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8 – 12 JULY 2023 | SYDNEY, AUSTRALIA

Remote patient monitoring: Promises and challenges for medically-underserved communities

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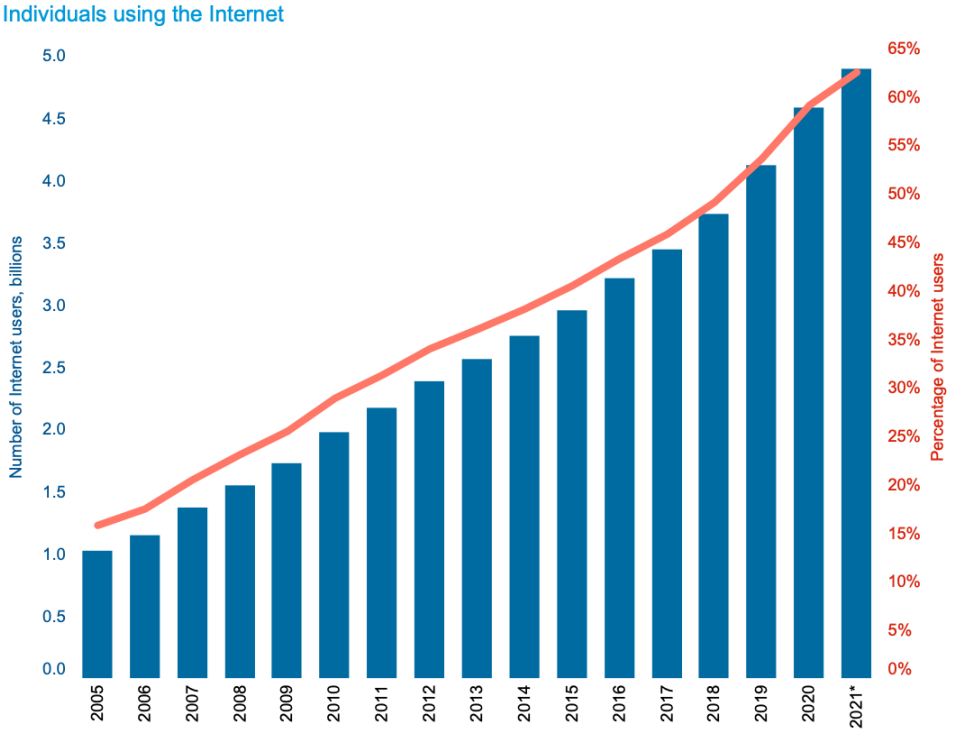
Telemedicine – a brief history

- **1948** – X-ray images are shared via telephone wires
- **1959** – Neurological exams are electronically transmitted
- **1961** – Alan Shepard had vitals monitored while on the spacecraft Freedom 7 (EKG, respiration, and temp)
- **1970s** – Kaiser Foundation and Lockheed develop an RPM program for the Papago Indian Reservation in Arizona, USA
- **1990s** – Internet adoption within healthcare, allowing RPM and telemedicine an opportunity for growth.
- **2000s** – Arrival of Smartphones, tablets, and connected devices

Global Internet Use

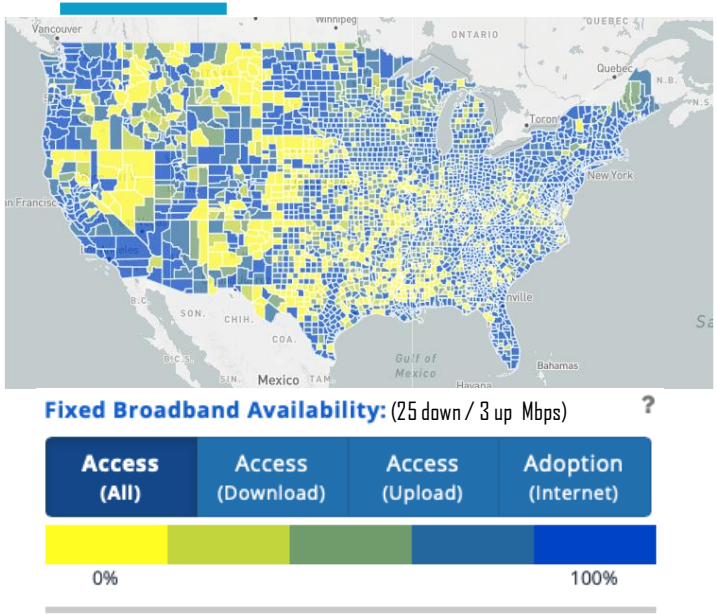
- An estimated 4.9 billion people are using the Internet in 2021
- Internet users are nearly twice as high in Urban areas than in Rural areas (76% vs 39%)



Source: ITU
* ITU estimate

https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2021.pdf

Barriers to health and digital equity for medically-underserved populations.



- Lack of broadband access for patients limits telehealth capabilities.
  - There are approximately 24 million Americans who lack access to broadband (25 Mbps)
  - Nearly 1/3 of Americans in rural areas lack broadband, with disparities greatest in people of lower socioeconomic status and people on tribal lands
- This gap was reflected in underserved populations limited use of virtual visits during COVID-19 [1-2]

https://www.fcc.gov/reports-research/maps/connect2health/

Remote Patient Monitoring for rural and underserved populations

Benefits

- Improved access to high quality healthcare
  - Transportation is a barrier to care[3]
- Asynchronous or synchronous options
  - Savings for patients and providers[4]
- Staffing
  - Staff shortages reported due to burnout[5]
- Enhanced patient satisfaction[6]
- Promoting equitable access to health services and social responsibility[7]

Remote Patient Monitoring for rural and underserved populations

Challenges

- Broadband access
  - Limited or unreliable internet connectivity[8,9]
- Digital literacy
  - Low satisfaction due to training and connectivity issues[10]
- Staffing[11]
- Patient engagement
  - Even with RPM, location and socioeconomic status impact engagement[12]
- Interoperability[13]

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ACTIVATE

ACTIVATE: a model for digital health demonstrated in rural California, USA

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Co-directors:
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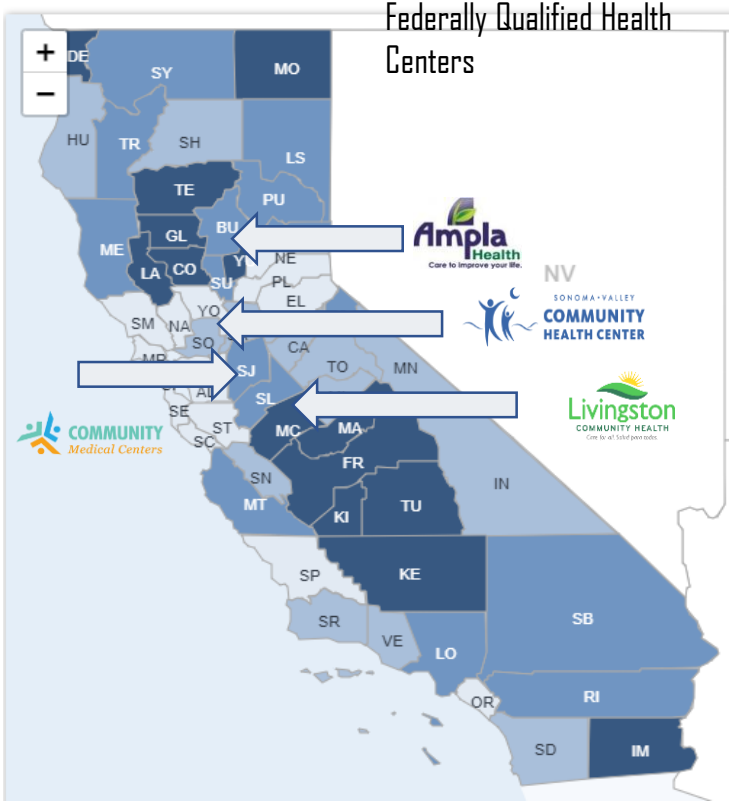
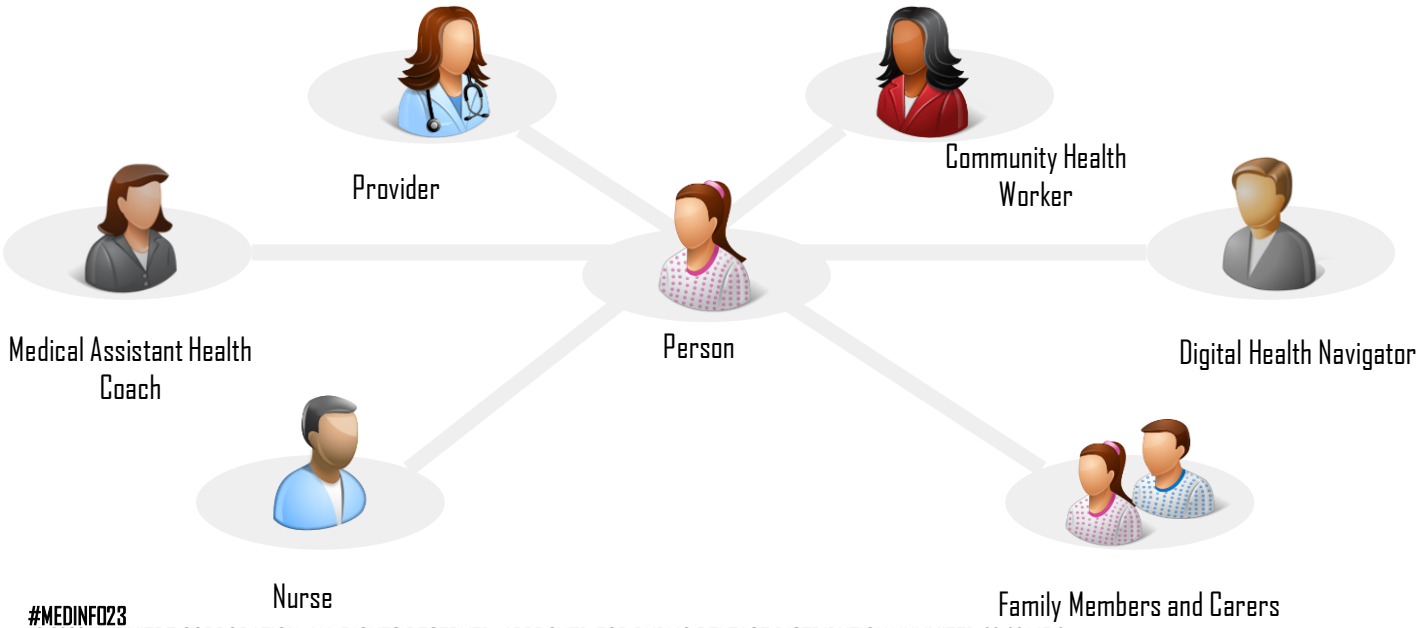


Embedded co-design approach to maximize usefulness, usability, outcomes



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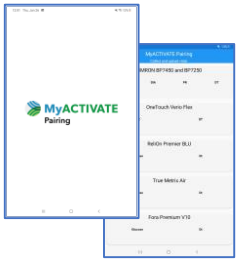
ACTIVATE

ACTIVATE Participant Dashboard

Remote Participant Monitoring

MyACTIVATE Pairing App

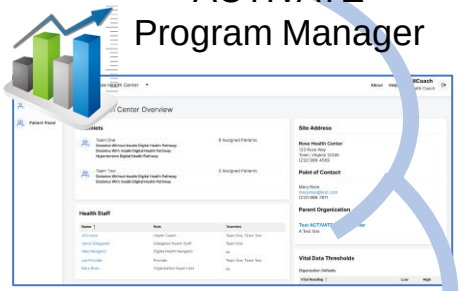


ACTIVATE Server

Batch

HL7v2

ACTIVATE Program Manager



Participants

PATIENTS

Healthcare

TEAMLETS

Tablet or Smartphone

Virtual Visit System

Electronic Health Record System

@TheMITRECH

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Demonstrated Outcomes in Community Health Centers

Kim KK, McGrath SP, Lopez Solorza J, Lindeman D. CIC 2022: The ACTIVATE Digital Health Pilot Program for Diabetes and Hypertension in an Underserved and Rural Community. Applied Clinical Informatics. 2023 May. DOI: 10.1055/a-2096-0326. PMID: 37201542.

Combined Results from First Two California Health Centers (unpublished, rolling enrollment)

Characteristic Number (%)	All Adults 18 to 64 years (n = 243)
Age, mean (range)	55.2 (31 – 83 years)
Female at Birth	95 (60.1%)
Hispanic or Latinx	216 (88.9%)
Spanish Primary Language	178 (73.3%)
Diabetes	195 (80.3%)
Hypertension	151 (62.1%)
Remote Patient Monitoring Measures Transmitted in 6 months, number	41,675

Diabetes in Target Control: 3.5 point improvement in A1c (unpublished, rolling enrollment)

	All Adults Target 7 – 8 %	
Pre-Post Measures	Number of patients	Hemoglobin A1c % m (SD)
Pre-enrollment	153	10.96 (1.89)
3-month[1]	153	7.89 (1.78)
3-month Change*		3.07 (2.72)
6-month [2]	89	7.57 (1.59)
6-month Change*		3.49 (2.50)

[1] Glucose readings over months 1-3 were averaged and converted to A1c using the ADA eAG to A1c conversion calculator[4]

[2] Glucose readings over months 4-6 were averaged and converted to A1c using the ADA eAG to A1c conversion calculator[4]

*Indicates reduction in measure

Hypertension in Target Control: 20 point improvement in systolic blood pressure (unpublished, rolling enrollment)

	All Adults Target below 130/80		
Hypertension	Number of patients	Systolic mmHG m (SD)	Diastolic mmHG m (SD)
Pre-enrollment	70	151.46 (15.81)	82.61 (8.12)
3-month [3]	70	136.23 (16.64)	82.06 (9.88)
3-month Change*		15.23 (16.66)	0.56 (10.17)
6-month [4]	40	132.83 (16.52)	79.53 (9.73)
6-month Change*		19.51 (14.95)	4.34 (8.82)

[3] Blood pressure measures were averaged over month 3

[4] Blood pressure measures were averaged over month 6

*Indicates reduction in measure

Thank You!