TeleMedicine

Javeed Siddiqui MD,MPH
Infectious Diseases
Chief Medical Officer
TeleMed2U

Disclosures

- I have NO financial disclosure related to this lecture
- I do make a living practicing medicine

- I believe in Telemedicine and TeleHealth
- Actively practicing Telemedicine based ID since April 2002

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Our Life on the Internet

Our Life and the Internet

There is almost no area in which digital technology has not impacted me and my family's life.

LARRY IRVING

co-founder

The Mobile Alliance for Global Good

The Influence of IoT on Our Life

As the sun rises, your AI device is now your alarm clock

As a set time you AI device automatically activate the expresso machine and when you leave the shower, your cappuccino is ready.

The refrigerator can detect the lack of almond milk creamer for your coffee or other foodstuffs and creates a shopping list for your AI device to ask you to order for home delivery.

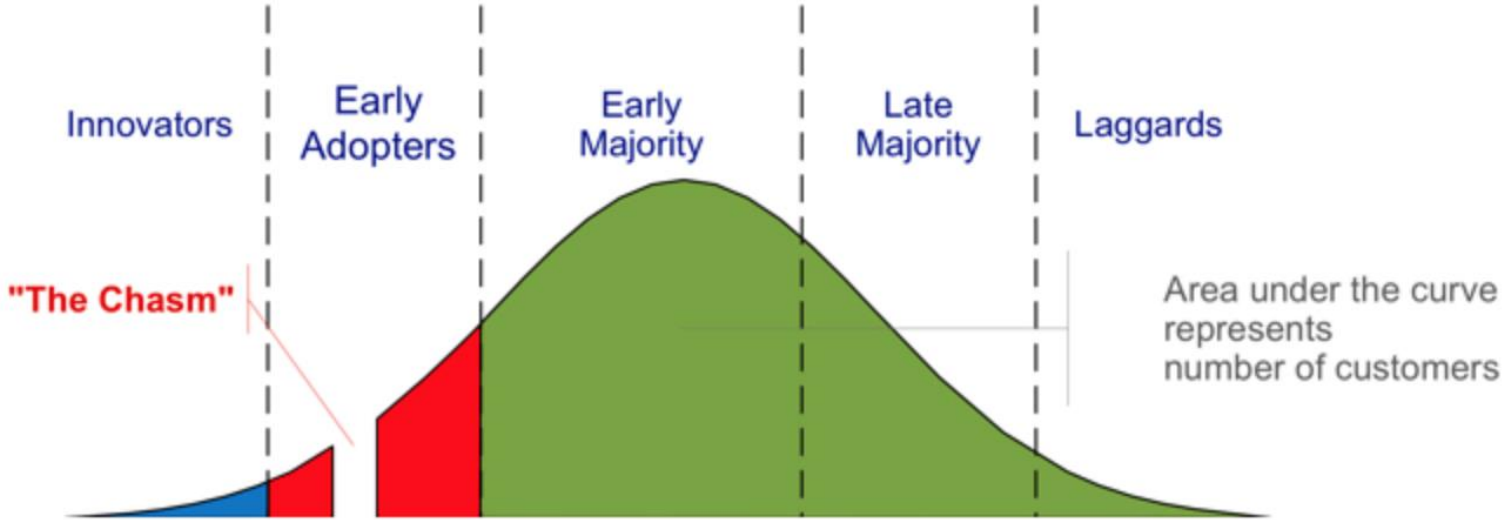
The car has GPS, searches for the fastest route and, in case of traffic jams, informs the customer, client, colleague or friends your current or updated ETA.

You can have phone calls, video calls, from your AI device in your car and make updates to your calendar and even listen to your emails while driving.

The world and our participation in the world is becoming smarter.

Innovation and Healthcare

The Law of Diffusion of Innovation



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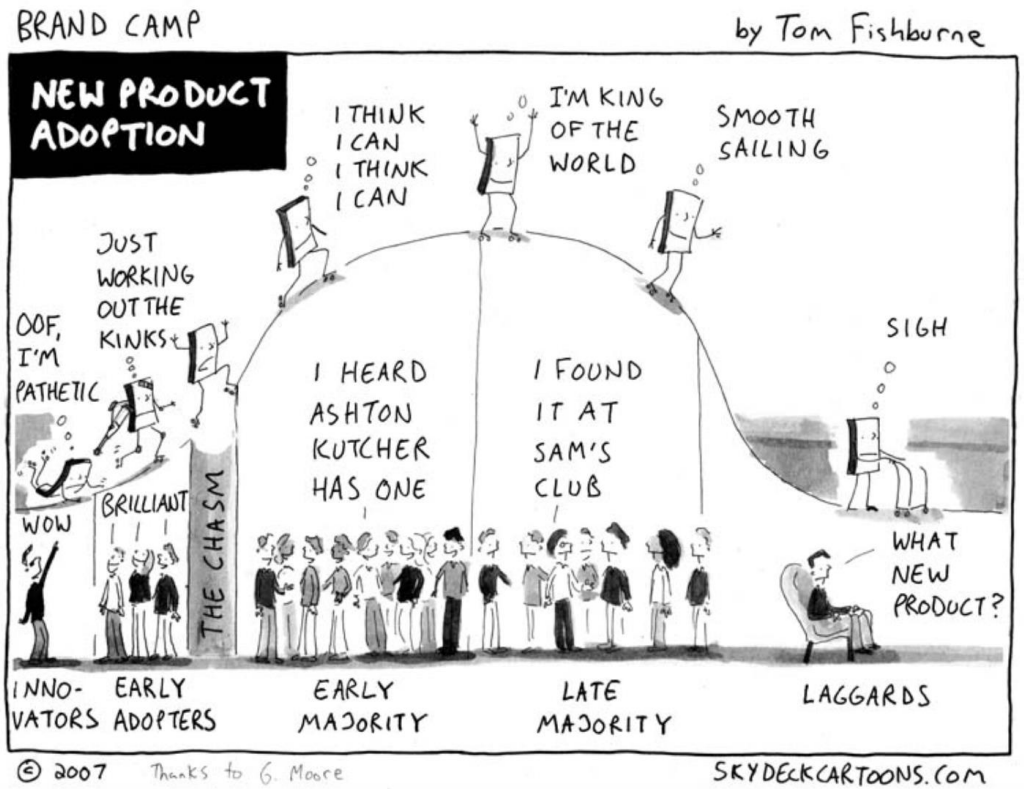

TeleMedicine: Historically

"Quaint"

"Innovative"

Pet Project

Academic institution

Private Sector

Teledoc 2002

MDLive 2009

AmWell 2006

Personal experience at an academic institution

What is the difference between a pioneer and a settlor ?

- Pioneers get slaughters
- Settlors thrive

Classic Venture Capitalist Saying

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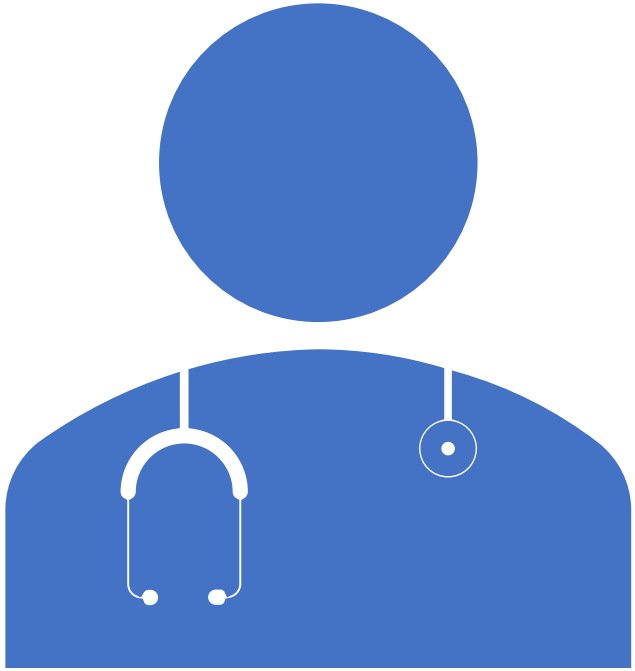
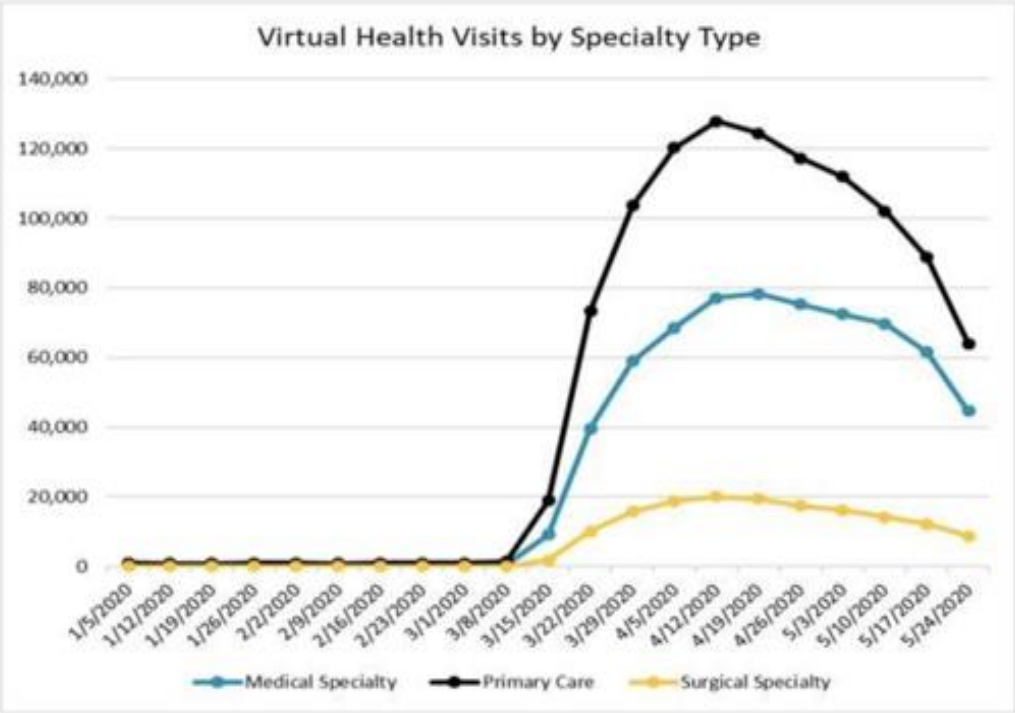
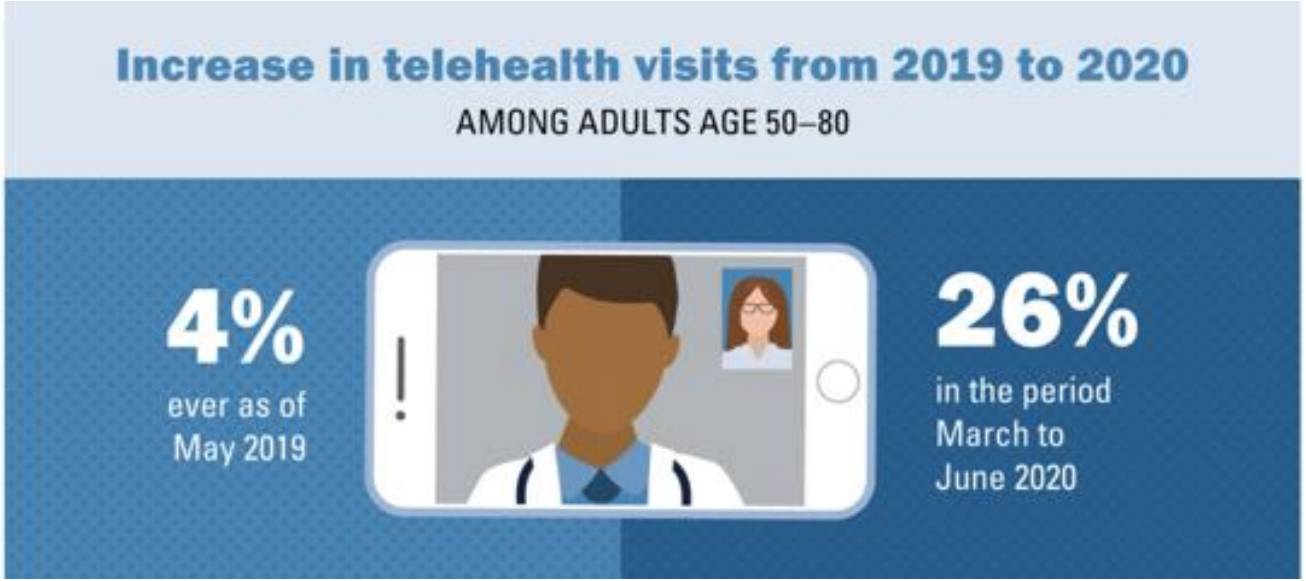
Do You Practice TeleMedicine?



TeleMedicine
Post SARS-CoV-2



Virtual visits to ambulatory settings hit record usage during the first wave of the COVID-19 pandemic, increasing **149X** in aggregate between March and May, compared to the prior nine-month, pre-pandemic weekly average.



One in four older Americans had a virtual medical visit in the first three months of the COVID-19 pandemic, most of them by video, a new telehealth poll finds.

https://www.healthyagingpoll.org/report/telehealth-use-among-older-adults-and-during-covid-19

TeleMedicine Participation

- The percentage of patients who participated in a telemedicine visit in the past year jumped from 42% in 2020 to 67% in 2021.
- Patients with chronic illness adopted telemedicine earlier in the pandemic.
- For the majority of patients, t**elemedicine is now a part of the new normal in healthcare**.

COVID-19 Healthcare Coalition Telehealth Impact Survey. https://c19hcc.org/telehealth/

TeleMedicine Advantages

Reduced risk of exposure to infectious illness

- Avoid public transportation, waiting rooms, etc.

Reduced access barriers

- Transportation challenges
- Missed work, child, or other family care needs

Added insights

- See the home environment

Overall high patient satisfaction, lower cost to patients

Vosburg RW et al. Telemed J E Health . 2021 May 17.
Andrews E. Int J Nurs Stud Adv . 2020 Nov;2:100008.
Nanda M, Sharma R. Telemed J E Health. 2021 March 12.
COVID-19 Healthcare Coalition Telehealth Impact Survey. https://c19hcc.org/telehealth/

TeleMedicine In The Age of SARS-CoV-2

HR 6074 and CMS Public Health Emergency
CMS Regulatory and Legislative Efforts in response to the Global Pandemic

Utilize Telemedicine to Mitigate the Exposure of Patients and Healthcare Workers to COVID-19[1]

Many Telemedicine Requirements Have Been Lifted

Restrictions

- Emergency funding legislation HB 6074 waived many of the long-standing restrictions to the use of telehealth for Medicare recipients, including
  - Rural area requirements for originating sites (ie, patient location)
  - Allowing phones with 2-way, real-time interactive audio and visual capabilities to be used
  - Allowing the provider to conduct a telemedicine encounter from his/her home
- CMS has temporarily waived the Medicare and Medicaid requirements that physicians and nonphysician practitioners be licensed in the state where they are providing services[2]
- Issues regarding crossing state lines are potentially waived; see local regulations

Penalties

- The U.S. Department of Health & Human Services Office for Civil Rights announced that it would not impose penalties for the good faith provision of telemedicine during the COVID-19 public health emergency, even if remote communication technologies used for such services may not fully comply with the requirements of the HIPAA rules

Reimbursement

- Medicare will reimburse telephone and telemedicine visits for both new and established patients
- Providers can bill for telemedicine visits at the same rate as in-person visits

CMS emergency provision **COVID-19 Public Health Emergency**

Home as an originating site of care

Suspended the Metropolitan Service Area exclusion rule

Telemedicine Transforms Doctor and Patient Relationships

The Utility of TeleMedicine

Telemedicine is helping bridge the large gap that once existed between patients and doctors.

Not only do patients feel more in control of their health checkups, but even **doctors get more time** to review individual cases by being ably supported by external physicians and specialists.

Post-Pandemic and TeleMedicine

Telemedicine will continue to be widely used; as over 73% of patients report that they plan to receive care through telemedicine after the pandemic.

Clinicians and health systems have had more time to optimize their telemedicine practices, which has likely contributed to the increase in telemedicine's overall favorability among patients.

"Consumer adoption of telemedicine in 2021." Rock Health, San Francisco, California. December 13, 2021

Telemedicine adoption

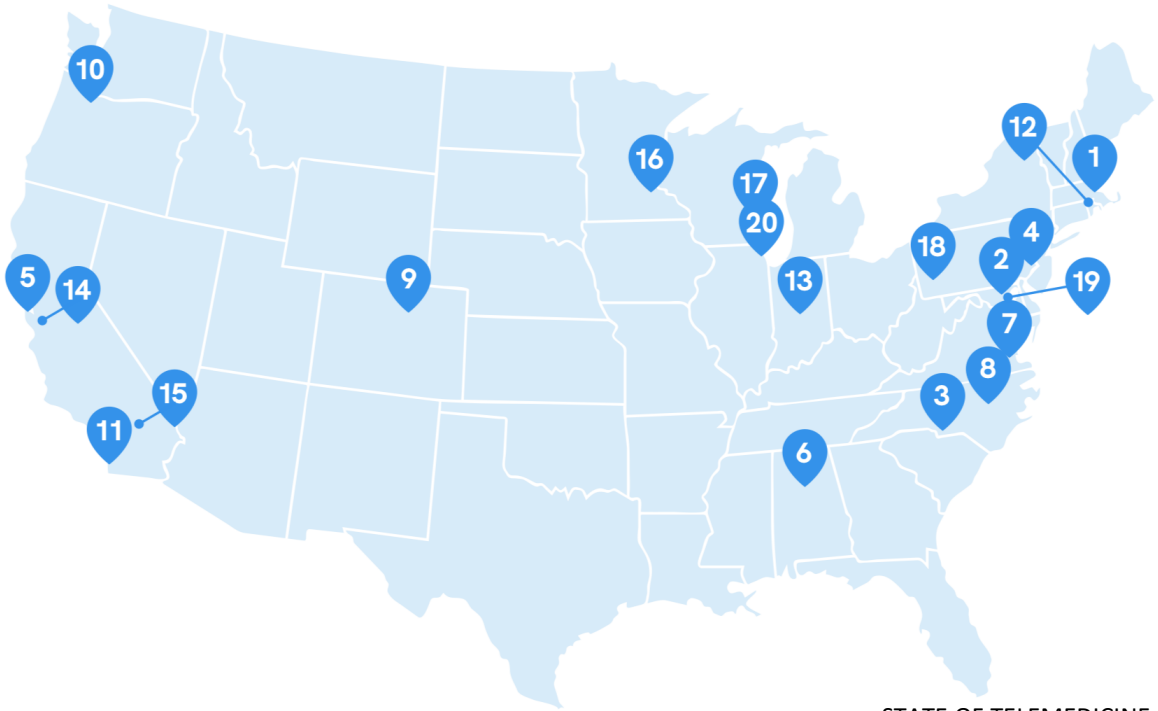
Telemedicine adoption was strong across all physician age groups, beginning with training and extending to retirement.

This contrasts with other categories of mobile video technologies that often see early adoption over-weighted in younger demographics.

One explanation could be that the onset of the pandemic drove adoption of telemedicine among physicians of all ages as they adapted their practice workflows.

Metro Areas with Highest Telemedicine Adoption Rates

1. Boston, MA
2. Baltimore, MD
3. Charlotte, NC
4. Philadelphia, PA
5. San Francisco, CA
6. Birmingham, AL
7. Richmond, VA
8. Raleigh, NC
9. Denver, CO
10. Portland, OR
11. SanDeigo,CA
12. Providence, RI
13. Indianapolis, IN
14. San Jose, CA
15. Riverside, CA
16. Minneapolis, MN
17. Milwaukee, WI
18. Pittsburgh, PA
19. Washington, DC
20. Chicago, IL



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Doximity Feb 2022

Telemedicine Adoption by Specialty

- Specialties that have a high proportion of patients with chronic illness tended to have a higher adoption of telemedicine among physicians.
- This may be because telemedicine can help facilitate continuity of care, allowing a patient to have follow up visits with the **same specialist** that knows them well.
- Additionally, treating long-term chronic conditions, such as diabetes or cancer, often requires frequent patient visits that may be adequately and more conveniently addressed via telemedicine.

Utilization of TeleMedicine Top 15 Adult Specialties

1.Endocrinology
2. Gastroenterology
3. Rheumatology
4. Urology
5. Nephrology
6. Cardiology
7. Otolaryngology (ENT)
8. Neurology
9. Allergy & Immunology
10. Hematology/Oncology
11. Family Medicine
12. Dermatology
13. Geriatrics
14. Pulmonology
15. Psychiatry

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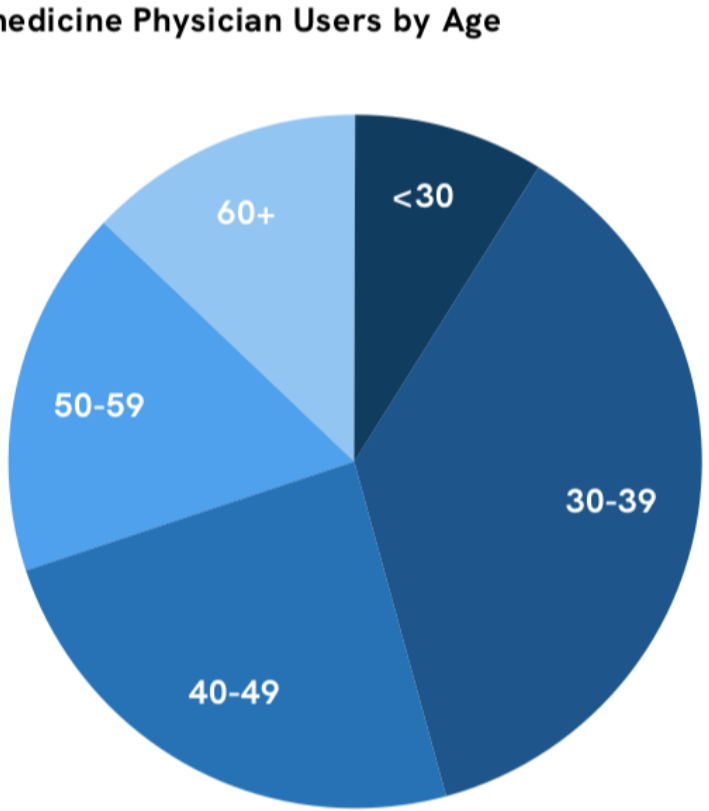

We're not going back; telehealth is now an essential part of doing the right thing for our patients, teams and clinicians.

CT Lin, MD

Chief Medical Innovation Officer

UCHealth

Telemedicine & Patient Trust

- ***Over 67% of physicians report telemedicine made it easier to build trust or was the same as in person visits***

- Among physicians surveyed, over 67% felt that access to telemedicine helped build or maintain trust with patients from historically marginalized communities.

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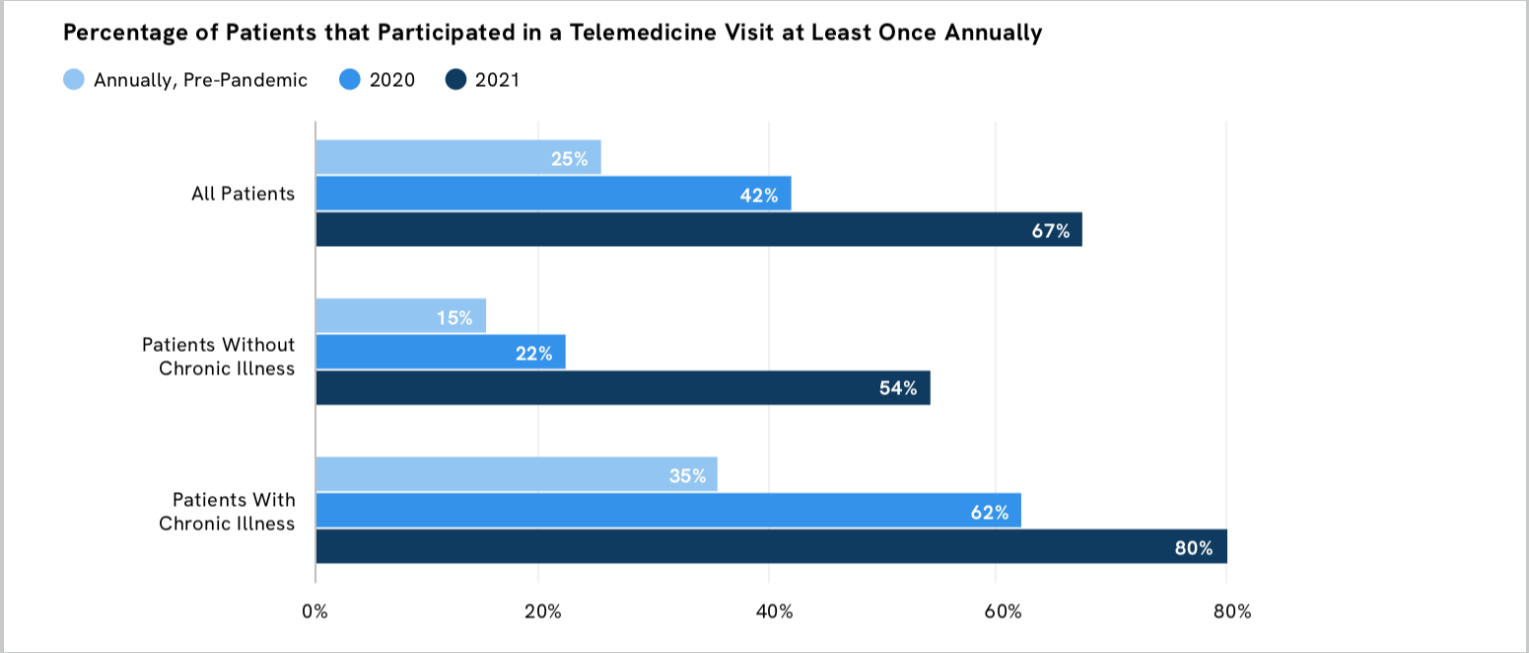

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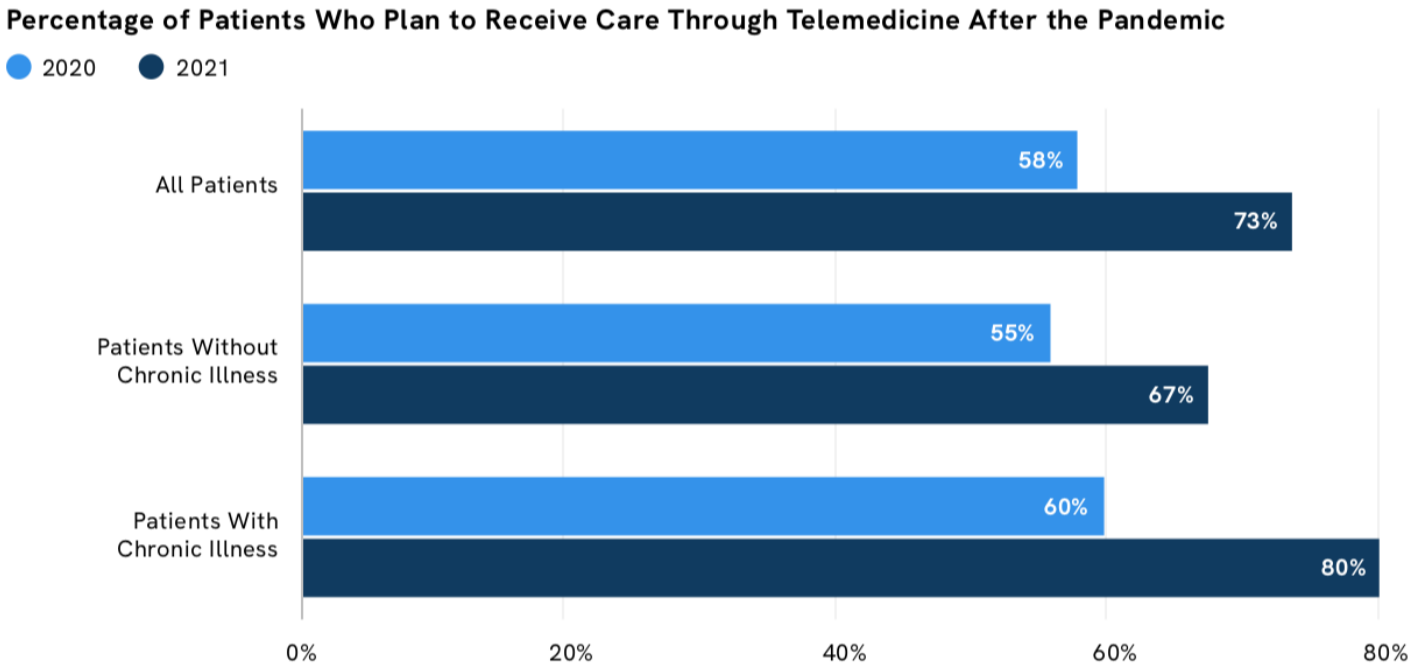

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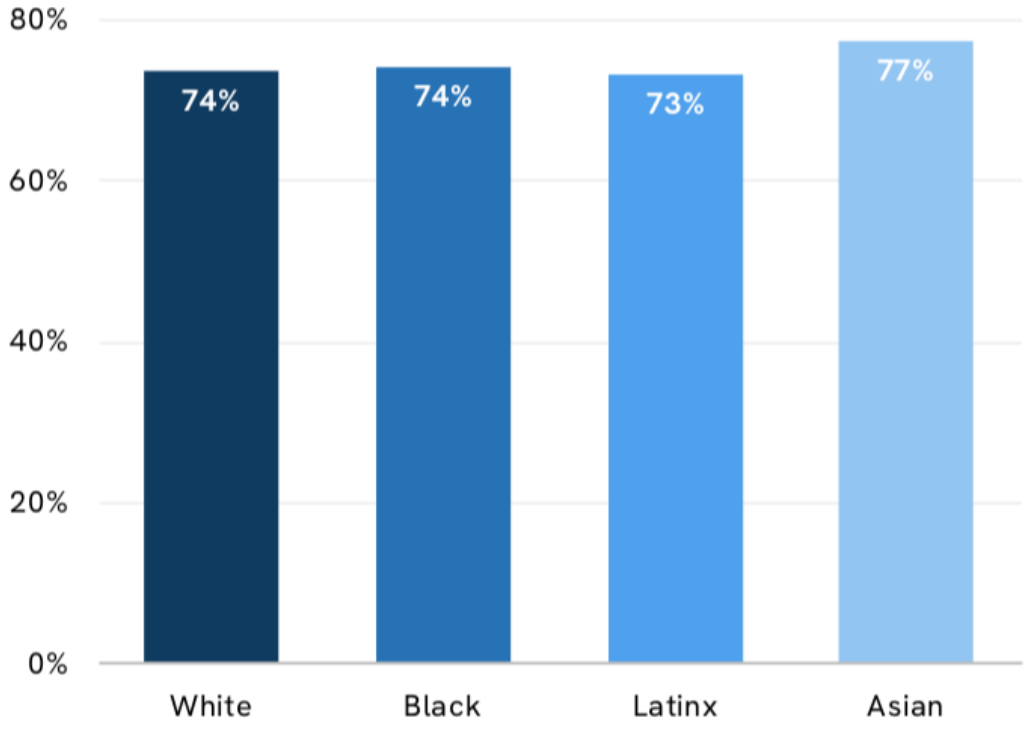
Patients Who Plan to Receive Telemedicine Care After the Pandemic



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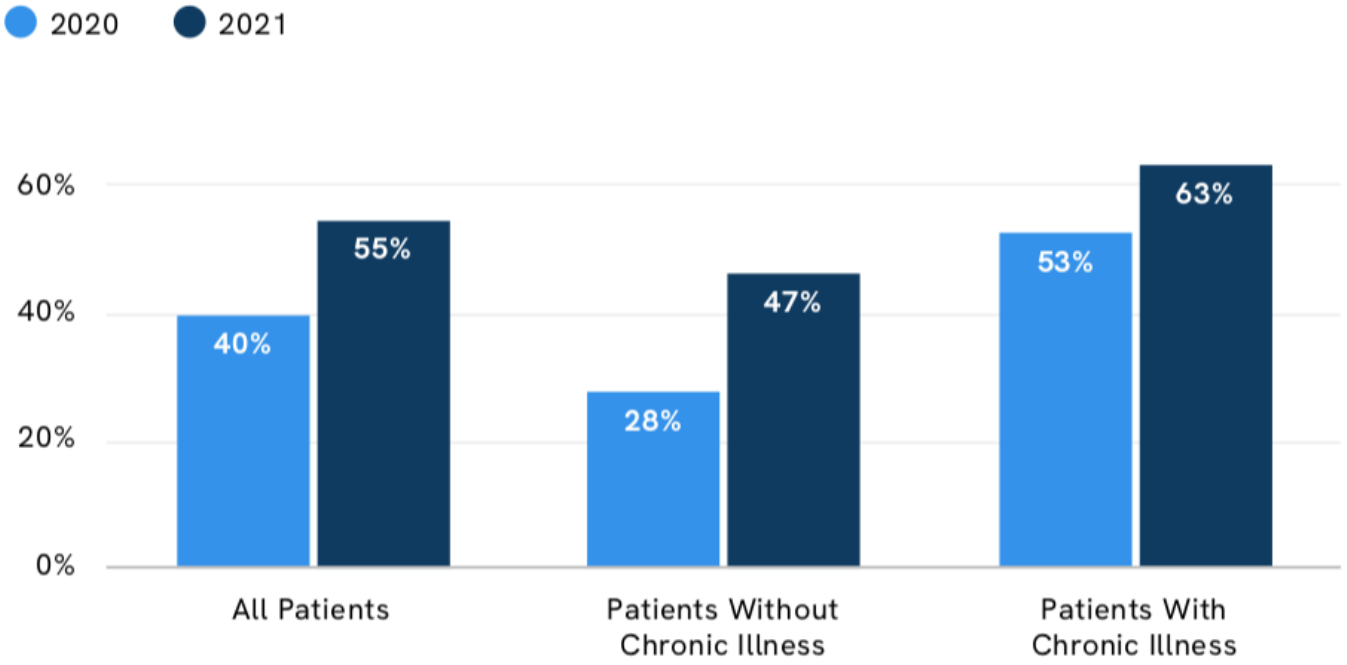
Percentage of Patients Who Feel Virtual Care Provides Equivalent or Superior Quality of Care Compared With In-Person Visits



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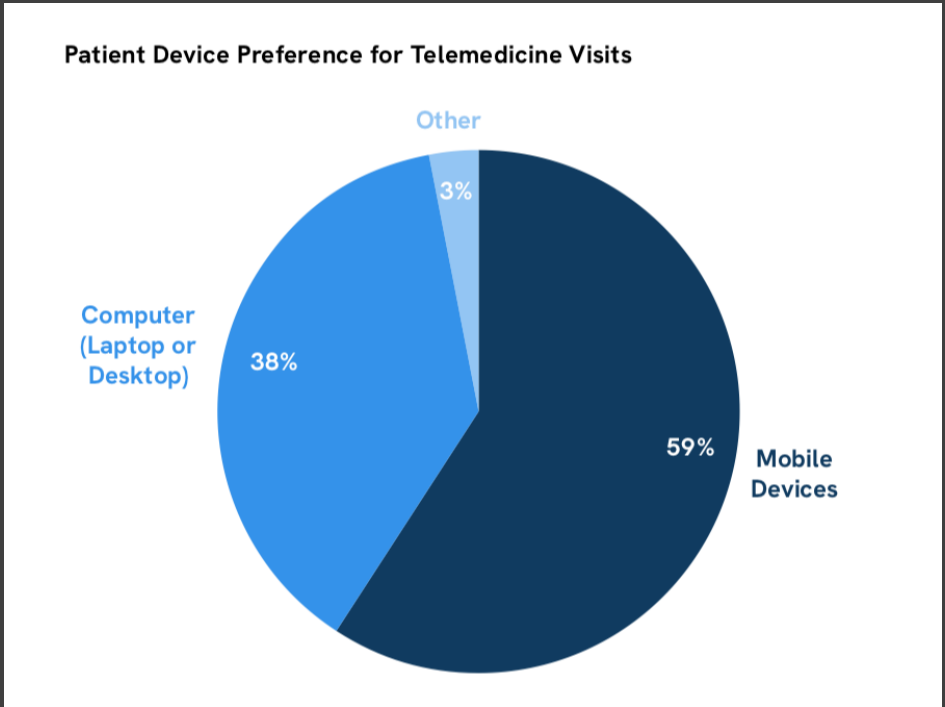

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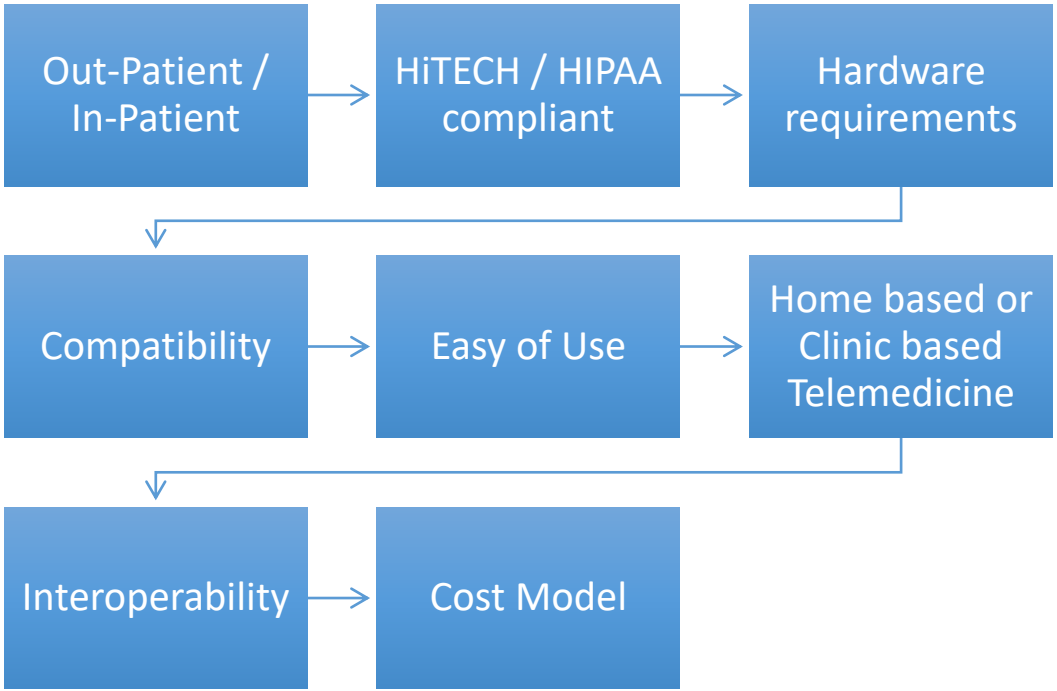
TeleMedicine

The Basics

Technology


Out-Patient / In-Patient
HiTECH / HIPAA compliant
Hardware requirements
Compatibility
Easy of Use
Home based or Clinic based Telemedicine
Interoperability
Cost Model

Hardware

- Computer
- Smart Phone
- Tablet

- iOS / Windows / Android

- Headphones

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Broad Band

The term **broadband** commonly refers to high-speed Internet access that is always on and faster than the traditional **internet** service.

Broadband includes several high-speed transmission technologies such as: Digital Subscriber Line (DSL) Cable Modem and Fiber.

Frames per Second

HD = 24 FPS

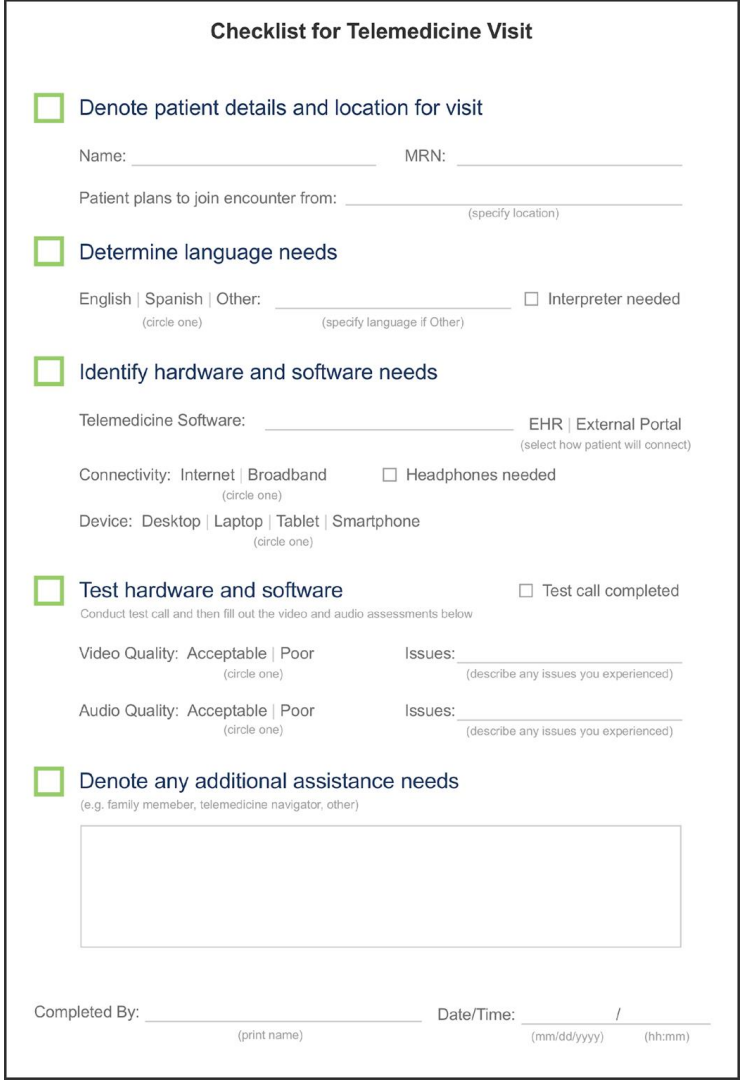
16-20 FPS can have a characteristic “jerky” appearance.

Our Patients

Privacy

- Key Issue for health care
- Especially important in Infectious Diseases – HIV, Hepatitis C, etc
- Home based TeleMedicine
- Patients who need WiFi

Sample Telemedicine Checklist



Checklist for Telemedicine Visit

Denote patient details and location for visit

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Patient plans to join encounter from: _____
(specify location)

Determine language needs

English | Spanish | Other: _____ ☐ Interpreter needed
(circle one) (specify language if Other)

Identify hardware and software needs

Telemedicine Software: _____ EHR | External Portal
(select how patient will connect)

Connectivity: Internet | Broadband ☐ Headphones needed
(circle one)

Device: Desktop | Laptop | Tablet | Smartphone
(circle one)

Test hardware and software

☐ Test call completed

Conduct test call and then fill out the video and audio assessments below

Video Quality: Acceptable | Poor Issues: _____
(circle one) (describe any issues you experienced)

Audio Quality: Acceptable | Poor Issues: _____
(circle one) (describe any issues you experienced)

Denote any additional assistance needs

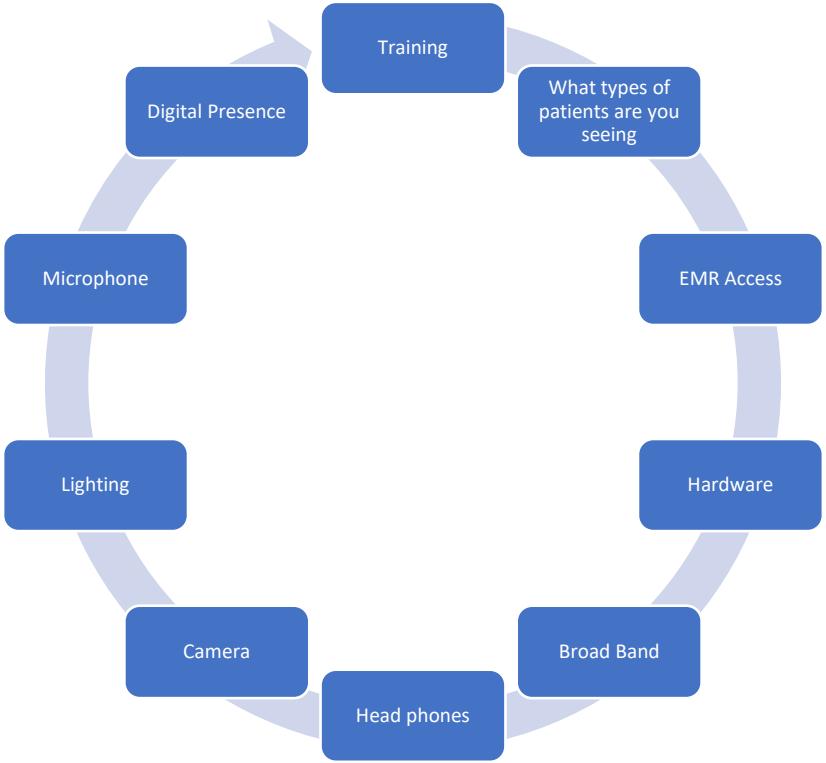
(e.g. family memeber, telemedicine navigator, other)

Completed By: _____ Date/Time: ____/____
(print name) (mm/dd/yyyy) (hh:mm)

Wood BR et al. CID 2020.

Digital Literacy: Providers

Digital Literacy: Providers



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Digital Literacy: Providers

- **Digital Presence:**
  - Lighting background
  - Audio
  - Avoid windows
  - Patterns in clothing
  - Comfort level with the medium

Digital Literacy: Providers

Think about:

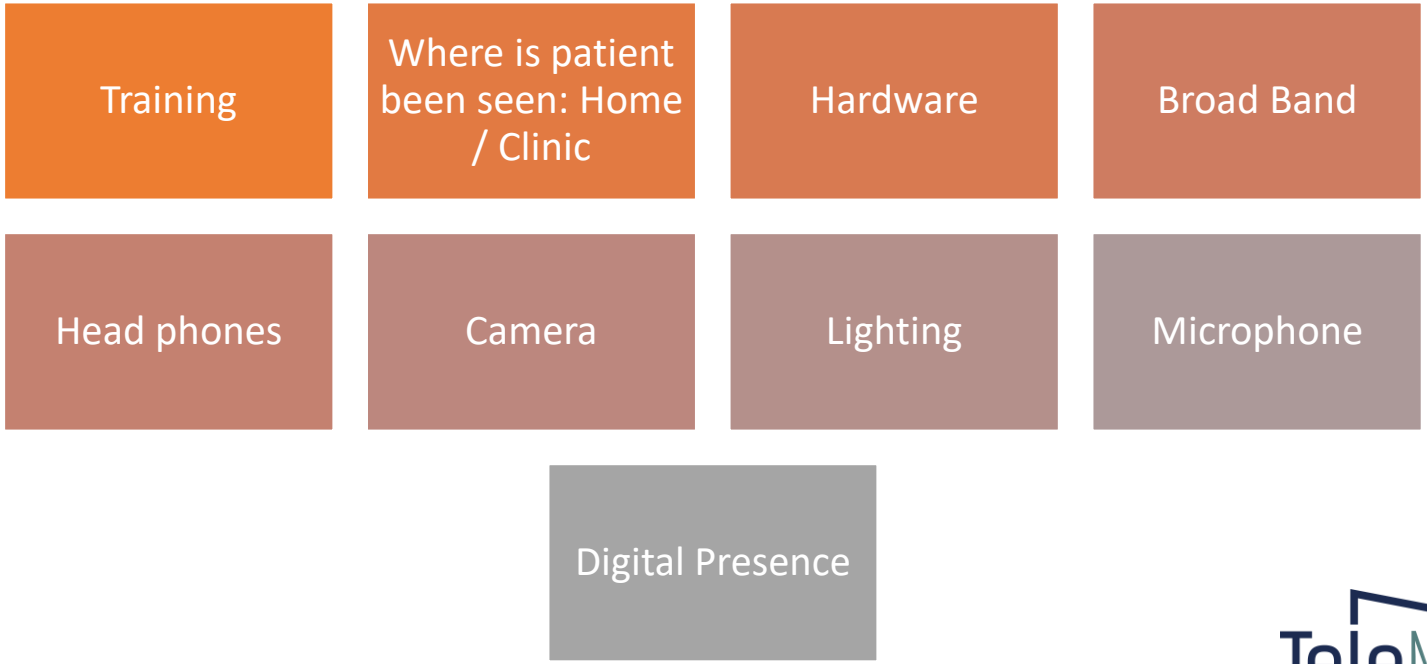
Patient confidence

Brand Management

“Window to the World

Digital Literacy: Patients

Digital Literacy: Patients



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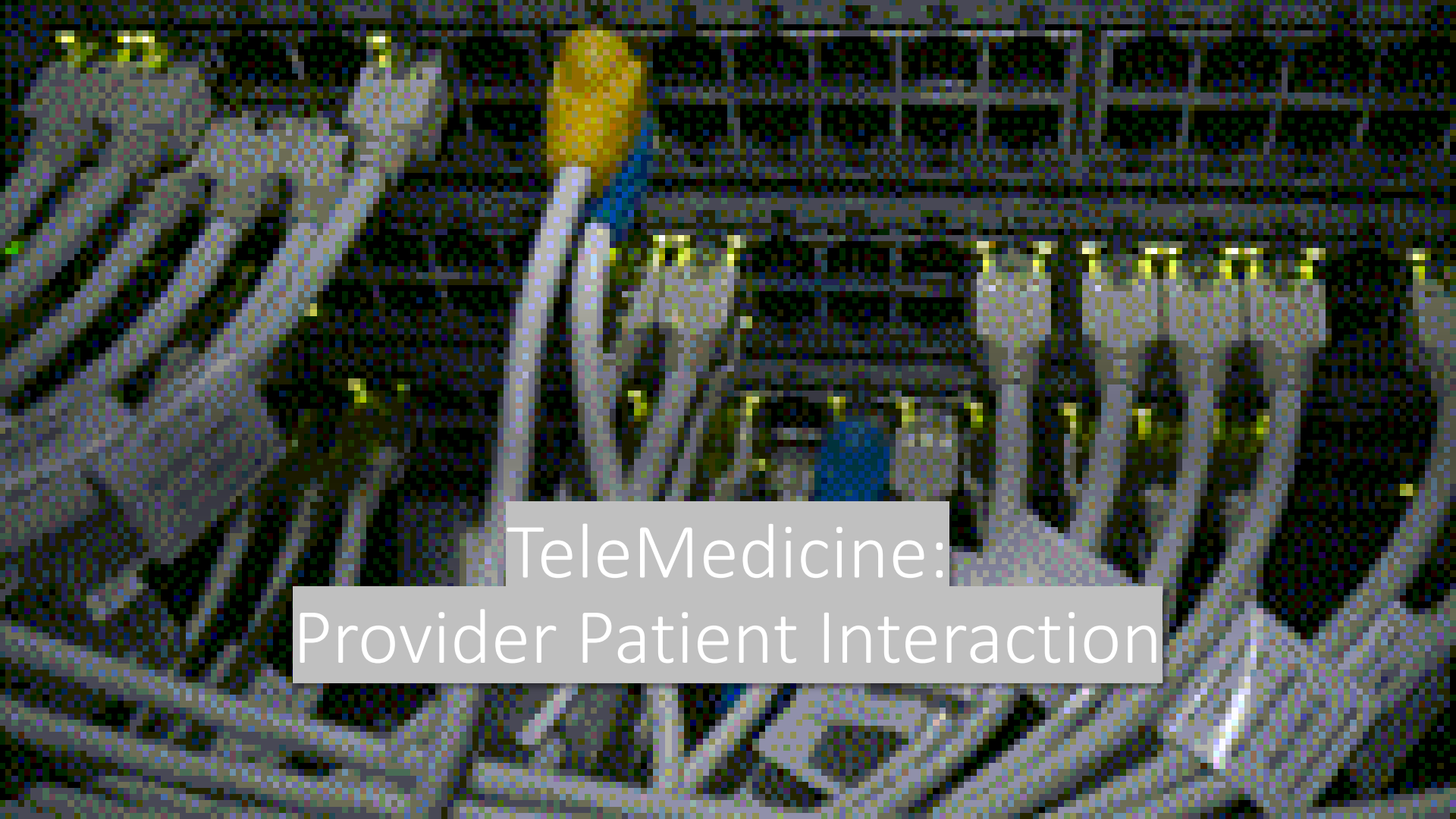
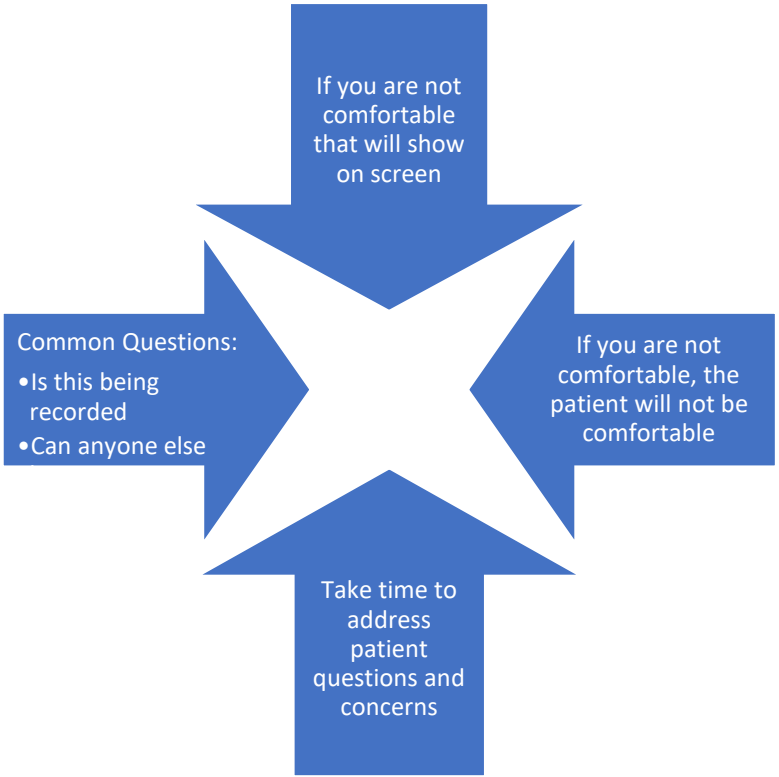

TeleMedicine:
Provider Patient Interaction

Building Rapport



- At the end of the visit ask the patient what their experience was like
- “Would like to see me through telemedicine again?”
- Explain your new practice paradigm

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How Often To See the Patients

- Individual decision
- Practice structure
- Examples:
  - Reviewing laboratory data
  - Follow up on specific issues or treatment
  - Triage

Physical Exam

At Home

In a Clinic

Equipment

The Telemedicine Musculoskeletal Examination

Edward R. Laskowski, MD et.AL

Mayo Clin Proc. n August 2020;95(8):1715-1731 n
https://doi.org/10.1016/j.mayocp.2020.05.026

Physical Exam

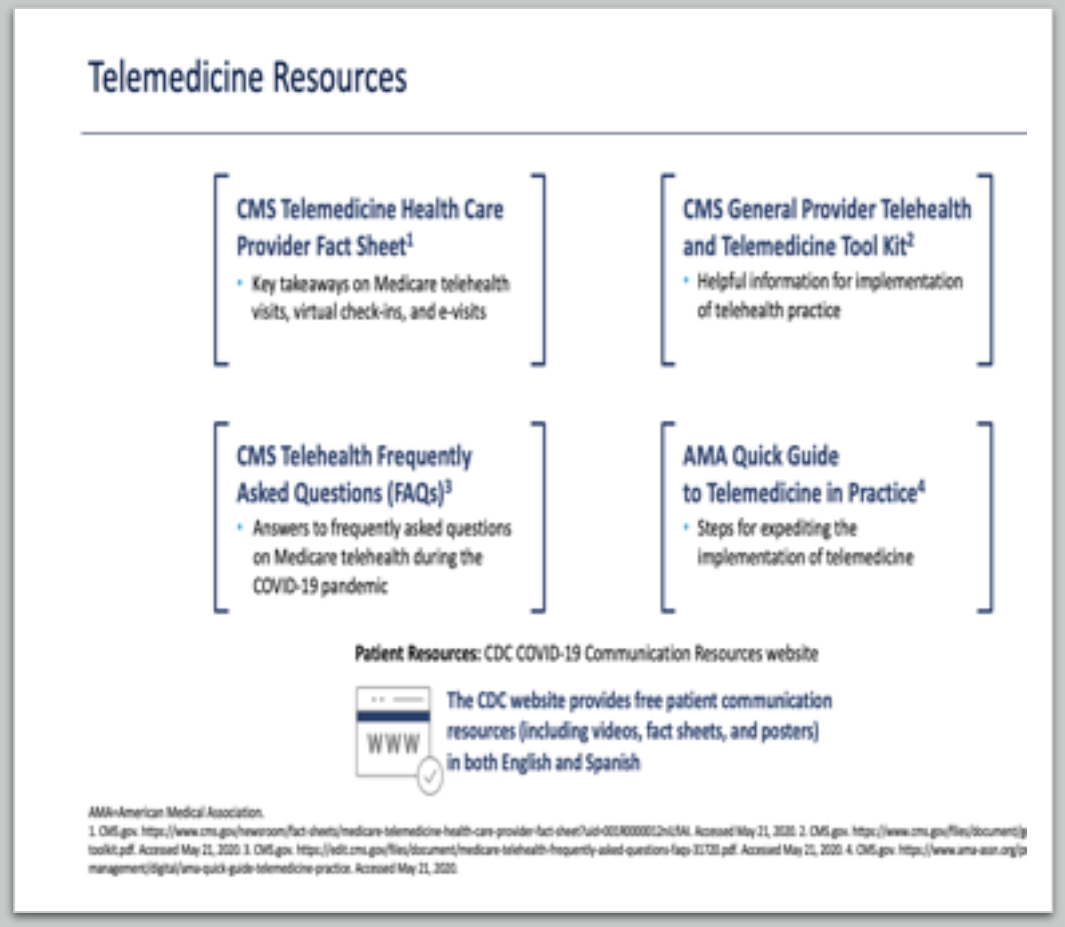
Hospital Based

- Equipment: Digital Statoscope
- 20 - 40X optical zoom
- Hand-Held ultrasounds
- Physician extenders

Physical Exam

Clinic Based

- Equipment: Digital Statoscope
- 20 X optical zoom
- Dermatoscope
- Physician extenders



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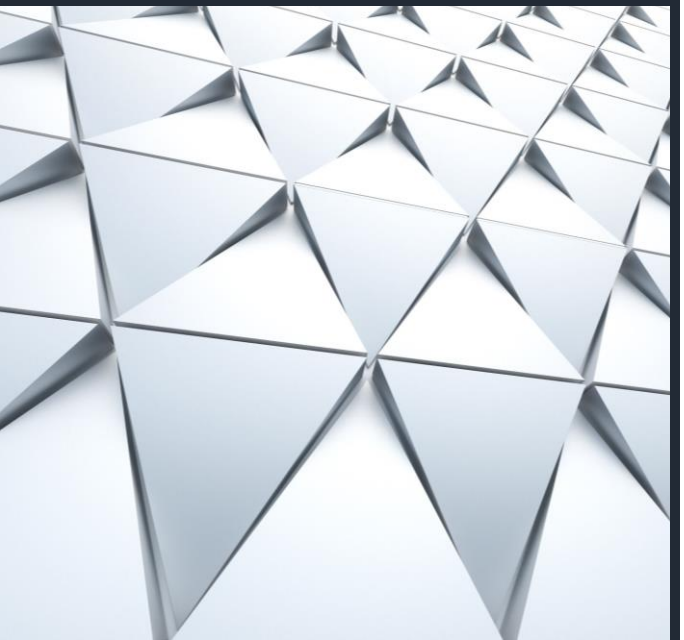
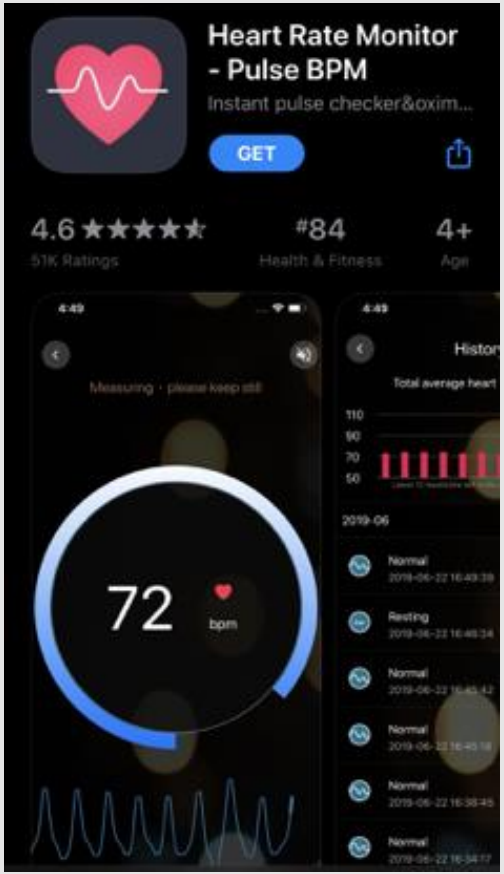


Home Based	Equipment: Limited to None
	Temperature / BP / HR
	Inspection



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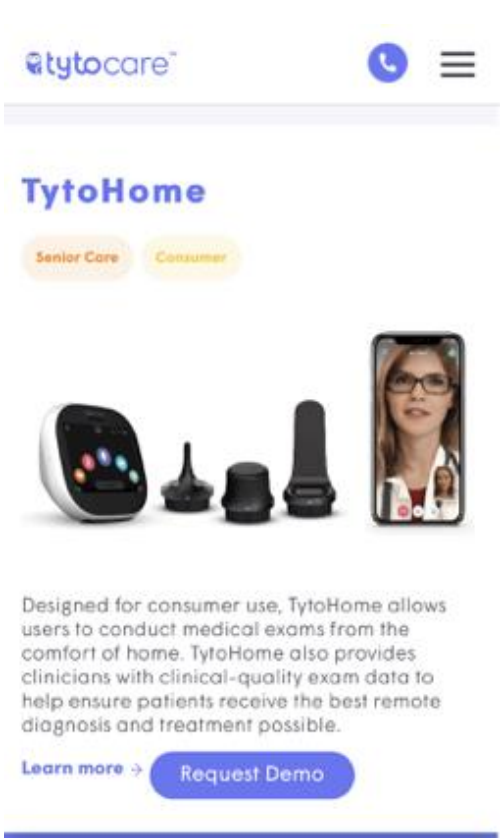
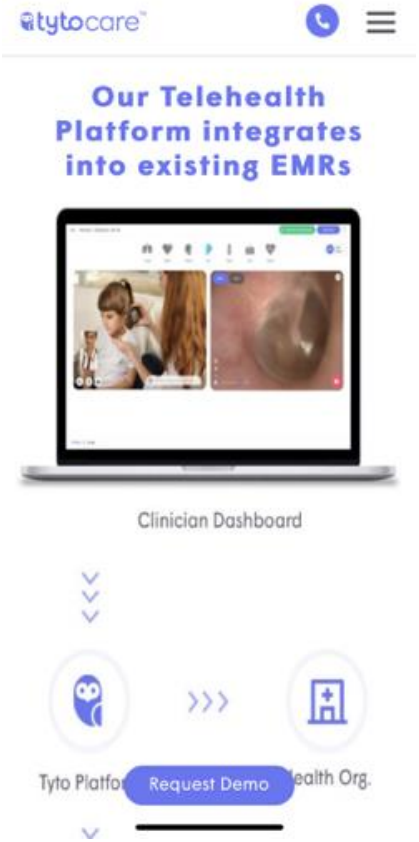
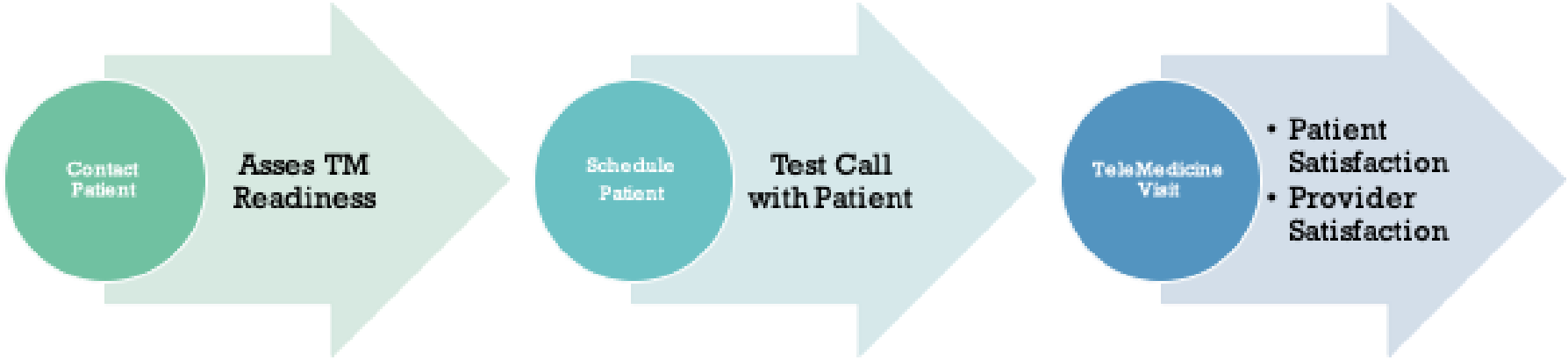




TeleMedicine WorkFlow



TeleMedicine WorkFlow

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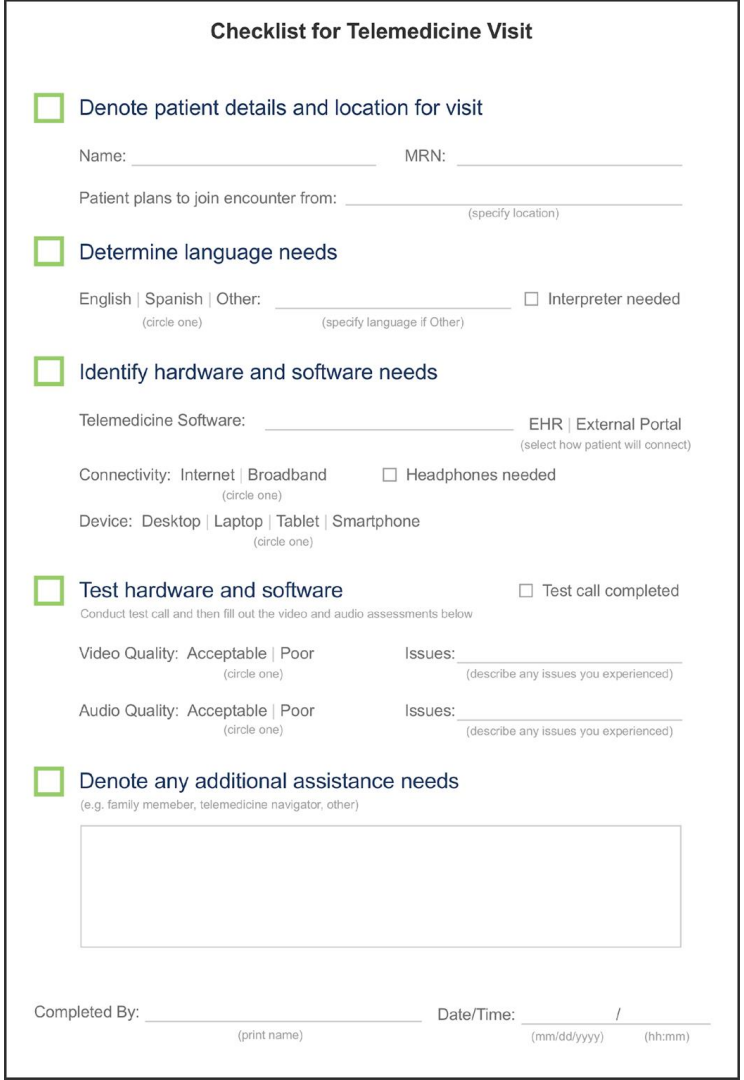

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Completed By: _____ Date/Time: ____/____
(print name) (mm/dd/yyyy) (hh:mm)

Wood BR et al. CID 2020.

A Message To The Division Chair / Business Manager

Do you want to develop a digital health care practice?

If the answer is yes:

Can not ask providers to do this while doing other clinical activities

Have to carve out telemedicine time

Select providers that have a passion for digital heath care. [Can not be “mandatory”

Provide support: Time, training and this needs to be a part of your business plan / road map

Why TeleMedicine and Infectious Diseases?

Why Telemedicine

Additional and New revenue streams

- Billable interactions with existing patients
- Expanding past your current geography
- Building on you “clinical brand”
  - HIV
  - Hepatitis C
  - OPAT
  - E-Consultations
  - Anti-Microbial Stewardship

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Why Telemedicine

Augment / Assist OPAT and Clinical Trials

- Follow up on OPAT patients
- Side effect evaluations / management

Clinical Trials

- Evaluations
- Screening
- Pre/Post enrollment
- Patient engagement
- Adverse Event Follow up

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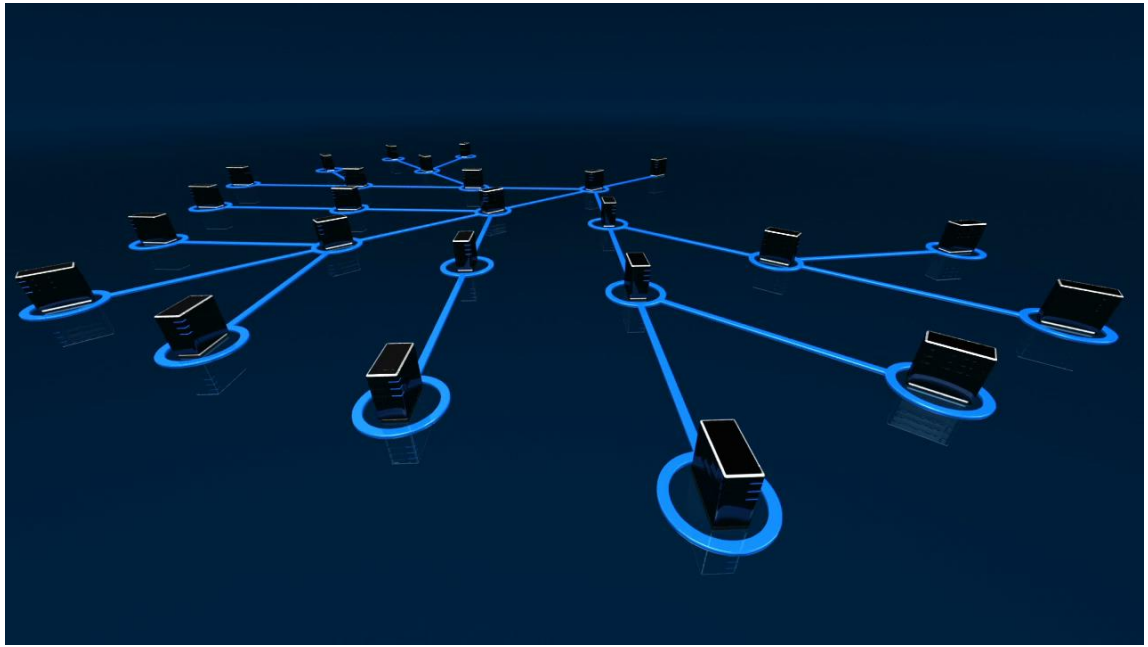
Why Telemedicine

Enhance a medical practice

Productivity – Physicians and NP/PA

Workforce Multiplier

Telemedicine WORK FORCE multiplier



Why Telemedicine

Improve productivity

- Example: “I drive to 3 hospitals about 90 mins in the car”

- 2 hours a day x 5 days = 10 hours per week
- 1 Day a week = zero compensation
- Telemedicine – eliminates commuting time

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Why Telemedicine

Adding Telemedicine to An Existing Practice

- Home Based follow up through video
- Post Hospital Follow Up

Hospital

- Weekend and After Hours Rounds / Consultations
- Secure Communication for Anti-Microbial Stewardship

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Why Telemedicine

Workforce multiplier

- Expanding your presence
- Physician – NP/PA Model
  - Out-patient Visits
  - Post-Hospital Follow

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The Future of Television
A Case Discussion

Data Analytics

- Big Data analytics plays a key role in analyzing data from many patients, helping to improve telemedicine treatments as a whole going forward.
- Patient data collection can help identify risk factors for certain illnesses, assisting physicians with recommending prophylactic treatments.

The Current Status in Health Care

Management of Febrile Neutropenia

Management of Febrile Neutropenia

Home-based therapy with oral (or parenteral) antibiotics is an acceptable option in the care of patients with cancer who have intercurrent febrile neutropenia and a predicted low risk for medical complications.

Winfried V. Kern **Risk Assessment and Treatment of Low-Risk Patients with Febrile Neutropenia** *Clinical Infectious Diseases*, Volume 42, Issue 4, 15 February 2006, Pages 533–540.

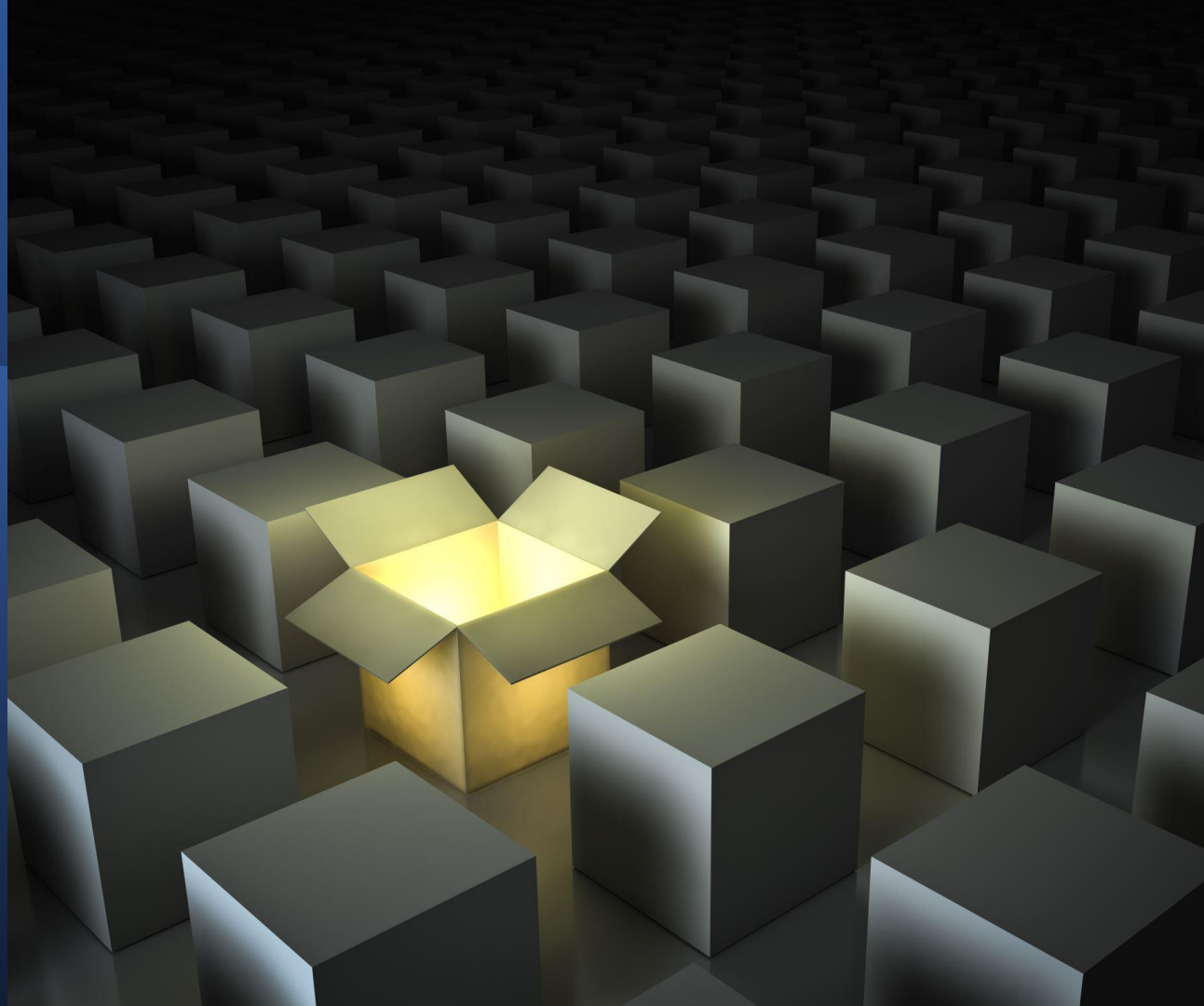
The Current Status in Health Care

Management of Febrile Neutropenia

- TeleHealth allows for remote patient monitoring
- Combination of Technology
- Temperature
- Pulse Ox symmetry
- Heart Rate

- Increased role for ID providers

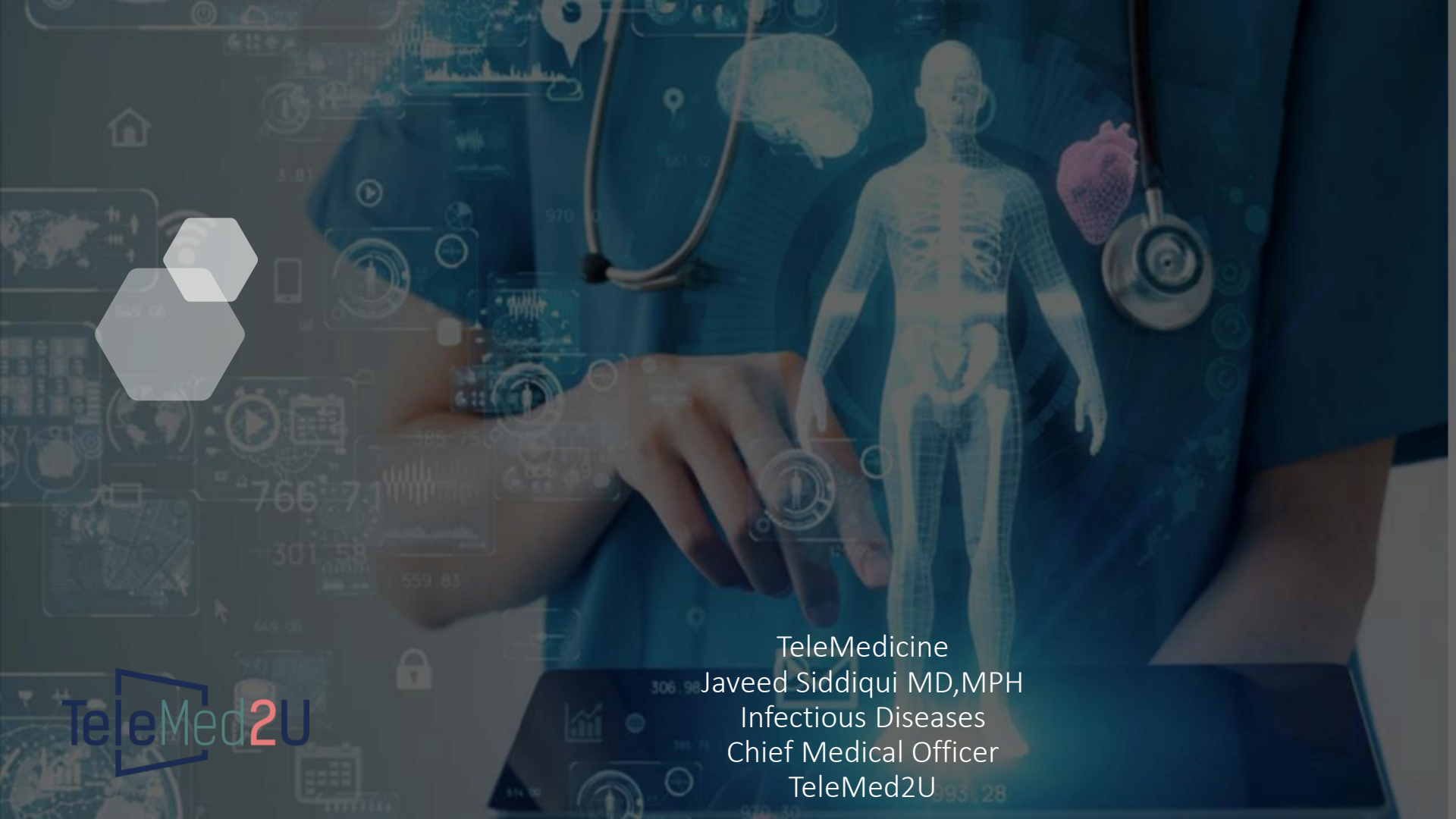
The Future is Here



Transformational Care Delivery

- ***OLD**: Telemedicine as a business model. → **NEW**: Telemedicine as a tool*
- ***OLD**: Virtual care. → **NEW**: Virtual-first care*
- ***OLD**: Telemedicine built for the masses. → **NEW**: Telemedicine built for (more) targeted care needs*

THANK YOU



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TeleMedicine

Javeed Siddiqui MD,MPH
Infectious Diseases
Chief Medical Officer
TeleMed2U

Next Phase of Clinical Practice

The Future of Telemedicine

Nearly three quarters of patients plan to use telemedicine post-pandemic

The COVID-19 pandemic drove increased innovation and adoption of telemedicine, and it appears that it's here to stay.

In 2020, 58% of patients reported an intention to use telemedicine "more" frequently or at "the same" frequency after the end of the pandemic.

In 2021, over 73% of patients surveyed reported they planned to receive "some" or "all" of their care through telemedicine after the pandemic.

It's clear that telemedicine is now an expected part of their health-care experience, even as they think about life beyond the pandemic.

Notably, this was consistent across race/ethnicity.

Quality of Care

Majority of patients perceive telemedicine provides equivalent or superior quality of care compared with in-person visits

The proportion of patients who reported that telemedicine provides the same or better quality of care as compared with in-person visits increased from 40% in 2020 to 55% in 2021.

This may reflect improvements in the technology and delivery of telemedicine. As demand for telemedicine continues, it’s likely that health systems and clinicians will prefer telemedicine platforms that are easy to use for both patients and doctors.

TeleHealth Today

- The pandemic-induced demand for remote care—and the accompanying ingenuity of innovators at organizations big and small—have evolved the conventional parameters of telemedicine.

AI to Detect CHF Exacerbation via Patients' Apple Watch ECGs Mayo CLINIC 2022

Presented 01 May 2022

Heart Rhythm Society conference

AI to Detect CHF Exacerbation via Patients' Apple Watch ECGs

- The researchers worked with Mayo Clinic's Center for Digital Health to develop the smartphone app that study participants used to send single lead ECGs from their Apple Watch.
- A total of 2,454 Mayo Clinic patients with an iPhone, the Mayo Clinic App and a series 4 or later Apple Watch took part in the study.
- The app securely sent all previous watch ECGs and additional ones as they were recorded by patients to a Mayo secure data platform. There they were analyzed.

https://newsnetwork.mayoclinic.org/discussion/mayo-researchers-use-ai-to-detect-weak-heart-pump-via-patients-apple-watch-ecgs/

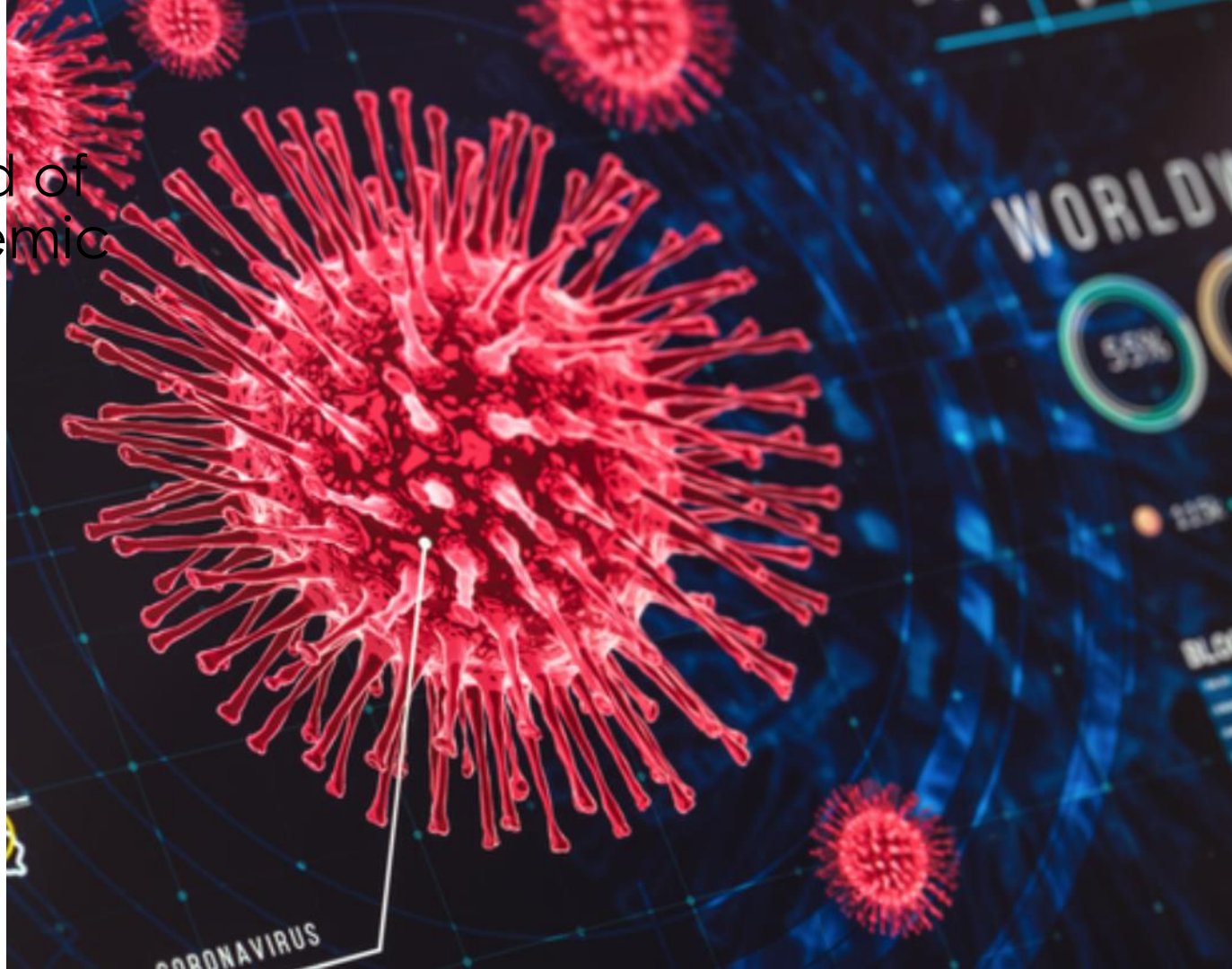
AI to Detect CHF Exacerbation via Patients' Apple Watch ECGs

- Participants securely transmitted 125,610 ECGs from 46 states and 11 countries over the six-month study period
- Overall participation was high, as 92% used the app more than once
- Each patient recorded many ECGs

- Approximately 420 patients had a watch ECG recorded within 30 days of a clinically ordered echocardiogram, or ultrasound of the heart

https://newsnetwork.mayoclinic.org/discussion/mayo-researchers-use-ai-to-detect-weak-heart-pump-via-patients-apple-watch-ecgs/

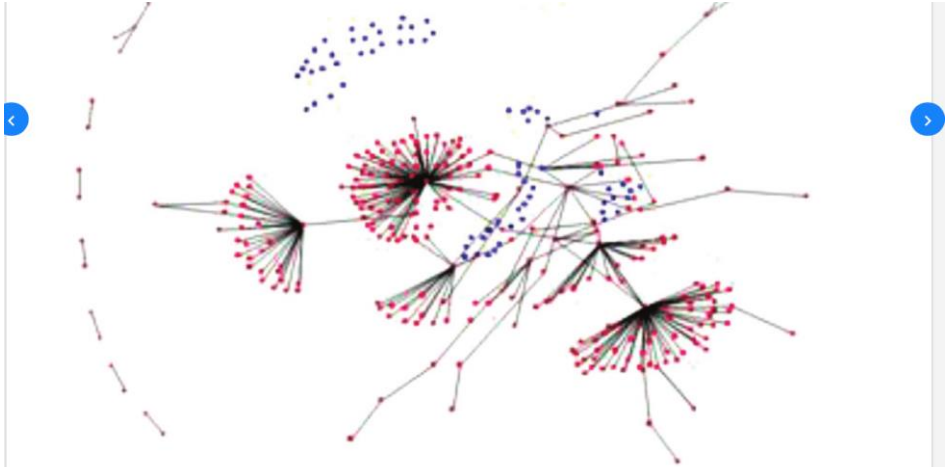
Getting Ahead of the Next Pandemic



Collaboration

- Global
- National
- Regional
- Local
- Public
- Individual

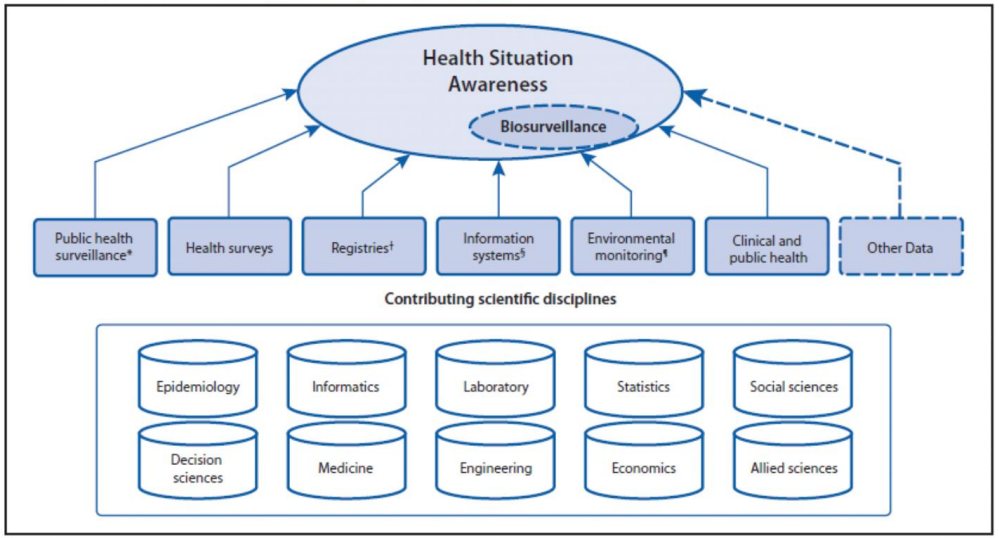
Worldwide Spark Surveillance Network



Disease surveillance organizations before involvement in the Disease Surveillance Network (DSN) Initiative. Blue dots represent DSN grantees from Asia and Africa when they were first supported by the Initiative. Source: Rockefeller Foundation and Neil Abernethy.

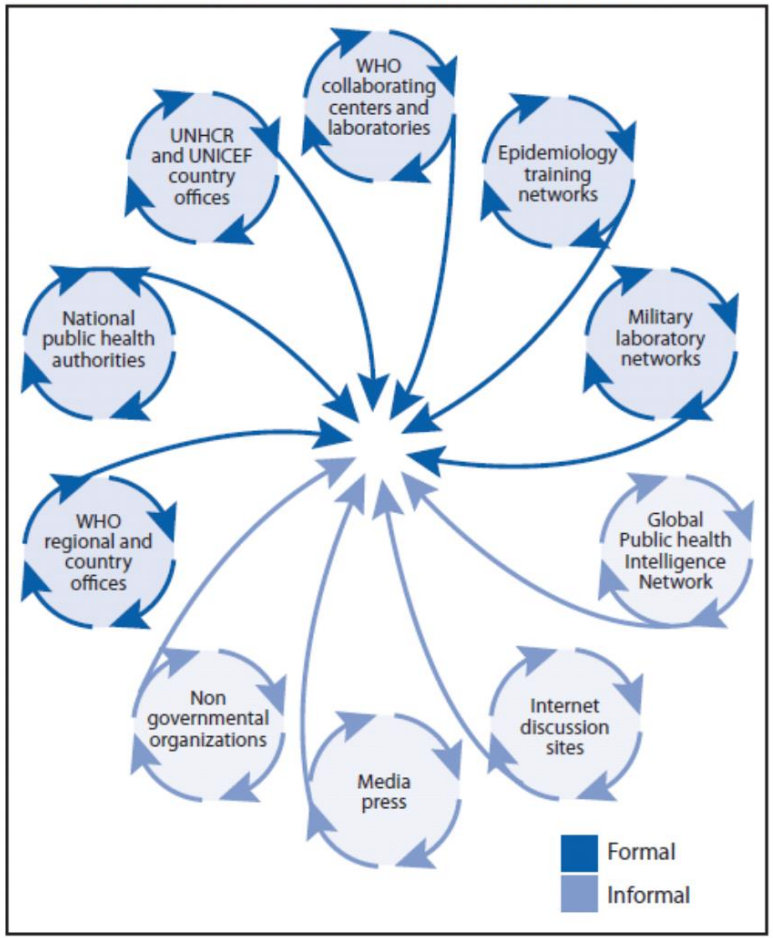
- International cooperation
- Set aside notional agendas for global considerations
- Coordination

FIGURE 1. Various data feeds to support health situation awareness



* Systematic and continuous collection, analysis, and interpretation of data, closely integrated with the timely and coherent dissemination of the results and assessment to those who have the right to know so that action can be taken (Porta MA, Dictionary of Epidemiology, 5th Ed., Oxford University Press, 2008).

FIGURE 3. Global infectious disease surveillance frameworks



Abbreviations: UNHCR = United High Commission for Refugees; UNICEF = United Nations Childrens Fund; WHO = World health organizatio

Source: Nsubuga P, White E, Thacker SB, et al. Public health surveillance: a tool for targeting and monitoring interventions [Chapter 53]. I
Disease control priorities for developing countries. 2nd ed. Jamison DT, Breman JG, Measham AR, et al., eds. Washington, DC: World Bank

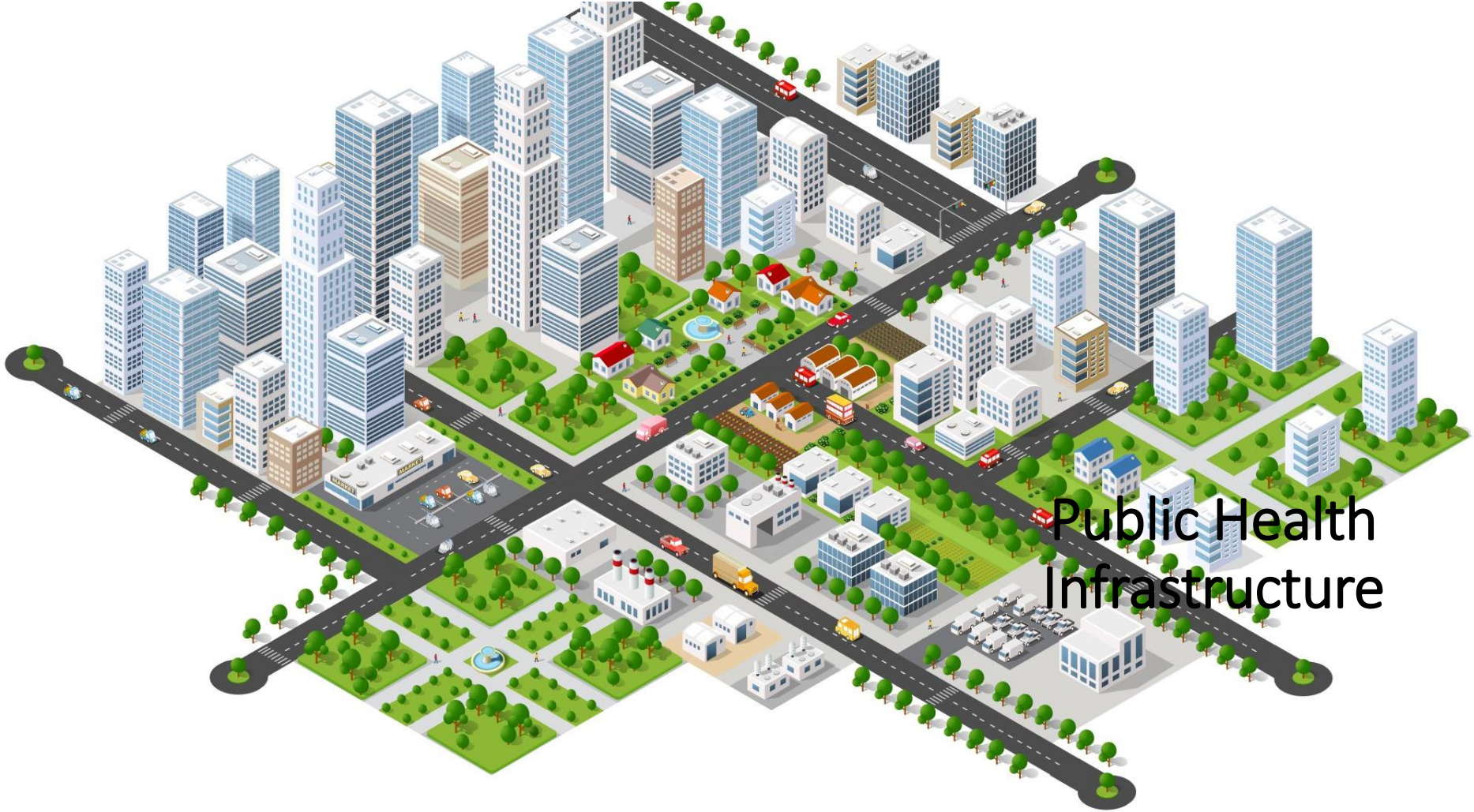
Infectious Diseases Response Teams

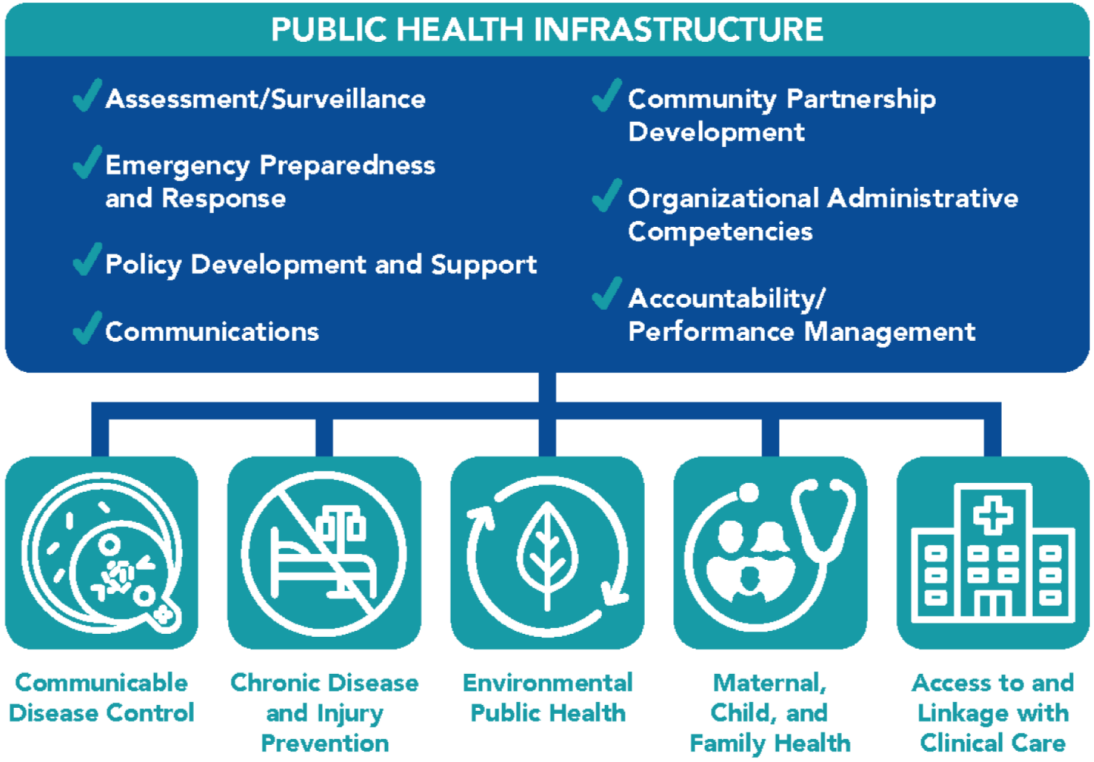
- Similar to Ebola outbreaks in Africa
- Physicians / Scientists / Epidemiologists
- Create world wide teams
- Training / equipment and Funding

Reed Hutchinson/UCLA

Congolese officials and the World Health Organization officials wear protective suits as they participate in a training against the Ebola virus near the town of Beni in North Kivu province of the Democratic Republic of Congo, August 11, 2018. REUTERS/Samuel Mambo

CDC's Global Rapid Response Team


Public Health
Infrastructure


PUBLIC HEALTH INFRASTRUCTURE
Assessment/Surveillance
Emergency Preparedness and Response
Policy Development and Support
Communications
Community Partnership Development
Organizational Administrative Competencies
Accountability/ Performance Management
Communicable Disease Control
Chronic Disease and Injury Prevention
Environmental Public Health
Maternal, Child, and Family Health
Access to and Linkage with Clinical Care

- Nearly 40,000 jobs at state and local public health agencies have been eliminated since the 2008

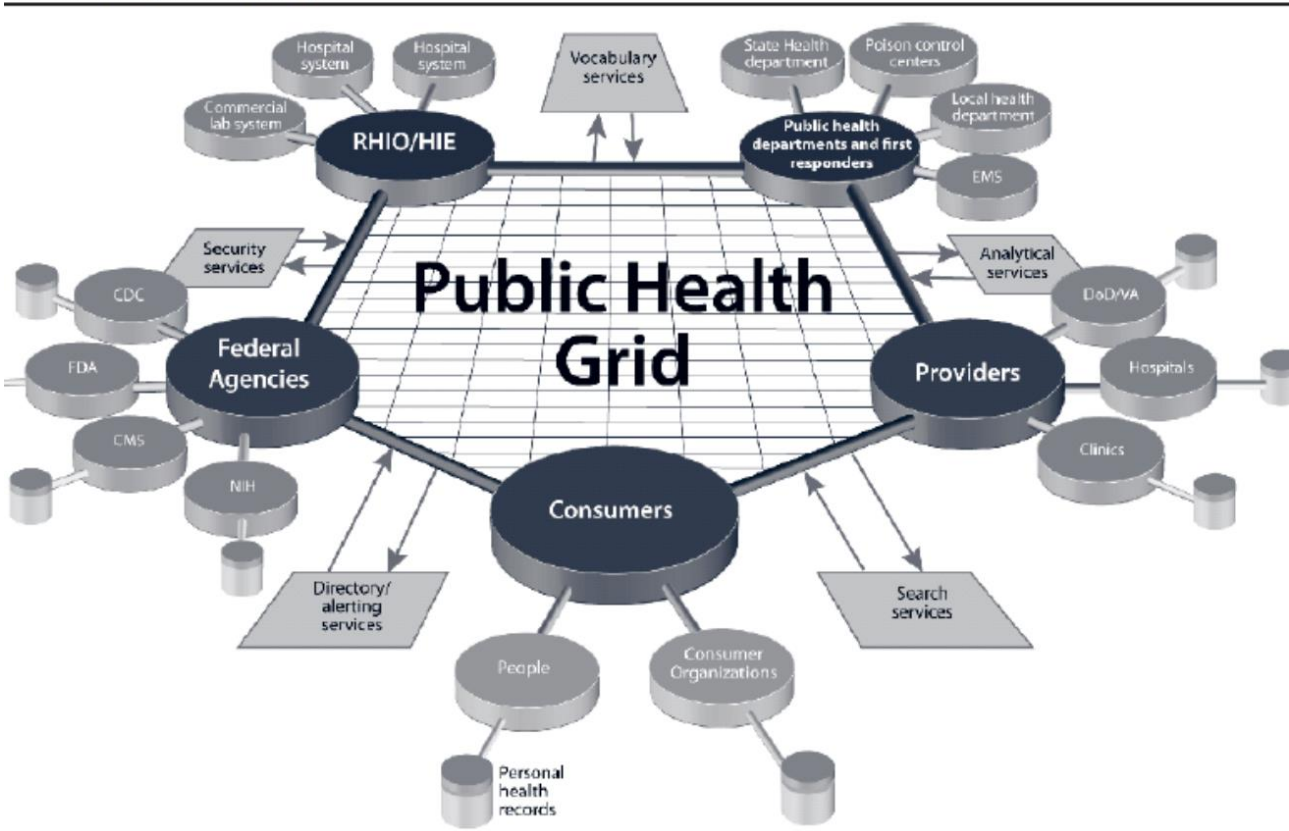
- Federal funding for emergency preparedness and response programs administered by the Centers for Disease Control and Prevention has been reduced by 50% over the past decade

- Strategic National Stockpile as well as the Hospital Preparedness Program. The budget has been reduced from $515 million in 2004 to $275.5 million in 2020

“Its like oxygen. You never think about it until it is not available.”

American Public Health Association

E 5. National public health grid



viations: CMS = Centers for Medicare and Medicaid Services; D0D/VA = U.S. Department of defense/Department of Veterans Affa
Services; FDA = Food and Drug Administration; NIH = National Institutes of Health; RHIO/HIE = Regional Health Information Or
ation Exchange.

: Savel TG, Hall KE, Lee B, et al. A public health grid (PH Grid): architecture and value proposition for 21st century public health.
9:523–9.


Testing Strategy

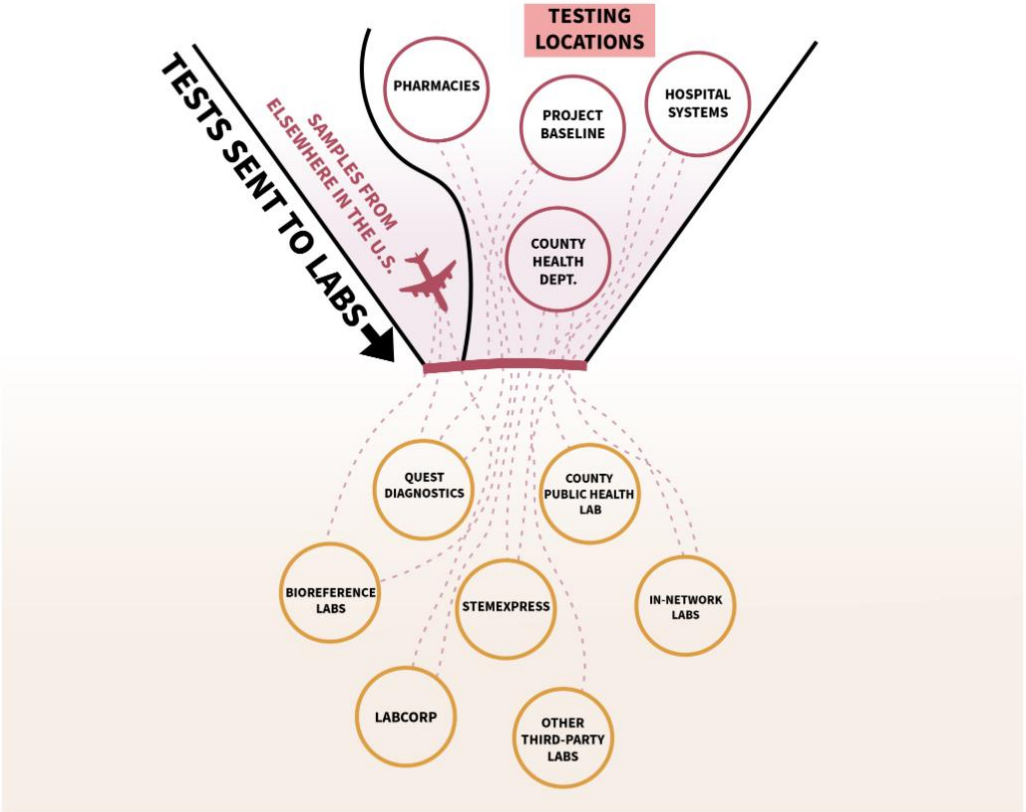
Testing Strategy

- Rapid PCR based Test
- Self collection
- High degree of sensitivity and specificity

- Net work of local/ Regional / National laboratories
- Share data and results in real time

- Assure supply chain for testing supplies and materials

| Metro Image



(Hannah Norman/KHN; Getty Images)

Resources

- IDSA Telehealth Resources: https://www.idsociety.org/clinical-practice/telehealth/telehealth/
- Center for Care Innovations (CCI) Telemedicine Health Equity Toolkit: https://www.careinnovations.org/resources/telemedicine-for-health-equity-toolkit/
- UCSF S.O.L.V.E. Health Tech: https://solvehealthtech.ucsf.edu/

- IDSA Telehealth Resources: https://www.idsociety.org/clinical-practice/telehealth/telehealth/
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- UCSF S.O.L.V.E. Health Tech: https://solvehealthtech.ucsf.edu/

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- **https://www.telehealthequitycoalition.org/is-telehealth-transforming-care-for-everyone.html**
- [3] “Public Health Tech Initiative: Using Health Technology to Respond to Public Health Emergencies.” Consumer Technology Association, Arlington, VA. (November 2021) **https://cta.tech/Resources/Newsroom/Media-Releases/2021/November/CTA-Issues-Policy-Recommendations-for-Pandemic-Pre**
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- [5] “Consumer adoption of telemedicine in 2021.” Rock Health, San Francisco, California. (December 13, 2021)
- **https://rockhealth.com/insights/consumer-adoption-of-telemedicine-in-2021**

Video Visit Risks

The Digital Divide & Other Risks

- Widening of the Digital Divide: gap between individuals who have access to modern information and communication technology and those who lack access
- Exacerbating implicit biases
- Less personal care/less rapport or trust
- Reduced quality of clinical care
  - Limited physical exam
  - Challenge coordinating labs
- Added administrative burden

Definition from: The Digital Divide Council (digitaldividecouncil.com)
Young JD et al. 2018. Telehealth: Exploring the Ethical Issues.

Video Visit Needs

Social Determinants of Digital Health

- Device with sufficient data
- Reliable broadband
- Technical literacy
- Language proficiency
- Privacy
- Social support

Wood BR et al. CID 2020.
Image from cnn.com (Aug 2020).

Risk but also Opportunity: Promote Awareness, Quantification, & Interventions to Reduce Disparities

Clinical Infectious Diseases

IDSA FEATURES

IDSA Infectious Diseases Society of America · hivma hiv medicine association · OXFORD

Advancing Digital Health Equity: A Policy Paper of the Infectious Diseases Society of America and the HIV

...d J. Vento,[6] Shireesha Dhanireddy,[1] Kay J. Moyer,[7] Javeed Siddiqui,[8]

Viewpoint | COVID-19: Beyond Tomorrow

ONLINE FIRST · FREE

March 26, 2021

Bridging the Digital Divide to Avoid Leaving the Most Vulnerable Behind

Nicholas W. Eyrich, MS[1]; Juan J. Andino, MD, MBA[1]; David P. Fessell, MD[2]

» Author Affiliations | Article Information

JAMA Surg. Published online March 26, 2021. doi:10.1001/jamasurg.2021.1143

HEALTH AFFAIRS BLOG

RELATED TOPICS:
ACCESS TO CARE | COVID-19 | TELEHEALTH | TECHNOLOGY | INTERNET | PUBLIC HEALTH | PANDEMICS

Ensuring The Growth Of Telehealth During COVID-19 Does Not Exacerbate Disparities In Care

David Velasquez, Ateev Mehrotra

MAY 8, 2020 10.1377/hblog20200505.591306

Wood BR et al. CID 2020.
Eyrich NW et al. JAMA Surg 2021.
Velasquez D, Mehrotra A. Health Affairs 2020.

Telehealth in 2021

Where Are We Going?

- Advocating for permanent policy changes:
  - Home can be originating site
  - No geographic restrictions
  - Payment parity for video visits
  - Coverage for audio-only visits
  - Treatment across state lines
- Assessing patient preferences and barriers
  - Surveys, focus groups, community input, quantifying uptake and barriers as well as solutions
- Quality improvement interventions to improve access

Opportunities to Advance Digital Health Equity

Clinical & QI Interventions

- Standardize telemedicine checklists; test visits beforehand
- Give devices with data plans or hotspots; also headphones
- Telemedicine stations at accessible locations
- Telehealth training kiosks; telehealth interpreters/navigators
- Make sure interpreters (including sign language) integrated
- Instructions in multiple languages; simple platforms (SMS)
- Include telehealth usage/gaps as key performance indicators

***Design considerations for persons with disabilities: 1) Valdez RS et al. JAMIA 2021.**
2) Consortium for Citizens with Disabilities. http://www.nacdd.org

Conclusions

Telehealth is Public Health

- As a community, we need to consider telehealth access as a social determinant of health and commit to promoting digital inclusion to mitigate worsening disparities

- It is important to acknowledge and better understand the risks of telehealth, so that together we can turn this era into an opportunity to improve healthcare access

- Closing the digital divide will take collaborative effort between numerous key stakeholders along with policy changes, research, advocacy, and community engagement

Information technologies

- Information technologies have wrought fundamental change throughout society, driving it forward from the industrial age to the networked era. In our world, global information networks are vital infrastructure—but in what ways has this changed human relations? The Internet has changed business, education, government, healthcare, and even the ways in which we interact with our loved ones—it has become one of the key drivers of social evolution.

- the Internet revolution is not just technological; it also operates at a personal level, and throughout the structure of society. The Internet makes it possible for an unlimited number of people to communicate with one another freely and easily, in an unrestricted way.

- there is no such thing as too much data, what we've seen is that healthcare is becoming more accessible, and that wearables and the ability to connect them to a virtual consult is making healthcare more accessible to the average American. People are taking greater interest in their own healthcare... it's a revolution, and better care can be delivered in real time.

- The Tech-Enabled Patient Journey at MM+M Transform '22

- Steve pointed out that telehealth visits have levelled out since the pandemic began and that telehealth is here to stay.

- Dr. Elliott agreed and pointed out that it allows you to bring more care into the home. Wearables can provide point of care diagnostic data and provide real time objective data that allows HCPs and patients to interact more frequently.

- While there was agreement that physicians can't necessarily trust data from consumer wearables that aren't FDA approved, Howard pointed out that even if you don't know how accurate the data always is, it encourages the conversation and makes people more aware of their health.

- Gene agreed that has provided a huge
- opportunity to drive behavioral change and stressed that 30% of all of the world's data is healthcare data.

- Howard reinforced that bringing health to the patient instead of waiting for the patient to visit the HCP is essential and that it’s all about accessibility
-

- If the data is keeping the consumer more and in tune to their own wellness and is getting consumers engaged, it's providing enormous value to the healthcare industry.

- Telemedicine has revolutionized the way patients and doctors share medical advice, and mobile technology is changing how the entire healthcare industry operates.

- Mordor Intelligence predicts that telemedicine will be worth more than $66 billion globally by the end of the year 2021.

Telemedicine transforms doctor and patient relationships

Mobile devices give a level of separation between patient and doctor, enhancing patient comfort and control around how they navigate their own personal healthcare journey.

IHS Markit research

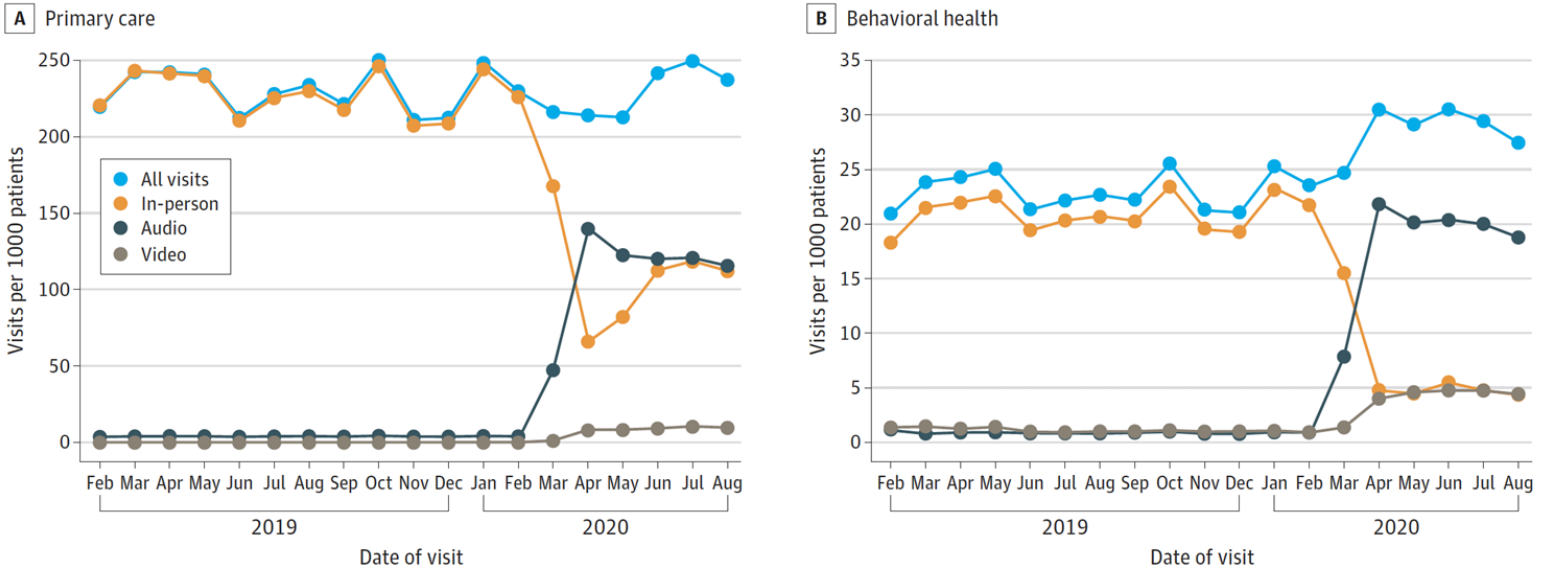
Telemedicine users are mindful.

- Patients feel more comfortable seeking help via telemedicine: mental health

Recent Explosion in Video and Audio-Only Phone Visits

Data from California Federally Qualified Health Centers

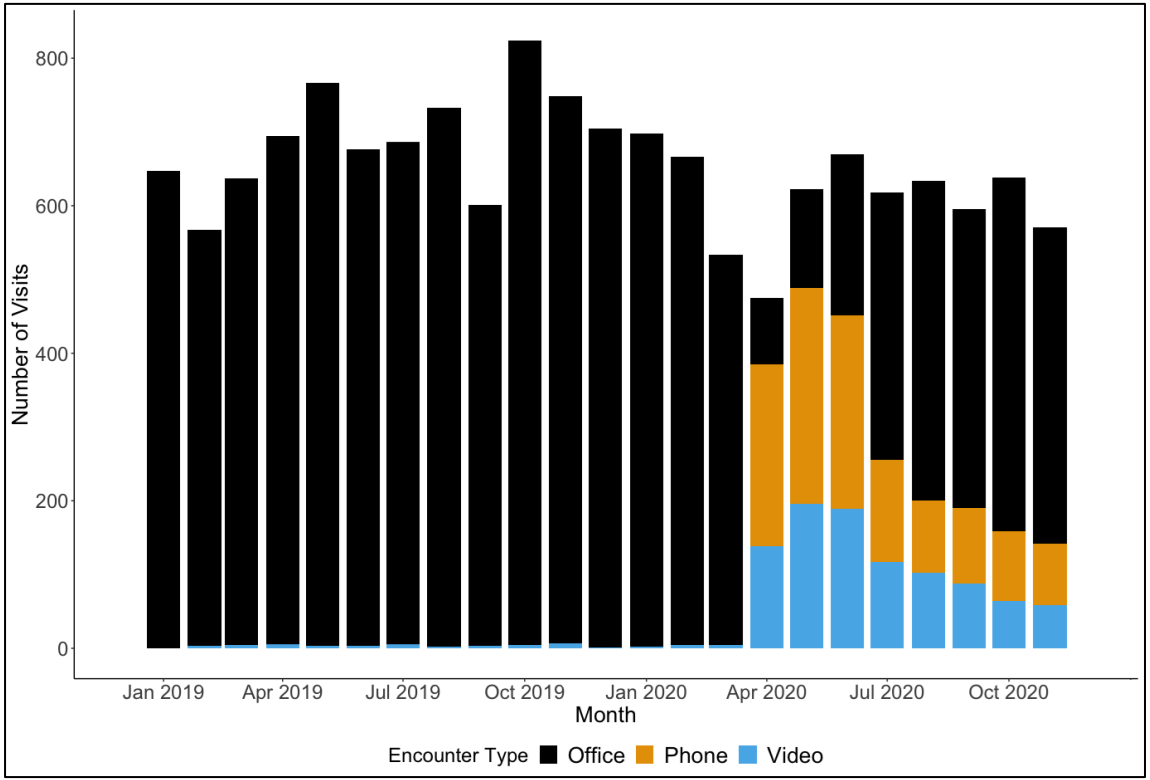
Figure. Primary Care and Behavioral Health Visits per 1000 Patients by Visit Type From February 2019 Through August 2020



Uscher-Pines L et al. JAMA 2021.

Recent Explosion in Video and Audio-Only Phone Visits

Data from Seattle's Ryan White HIV Clinic

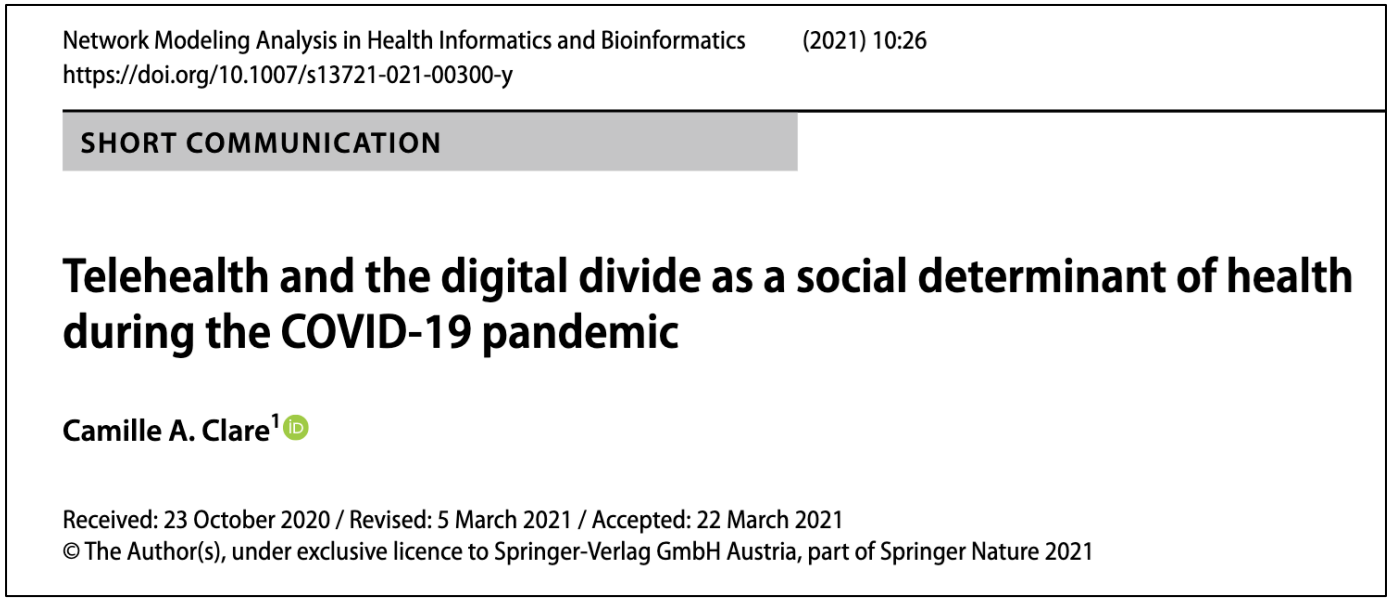


Wood BR et al. OFID 2021.

Disparities in Telehealth Access

The “Digital Divide”

- Digital Divide: “the gap that exists between individuals who have access to modern information and communication technology and those who lack access”



Network Modeling Analysis in Health Informatics and Bioinformatics (2021) 10:26
https://doi.org/10.1007/s13721-021-00300-y

SHORT COMMUNICATION

Telehealth and the digital divide as a social determinant of health during the COVID-19 pandemic

Camille A. Clare[1]

Received: 23 October 2020 / Revised: 5 March 2021 / Accepted: 22 March 2021
© The Author(s), under exclusive licence to Springer-Verlag GmbH Austria, part of Springer Nature 2021

Definition from: The Digital Divide Council (digitaldividecouncil.com); Clare CA. Netw Model Anal Health Inform Bioinform. 2021.

Early Pandemic Telemedicine Uptake Uneven

Real World Clinical Data

- UPenn primary care & subspecialty outpatient visits1
  - Less telemed: older, Asian, limited English proficiency (LEP)
  - Less video: older, female, Black, Latinx, lower income
- UPenn Cardiology & GI clinics2,3
  - Phone not video: Black, female, older, lower income, LEP
  - Less online portal use: Black, older
- MGH Cardiology4
  - Less video: older, lower income, public insurance, Black, Latinx

1. Eberly LA et al. JAMA Netw Open 2020. 2. Eberly LA et al. Circulation 2020. 3. Serper M et al. Gastroenterology 2020. 4. Brown et al. Eur Heart Journal 2021.

Data from Seattle Ryan White Clinic

Factors Associated with Completion of at least 1 Video Visit

Variable	Unadjusted OR	Adjusted OR	Adjusted OR lower CI	Adjusted OR upper CI	P value
Age, years					
35 to 50	0.89	0.90	0.68	1.19	0.400
50 to 65	0.72	0.75	0.57	0.99	**0.025**
Above 65	0.56	0.56	0.35	0.88	**0.010**
Race					
Asian or Pacific Islander	0.70	0.71	0.48	1.03	**0.045**
Black	0.70	0.81	0.65	0.99	**0.018**
Other	0.46	0.50	0.23	0.99	0.055
Unknown	1.80	1.71	0.07	44.31	0.690
Patient portal login	2.04	1.80	1.48	2.19	**<0.001**
Insurance status					
Medicaid	0.65	0.73	0.58	0.91	**<0.001**
Medicare	0.75	0.92	0.70	1.20	0.410
Self-pay	0.96	1.01	0.69	1.47	0.948

Wood BR et al. OFID 2021.