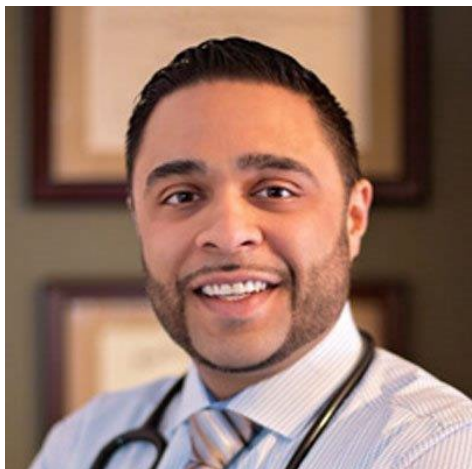# Telemedicine

The past, present and future

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Chief Medical Officer

StationMD, PC

Dr. Unadkat is a board certified emergency physician, recognized physician leader, and a founding partner at StationMD. After graduating medical school and completing his graduate studies in healthcare administration and policy at New York University, he completed his residency at Northwell Health where he served as chief resident. He has held numerous academic positions throughout his career and has served as assistant residency director for the emergency medicine training program at Long Island Jewish Medical Center. He has practiced clinically over the past 18 years in large academic centers, community hospitals, free standing emergency centers, and has been delivering care via telehealth. He has served as chairman and medical director of emergency medicine at a one of the largest academic trauma centers in New Jersey. Throughout his clinical career, Dr. Unadkat has focused on improving access to high quality medical care to vulnerable populations. As chief medical officer at StationMD, Dr. Unadkat, supervises a team of physicians and allied health professionals. He oversees clinical operations, education, clinical quality improvement, and development and growth of our clinical services.

Disclaimer

- I have no conflicts of interest and no financial relationships with any medical device, medication, medical company (except StationMD) discussed in this talk

- The information in this lecture is for educational purposes only. This presentation is not designed to diagnose or treat any specific patient or disease pertaining to a specific patient.

Objectives

REVIEW THE HISTORY OF TELEMEDICINE

UNDERSTAND BASIC DEFINITIONS

TELEHEALTH IN IDD

NURSING USE OF TELEHEALTH IN PATIENTS WITH IDD

The first use of technology in medicine

- The first use of electronic communication for health purposes in the United States occurred during the American Civil War. The Union Army used the telegraph to communicate casualty reports, coordinate patient transport, and request medical supplies.

- In1879, The Lancet described a telephone call between a mother and a physician to determine whether a baby had croup.

- In 1910 two New York cardiologists reported the remote transmission of electrocardiograms (ECGs) for diagnosing cardiac hypertrophy and arrhythmias via telephonic transmission.

Transitioning to modern telehealth

- In 1959, the transmission of fluoroscopy images over video connection was reported to also have occurred in Canada.

- The first widely reported use of interactive video communications for health care in the United States occurred at the University of Nebraska, where clinicians transmitted neurological examinations across campus to medical students in 1959.

- Several years later, a 112mile, closed circuit, two television link was established between the university and Norfolk State Hospital for psychiatric and neurologic consultations.

Modern Telehealth

- During the 1960s, the critical ability for first responders to send cardiac monitoring information to responding emergency physicians who were en route was accomplished in Miami using voice radio channels.

- In 1968, Massachusetts General Hospital (MGH) and Logan Airport. Staffed by nurses, the "medical station" at the airport was linked via microwave relay to MGH as a means of providing primary and emergency services to travelers and airport staff

NASA (1970's 1980's)

- NASA played a major role in the advancement of telehealth
  - Advanced many remote patient monitoring tools. Mainly used to monitor space travelers
- Started STARPAHC (Space Technology Applied to Rural Papago Advanced Health Care), lasted until the late 1970s
  - Connected via satellite communication technology the rural communities in Arizona to Medical doctors at NASA.
  - Also used similar technology to connect rural Alaskan communities to large medical centers in Alaska

1990's- 2000's

- Expanding and ever-growing technology
- Still cost prohibitive for general population
- Internet infrastructure rapidly growing
- Home computer and home internet access becomes more normal
- Mobile phone technology making mobile phones accessible to the public
- 1993 the first meeting of the American Telemedical Association occurred in New Mexico
- Between 1994 and 2004 VHA staff members published about 80 peer reviewed journal articles, contributing to the evidence base for telehealth.

Georgia- Telehealth pioneer

- Starting with a pilot program in 1991 at Dodge County Hospital the network grew to include an academic hub, "secondary" specialty services hubs, correctional sites, and ambulatory care sites.

- Georgia's operational and clinical training and consultation influenced the design and implementation of many programs in the 1990s

2000-2010

- Maturation of Telemedicine
- Teleradiology was normal place allowing real time reads
- Tele- neurology growth allowed for safe TPA administration and countless lives saved
- Tele- ICU as a result of the need to be staffed by intensivists
- Pediatric subspecialty care grew as children's medical centers acted as hubs for local community hospitals
- Tele- psychiatry started as public health needs increased for behavioral health services
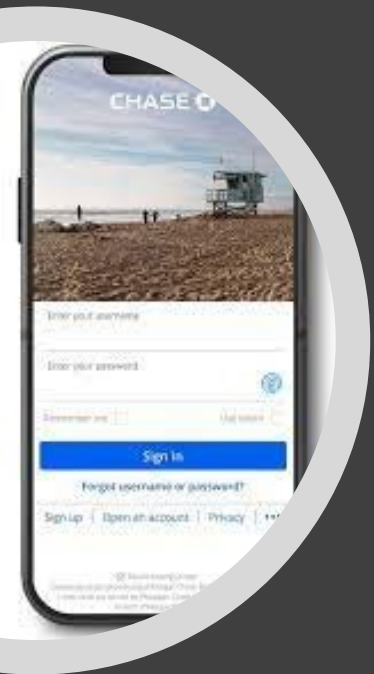
The age of e-commerce

Definitions

Telehealth

Telehealth is defined as the delivery and facilitation of health and health-related services including medical care, provider and patient education, health information services, and self-care via telecommunications and digital communication technologies.

Telemedicine

Telemedicine is the exchange of medical information from one location to another using electronic communication, which improves patient health status.

Telemedicine has multiple applications and can be used for different services, which includes wireless tools, email, two-way video, smartphones, and other methods of telecommunications technology.

Store Forward Technology

Record a finding and save the finding on a device or cloud

At a later time, the physician will access the recording and interpret the finding

Video and Audio technology

- Real time audio video technology that simulates the actual doctor patient interaction.

- Gold standard

- Utilize peripherals:
  - Blue-tooth stethoscope
  - Otoscope
  - Ophthalmoscope
  - High-definition dermatology camera
  - Machines that transmit vital signs (temperature, heart rate, BP, RR)
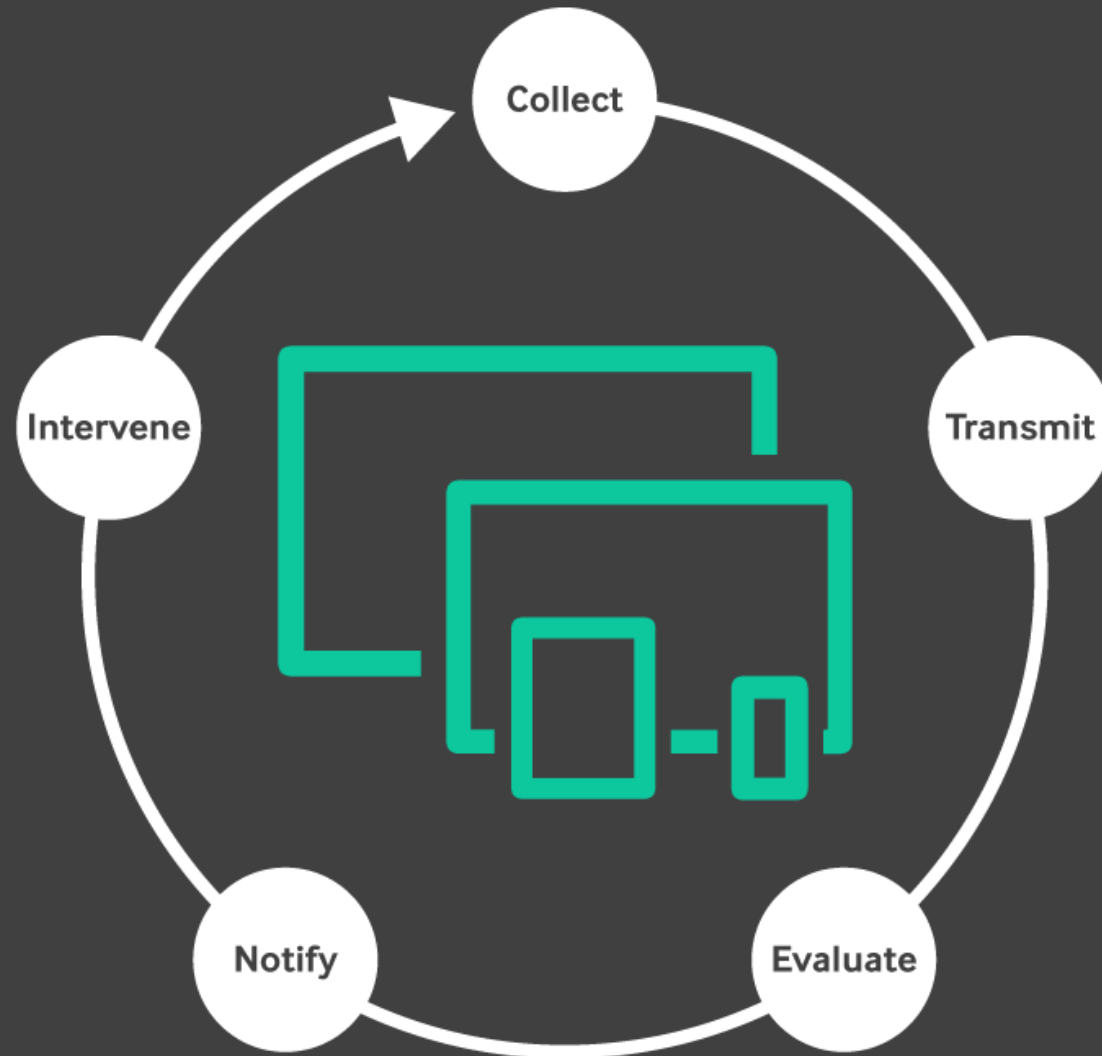 - ECG tracings

Remote Patient Monitoring

Remote Patient Monitoring involves the reporting, collection, transmission, and evaluation of patient health data through electronic devices such as wearables, mobile devices, smartphone apps, and internet-enabled computers.

Telehealth Remote Patient Monitoring

Remote patient monitoring process

Collect

Transmit

Evaluate

Notify

Intervene

CMS: Hub and spoke model

- Originating site connecting to distant site practitioner.

- Originating sites include:
  - Physician offices
  - Hospitals
  - Critical access hospitals
  - Rural Health Clinics
  - Federally Qualified Health Centers
  - Renal Dialysis center
  - Skilled Nursing Facility
  - Community Mental Health Centers
  - ESRD patients getting home HD
  - Mobile Stroke Units
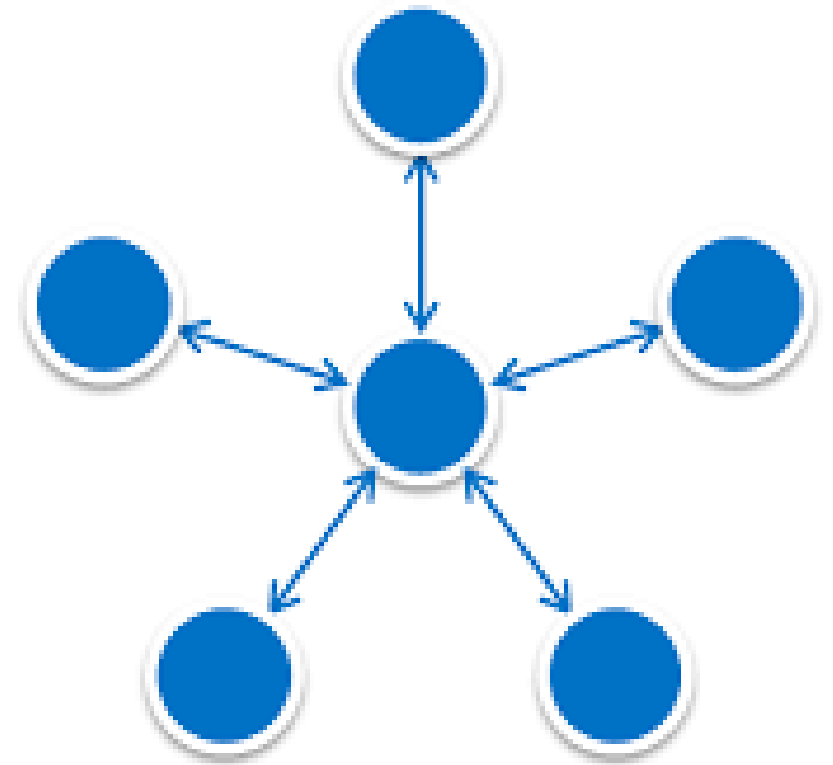
Types of Telemedicine practices

Traditional Telemedicine applications

Tele- Radiology

Tele- Psychiatry

Tele- Psychology/therapy

Tele- Dermatology

Tele- ICU

Tele- Neurology

Tele- Urgent care

Niche telemedicine

Telehealth applications in women's health:

- Menopause and hormone replacement therapy management
- Birth control prescription management and monitoring
- Postpartum depression screenings and video consults
- Remote lactation assistance through video consults
- Reproductive guidance

Niche Telemedicine

Telemedicine in diabetes care:

- Monitoring and guiding patients through insulin injections via video consult

- Using mHealth apps for remote monitoring of blood glucose levels and carb counting

- Providing lifestyle education and personalized coaching through video consults

- Reviewing vital signs and recommending additional bloodwork when necessary

Niche Telemedicine

Men's health telemedicine applications:

- Reviewing depression questionnaires & prescribing anti-depressants or anti-anxiety medication

- Reviewing hair loss images to develop a treatment plan

- Conducting a virtual video consult to assess low testosterone symptoms

- Completing follow-up appointments with video consults

TELEMEDICINE IS MEDICINE

THE OPPORTUNITY IS ACCESS!!!!

IDD: A real opportunity to make an impact

1

Reach a group of people that need access to doctors and nurses that understand their needs

2

Level the playing field = promote access

3

Allow for holistic care- view the home, the people that support our patients and their environment

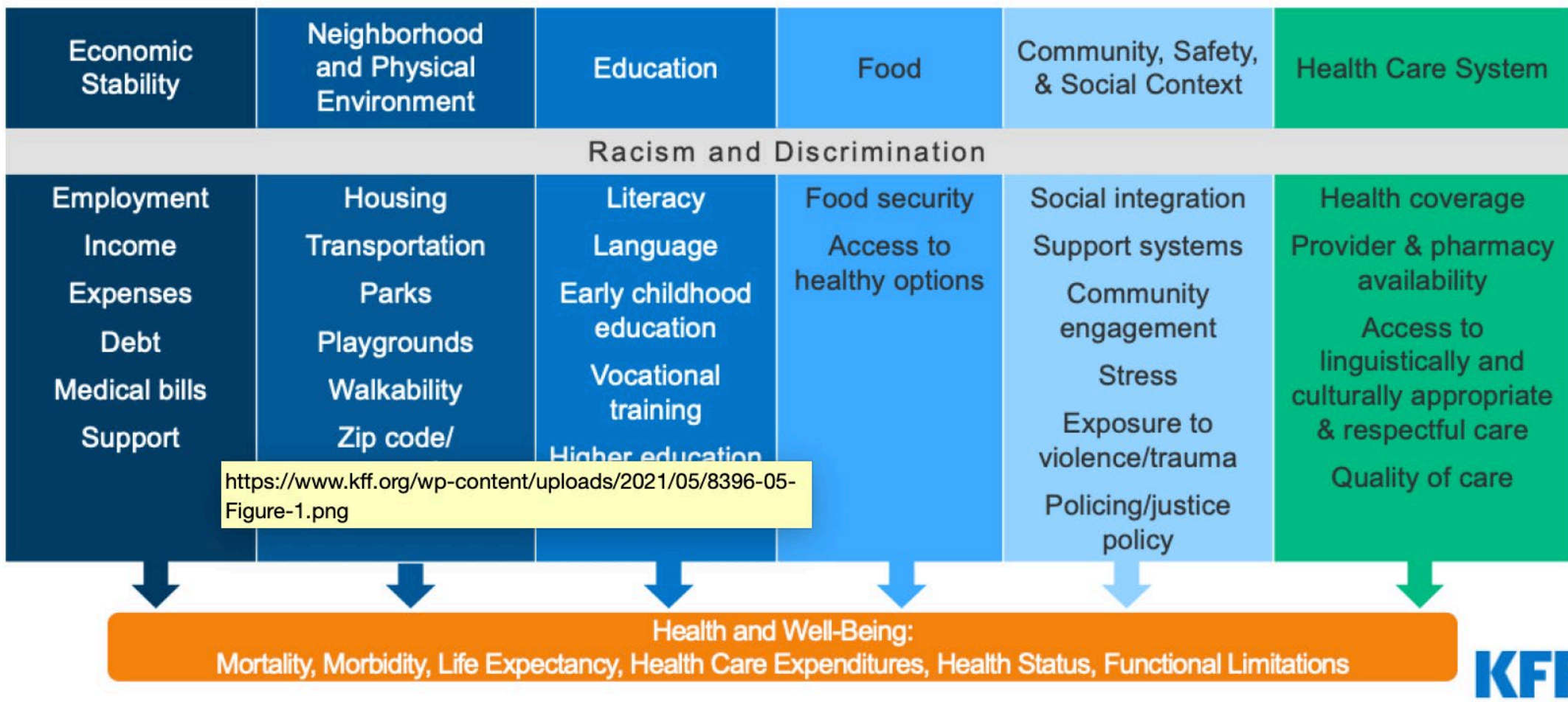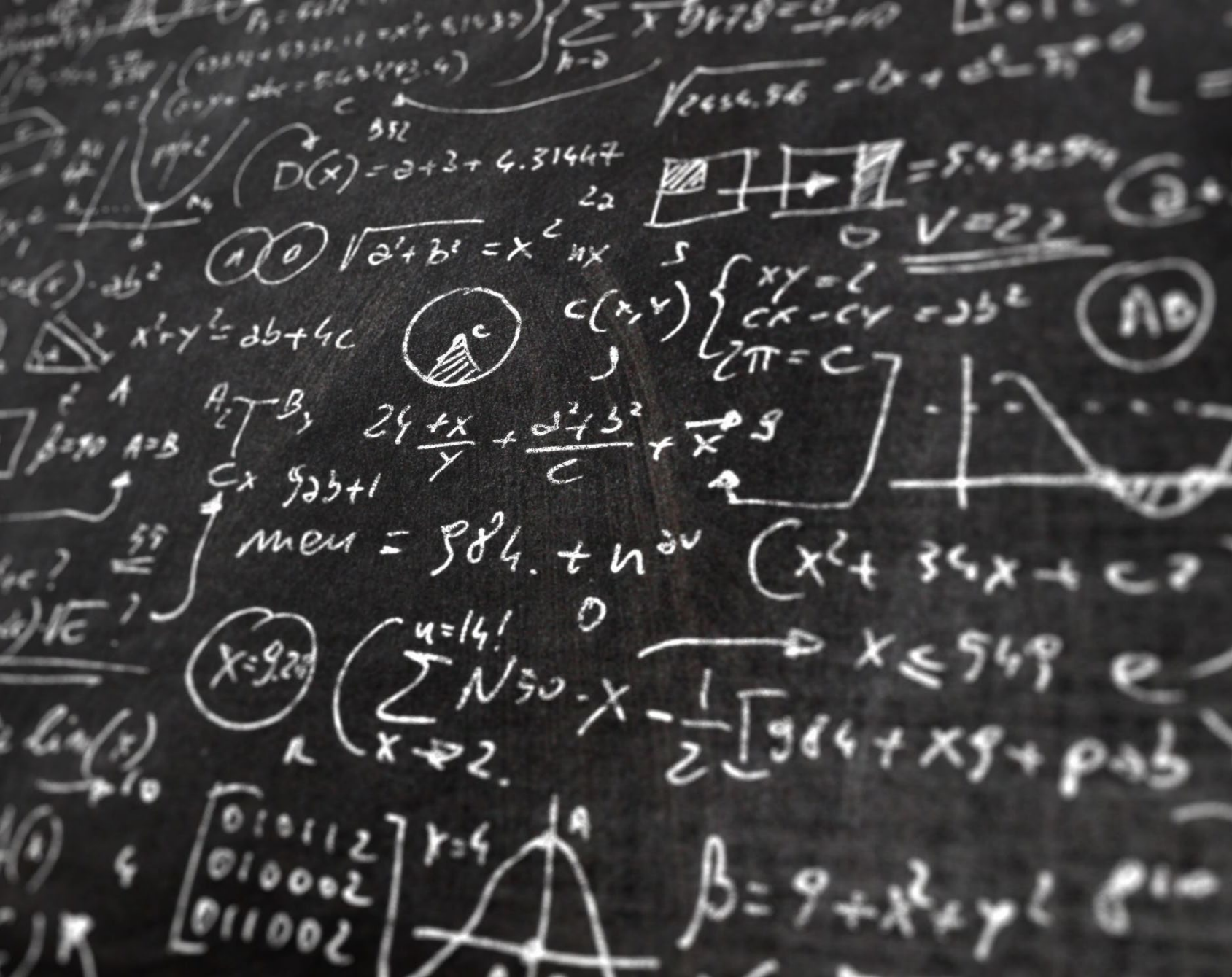# Health Disparities are Driven by Social and Economic Inequities

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community, Safety, & Social Context	Health Care System
Racism and Discrimination					
Employment Income Expenses Debt Medical bills Support	Housing Transportation Parks Playgrounds Walkability Zip code/	Literacy Language Early childhood education Vocational training Higher education	Food security Access to healthy options	Social integration Support systems Community engagement Stress Exposure to violence/trauma Policing/justice policy	Health coverage Provider & pharmacy availability Access to linguistically and culturally appropriate & respectful care Quality of care

https://www.kff.org/wp-content/uploads/2021/05/8396-05-Figure-1.png

Health and Well-Being:
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

KFF

Figure 1: Health Disparities are Driven by Social and Economic Inequities

Demand
+
Technology
=
Innovation

Clinical Case I- store and forward

Monitor Bowel Habits

Utilize Store and forward technology

DSP records bowel movement chart electronically

RN analyzes trends

RN intervenes by escalating to doctor for bowel regimen

Clinical Case II- remote patient monitoring

Diabetes management

Patient has insulin pump

Pump monitors blood glucose

Glucose measurements stored on cloud

RN reviews weekly

Checks for trends

Adjusts carbohydrate loads- with consultation with dietitian

Reports sent to Endocrinologist to adjust insulin and medications

Clinical Case III- real time audio- video

Patient with pressure sore

RN to perform bedside visit and perform wound care

Daily check via real time audio video monitoring

Adjustments made to treatment with communication and education of DSP

Instead of doing in person visits daily; now in person visits can occur weekly but RN can check patient daily remotely

Better care, less travel, more efficiency

Clinical Case IV

Patient sustains a fall

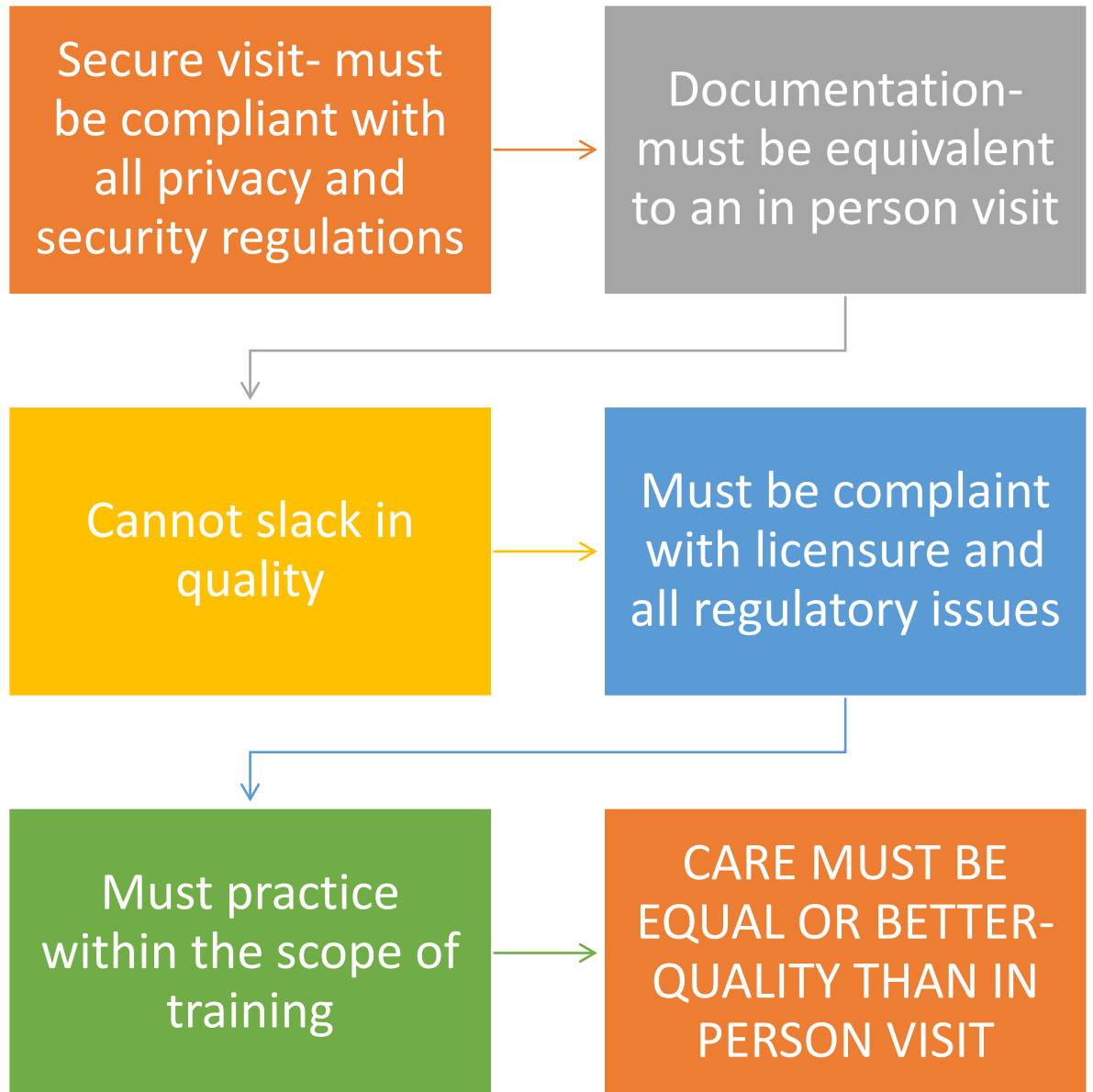DSP says there is a cut on the forehead

RN does real time audio video visit

RN notes that the cut is superficial and can be managed with local care

Saves sending someone to the ED

RN does daily checks for neuro and cognition to ensure patient is safe

Key to all cases

Secure visit- must be compliant with all privacy and security regulations

Documentation- must be equivalent to an in person visit

Cannot slack in quality

Must be complaint with licensure and all regulatory issues

Must practice within the scope of training

CARE MUST BE EQUAL OR BETTER- QUALITY THAN IN PERSON VISIT

Real time audio- video technology

Benefits

Gold standard

Replicates in person interaction

Simple technology

On- demand

Pit Falls

- Staff training
- Provider training
- Back- up process for technical failure
- Requires strong internet connection

Store Forward Technology

Benefits

Can track and trend data

Can use AI technology to interpret data

Allows clinician to review stored data for accurate diagnosis

Pitfalls

- Requires higher level of technology

- Data is staff or human dependent

- Storing health data requires stringent security measures

Remote Patient Monitoring

Benefits

ACTIVE MONITORING OF PATIENT CONDITION

AI TECHNOLOGY TO TRACK AND TREND

WEARABLE TECHNOLOGY TO ALLOW SEAMLESS DATA COLLECTION- DOES NOT RELY ON HUMANS

Pitfalls

- Need to have staff to monitor changes
- Need to have plan/protocol when there is deviation from expectation
- Requires high level technology
- Requires intense training of staff

Objectives- Revisited

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Thank you

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