Q1: Facility Name: The Miriam Hospital Center for Cardiac Fitness

Q2: Program/Project Name: Computer Based Patient Portal for Patient Surveys/Assessments

Q3: Address
   Address: 208 Collyer St - 2nd floor
   City: Providence
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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..."

In the technology age, the majority of Cardiac & Pulmonary Rehab patients are using a computer, if not a smartphone/tablet in their daily life. By partnering with the Behavioral Medicine data management team, we eliminated baseline and discharge pen and paper psychosocial/nutrition assessments and manual scoring. We created a patient friendly, Access-based computer portal (Patient Portal) that allows patients to answer 10 surveys with just one click per question. One click also produces a patient report with automated scoring for each assessment. This innovation increased survey completion rates, increased staff productivity, reduced scoring errors and enhanced patient care.

PAGE 5: Population Served by The Program (up to 5 points)
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

Patient populations that are served via this project are cardiac and pulmonary rehab (current and graduates), cardiopulmonary maintenance, and primary prevention.

(a, b, c, d, e - supporting materials provided via email)

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

All patients who are referred to the Miriam Hospital’s Center For Cardiac Fitness for cardiac and pulmonary rehab as well as cardiopulmonary maintenance and primary prevention programs were the identified populations in need of an improved process for completing the baseline, discharge and annual assessment surveys.

A need for a change in the process of distributing paper surveys was apparent given that the response rate of completed surveys at both entry and exit was less than ideal (47%). In addition, the time elapsed between the return of the survey and availability of scores (3-4 weeks) resulted in a delay addressing patient needs. Identifying the need for a referral to the program behavioral therapist, nutritionist, or pharmacist to provide intervention and treatment was not being addressed in an optimal time which negatively impacted patients progress towards goals as well as patient outcomes.

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

After using the Patient Portal for 1 year, we identified the need to have the enrolled maintenance and primary prevention patients complete the same surveys annually to assess psychosocial and nutritional changes in order to tailor the treatment and delivery of care towards their needs and goals. Specific education, counseling and referrals to ancillary providers are now individualized and tailored for the maintenance and risk reduction patient based on the annual Patient Portal assessment scores. This process also helps to provide a one year follow up to evaluate the sustainability of Cardiac & Pulmonary Rehab outcomes achieved from the initial 12 or 18 weeks after 12 months of participation in the cardiopulmonary maintenance program.

18 months after implementation of the Patient Portal, the process was implemented in a sister program at another Lifespan Hospital. Reports were created by the Behavioral Medicine Data Manager to compare or combine outcomes between the 2 programs.

After 2 years of using both the Patient Portal as well as the AACVPR Cardiac Rehab Registry, the program Medical Director identified an opportunity for the Cardiology Fellow to utilize the Patient Portal to track 1 year outcomes of patients who graduated from cardiac rehab but who did not enroll in maintenance. The Behavioral Medicine Data Manager created a report of all patients who are 1 year post their discharge from Cardiac Rehab. Those patients are contacted by the Cardiology Fellow and scheduled an appointment to complete the Patient Portal. This allows the program to provide 1 year follow up data to the AACVPR Registry on all program graduates as well as presents the opportunity for research comparing outcomes of maintenance enrollees to those patients who are continuing on their own.

The next phase will be to implement a similar process for our Pulmonary Rehab Patients as we will begin using the AACVPR Pulmonary Registry in April.

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

For our non-english speaking patients, the hospital provides interpreters. The interpreters read the questions and the answer options so this population can be assessed (about 5% total population). Paper surveys are available in Russian, Spanish and Portuguese for patients who deny use of an interpreter; data entry would be performed by student interns for this small population of patients.

For any patient who is unable to read or otherwise cannot operate a computer we have student interns available to read and assist with the computer if necessary.
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.
Our program has established via tracking patient outcomes over 10 years that we had a significant gap in patients returning both entry and discharge psychosocial, dietary, and symptom questionnaires (response rate 47%). In addition, given that staff hand scored some surveys and others were completed on Scantron paper and shipped to another department for scanning the turnaround time for scores was 3-4 weeks.

In 2001 the Institute of Medicine published “Crossing the Quality Chasm: A New Health System for the 21st Century.” Its Executive Summary noted:

“Healthcare has safety and quality problems because it relies on outmoded systems of work. Poor designs set the workforce up to fail, regardless of how hard they try. If we want safer, higher quality care, we will need to have redesigned systems of care, including use of information technology to support clinical and administration processes.”

The executive summary outlined six aims for healthcare redesign: Safe, Effective, Patient Centered, Equitable, Timely and Efficient.

The final two are directly related to our process redesign as they are defined as “Timely: Reduce wait and sometimes harmful delays for those who receive care and Efficient: avoiding waste, including equipment, supplies, ideas and energy.

Throughout the 2000’s relevant research was completed assessing computer based patient reported outcomes vs. paper based outcomes.

Equivalence was established between electronic vs. paper based patient reported outcomes by Gwaltney et al.1

Salaffi et al concluded in their research with the chronic disease population with rheumatoid arthritis that “computer touch screen questionnaires were well accepted by RA patients with good data quality, reliability and score agreement.”2

Larson found that the computer touch screen was perceived by the patients to be easier to use and took less time to complete. 3

Fann, JR et al evaluated using a computer vs paper based for PHQ 9 testing in oncology patients, concluding that “the touch screen computer is feasible and provides valid depression data in a diverse cancer population.”4

Newman et al concluded that as a larger multidisciplinary rheumatology practice, redesigning the patient reported outcomes from paper to computer based resulted in reduced workflow steps, improved communication between clinicians and physicians and assisted in real time medical decision making.5

Although we did not have the capability to implement a touch screen computer based program, we forged ahead with large font and a one click mouse based system. At the time of implementation, we felt the pros (higher response rate, less missed questions, immediate scoring) outweighed the small segment of the population who were unable to operate the mouse.


4. Depression screening using the Patient Health Questionnaire-9 administered on a touch screen computer. Fann JR; Berry DL; Wolpin S; Austin-Seymour M; Bush N; Halpenny B; Lober WB; McCorkle R. Psychooncology. 2009; 18(1):14-22.

Q16: Describe in detail your model of collaboration; how have you worked to include a variety of caregivers into your program?

After receiving the patient’s referral, the patient is scheduled for an initial evaluation and stress test. The patient is assigned a case manager who will be the primary care provider for the remainder of the 12 or 18 week Cardiac or Pulmonary rehab program. Our program has 15 case managers that are comprised of exercise physiologists, nurses and a physical therapist.

In addition to the case managers our multidisciplinary ancillary providers consist of a dietitian, available 12 hrs per week, behavioral therapist 18 hrs per week, pharmacist 8 hrs per week and respiratory therapist 6 hrs per week. In addition, under the supervision of their respective disciplines a 40 hour a week Johnson and Wales Culinary Dietitian intern provides dietary/culinary services such as cooking demonstrations and supermarket tours (2x/week each) and a behavioral psychology resident provides an additional 8 hours a week.

The program manager, clinical case managers, ancillary providers, medical directors and behavioral medicine research staff all provided input into which surveys were implemented into the Patient Portal. The Behavioral Medicine Data Manager keeps the Patient Portal current as Medicare, Joint Commission, AACVPR Accreditation and AACVPR Registry standards change.

The collaboration amongst all providers begins immediately; during the initial evaluation, the patient completes all the surveys in the Patient Portal. The staff member providing the initial evaluation enters the patient scores into the Baseline Individualized Treatment Plan and develops the treatments and interventions based on the entry survey scores, patient risk factors and mutually agreed upon goals. If anything urgent appears on the printed Patient Portal report (e.g. positive suicide screen), the appropriate steps are addressed before the patient leaves the appointment, including scheduling an appointment with the behavioral therapist. If nothing urgent appears on the Patient Portal Report, patients are transferred to the assigned case manager. Each case manager further develops and implements the Individualized Treatment Plan to help the patient move through the Stages of Change.

A component of the treatment plan is to provide pertinent referrals to the program ancillary health care providers (nutritionist, behavioral therapist, pharmacist and respiratory therapist) for individual thirty or 45 minute appointments to further assist patients in modifying their risk. In addition to providing raw scores, the portal report also categorizes each score with a risk classification of clinical, sub clinical and normal. If and when the patient meets a clinical score – a recommendation for appropriate referral will print directly on the report. For example, if a patient scores > 10 on the PHQ 9 the report will read “Clinical- recommended patient meet with the behavioral therapist”.

If patient scores are elevated, but the patient did not, at the time of the evaluation, see the value in addressing the component as a goal, the report and scores assist patients in visually seeing the need for change. It provides opportunity for the staff to use motivational interviewing and help the patient move along the Stages of Change.

At the end of the Rehab program, either at the time of the 6 min walk, stress test or during their last week of participation, the patient will complete the discharge surveys. This allows for opportunity to review with the patient improvement and areas that need continued work. If scores remain elevated it is also an opportunity to further discuss enrolling in the Maintenance Program in order to continue working with the staff as well as our ancillary healthcare providers.

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

- CR/PR staff
- Physician
- State/Federal Government Agences
- Other Health Care Professionals
- Other Ancillary Departments
Q18: Describe (or show evidence of) how participant results are shared among all team members and provide examples of this communication process:

There are a variety of levels of communication regarding the information that is pulled from the Patient Portal.

Communication from staff to staff regarding direct patient care:
The staff performing the initial evaluation provides information regarding need for referrals at the handoff to the case manager.

The Report is also placed in the patient’s chart/EMR, therefore, scores are readily available to the Ancillary Healthcare Providers when they are scheduled to meet with the patient.

Communication regarding access to data/information to enhance patient care:
The dietitians suggested that in addition to the raw score for the Rate Your Plate,(c) knowledge of the actual answers pertaining to each category would be helpful. Therefore, the Behavioral Medicine Data Manager created a report with the category and the patient's specific, correlating answer. The dietitians reviews this report prior to meeting with the patient to better understand the patient's dietary needs.

The Patient Portal has also been used to assess the feasibility of changing surveys. For example, it was suggested that the COPD Assessment Test replace the CRQ for quality of life. The Behavioral Medicine Data Manager added the COPD Assessment Test to the Patient Portal surveys in order to compare data simultaneously from both surveys to identify if similar outcomes were being captured from both survey tools. This same process was applied to the TMAS (Taylor Manifest Anxiety scale) and the GAD -7 (General Anxiety Disorder). After using both tools simultaneously, we found the GAD-7 to be better identifying anxiety traits in the cardiac patient population.

Lastly, Behavioral Medicine also developed reports that assess aggregate data.(d) This has been invaluable for data that is not being uploading to the Cardiac Registry such as GAD – 7 and PANAS Affect, and ENRICHED social support. As well, it has been significantly important in our Pulmonary Rehab program applying for program recertification as the program had not been enrolled in the Pulmonary Rehab AACVPR Registry until recently.

PAGE 8: Patient Self-Management Education (up to 10 points)

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:

Completion of the Patient Portal on the first visit to cardiac/pulmonary rehab establishes patient expectations that cardiac or pulmonary rehab is not just about exercise. Results are immediate, therefore, if a patient struggled to establish meaningful, measurable goals it allows for conversation over the first few visits to help begin motivational interviewing and the process for self-managing behavior change.

Patients are asked their preferred healthcare language at the time of scheduling and an interpreter is booked at that time if necessary. Patients receive via mail, prior to their initial evaluation; one questionnaire that asks their Learning Needs, what they think brought them to Rehab, barriers to learning and preferred learning style. This is reviewed by the clinician performing the initial evaluation prior to meeting with the patient. At the conclusion of the evaluation, it is explained to the patient that much like the stress test/6MWT assesses their current function; there are a series of questionnaires that assess and quantify the remaining risk factors such as stress, diet and clinical issues such as symptoms and medication adherence. The patient is asked if they are able to operate a computer mouse. If they are able to do so, it is explained that questions are in a white box, the answers require one click resulting in the tab turning blue. Once the patient is at the bottom of each page, the patient clicks continue. If the patient skips a question, the next page does not advance. The patients are instructed that the questions are framed “over the last 2 to 4 weeks” so it is understood that questions are answered based on current behaviors or symptoms.

If a patient has a learning barrier or cannot operate a mouse, the clinician or a student intern will sit with the patient to read and/or operate the mouse. If the patient has a language barrier, the interpreter will interpret the questions and answers for the patient. On a rare occasion, if for some reason the patient is unable to use the computer, the surveys are completed on paper and then entered in the Patient Portal after completion.

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:

The Patient Portal is used in conjunction with establishing Stages of Change, development of SMART Goals and utilization of Motivational Interviewing. The immediate results of the questionnaires from the Patient Portal are used to assist a patient with setting SMART Goals especially if the patient has difficulty understanding the scope of the program services beyond what exercise has to offer. Additionally, if a patient scores low on the Rate Your Plate, but wasn’t amenable to setting a dietary goal, the staff understands that patient is in Precontemplation or Contemplation and needs more education and information to help the patient see the need for behavior change in this area. Scores for questionnaires such as the PHQ-9 (Patient Health Questionnaire) for depression or a more negative than positive affect as assessed by the PANAS questionnaire may also elucidate why a patient is resistant to making a particular behavior change. Compliance and noncompliance are both addressed using the Motivational Interviewing Technique. Using the objective scores received from the Patient Portal combined with assessing the importance and confidence regarding behavior changes helps establish readiness. If the patient is resistant (or noncompliant) the empathy, open ended questions, exploring the ambivalence and supporting self-efficacy associated with Motivational Interviewing assists patient in moving through the Stages of Change. At the time of discharge, the improvement seen in the questionnaires is useful in supporting self-efficacy and in confirming the benefits of living a healthier life style. At the annual Maintenance interval, the Patient Portal has the ability to open the door for reversing any downward trends by presenting the change from the previous year. The annual portal results also have the ability to improve or maintain program compliance for sustainability of positive outcomes.

PAGE 9: Process/ program outcomes evaluation - How is success measured? (up to 30 points)
Q22: **What is evaluated in your patient outcomes tracking system:**

Patient at entry and discharge complete the computer based patient portal. Surveys include:
- RAND SF36
- PHQ9
- GAD 7
- PANAS affect
- ENRICH Social Support Scale
- Rate Your Plate
- Morisky (Medication Adherence)
- CAGE
- Symptoms
- MMRC, CRQ and COPD Assessment Test (pulmonary only)

Q23: **How is your patient outcomes tracking system measured?**

Patients, after completing the initial evaluation, are seated at the Computer based Patient Portal to complete their entry surveys. The discharge surveys are completed either at the time of the discharge stress test or during the last week of rehab.

The Patient Portal automatically calculates the scores for above assessments as well as provides recommendations for referrals to ancillary providers if score falls out of normal range (e.g., GAD score > 5 will print with a recommendation for referral to behavioral therapist).(b)

Reports have been created to also look at aggregate data within the system. One of these reports tally’s the number of patients that have pre and post data (numerator). It is this report that enabled us to assess the response rate (i.e., the percentage of patients who completed both sets of surveys).(d) The AACVPR Registry provides us with the total number that graduate the program (the denominator). For comparison, our previous database (Cardiac2000) allowed us to see this same data for the SF36 which was completed on a Scantron form and scanned into the system.

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

| N = 1004 Number of patients with entry and exit Patient Portal information |
| 1146 # of graduates from Cardiac Rehab |
| 88% Percent of patients who completed both entry and exit data |

The Patient Portal was being used for all patients entering the cardiac and pulmonary rehab programs in June 2014, at the same time we enrolled in the AACVPR Cardiac Rehab Registry. The Patient Portal has a report that calculates the number of patients in a given time period that have both pre and post data to use for comparison and aggregate outcomes. The Registry provides us with the total number of patients who completed the program during the same time period.

There is a 12% gap in either a pre or post survey being completed, however, or those completing the initial survey, only 5% did not complete an exit survey.

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):**

RESPONSE RATES (Table 1 in supporting material)

| Cardiac2000 (January 2011 to May 2014) |
| # Complete pre/post surveys 369 |
| # Graduates 772 |
| % Complete 47% |

| Computer Patient Portal (June 2014 to February 2017) |
| # Complete pre/post surveys 1004 |
| # Graduates 1146 |
| % Complete 88% |
Overall Percent Improvement 41%

For comparison, performance regarding response rate for both entry and exit, data from the 2 ½ years of using the Patient Portal was compared with data from the last 2 ½ years of our previous database system when surveys were distributed, returned, scored and entered. The response rate, using the paper surveys, was hindered by several factors.

A. Some surveys were hand-scored and others required patient to fill a Scantron form which were sent to another department to be scanned and uploaded into a program database. Patients did not always “fill in the bubble” correctly, causing an error in scoring.

B. Scantron forms required special paper, which at times were back ordered and therefore surveys weren’t available causing a gap in data collection,

C. The portable nature of paper surveys resulted in patients taking them home to complete and not returning them.

The Patient Portal was designed to eliminate all of these issues. Most importantly is that the patient cannot leave the facility to do them, therefore they are completed in a timely fashion.

ENHANCED DELIVERY OF CARE AND PATIENT OUTCOMES (Table 2 in supporting material)

Cardiac2000 Depression
# patients assessed at entry and exit = 513
# elevated Depression at entry = 85
# elevated Depression at exit = 58
% achieving normal at discharge = 31%

Patient Portal Depression
# patients assessed at entry and exit = 1081
# elevated Depression at entry = 291
# elevated Depression at exit = 160
% achieving normal at discharge = 45%

Percentage increase in patients achieving normal Depression scores at discharge = 14%

Cardiac2000 Anxiety (Table 3 in supporting materials)
# patients assessed at entry and exit = 668
# elevated Anxiety at entry = 152
# elevated Anxiety at exit = 97
% achieving normal at discharge = 36.1%

Patient Portal Anxiety
# patients assessed at entry and exit = 1081
# elevated Anxiety at entry = 270
# elevated Anxiety at exit = 180
% achieving normal at discharge = 48.8%

Percentage increase in patients achieving normal Anxiety scores at discharge = 12.7%

The improvement in the timeframe, has allowed for immediate intervention resulting in an impact on the delivery of care and patient outcomes.

Using evidenced based screening tools for depression and anxiety there are a greater percentage of patients (presenting as anxious and/or depressed at entry) whose scores are normal at exit (table 2 and 3). With the implementation of an automated system and Patient Portal a 14% improvement in normalizing depression scores and 12.7% improvement in normalizing anxiety scores was observed in comparison to the previous pen/paper delivery system.

By comparing outcomes using an identical timeframe (2.5 years), it was also noted that in addition to the response rate increasing and patient outcomes improving, the census increased by 37% during this same time period. Therefore, we can conclude the improved process moving from paper surveys to computer based surveys has been successful.

FINANCIAL IMPROVEMENT (Table 4 in supporting materials)
Cardiac2000 Cost of paper = $2.94/patient
Patient Portal Cost of paper = $0.40/patient
Percent savings per patient = 86%
Cost of Saving over 2.5 year time period = $2745.74
Due to the higher cost of the specialty Scantron paper our new process saves the program $2.54 per patient. Over the 2.5-year period assessed the program saved $2745.74 for the 1081 patients assessed at entry and exit.

In conclusion, the development of a patient portal for the purpose of administering surveys at baseline and discharge in Cardiac and Pulmonary rehab resulted in automating a process, streamlining work flow, reducing rework, improving efficiencies, saving costs, enhancing the delivery of care, and improving patient outcomes.

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):

The primary operational benefit is related to the streamlining of the process of obtaining entry and discharge surveys. The previous process required up to 6 steps and the questionnaires were handled by at least 3 staff people from 2 different departments: questionnaires were given to the patient to complete, possibly having to ask several times for the return, hand-scoring 3 surveys, sending the 4 Scantron psychosocial questionnaires to the Behavioral Medicine department to be scanned and uploaded, wait for the forms to be returned from Behavioral Medicine and then enter the data into the Treatment Plan. Our current process has 3 steps and requires just one staff person from the treating department: Patient completes questionnaires at the Center, the report is printed and data entered into the Treatment Plan by the same staff person.

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):

Financial benefit is provided mainly in not paying the Behavioral Medicine Data Manager in another department to troubleshoot, scan and upload the psychosocial scores (salary of $68.35/hr). This savings allows the program to utilize the Behavioral Medicine staff in a way that impacts quality or care. Therefore, Behavioral Medicine Data Manager’s time can now be allocated to add or improve existing surveys, compile data for individual patients or aggregate data that ultimately will enhance the program as a whole. These reports present a further savings as they have been created to print the necessary recommendations for elevated psychosocial scores are required by Medicare, therefore, the program ensures Medicare compliance if the program is to receive an audit. The streamlining of this process allowed for an expansion of the role of the Behavioral Medicine Data Manager for data extraction and analysis for research purposes.

Eliminating the purchase of the specialty Scantron paper as well as the regular copy paper for the remaining surveys presents a savings of $2.54 per patient.

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 evident by improved health knowledge and/or behavior; decreased hospital, physician or ER visits):

Given that results are immediately available, the most significant health benefit is that accurate and comprehensive data is available during the initial evaluation to immediately begin the establishment of goals and development of a treatment plan. It alerts staff to issues or problems that may not be readily apparent from one meeting (e.g., depression, medication adherence issues, lack of social support). Patients are immediately referred to ancillary healthcare providers at the start of the program and patients are alerted to areas that need continued attention at discharge. With the addition of an annual maintenance Patient Portal reassessment changes in areas such as anxiety and depression are identified and treated in a timely fashion.

Since the Patient Portal is easy to use for both the patient and staff, questionnaires that enhance patient care have been easily added. For example, with the implementation of individualized pharmacy consults, the Morisky Medication Scale (e) to assess medication adherence as a screener was easily added to the Patient Portal.