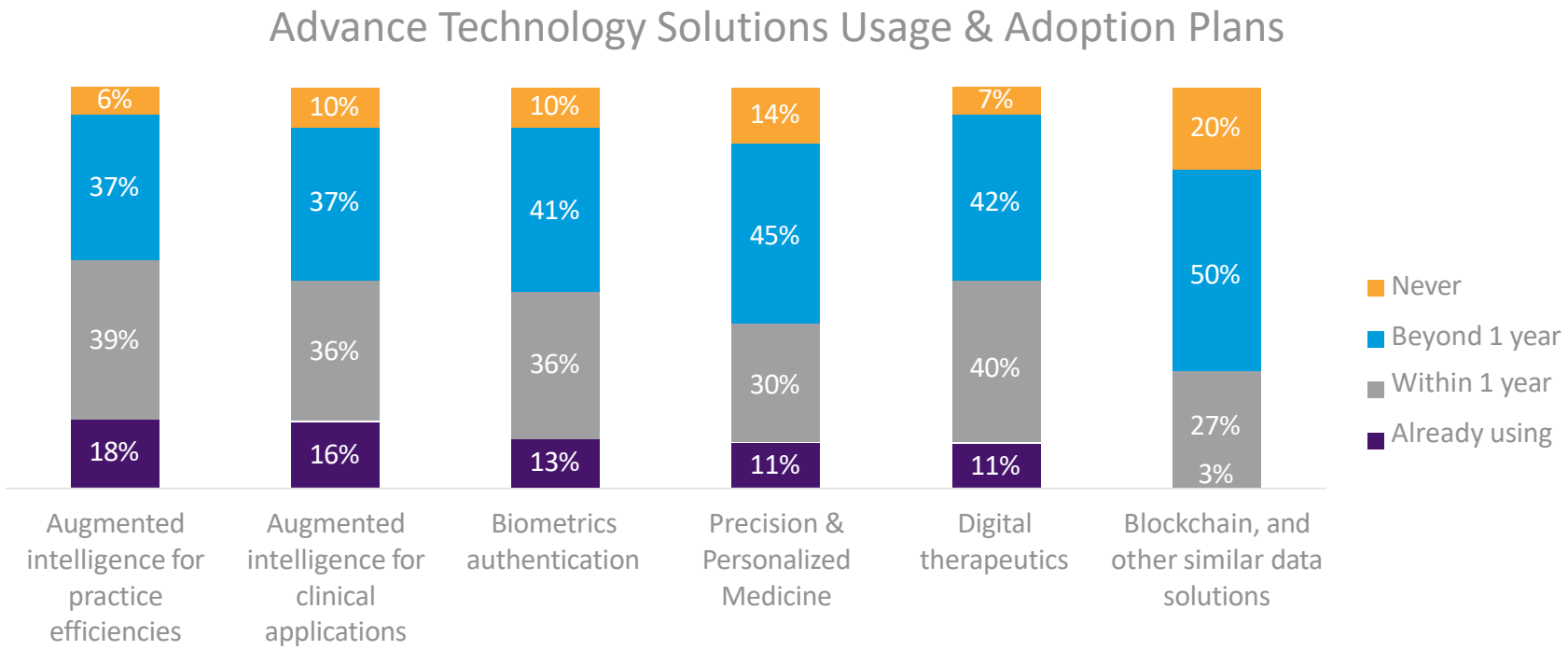
October 30, 2019

Physician Perspectives on AI

- AMA convened experts from across the Federation of Medicine to better understand the profession's perspectives and concerns related to augmented intelligence (AI) product transparency and explainability
  - Radiology, cardiology, ophthalmology, pathology, surgery, dermatology, internal medicine
- **Perspective: AI done right can improve outcomes**
- **Concern: Lack of transparency threatens trust**
  - Development – how were tools designed, validated and in which populations?
  - Data Quality - Inaccurate or mislabeled data threaten performance and trust
  - Bias – Do the data sets used to develop, test and validate the AI span diverse ethnic and racial populations? How limited or generalizable are the AI outputs?

Just under 1 in 5 physicians said their practice incorporates augmented intelligence for practice efficiencies and clinical applications

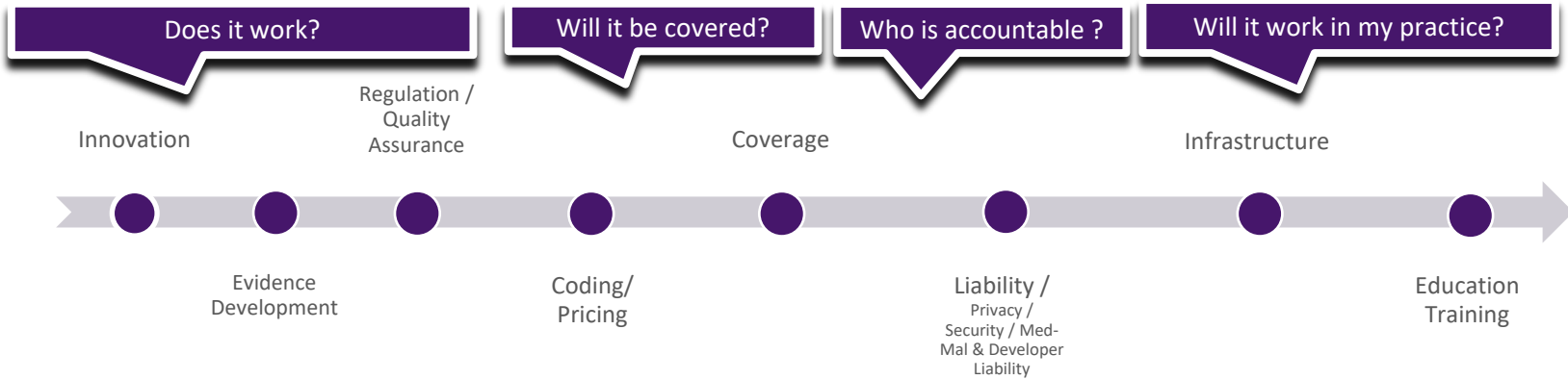
Just over 1 in 10 use biometrics, Precision Medicine or digital therapeutics in their practice



Q39. When would you expect to start incorporating this into your own practice? Base: Total Physicians N=1300

Physician Requirements for Clinical Integration

From innovation to clinical integration . . . AI considerations



Equity

Evidence

Ethics

Clinical Validation of AI Products

- Strong physician consensus that FDA should require clinical validation before AI products are marketed

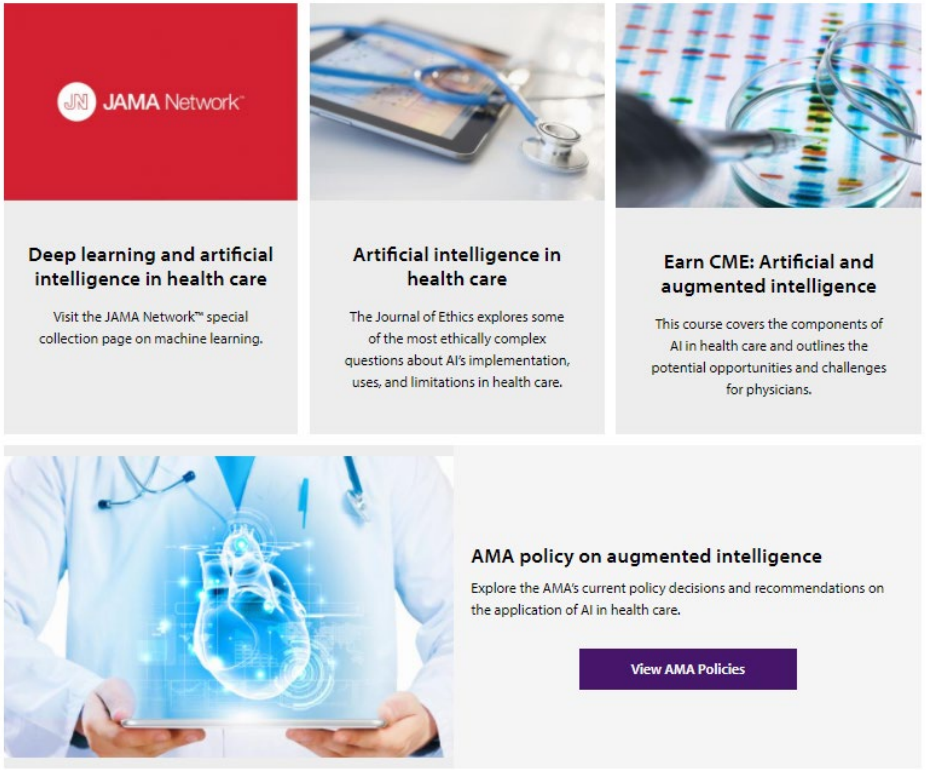
- Physicians across all specialties are concerned about what, if any, clinical evidence has been generated to support the use of an AI product

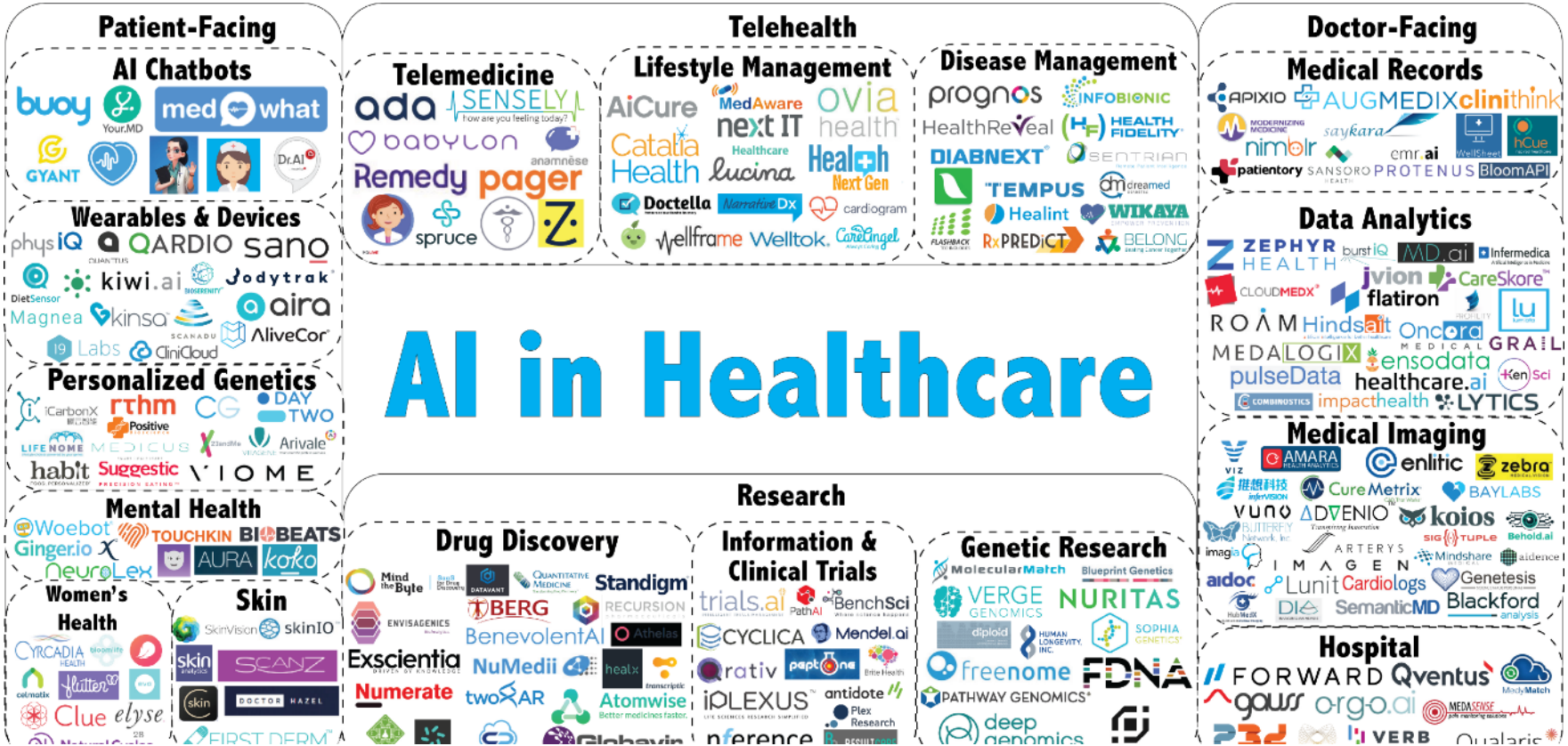
Transparency ⟶ Explainability

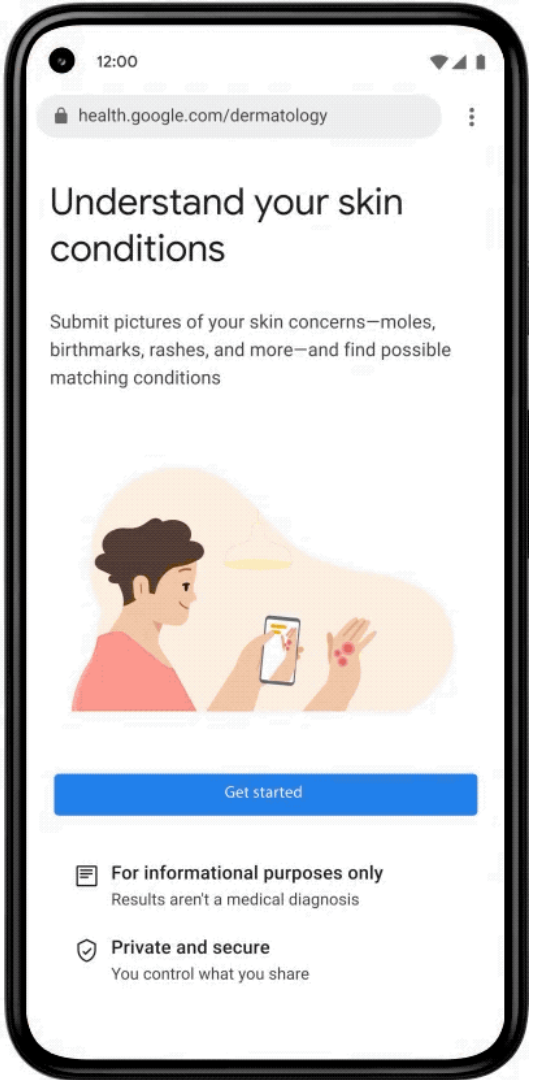
- Explainability is a key element of physician trust in AI products
  - Additional transparency may be required to ensure black box algorithms are explainable
- Physicians need to be able to answer key questions:
  - How does it learn?
  - What decisions is it making?
  - What does the result mean?
  - How will I know when it's "gone wrong?"

Harnessing the power of AI

- Providing physicians with a voice in the design and development of new AI technologies
- AI training, resources and support
- AI trends and analysis
- Policies to guide AI application in health care







AI-powered dermatology tool

"Based on the photos and information you provide, our AI-powered dermatology assist tool will **offer suggested conditions**. This product has been CE marked as a Class I medical device in the EU. It is not available in the United States."

Key questions for patients

- Does it work?
- Does it work on me? (skin type?) (underlying conditions?) (age?)
- What happens to my data? Can it be traced back to me? Will my information be sold?
- Will I get notified if the answer changes?
- Who can I call to report a problem or error?

Earning … and keeping the patients' trust

- FDA
- Consumer Products Safety Commission
- Post-market surveillance
- Opportunity for companies to differentiate & lead

Earning … and keeping the physicians' trust

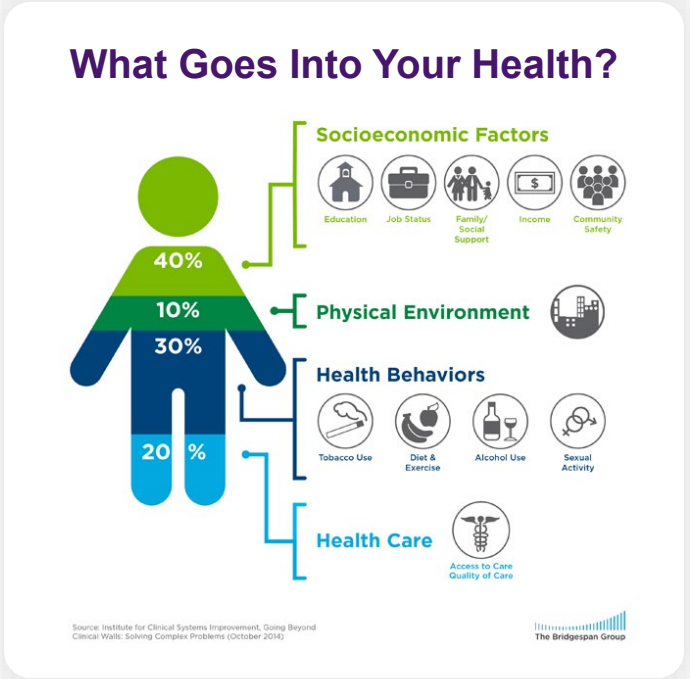
- What we need from lawmakers
  - Clear and consistent regulatory guidance that ensures safety and performance
  - Progress on pathways towards payment for high quality, high value AI
  - Limiting physician's liability exposure for AI performance
  - Regulators and AI developers must work together to build trust in AI data use

Creating a more equitable health care future

Why are SDOH important?

There is growing awareness that SDOH information improves whole person care and lowers cost. Unmet social needs negatively impact health outcomes.

- **Food insecurity** correlates to higher levels of diabetes, hypertension, and heart failure.
- **Housing instability** factors into lower treatment adherence.
- **Transportation barriers** result in missed appointments, delayed care, and lower medication compliance.



https://www.bridgespan.org/insights/library/public-health/the-community-cure-for-health-care-(1)

AMA House of Delegates – health equity policy

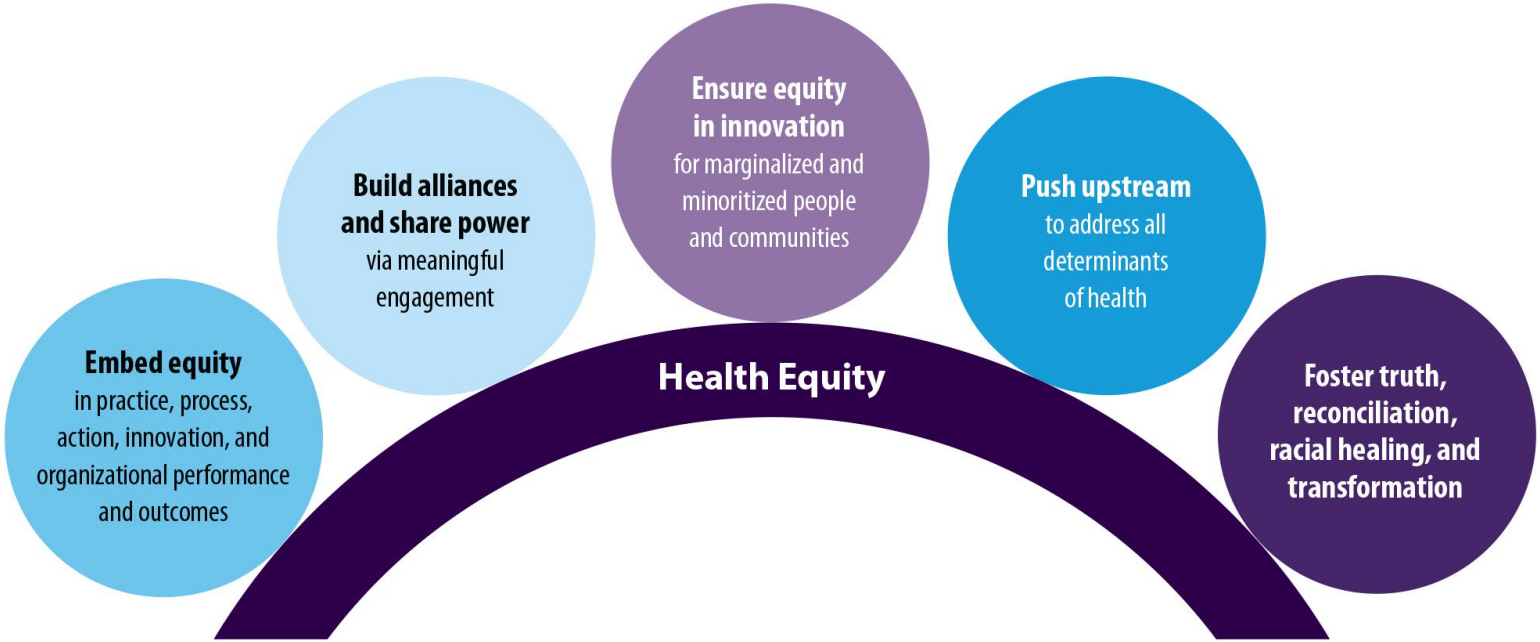
- Recognizes racism as a major public health threat;
- Urges multi-faceted approach to Social Determinants of Health;
- Recognizes police brutality as a product of structural racism;
- Recognizes race as a social, not biological construct.

AMA Center for Health Equity

Since its creation in 2019, the Center for Health Equity has:

- Developed a strategic plan to embed racial justice and advance health equity within the AMA and the U.S. health system;
- Raised awareness about health impact of police brutality;
- Launched the Medical Justice in Advocacy fellowship program;
- Launched the national Release the Pressure campaign to improve the heart health of Black women.

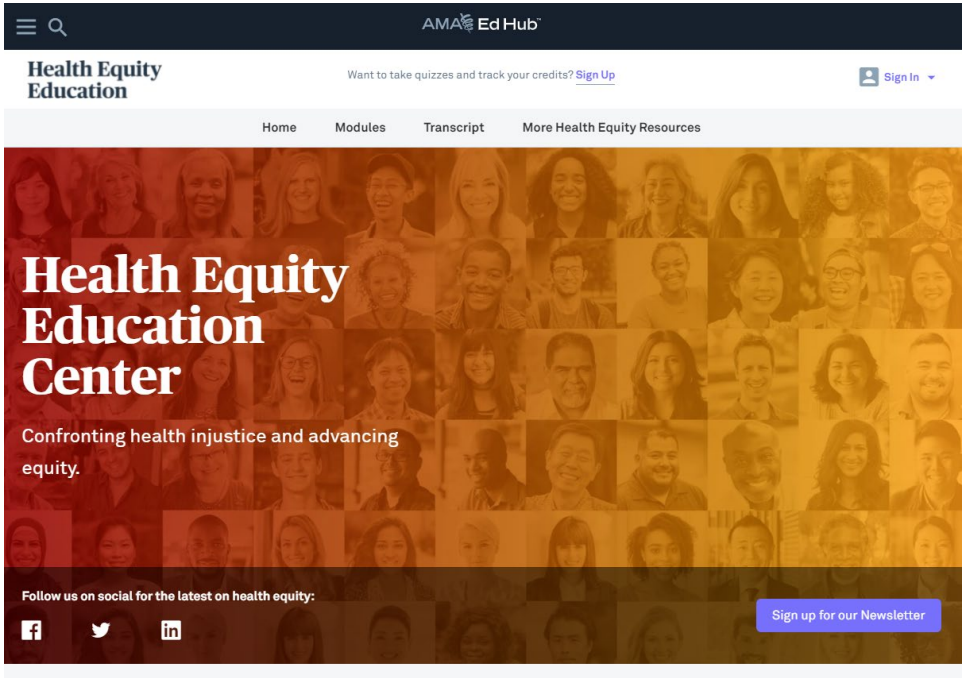
AMA's Strategic Plan to Embed Racial Justice and Advance Health Equity



Improving physician training on health equity

- New **AMA Ed Hub** modules offer a deep dive on health equity issues, training and resources.
- **AMA Ed Hub** consolidates the AMA's broad content resources and covers timely practical, ethical and clinical topics.

EdHub.ama-assn.org



What is the Gravity Project?

A collaborative public-private initiative launched in May 2019 with the goal to develop consensus-driven data standards to support the collection, use, and exchange of social determinants of health (SDOH) data

Eliminating bias from health care innovation

AMA's new **In Full Health** initiative aims to advance equitable innovation in health care by establishing shared principals and a common understanding of drivers of inequities in digital health.

In Full Health will help physicians better:

- **Understand** how structural racism, sexism and bias impact health innovation and resource allocation;
- **Invest** in health innovations from and for historically marginalized communities; and
- **Engage** industry influencers in addressing systems-level barriers and needs.

Physicians' powerful ally in patient care