mHealth Abstracts

Center for
Technology and Aging

mHealth
Diffusion Grants Program

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Introduction

Mobile health (mHealth) is emerging as a significant tool for connecting seniors with health care providers and the health care system, using technology to reach older adults wherever they are and allowing them to remain at home. This initiative seeks to identify best practices and business models for the deployment of mHealth technology-enabled services that support older adults. Grantees are building a strong evidence-base for diffusion for mHealth interventions that improve chronic disease management, post-acute care, and/or the safety of older adults.

In addition, this initiative is being conducted in collaboration with the Beacon Community Program. Under the auspices of the Office of the National Coordinator (ONC) for Health Information Technology, the Beacon Communities are in the forefront of connecting entire communities through technology, including the use of mHealth.

Five 1-year grants, totaling $477,150, were approved for funding commencing August 1, 2011. The mHealth Diffusion Grants Program awardees include:

- CalOptima
- Family Services Agency – San Francisco
- Front Porch Center for Technology Innovation and Wellbeing
- HealthInsight – Utah Beacon Community
- Sharp HealthCare Foundation

This report contains a description of each project, their goals, and the specific technologies being deployed.

Lead Organization	**CalOptima**
Project Title	The Heart Health Pilot Program
Project Summary	To prevent or delay transitions of Medicare members with heart disease to higher levels of care settings by using mHealth, RPM, MedOp and data and information exchange support
Technology	RPM and MedOp devices, cell phones
Targeted Locations	Orange County, CA
12-Month Goals	• Establish qualifications for OneCare member participation in home monitoring program; • Qualify, engage, and implement qualified OneCare members in a home monitoring program pilot with a minimum goal of 30 in the first three months and up to 100 by 12 months; • Through pilot program evaluation, establish and document best practices for continuation and growth of the program as an option to 100% of qualified OneCare members; • Continuously improve participating members' self-monitoring skills and self-care knowledge through direct training; • Enhance information flow by providing Case Managers, patients and providers with access to real time/near-real time telemetry data, including provision of cell phones; • Develop and implement interventions tied to near real-time receipt of telemetry data; and • Identify baseline and show decrease in utilization of hospitals, emergency rooms, and/or Case Manager home visits over twelve months.
Older Adult Population	1st year: 50-100 members of OneCare members (Medicare special needs plan) 5th year: Over 85% of OneCare members with Chronic Heart Failure (8,500)
Setting/Provider Type	Home care
Evaluation and Measurable Outcomes	Measures: patient satisfaction, patient health outcomes, and medical cost savings through reductions in utilization of high cost services. CalOptima will distribute a baseline survey and surveys for re-measurement at six (6) months, one (1) year, and at the end of the program to determine its effectiveness. CalOptima will also analyze pre- and post-emergency room visits and hospital admissions data to determine if the pilot project reduced the member's utilization.
Replication, Dissemination plan	CalOptima will develop a roadmap of project implementation for other organizations to follow in order to replicate and improve on the program. Several entities are looking to this project to determine their future investment and participation in such a program for their members, including both the Health Care Agency and several Community Health Centers. Working together with the CalOptima Regional Extension Center (REC) effort, CalOptima's vision is to incorporate or "link" the generated telemetric data and analysis to appropriate Electronic Health Records through the REC network.
Sustainability plan	Given positive results, there will be a reallocation of existing expenditures from high cost hospital, institutional and emergency room care to more appropriate, patient friendly, home and Patient

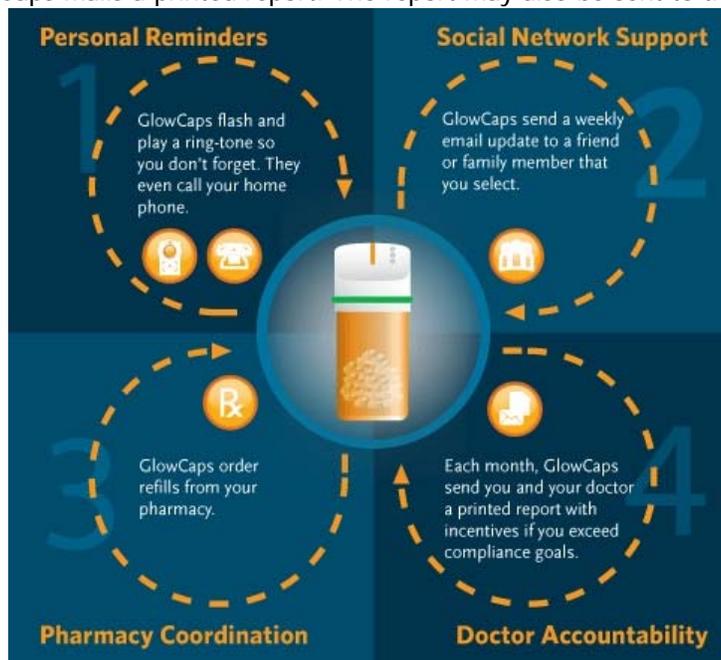|	
	Centered Medical Home based levels of care. CalOptima is making significant investments in the development of the Patient Centered Medical Home and see the Heart Health Pilot Program and future expansion to that program as a direct value add to this model.
Funding Request	$100,000
Matching Funds	$372,742

CalOptima Technology Intervention

The Heart Health Pilot Program will utilize low-cost home monitoring devices to monitor patients with heart disease. Based on the needs of the member, these devices may include IDEAL Life's wireless weight scales, blood pressure and pulse oximeter monitoring devices, and Vitality's GlowCaps telemetric pill containers which are placed in the patient's home, connected wirelessly to a local hub, securely transferred via Internet, land-line or mobile phone networks and displayed on clinical monitoring tools at a call center staffed with health care professionals that can intervene appropriately based on individual results. CalOptima's Chronic Care Improvement Program case management staff will receive real-time analytical information to engage patients and their physicians in a more proactive process to manage their care. Patients and case management staff will communicate via mobile phone.

Technology Example: GlowCaps
GlowCaps is a medication adherence technology that is used on top of prescription bottles available at Walgreens and other retail pharmacies. Inside the GlowCap is a wireless chip that enables four services. Collectively, the services help people stick with their prescription regimen.
1. Reminders Ramp from Subtle to Insistent: GlowCaps use light and sound to signal when it is time to take a pill. GlowCaps sense when the bottle is opened and wirelessly relay their status to Vitality's secure network. If the bottle is not opened two hours after a scheduled dose, the user is automatically reminded with a telephone call that states: "It's time to take the pill in your green GlowCap." 2. Social Support: Each week, a report summarizing progress is e-mailed to the GlowCap user. If the user chooses, a family member, friend or care-giver may also receive the report. 3. Refill Coordination: GlowCaps can even call with refill reminders and connect the patient to their pharmacy as pills deplete. 4. Doctor Accountability: Each month GlowCaps mails a printed report. The report may also be sent to the patient's doctor.

Lead Organization	**Family Service Agency of San Francisco (FSA)**
Project Title	CIRCE-KIOSK Diffusion Initiative
Project Summary	Use of cloud technology to improve assessment, service coordination and outcome evaluation for older adults with multiple service needs
Technology	CIRCE (cloud based electronic health record) with consumer kiosk (mobile, tablet-based, touchscreen assessment and care planning tool)
Targeted Locations	San Francisco, CA
Collaborators	UCSF, San Francisco Department of Aging and Adult Services, East Bay Community Recovery Project, National Council on Aging, Salesforce.com
12-Month Goals	• Goal 1: By July 30, 2012 FSA will have used CIRCE-ADEPT Kiosk to manage behavioral health care of 250 clients engaged in multiple settings and systems in the San Francisco and Alameda County Departments of Aging and Adult Services, Departments of Community Behavioral Health Services. • Goal 2: By July 30, 2012 FSA will use its newly adapted Economic Security Kiosk (ES-Kiosk) platform to assess the economic security and eligibility for health, tax, and financial benefits for 200 older adults served by the NCOA's Senior Community Service Employment Program (ESI). • Goal 3: By July 30, 2012 the CIRCE platform will be used to produce evaluation results that demonstrate the degree to which shared assessment data in primary care, behavioral care, employment and aging services systems can be used to help older adults remain in independent settings, maintain their quality of life, and reduce use of expensive high-end health, housing, and behavioral care services. • Goal 4: By July 30, 2012 FSA will develop relationships to expand the use of the CIRCE-ADEPT Kiosk to primary care and behavioral care providers in the Central Valley, Mexico, China, and to expand the use of the ES-Kiosk to older adult employment systems in ten NCOA partnerships operating throughout the United States.
Older Adult Population	1st year: 400 60+ year old older adults that are either frail and isolated, low-income seniors, or have behavioral health or substance abuse issues
Setting/Provider Type	Home care
Measurable Outcomes	Measures: patient and provider satisfaction with intervention, quality of life, quality of care, clinical indicators, the amount of time spent charting, quality of charting.
Replication, Dissemination plan	The core kiosk technology lends itself to facilitating rigorous replicable assessment regimens across a wide variety of domains as the low cost and multiplatform aspects make it extremely attractive to end user organizations. The intervention will be an application on Salesforce.com's App Exchange. Applications can be downloaded and installed by anyone with a Salesforce license. Users downloading it will be able to customize it themselves; hire a third party to customize it; or can contract with FSA for customization, training, and product support. Organizations wishing to download

	the application will pay an initial fee for installation and training, and then a modest monthly fee for hosting, technical support, and upgrades.
Sustainability plan	FSA will not rely upon grant funding to sustain its development of CIRCE and other uses of technology. To continue to use the system after the end of the first project year, participating agencies must pay a Salesforce seat license fee. The first 10 licenses are free to non-profits (for most ESI sites, the ten free licenses will probably be all that they need). Additional licenses cost $260 per year, a fee that includes Salesforce providing data hosting. Each of the participating agencies is aware of that cost and committed to paying it. FSA intends to fund development, training, and customization by charging users a monthly fee for the kiosk, as a hosted application, and by providing customization, training, and support to CIRCE downloaders on a contract basis. In addition, FSA continues to enhance its technology as part of the core enterprise of the Felton Institute, which is funded through ongoing contracts, research grants, and as part of the administrative overhead of FSA as an organization.
Funding Request	$100,00
Matching Funds	$74,379

Family Services Agency of San Francisco Technology Intervention
Developed by FSA, CIRCE – a HIPAA compliant, cloud-based electronic health record – has already been tested and validated by FSA clients and service providers. CIRCE was initially designed as a client charting and reporting system that allowed FSA managers to monitor productivity, contract compliance, and Medicaid/MediCal billing. Implementation resulted in immediate increases in productivity, reduced time spent preparing case notes, and increased time spent with clients. The total amount of time staff spend on paperwork decreased by half, resulting in 25% more face-to-face time with clients. The invoicing error rate decreased from 7.8% to 0.3%. Productivity per staff person increased by 17%.

In partnership with Salesforce.com and UCSF, FSA expanded CIRCE's utility significantly with the development of the Assessment Diagnosis Evaluation Planning Tool (ADEPT), a rigorous science-based assessment and care management tool that clinicians use to assess clients, create plans of care, monitor progress and foster positive client outcomes. The ADEPT consists of three parts: 1) a rigorous diagnostic expert system that assesses older clients for 13 major mental health and substance abuse conditions; 2) a quality of life tool that tracks quality of life across four principal life domains; and 3) an activities of daily living assessment tool. To increase mobility, FSA adapted CIRCE to an iPad "Kiosk" platform that can access cell phone connectivity, freeing it of reliance upon broadband.
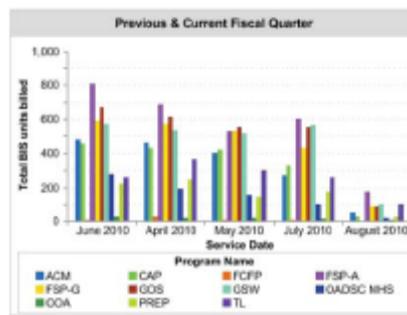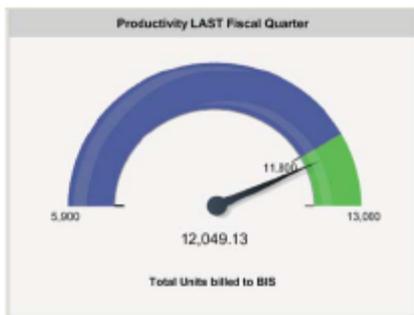
CIRCE-ADEPT allows clinicians to quickly screen and assess clients and use results to inform treatment planning. The results of the ADEPT assessment also provide a benchmark for client symptoms, quality of life and functionality against which progress can be matched with monthly reassessments. Visually intuitive graphics enable the client to quickly grasp areas in which they are making progress and to work with providers to adjust their treatment plan to address areas where they are not making progress. In partnership with UCSF and SRI, FSA is using artificial intelligence to interpret case notes and assessment and reassessment trends to make treatment recommendations. With artificial intelligence able to consider thousands of past case notes and every change in assessment results instantly, it would be able to identify trends or trajectories that the clinician could never have caught and make treatment recommendations based upon consideration of far more information than a clinician could grasp at once. This research effort suggests the horizon for CIRCE, an expanding capacity to aid care planning.

Consumers are asked to complete the ADEPT using the computer kiosk prior to each of their visits with an FSA provider. The consumer kiosk has been programmed such that at the end of each assessment two separate reports are created; one for the consumer and one for the provider. The consumer report consists of an easy to read outline which informs consumers of their progress since their first clinic visit. The consumer then has the opportunity to share the report with the FSA provider to aid in the discussion of their progress. The reports generated for the provider give detailed diagnostic information and measures of symptom severity and levels of functional impairment. This information when collected on reassessment is used in clinical case conferences and in therapy sessions with the consumer, to assess the success and focus of the treatment plan. All information gathered through the consumer kiosk is automatically transferred into FSA's electronic client record, thereby eliminating the need for data entry.
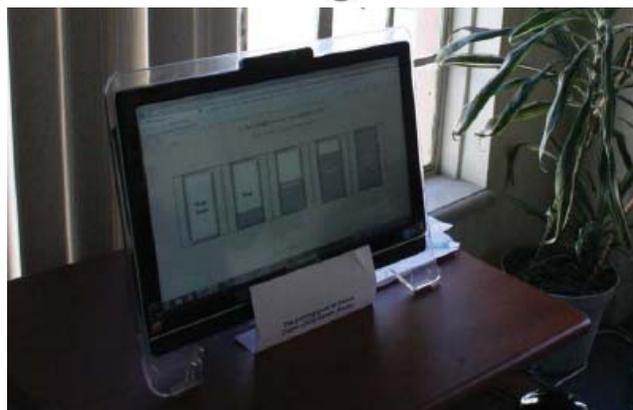
To expand CIRCE's functionality, the Economic Security Kiosk (ES-Kiosk) enables individuals to work with older adults and screen for their eligibility for income benefits, tax benefits and health plan eligibility.

CIRCE productivity monitoring

CIRCE provides graphical, real time monitoring capabilities for billing and staff productivity that improve the efficiency and quality of clinical services at Family Service Agency of San Francisco.

Lead Organization	**Front Porch Center for Technology Innovation and Wellbeing**
Project Title	"Minding our Meds": Demonstrating Senior Medication Adherence with Cell Phone Texting Reminders
Project Summary	Addressing medication adherence among active, independent older adults in need of a mobile solution using a medication mHealth solution
Technology	CareSpeak.com
Targeted Locations	Greater Los Angeles, San Diego, and other locations
Collaborators	• Front Porch • Community-based organizations • CareSpeak • One Economy Corporation • Sprint Nextel • UCSF (evaluation design)

12-Month Goals	• Goal 1: demonstrate that mobile alerts and monitoring lead to improved medication adherence in chronic disease management.
	   ▪ Strategy: use currently available cell phone SMS texting, and pre- and post-intervention survey data to track medication adherence, user satisfaction with the technology, and overall health and wellbeing.
	• Goal 2: create a replicable and sustainable technology solution for medication adherence.
	   ▪ Strategy: develop a replicable model that combines education, training, and web-based resources, with lessons and techniques that can improve medication adherence.

Older Adult Population	1st year: 150 patients (60 phase 1, 90 phase 2) at least 50 yrs old living in FP community or community partner, targeting 9 retirement communities and senior service centers 5th year: Make available to over 3000 seniors in FP family of communities, similar senior communities, and other community-based senior service centers
Setting/Provider Type	Retirement communities and senior service centers
Measurable Outcomes	Study involves two 5 month cohorts Measures: quality of life, satisfaction with intervention, patient behaviors, medical service use, demographic data
Replication, Dissemination plan	FPCTIW will disseminate the project findings to 11 Front Porch communities in CA, LA and FL and similar communities. FPCTIW will work with CareSpeak in Year 2 to share its findings and enhance future versions of the texting service. FPCTIW will also support policy action via CAST, LeadingAge, AgeTech.
Sustainability plan	FPCTIW will pursue multiple strategies to achieve the sustainability of the project that will include working with colleagues and partners to advocate for alternative business models and reimbursement at the state and federal levels, educating the public on the value proposition of these technologies to increase the critical mass of the market base and thereby potentially lowering the costs. FPCTIW will collaborate with project partners to identify ways to incorporate these costs into the Front Porch business and services model both as a strategic revenue source and in some cases as a

	strategic investment leading to market differentiation.
Funding Request	$77,150
Matching Funds	$90,231

Front Porch Center for Technology Innovation and Wellbeing Technology Intervention

"Minding our Meds" will deploy CareSpeak, a two-way SMS-based medication reminder service that is available on virtually any cell phone or smartphone device with a texting plan. It additionally offers participants the opportunity to alert caregivers via text if s/he failed to respond to a medication reminder, enabling and supporting the patient's personal system of care.

The project will use One Economy Digital Connectors as part of their community service projects to provide some of the training in showing seniors how to set up and access CareSpeak accounts through its web-based dashboard. In addition, "Minding our Meds" will recruit members from the Front Porch volunteer program to support similar training activities and workshops at targeted Front Porch retirement communities.

The evidence-based solution that this project proposes has been the subject of a study with Mt Sinai Medical Center, as published in the Journal Pediatrics, New York Times, AHRQ and ongoing development with some of the largest healthcare institutions including: New York Presbyterian, Phoenix Children's Hospital, University of Alabama at Birmingham, Columbia University Oncology Department, Easter Seals New Jersey and others. CareSpeak has proven its platform to positively affect patient compliance and persistence. CareSpeak has been commercially deployed to several healthcare companies including United Health Group.

CareSpeak's Mobile Medication Manager sends text messages to a mobile phone to help a user take his/her medications on time and in the right amount. The messaging service enables a user to:

- Receive timely reminders to ensure medication is taken as prescribed.
- Log medication intakes by response text and view adherence calendar online.
- Get timely refill reminder alerts to ensure uninterrupted therapy.
- Involve caregiver(s) by having them receive escalation alerts so they can call a user in case s/he misses an alert.

Current subscribers use the Mobile Medication Manager for managing anything from daily supplements and birth control, to Diabetes, Hypertension, Organ Transplant, Cancer, Multiple Sclerosis and more.

Lead Organization	HealthInsight – Utah Beacon Community
Project Title	IC3 Diabetes Mobile Health Pilot
Project Summary	Use of mobile health tools to improve diabetes education and self care management in older adults
Technology	Voxiva's Care4Life (SMS, email, Web)
Targeted Locations	Salt Lake, Tooele, Summit, Utah
Collaborators	• Beacon Community (Intermountain Healthcare, University of Utah, Utah Department of Health) • American Diabetes Association of Utah, AARP-Utah, Tooele County Diabetes
12-Month Goals	• Improve knowledge of self-care and disease management practices among adult patients with diabetes treated in Beacon clinics in the Salt Lake Metropolitan Statistical Area. • Test the ability of an SMS-based diabetes education and coaching tool to impact measures of diabetes control, and blood pressure control, at the clinic level. • Share results and proof of concept with the broader healthcare community in Utah and nationwide.
Older Adult Population	1st year: 1,000-1,200 adults aged 50+ 5th year: 15,000 within Beacon Community Clinics, up to 120,000 in Utah
Setting/Provider Type	50 primary care clinics within the Utah Beacon Community
Measurable Outcomes	Measurable outcomes include: patient, caregiver, staff satisfaction with intervention, clinical indicators (HbA1c Level in Control (<8%) NQF #575, Blood Pressure in control (<140/90 mmHg) NQF #61, BMI measurement and counseling NQF #421), patient behaviors, penetration/utilization of Care4Life service by clinic
Replication, Dissemination plan	Project findings will be shared with the Beacon Community network though conference calls, listserv postings, and presentations. HealthInsight is also a Regional Extension Center and is connected to 62 REC organizations nationwide to which it can share the study findings. In addition, HealthInsight is one of 24 federally designated "chartered value exchanges", multistakeholder collaboratives with a mission of quality improvement and transparency. CVE stakeholders are connected through the CVE Learning Network, a very-active knowledge sharing system staffed by AHRQ and the Lewin Group.
Sustainability plan	Utah provider organizations may be front-runners in testing the ACO model and well-positioned to adopt new patient engagement tools such as Care4Life.
Funding Request	$100,000
Matching Funds	$139,191

HealthInsight – Utah Beacon Community Technology Intervention

The technology intervention will utilize Voxiva's Care4Life product—a personalized, interactive mobile health service designed to help patients with diabetes better manage their condition. Care4Life was developed with content from the National Diabetes Education Program, a partnership of the NIH and the CDC. Patients can self-register for this service via mobile phone or web. Once enrolled, users complete a health risk assessment which is used to place them in an appropriate educational protocol. Participating patients then receive customized educational and coaching messages matched to their disease type, current condition, and personal preferences.

Care4Life sends enrollees a daily text reminder (at different times each day) asking the participant to test and record their glucose reading via text message. The service makes periodic requests for weight and blood pressure as well. Lipids and kidney tests can be uploaded via a web portal. User messages are stored, analyzed, and used to activate tailored alert messages or to create new coaching protocols if reported metrics are outside of normal ranges. These user interactions allow Care4Life to give patients real-time feedback on their status and progress. Care4Life can be integrated with a wireless glucometer, and if the patient consents, a care provider can have direct access to the patient portal to jointly monitor the user's blood glucose and other trends.

Lead Organization	**Sharp HealthCare Foundation**
Project Title	COPD Chronic Care Management mHealth Program
Project Summary	COPD chronic care management of under-funded (Medi-Cal, CMS), unfunded (self-pay) and unassigned (Medicare FFS) patients utilizing mHealth technology
Technology	Cardiocom Commander Flex
Targeted Locations	San Diego, CA
Collaborators	• San Diego Beacon Community • Cardiocom
12-Month Goals	• Reduce 30-day readmit rates by 30% during grant period • Reduce direct costs associated with readmissions by 30%
Older Adult Population	1st year: 120-180 patients with COPD, Medi-Cal/County Medical Services, unfunded and Medicare fee-for-service
Setting/Provider Type	Patient homes and Sharp HealthCare clinicians
Measurable Outcomes	Medical service use (e.g., total admissions, readmissions); cost of medical care (hospital costs, medical group costs, system costs); caregiver burden; clinical measures; patient behaviors (e.g. compliance using remote monitoring equipment; medication adherence, primary/specialty physician follow up, drugs); and mortality.
Replication, Dissemination plan	Knowledge management, specifically sharing best practices and lessons learned with other organizations, is a cultural norm at Sharp HealthCare. Dissemination of project findings to the San Diego Beacon Community will also occur.
Sustainability plan	Financial savings (cost avoidance) of the technology are significantly greater than the cost to implement and maintain the program, future funding to support the sustainability of this program will be incorporated into the budgeting process for the operational area supporting the program. This will be treated as an expense (i.e., home care, disease case management, transitions, etc.) to care for chronic care patients in an effort to keep them out of the acute care setting.
Funding Request	$100,000
Matching Funds	$131,482

Sharp Foundation Technology Intervention

This project, which includes use of the Cardiocom Commander Flex, web-enabled data portal and a personal health coach, will enable Sharp to reach at least 120 – 180 patients with COPD. The device will monitor daily oxygen saturation along symptoms. Information is automatically sent over a cellular network to data portal for analysis by the chronic care RN project coordinator. The qualifying patients will be referred from Sharp facilities that have not yet deployed technologically innovative strategies to reduce readmits for COPD patients.

The technology, in conjunction with a Chronic Care RN Project Coordinator, will provide patients in need with a transitional care model that will enable the patient to be successful in their transition from hospital to home. While technology adoption by older adults is increasing, a patient dealing with a chronic condition, especially post-hospital discharge, has a greater likelihood of success in complying with their discharge instruction if they have a person to whom they are accountable. The approach, which includes a dedicated hospital-affiliated clinician, provides a means to address the critical social factors that influence poor compliance and thus readmissions such as depression, medication reconciliation and the impact on activities of daily living on management of this complex disease. Additionally the use of this mHealth product/strategy where there is a portable device that allows two-way communication will contribute to patients being more compliant with their discharge instructions.