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The ACTIVATE Digital Health Pilot Program for Diabetes and Hypertension in an Underserved and Rural Community

Katherine K. Kim[1,2] Scott P. McGrath[3] Juan L. Solorza[4] David Lindeman[3]

[1] MITRE Corporation, Health Innovation Center, McLean, Virginia, United States
[2] Department of Public Health Sciences, Division of Health Informatics, University of California Davis, School of Medicine, Sacramento, California, United States
[3] CITRIS and the Banatao Institute, University of California Berkeley, Berkeley, California, United States
[4] Livingston Community Health, Livingston, California, United States

Address for correspondence Katherine K. Kim, PhD, MPH, MBA, FAMIA, MITRE Corporation, Health Innovation Center, 7515 Colshire Drive, McLean, VA 22102, United States (e-mail: kkim@mitre.org).

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Abstract

Background Community health centers and patients in rural and agricultural communities struggle to address diabetes and hypertension in the face of health disparities and technology barriers. The stark reality of these digital health disparities were highlighted during the coronavirus disease 2019 pandemic.

Objectives The objective of the ACTIVATE (Accountability, Coordination, and Telehealth in the Valley to Achieve Transformation and Equity) project was to codesign a platform for remote patient monitoring and program for chronic illness management that would address these disparities and offer a solution that fit the needs and context of the community.

Methods ACTIVATE was a digital health intervention implemented in three phases: community codesign, feasibility assessment, and a pilot phase. Pre- and postintervention outcomes included regularly collected hemoglobin A1c (A1c) for participants with diabetes and blood pressure for those with hypertension.

Results Participants were adult patients with uncontrolled diabetes and/or hypertension ($n = 50$). Most were White and Hispanic or Latino (84%) with Spanish as a primary language (69%), and the mean age was 55. There was substantial adoption and use of the technology: over 10,000 glucose and blood pressure measures were transmitted using connected remote monitoring devices over a 6-month period. Participants with diabetes achieved a mean reduction in A1c of 3.28 percentage points (standard deviation [SD]: 2.81) at 3 months and 4.19 percentage points (SD: 2.69) at 6 months. The vast majority of patients achieved an A1c in the target range for control (7.0–8.0%). Participants with hypertension achieved reductions in systolic blood pressure of 14.81 mm Hg (SD: 21.40) at 3 months and 13.55 mm Hg (SD: 23.31) at 6 months, with smaller reductions in diastolic blood pressure. The majority of participants also reached target blood pressure (less than 130/80).

Keywords
- diabetes mellitus
- hypertension
- telemedicine
- codesign
- patient participation
- digital divide
- consumer health informatics

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Conclusion The ACTIVATE pilot demonstrated that a codesigned solution for remote patient monitoring and chronic illness management delivered by community health centers can overcome digital divide barriers and show positive health outcomes for rural and agricultural residents.

Background and Significance

Providing care to underserved populations in health care is already a global challenge.[1] Diabetes mellitus, a set of disorders related to hyperglycemia,[2] is a worldwide concern with the global prevalence of diabetes in adults at 537 million people (10.5%) and the expectation that this will increase over the next 25 years.[3] Essential or primary hypertension is defined by elevated blood pressure without an identifiable secondary cause.[4] Hypertension affects an estimated 1.3 billion people and almost half are unaware that they have the condition. In addition, only 20% of those who are diagnosed with hypertension have it under control.[5]

The severe acute respiratory syndrome coronavirus disease 2019 (COVID-19) pandemic caused substantial disruption to many facets of life, including health care delivery. There were large reductions in visits and testing for diabetes in 2020 as people avoided health care institutions and delayed care.[6–9] The pandemic also stimulated a rapid interest and adoption of digital health, the combination of health care and the Internet, which had been popularized in the early 2000s.[10] Digital health encompasses a wide range of use of cases and technologies including smart pills, augmented and virtual reality, mHealth apps, connected devices, and remote patient monitoring (RPM) such as glucometers and blood pressure machines. In 2020 to 2021, there was a rapid rise in the use of virtual visits in which patients interacted with health care providers via audio or video telehealth.[11]

While digital health evidence has only recently emerged, there are promising signs of impact from use of RPM. For example, two recent systematic reviews reported that most of the studies showed positive outcomes from RPM interventions, although results varied among wearables, smartphone apps, telehealth, and other forms.[12,13] Impacts related to studies specifically using RPM for diabetes and hypertension included improved diabetes control among adults[14,15] and older adults,[16] improved hypertension control,[17] more timely and uniform data in the electronic health record (EHR) for patients with diabetes with a history of telehealth visits compared with those who don't,[18] and improved efficiency from workflow automation in virtual hypertension management programs.[17] There remain substantial gaps in the evidence base on efficacy, effectiveness, and patient acceptance of RPM interventions for chronic conditions.[19–21]

The obstacles contributing to health and digital inequity for medically underserved populations continue to be major concerns.[22,23] Use of virtual visits among these underserved populations during the public health emergency spurred by COVID-19 lagged behind use by majority and better-resourced communities.[23,24] Care for chronic conditions like diabetes and hypertension faced challenges including lack of utilization of regular health maintenance, lab tests, and monitoring during the pandemic.[6,8,9] RPM may deliver specific advantages for medically underserved populations/areas but significant barriers persist. Lack of health information exchanges, staffing, and lack of patient engagement capacity are some of the impediments to RPM from the clinical perspective.[25] There are also obstacles from an infrastructure and patient perspective like broadband access[25] and digital literacy.[26] The limited literature on outcomes of RPM and telehealth among racial and ethnic minority groups indicates that disparities persist.[27–29]

In the United States, the rates of diabetes and hypertension are disproportionately higher among Black, Asian, and Hispanic/Latinx adults and rural populations compared with White and urban.[30–33] These groups face confounding challenges of limited access to health care services, inadequate educational resources, and higher rates of poverty.[34] Rural, low-income, and agricultural workers in California are especially at risk for disproportionately poor health outcomes, including from COVID-19.[35,36] Hispanic and Latinx populations in the United States have a documented higher prevalence of diabetes and worse glycemic control outcomes[37,38] and higher death rates.[39] Hypertension studies have documented rural Hispanic and Latinx individuals were more likely to have persistent undiagnosed, untreated, and uncontrolled hypertension.[40,41]

California's Central Valley, a rural and agricultural region, houses a predominantly Hispanic and Latinx population facing the state's worst environmental conditions, extreme poverty, and health professional shortages. Before the pandemic, community health centers nationwide, including California, were not authorized for telehealth visits. They struggled to meet virtual visit demands and monitor chronic illnesses during the pandemic due to disparities and limited technology access.[42] There remains a gap in understanding how to address the challenges and barriers to implementing and adopting telehealth and RPM in these communities.

Objectives

The ACTIVATE (Accountability, Coordination, and Telehealth in the Valley to Achieve Transformation and Equity) project was designed to address the needs of community health centers and their patients for digital health tools to improve monitoring and care of diabetes and hypertension. We applied the principles of codesign[43] to develop a digital health solution and deployed it in a rural community health center. The objective was to assess the outcomes of a pilot prior to considering expansion of the program to a larger group of patients at the clinic.

Methods

Setting and Eligibility

The study was conducted in a federally qualified health center (FQHC) serving two primarily rural and agricultural counties in California. Eligibility criteria included adult patients of the health center with a diagnosis of diabetes mellitus, with the most recent hemoglobin A1c (A1c) $\geq$ 8.0 within the last year, and/or a diagnosis of essential hypertension with the most recent blood pressure $\geq$ 140/80 within the last year. Patients with end-stage or advanced disease as determined by the provider were excluded. Participation was limited to patients speaking English or Spanish because the health care teamlet, composed of a provider, health coach, and digital health navigator, was bilingual in those languages. A list of eligible patients was created and a health coach contacted patients on the list sequentially within a few weeks until reaching the target of 50 participants. An enrollment survey administered orally by health coaches or community health workers, collected data on demographics, technology access, digital literacy, health literacy, and diabetes and hypertension self-efficacy. The survey was used to tailor the technology package offered to the participant and guide the starting conversations with the health coach. Participants were enrolled on a rolling basis until reaching the target of 50 individuals. The same eligibility criteria were applied to the technical feasibility and pilot phases (described below).

Codesign

We applied a codesign approach to development of the technology solution and intervention.[43] Codesign, coproduction, and related participatory methods are rooted in the principle that solutions are more relevant to the problem of interest and better able to produce the intended outcome if the users and others affected are engaged in the definition, design, and implementation. In consumer health informatics, it is essential that patient and community member perspectives and voices are prominent throughout the codesign process. This may be especially important with underrepresented and medically underserved populations.[44] Evidence suggests that codesign in consumer health informatics, which encompasses a variety of frameworks, philosophies, methods, and approaches is a nascent, fragmented, and rapidly evolving area of research.[45,46]

The ACTIVATE team worked closely with community codesigners (an advisory group) who included over 20 staff and providers of the health center as well as six adult patient and community members. The staff represented operations, information technology, nursing, outreach, and quality improvement/analytics. Three of the patient and community codesigners self-reported that they had diabetes or hypertension. Four were most comfortable conversing in Spanish, one spoke only English, and one was bilingual. Two bilingual staff from the outreach department of the health center attended all patient and community codesign sessions and served as interpreters. Over 6 months, the ACTIVATE team met with clinic codesigners in several workstream meetings every 2 weeks: digital health pathway (clinic workflow, care coordination), technology (information technology, technology education, and training), and community engagement (digital health barriers, health education, patient outreach). The ACTIVATE team met with community and patient codesigners six times as a group plus individual meetings to inform delivery of educational material, RPM equipment setup, patient technology assessment tools, and testing of technology.

Intervention Description

The intervention consisted of connected blood glucose and blood pressure monitors, a data-enabled tablet, virtual health coaching sessions twice per month, and virtual or in-person provider visits as needed. The architecture of ACTIVATE platform is shown in ►Fig. 1. Participants used a custom app available on Android and iOS (►Fig. 2) to facilitate pairing of the commercially available RPM devices to the smartphone/tablet via Bluetooth and transmit data to the ACTIVATE system. Patients were provided with OneTouch Verio Flex glucometers and/or Omron 7 or 10 Series blood pressure monitors, a Samsung Galaxy Tab S6 LITE tablet loaded with the pairing app, and a data plan if needed. A clinic digital navigator assisted patients with technology setup and use either in the clinic or by phone. Patients with diabetes were instructed to perform structured blood glucose testing before and after each meal for 3 days during the first 7 days, a total of 18 measures. Those with hypertension were instructed to take blood pressure twice a day for 7 days, a total of 14 measures. Use of the RPM beyond this was up to the patient. A health coach employed by the health center reviewed the RPM data via a secure web portal. In addition, weekly summaries of each participant's data were produced as pdfs were uploaded to the electronic health record (EHR; ►Fig. 3) The health care teamlet met in a huddle every week to discuss RPM data, treatment goals and current status, and adjustments to care plans. The health coach reached out to enrolled patients every 2 weeks to engage in a patient-driven conversation about individual goals, self-management action plans, and any challenges faced.

Technical Feasibility Phase

A small group of 12 adult patients were enrolled sequentially by health center staff as the initial participants to confirm technical feasibility of the system prior to expanding enrollment in the pilot phase. Technical feasibility was determined based on two criteria: the number of RPM measures transmitted as captured by the platform and access to and usability of measures by the care team including physician and health coach. The threshold to pass the feasibility assessment was (1) at least 50% of participants fulfilled these measures within 3 weeks and (2) confirmation of RPM data availability in the ACTIVATE portal by the physician and health coach. Technology and process improvements would be made iteratively until this threshold was reached; at which time the pilot phase would proceed.

Pilot Phase

After successful completion of the feasibility phase, additional patients of the health center who met eligibility criteria were

Fig. 1 ACTIVATE digital health platform. The figure depicts the digital health solution for rural patients with diabetes and hypertension. The RPM devices connect via Bluetooth to a mobile gateway app on a tablet (or bring your own device) connected via the Internet to the server. RPM data flow to the dashboard and a weekly data summary is deposited as a document in the EHR. Virtual visits are scheduled in the EHR and conducted by the patient on the tablet. EHR, electronic health record; RPM, remote patient monitoring.

enrolled on a rolling basis over the period April to December 2021. Participants were followed for at least 6 months from each person's enrollment date. The pilot intervention was the same as that conducted during the feasibility phase. Adjustments to the RPM schedule and self-management strategies were made based on person-centered health coaching conversations and in consultation with the provider.

The primary outcome measures are A1c for diabetes and blood pressure for hypertension. Measures were calculated at 3 and 6 months after enrollment (determined by the first day of vitals measurements transmitted to the platform) and compared to preenrollment baselines. A1c approximates the average random blood glucose measures over a 2- to 3-month period. Using a standard conversion metric, we calculated a 3-month A1c averaging all measures transmitted during months 1 to 3 and a 6-month A1c averaging measures during months 4 to 6.[47] The difference was calculated from the preenrollment A1c recorded in the EHR. All participants with at least one measure during the respective period were included.

To account for expected variability of blood pressure readings across days and time of day, studies take different approaches including averaging multiple readings.[48–50] We took a conservative approach and calculated the average blood pressure in months 3 and 6 (including all measures during the respective month) and calculated the change from preenrollment measures from the EHR. Participants were included if they had at least one measure during the respective month. Use of the ACTIVATE system was determined by the number of RPM measures transmitted as captured by the platform. This project was a quality improvement project conducted at the health center to demonstrate how RPM might improve chronic illness care and be expanded throughout the clinic. It was not deemed human subjects research. The ACTIVATE team had no contact with patients. A data use agreement was signed by the health center and the ACTIVATE team that allowed for use of a Health Insurance Portability and Accountability Act limited data set for analysis purposes.

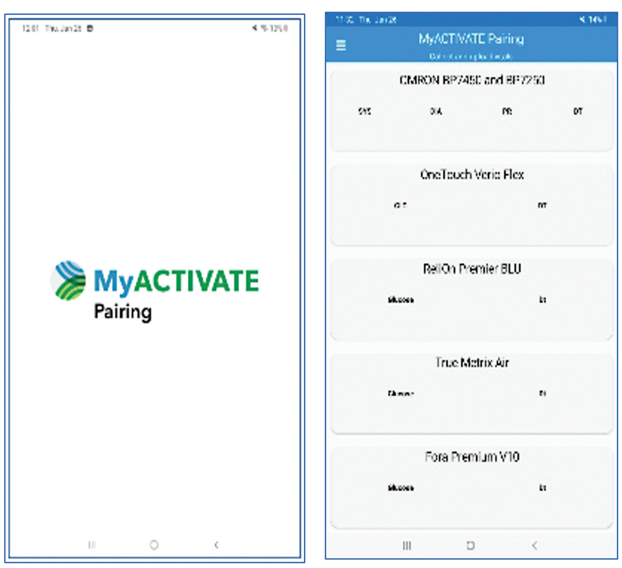
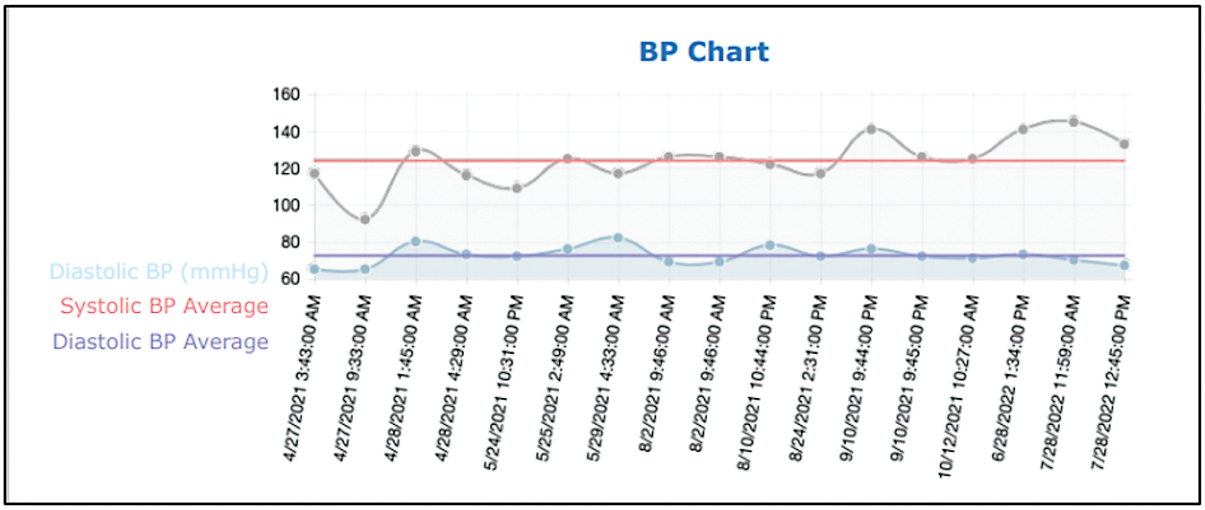


Fig. 2 MyACTIVATE pairing app.

Results

Codesign

The clinic codesigners reengineered clinic workflows and assigned a health care teamlet to conduct program activities. The patient and community codesigners provided important input to the intervention components. For example, a



Updated Date	Blood Pressure
4/27/2021 3:43:00 AM	117 / 65 mmHg
4/27/2021 9:33:00 AM	92 / 65 mmHg
4/28/2021 1:45:00 AM	129 / 80 mmHg
4/28/2021 4:29:00 AM	116 / 73 mmHg
5/24/2021 10:31:00 PM	109 / 72 mmHg
5/25/2021 2:49:00 AM	125 / 76 mmHg
5/29/2021 4:33:00 AM	117 / 82 mmHg
8/2/2021 9:46:00 AM	126 / 69 mmHg
8/2/2021 9:46:00 AM	126 / 69 mmHg
8/10/2021 10:44:00 PM	122 / 78 mmHg
8/24/2021 2:31:00 PM	117 / 72 mmHg

Fig. 3 Example summary report of individual patient measures. BP, blood pressure.

Spanish-speaking codesigner testing a blood pressure monitor found that the instructions were only in English. A family member helped search the Internet for Spanish instructions. Codesigners also helped refine a technology readiness assessment tool sharing their concerns and practical considerations that might affect patient readiness. Only two people had used video conferencing in the past and their primary device for connecting was a smartphone that posed challenges in viewing or sharing documents. They were also unfamiliar with the term "click a link." They discussed how these issues might be challenging to patients who are asked to join a virtual visit with a doctor, complete an online form, or access a health education website. They recommended multilingual tutorials and individual navigation assistance. Consequently, the intervention incorporated bilingual "digital navigators"—trained outreach staff assisting patients with the technology's setup and use.

Technical Feasibility Phase

Twelve patients were first recruited and participated in monitoring to conduct assessment of feasibility. The ages range from 38 to 64. A total of 11 are female and 9 are monolingual Spanish speakers with the remaining 3 being English speakers. Three participants have diabetes, three have hypertension, and six have both. Three of nine the patients with diabetes transmitted 18 measures in their first week and three of nine patients with hypertension transmitted 14 measures in their first week. By the third week, four of nine of the diabetes patients had submitted 18 entries and five of nine of the hypertension patients had 14 entries. Thus, the feasibility assessment cleared the threshold of 50% of enrolled participants by week 3. No unanticipated challenges or barriers to use of technology were identified during feasibility assessment, thus clearing the way for continued recruitment for the pilot.

Pilot Outcomes

A total of 50 patients (including the 12 from the feasibility phase) were recruited from a total of 53 individuals approached. The mean age was 55 years and range was 31 to 83 (►Table 1). Most participants were White and Hispanic or Latino (84%) and 69% spoke Spanish as their primary language. Three participants had a diagnosis of diabetes only, 15 had hypertension only, and 22 had both conditions. More than half the participants had access to the Internet at home, but almost all had problems connecting sometimes or often.

Table 1 Participant characteristics at enrollment

Characteristic		Number	Percentage
Sex (*n* = 50)			
	Female	30	60
	Male	20	40
Age (*n* = 50)			
	Average	55	
	Range	31–83	
Race and ethnicity (*n* = 50)			
	White, Hispanic, or Latino	42	84
	White, not Hispanic, or Latino	6	12
	White and Other Pacific Islander	1	2
	Black or African American	1	2
Primary language (*n* = 50)			
	Spanish	34	68
	English	15	30
	Portuguese	1	2
Condition (*n* = 50)			
	Diabetes	35	70
	Hypertension	37	74
Technology available			
Access to the Internet where you live (*n* = 48)			
	Yes	26	54
	No	21	44
	I don't know	1	2
How often you have problems with your Internet where you live (*n* = 20)			
	Sometimes	17	85
	Often	2	10
	Never	1	5
Have a cell phone (*n* = 48)			
	Yes	43	90
	No	5	10
	I don't know	0	0
Have access the Internet (Web) from your cell phone (*n* = 41)			
	Yes	25	61
	No	15	37
	I don't know	1	2
Have a tablet or iPad (*n* = 48)			
	Yes	6	13
	No	42	88
	I don't know	0	0

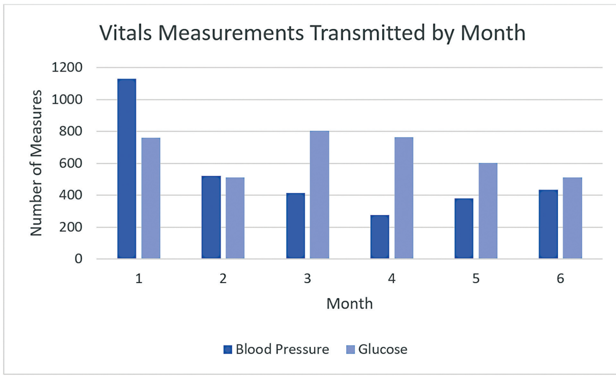


Fig. 4 Number of blood pressure and glucose measures transmitted by month of participation.

Almost all participants had a cell phone and about 60% had access to Internet on their phone.

Of 50 enrollees, 46 attended the first visit, receiving an RPM device, tablet/data plan (if needed), technology assistance from a community health worker/digital navigator, and health education from a licensed vocational nurse/health coach. Four participants did not attend their device appointment. A total of 45 tablets were distributed and 25 participants received data plans. Among 35 eligible individuals with diabetes, 29 participated in glucose monitoring. Among 37 eligible individuals with hypertension, 34 participated in blood pressure monitoring. During the rolling 6-month pilot period, 10,031 unique vitals measures were transmitted: 5,819 blood glucose (per participant $m = 200.66$, range: 1–771) and 4,212 blood pressure (per participant $m = 123.88$, range: 1–607; ►Fig. 4). Overall, the number of participants transmitting measures decreased per month: for blood pressure, from 34 participants in month 1 to 17 in month 6, whereas for glucose it decreased from 29 to 13 participants.

Changes in A1c and blood pressure at 3 and 6 months for those participants with measures during the respective periods are shown in ►Table 2. The participants in glucose monitoring achieved a mean reduction in A1c of 3.28 points at 3 months and 4.19 points at 6 months. At 3 months, 21 of 29 participants had an A1c at or below the 8.0% target for control. At 6 months, all 19 participants who were still participating reached and/or maintained at target.

Systolic blood pressure was reduced by a mean of 14.81 mm Hg at 3 months and 13.55 mm Hg at 6 months, whereas smaller reductions were seen in diastolic blood pressure. At 3 months, 12 of 20 participants had reached target systolic blood pressure of less than 130, and 5 had diastolic under 80. At 6 months, 10 of 15 participants remaining had reached the systolic target, and 8 had reached the diastolic target.

For hypertension monitoring participants who uploaded more than one blood pressure measure ($n = 32$), we compared the difference in blood pressure from first measure transmitted by each participant to their last measure whenever that final measure was taken. The average time between first and last measures was 141.76 days (standard deviation [SD]: 100.86, range: 1.32–322.22). The overall difference was a reduction in systolic of 10.65 (SD: 22.89) and reduction in diastolic of 7.62 (SD: 16.25).

Discussion

The ACTIVATE pilot resulted in meaningful improvements in A1c and blood pressure at 3 and 6 months. The program tackled digital health barriers, such as tablet access, Internet connectivity, digital literacy, and facilitated both in-person and virtual health coaching sessions and provider visits with a language-congruent health care teamlet. The recruitment rate into the program was very high with almost all patients approached agreeing to participate. The large number of measures transmitted and relatively long period of technology use (6 mo) suggests that the program successfully addressed barriers and patients found the technology and data usable and useful.

The results of ACTIVATE build on the recent literature on RPM in hypertension and diabetes. For example, a three-arm randomized clinical trial to study the effectiveness of RPM

Table 2 Change in hemoglobin A1c and blood pressure at 3 and 6 months

Diabetes	Hemoglobin A1c% mean (SD)	Hypertension	Blood pressure systolic, mm Hg mean (SD)	Blood pressure diastolic, mm Hg mean (SD)
Enrollment ($n = 29$)	10.53 (2.32)	Enrollment ($n = 20$)	147.75 (24.51)	83.65 (9.54)
3 mo ($n = 29$)[a]	7.25 (1.27)	3 mo ($n = 20$)[c]	132.94 (18.04)	82.44 (8.78)
3-mo change ($n = 29$)[e]	3.28 (2.86)	3-mo change ($n = 20$)[e]	14.81 (21.40)	1.21 (10.91)
6 mo ($n = 19$)[b]	6.49 (0.72)	6 mo ($n = 15$)[d]	130.58 (15.96)	79.46 (7.54)
6-mo change ($n = 19$)[e]	4.19 (2.76)	6-mo change ($n = 15$)[e]	13.55 (23.31)	3.07 (11.21)

Abbreviation: SD, standard deviation.
[a]Glucose readings over months 1 to 3 were averaged and converted to A1c using the ADA eAG to A1c conversion calculator.[8]
[b]Glucose readings over months 4 to 6 were averaged and converted to A1c using the ADA eAG to A1c conversion calculator.[8]
[c]Blood pressure measures were averaged over month 3.
[d]Blood pressure measures were averaged over month 6.
[e]Indicates reduction in measure.

with or without in-person visits compared with standard care without RPM ($n = 374$) found no significant differences in blood pressure at 6 months.[48] However, the authors found RPM was beneficial for patients 55 years and older compared with standard office visits alone with systolic blood pressure changes for the RPM group similar to the improvements in the ACTIVATE study.

A meta-analysis of 18 clinical trials of glycemic control in type 2 diabetes using RPM plus interactive phone calls, automated calls, or text messages reported a mean change in A1c of −0.54% (95% confidence interval: −0.75 to −0.34) compared with the control group mean increase of 0.54%.[15] Improvement in the ACTIVATE participants with diabetes who completed 6 months was substantially better (greater than 4%) than the best studies in the systematic review (two studies with interactive phone calls showed 1.5–1.56% drop in A1c).

Our findings including outcomes of RPM in a rural, primary Hispanic/Latinx community are unique to the field. The combination of RPM and trained medical assistant health coaches may be an innovative intervention strategy that warrants further investigation.

Several limitations should be taken into account to put the results reported here in context. The drop in number of participants who continued to use RPM at 6 months is concerning. It is unclear whether these patients were disengaged in care at the health center or if the use of RPM might vary over time. The impact of these variations on longer-term outcomes should be investigated. Longer-term follow-up may shed light on patterns of periodic usage and how these patterns relate to ongoing chronic condition self-management. The small sample size limited subgroup analyses by technology experience or participant demographics. The pre–post study design is not suited to controlling for bias, explaining relationships between predictors and outcomes, or determining cause and effect. In addition, this pilot was conducted during a relatively long period during the COVID-19 pandemic and public health emergency during which there may have numerous unexplained impacts on the patient population that were not controlled during this study.

Future studies designed as pragmatic clinical trials might enhance knowledge by incorporating assessment of potential moderators including health literacy and self-efficacy as well as differences among sites. Furthermore, a thorough study of feasibility factors and participant experiences could help researchers and developers evaluate the potential for expansion and adaptation to other clinics. Given, the diversity of the FQHC and other health center patient population, future programs must consider how the program would need to be tailored for languages other than Spanish and English and other cultural aspects of health.

Conclusion

ACTIVATE demonstrated the promise of digital health in a rural and medically underserved community. In this community, already facing digital health inequalities were presented with additional hurdles under COVID-19 pandemic conditions. ACTIVATE targeted these very inequities with direct patient engagement, hardware and Internet access solutions, and increased health literacy to improve outcomes through a digital health solution. Experience in the pilot indicates that delivering on ACTIVATE's key goals of digital health equity and improvement in diabetes and hypertension outcomes is possible and worthy of expansion to other clinic patients and further research.

Clinical Relevance Statement

The ACTIVATE study showcases the potential for RPM to enhance diabetes and hypertension management in rural communities. We describe the codesign approach and successful digital health program implementation for underserved and rural communities that may serve as an example of how to address the barriers to adoption of digital health. The results of ACTIVATE may offer guidance to health informatics researchers and developers seeking to improve chronic care and self-management through RPM.

Multiple-Choice Questions

1. Studies have shown that RPM projects that use interactive phone calls as an intervention for patients with type 2 diabetes:
   a. Did not cause a statistically significant change of A1c values over time compared with control groups
   b. Caused a statistically significant increase in A1c values over time compared with control groups
   c. Caused a statistically significant decline in A1c values compared with control groups
   d. None of the above. RPM studies have not used interactive phone calls in the past, only text messaging or automated calls. ACTIVATE was the first program of its kind to do so

   Correct Answer: The correct answer is option c. In the meta-analysis of 18 clinical trials of glycemic control for type 2 diabetics, studies that used phone interventions in addition to their RPM demonstrated an A1c drop of 1.5 to 1.56% compared with the control group. ACTIVATE utilizes health coaches to reach out to patients enrolled in the program. The focus on education and their individual challenges is a factor we believe contributed to improved health outcomes for ACTIVATE participants.

2. When considering the digital divide, and Internet access at home, ACTIVATE participants reported:
   a. No issues, with 98% reporting they have access where to Internet where they live
   b. Reliable Internet, with 85% reporting they have access to Internet where they live
   c. Challenges with access, with 54% reporting they have access to Internet where they live
   d. Significant issues, with only 5% reporting they have access to Internet where they live

Correct Answer: The correct answer is option c. When polled, only 26 out of 48 patients (54%) had access to Internet where they live. According to the Broadband for All initiative in California, 1 in 5 Californian's do not have access to high-speed Internet. According to the Pew Research center in a study conducted in January to February 2019, only 63% of rural homes have a broadband connection, which is not far off from the 54% reported in the ACTIVATE study. The Digital Divide remains a challenge and contributes to a multitude of issues like access to health care, education, and information.

Protection of Human and Animal Subjects

ACTIVATE was a quality improvement project conducted at the health center to demonstrate how RPM might improve chronic illness care and be expanded throughout the clinic. It was not deemed human subjects research. The ACTIVATE team had no contact with patients.

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Conflict of Interest

None declared.

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