Q1: Facility Name: South Shore Hospital
Q2: Program/Project Name: Utilizing a Smartphone App and a Web-Based Clinician Dashboard to Measure Changes in Health Behaviors in the Cardiac Rehab Setting
Q3: Address
   Address: 55 Fogg Road
   City: So. Weymouth
   State: Massachusetts
   Zip Code: 02190
Q4: Contact Person's Name: Karen LaFond
Q5: Phone Number: 781-624-8903
Q6: FAX Number: 781-624-8118 or 781-624-6530
Q7: Email: karen_lafond@sshosp.org

PAGE 3: AACVPR Certified Program (10 points)
Q8: Does your Institution operate an AACVPR Certified Program (Cardiac or Pulmonary)? Yes

PAGE 4: Introduction (10 points)
Q9: (10 points) In 100 words or less please complete the following statement; "We believe our program is unique and innovative because..."

We believe our program is unique and innovative because we offer our patients an opportunity to connect with the CR team in a more intimate and personal way using a smartphone/smartpad app that is directly connected to a clinician dashboard in the CR setting. This app allows our patients to track changes in their health behaviors, set personal goals, and communicate their progress back to the CR team members in real time. Clinicians can utilize the dashboard to evaluate patient compliance with treatment plan as well as use the 2-way text messaging feature in the app to support patients along the way. This is a free offering to our patients and they can remain connected to the CR team for 6-12 months during their critical transitional maintenance phase. Patient outcomes can easily be measured directly from the secure data that is inputted by patients using the app. Patients also have access to their own "report card" on the app as to their overall compliance with lifestyle changes. Educational videos of CR staff is part of the educational library that is reviewed by the patients on a daily basis. There are 2 platforms offered. One for traditional CR patients and one specific for Heart Failure patients. Added programs for diabetics and smokers can be provided on the app for those needing additional support in those areas.

Q10: Specify and describe the unique population selected for this program or service. Examples include:
- Clinical populations currently served (CR, PR, and VR)
- Subgroup within CR / PR /VR (i.e. dyslipidemia)
- Primary prevention groups
- Other Clinical conditions or populations (Obese, cancer, osteoporosis, etc)
- Children, elderly, women, minorities, underserved (rural), etc

Currently, all cardiac rehab patients who have access to a smartphone (either droid or Iphone) or a smartpad are offered this program. There are 2 platforms offered (one traditional cardiac rehab and one specific to Heart Failure). All cardiac diagnosis included as well as a separate Heart Failure platform. Added overlay programs can be included with the original platform that focus on diabetes and smoking for added reinforcement with these groups of patients. We had approximately 500+ patients who have used the app since starting this program. Both men and women were targeted and currently we have 70% men and 30% women who have used the app. The average age is 59-60 years old.

Q11: Please specify how this population was identified and how their needs were identified:

We conducted an initial feasibility and utilization study in 2013 that was published in JCRP in 2014 to look at whether our patients would benefit from this new offering. We had specific patients as well as clinician outcome measures as part of the study. Once we had our results, we enlisted the support of our hospital administration as well as our IT department and we proceeded to offer this to all patients who had access to the smartphone/smartpad technology. We did have some initial loaner devices that were used by patients who did not have a smartphone and could use the loaner devices for up to 3 months and then return them.

Q12: Please identify other opportunities within this target population (referrals or procedures):

We also found that those patients who are using the app were more engaged with their program and had less cancelled visits compared to those who were not on the app. We also found that for those patients who could not attend the usual 3x/week program due to schedule, cost, transportation, etc, we were able to offer an option to check in and connect with their CR team on a daily basis using the app. Patients also found that once they have been discharged from their formal CR program, that being able to stay connected to the CR team was helpful to them during the crucial transition maintenance period for up to a full year to stay on track with their commitment to their overall health needs. We also offered a patient's spouse to download the app as well if they wanted to help the patient along and learn about healthy lifestyles together.

Q13: Please explain considerations given to undeserved or rural populations:

The app is free to all of our patients so there is no financial burden added. During our initial pilot study and for the first year thereafter, we were able to offer loaner smartphones or Itouch devices that could download the app so that those patient who did not have access to a smartphone or smartpad could participate in the study and into the first year thereafter. Also, if patients lived a greater distance away from the CR setting, they could still check in on the app and communicate with the CR team especially if they could only attend a CR session 1-2x/week.
Q14: Does your program have a research basis: Yes

Q15: If "yes", please indicate the specific guideline(s), scientific evidence, or research articles used in planning this program. Also include, research that supports that this type of innovative program can be/is effective.

As mentioned, we did a pilot study of our own before moving forward with offering this program on a long term basis. Since this was a newer concept with smartphone technology, we did not find many studies in the literature re: smartphone technology in the cardiac rehab setting.

Utility and Efficacy of a Smartphone Application to Enhance the Learning and Behavior Goals of Traditional Cardiac Rehabilitation: A FEASIBILITY STUDY

Forman, Daniel E. MD; LaFond, Karen MSN, RN; Panch, Trishan MD, MPH; Allsup, Kelly BS; Manning, Kenneth MS; Sattelmair, Jacob MSc, DSc

Journal of Cardiopulmonary Rehabilitation & Prevention:
September/October 2014 - Volume 34 - Issue 5 - p 327–334
doi: 10.1097/HCR.0000000000000058
Cardiac Rehabilitation

To assess feasibility and utility of a novel smartphone application for cardiac rehabilitation (CR) and its usability and impact (task completion and qualitative feedback) over 30 days on a phase 2 program. Patients and providers reported positive experiences; it was feasible, enhancing, and agreeable to CR patients and clinicians.

Abstract:

PURPOSE: Most eligible patients do not participate in traditional clinic-based cardiac rehabilitation (CR) despite well-established benefits. Novel approaches to overcome logistic obstacles and increase efficiencies of learning, behavior modification, and exercise surveillance may increase CR participation. In an observational study, the feasibility and utility of a mobile smartphone application for CR, Heart Coach (HC), were assessed as part of standard care. Ultimately, innovative CR models incorporating HC may facilitate better CR usage and value.

METHODS: Twenty-six patients enrolled in CR installed HC. Over the next 30 days, they were prompted by HC to complete a daily "task list" that included medications, walking, education (text and videos), and surveys. Cardiac rehabilitation providers monitored each patient's progress through a HC-based Web dashboard and also sent them personalized feedback and support. Completion of the tasks and feedback (qualitative and quantitative) from patients and clinicians were tracked.

RESULTS: Patients engaged with HC 90% of days during the study period, with uniformly favorable impact on compliance and adherence. Eighty-three percent of patients reported a positive/very positive HC experience. Providers reported that HC enhanced their provision of therapy by improving communication, clinical insight, patient participation, and program efficiency.

CONCLUSIONS: Integrating a mobile care delivery platform into CR was feasible, safe, and agreeable to patients and clinicians. It enhanced patient perceptions of CR care and physician perceptions of the CR caregiving process. Mobile-enabled technologies hold promise to extend the quality and reach of CR, and to better achieve contemporary accountable care goals.
Q16: Describe in detail your model of collaboration; how have you worked to include a variety of caregivers into your program?

The web-based clinician dashboard and the patient data that is collected is accessed by the CR team including cardiac rehab nurses, exercise physiologists, registered dietitians. When our initial pilot study was done, we worked with our research department and IRB to develop our study protocol. We collaborated with the physicians associated with the study, IT department, compliance department, hospital administrators with approving both the study as well as the subsequent approval to offer this program to all of our patients. We also have added a separate Heart Failure platform and another study that is underway to measure patient engagement and compliance within the HF patient population. We collaborated with IT to produce CR staff educational videos based on the "Krames" Heart Failure educational book. We obtained a licensing agreement from Krames to utilize the educational content in the teaching book as part of our educational videos that were produced and put on the HF app.

Q17: Who are the caregivers involved in this collaborative process? (identify members of the team):

CR/PR staff, Physician, Family, Other Health Care Professionals, Other Ancillary Departments, Other (please specify) Hospital Administrators; Hospital IT Department; Hospital Research Dept/IRB, IT Vendor, Krames Heart Failure Book publishers

Q18: Describe (or show evidence of) how participant results are shared among all team members and provide examples of this communication process:

Using the web-based clinician dashboard in the CR clinic setting, patient progress is tracked in terms of compliance with treatment plan, daily activity level, medication adherence, engagement of educational information (videos and narratives), patient responses via in-app text messages in response to communications sent by staff (RN's, RD, EP's). Patient data from the app is also added to the ITP's especially when measuring changes in health behaviors outside the clinic setting and will be part of the 30-day updates for each patient. During Nurse Manager rounds within each patient group, the NM uses an Ipad to pull up the dashboard and connect with the patients on how they are doing with using the app while at their clinic visit. Individual and Group messaging is often done on a weekly basis by the Nurse Manager, RD, other staff. The dashboard is set up so that there is a "Priority" list of patients who may have sent a new message to help streamline communication efforts and workflow. Patient outcome data is available both on the dashboard as well as for the patients to see their individual "progress report" with a "week at a glance" option for timely feedback.

Q19: Are patient self-management strategies included? (including primary prevention, behavior modification, compliance and surveillance) Yes

Q20: If yes: Provide details of the education process used and explain how it encourages patient self-management. State the process for identifying barriers to learning, determining state of readiness for learning, and identifying patient’s preferred learning style. Identify by what means education information is provided to the patient/participant:

Patients would need to be able to read English to use this app but all narratives and educational information is written at a primary grade level. The inclusion of educational videos and illustrations would offer another mode of education if patient literacy levels are deficient or below the primary grade reading level. The app is a self-management tool which also can enhance overall patient engagement in self-care activities with direct support from the CR caregiving team. Patients often enjoy having a different type of media to achieve their learning goals. Patients are offered a more intimate way to change health behaviors with using a communication device that is part of their everyday life.
Q21: If yes: Describe behavior modification techniques or interventions used. Explain how patient / participant compliance to treatment plans is tracked and how issues of non-compliance are addressed.

Patients are offered a way to be accountable to themselves with completing a daily "to do" list related to their health goals. As mentioned previously, the clinician dashboard as well as the "weekly progress report" on the app helps to track compliance with overall treatment plan. Dashboard can be sorted by "engagement level" such as "very active", "active", "inactive" to alert the CR staff as to how each patient is using the app. This mechanism can help to prioritize using the dashboard when messaging individual patients as well as groups of patients. The dashboard can also drive the conversations that take place with patients during the clinic visits.

Q22: What is evaluated in your patient outcomes tracking system:

- Daily Activity Levels
- Medication Compliance/Adherence
- Educational Article/Video Viewing
- Responses to various in-app survey questions using various scales
- Responses to helpfulness to using the app
- Responses to patient perceptions of overall health and changes in various health behaviors
- Patient satisfaction with using the app
- Daily and Weekly Engagement
- % of Messages from caregivers read by patients
- # messages sent by patient per week
- Daily Checklist Task Completion
- Physical Activity Task Completion

Q23: How is your patient outcomes tracking system measured?

In-app patient data that is completed with each daily task list is measured on the dashboard and various reports are available to the clinicians (both individual and group reports). The dashboard has a combination of observational data, patient feedback data, objective activity level data, medication compliance/adherence data.

Q24: Describe your outcomes to date (provide "n," pre- & post-values, %change, & supporting narrative):

Examples of our outcomes data:

- n= 348
  - 100% say the app helps them feel more connected to their cardiac rehab provider
  - 100% say the app is improving the quality of their cardiac rehab visits
  - 93% say it is easy to use the app
  - 55% of educational articles are read, and there are at minimum of one educational article per day for 95 days
  - Many nutrition questions are asked throughout the program. These are 2 examples
    - Patients report 7 on a scale of 1 – 10 for how healthy their nutritional intake in the past two weeks was.
    - Example: 90.9% have had less than 1 sugary drink or soda in the past week
  - Many activity questions are asked both daily and intermittently throughout the program. These are 2 examples
    - 89.1% say the app helps them keep up with their daily walking
    - Patients report 7.3 on a scale of 1 – 10 for ranking their level of physical activity over the prior two weeks
  - 0.9 are the # messages sent by patient per week
  - 91% of Messages from caregivers are read by patients
  - 60.8% Daily Checklist Task Completion
  - 43% Physical Activity Task Completion (reaching their steps goal)
  - 53% Reported Medication Compliance
  - 98% Rated the App Positively
Q25: Describe your program/process-related outcomes - how do you know your program is successful (how did your patients do)? Describe outcomes to date (provide pre- & post-values, %change, & supporting narrative):

The dashboard provides both subjective and objective data for both individual patients as well as group performance data. For this last year, we have enrolled 143 patients on the app and the outcomes data listed above are examples of the types of questions and responses that we measure. There are also many patient responses seen based on questions asked by the clinicians in the in-app text messaging feature. For example, the dietitian will send out a nutrition question of the week (may be multiple choice, T/F, open ended questions). Many patients will send back a response and they will then receive a confirmation from the RD re: the correct answer and address the patients' responses. The nurse may send out a question such as: "Do you know what your safe Heart Range should be with exercise" or "Can you identify the names of stress hormones" or "What are your target lipid goals?". There are many built-in survey questions on the app platform that will have a range/likert scale/scroll responses that are options for patients to respond.

Q26: Describe the evidence of Operational Benefit gained from this program (e.g., growth documented by increased visits or patients; enhanced efficiency and process as evident by improved productivity; improved customer and/or physician satisfaction):

We were able to prove that there were less cancelled CR visits by those patients using the smartphone app compared to those in the traditional CR setting. We feel this was due to the higher level of patient engagement with their self-care and added remote support by CR caregivers. Dashboard use allowed for staff to see patient progress outside the clinic setting and helped to guide the ITP updates every 30 days. In-app group messaging allowed for simultaneous large volumes of messages to reach many patients in a timely fashion. We have seen an average growth rate of 40% in patient enrollment in CR in the last year.

Q27: Describe the evidence of Financial Benefit gained from this program (e.g., return on investment (how it is measured); description of revenue or reimbursement sources; indication of cost savings, in-direct revenue enhancement elsewhere in organization; any evidence of payer cooperation or support):

This program enhancement did not require any added staff time. We were able to offer this program without adding more staff. With reduction in cancelled visits, there was a reduction in potential lost revenue (average 1.1 cancelled visits with app users versus average 1.9 cancelled visits with non-app users). Projected Revenue Increase: $6,400/month or $76,800/year.

Existing Nurse Manager rounds and using an Ipad in the clinic during patient visits allowed for streamlining workflows and did not add more time to the NM rounding process. Our IT department supports our use of the platform so existing IT staff were used with no added staff needed.
Q28: Describe the evidence of Health Benefit gained from this program (e.g., increased health awareness and/or decreased health risk; improved health of community (or population targeted) as evidence by improved health knowledge and/or behavior; decreased hospital, physician or ER visits):

Overall benefits of using this platform with mobile technology and web-based clinician dashboard are:
- Daily clinical guidance
- Preferred mode of interaction for patients
- Shift from episodic to continuous support
- Integrated into daily life
- High frequency of interaction between patient and caregiver
- Real-time patient insight
- Promote care plan adherence

As mentioned previously, there are many benefits to the patients in terms of self-care management/awareness, lowering their overall cardiac and health risk. This program helps to measure changes in health behaviors both in the clinic and outside the clinic setting in REAL TIME. We have been able to market our services by highlighting this added program when patients are seen in the inpatient setting as a way to connect with them in the outpatient setting. Our readmission rate in general with our CR patient population after attending at least 20 CR visits (minimal dose of CR visits that may be effective with changes health behaviors) and looking at the time frame of 90 days post-discharge from CR is about 3.1% for all cause readmission (looked at 504 total discharges from CR with total of 16 all cause readmissions 90 days post-CR discharge).