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# Prehabilitation Impact on Post-operative Risk, Readmission Rates and Patient Satisfaction

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Prehabilitation Impact on Post-operative Risk, Readmission Rates and Patient Satisfaction

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### **Abstract**

**Background:** Prehabilitation programs may improve 30-day readmission rates, post-operative infections and patient satisfaction in obese total joint replacement (TJR) patients. Joint replacement patients who participate in prehabilitation have improved physical function and patient satisfaction. In an effort to improve TJR patients' mobility and recovery, a prehabilitation performance improvement project was implemented at a local wellness center.

**Method:** The Institute of Healthcare Improvement, Triple Aim Initiative (IHI, TAI) and Centers for Medicare and Medicaid (CMS) performance improvement goals provided the project foundation (IHI, 2015; CMS; 2015). The physical exercise routine utilized in this program was identified as appropriate for use with the TJR population (Topp & Page, 2009). The development of an evidence based prehabilitation program for the purpose of reducing post-operative mortality and improving patient satisfaction was supported by the literature.

**Results:** The project outcomes include a 7% improvement in overall patient satisfaction rates, and a 0.8 % reduction in post-operative infection rates.

**Conclusion:** The prehabilitation Scholarly Project served to inform future efforts of similar sustainable programs fulfilling the IHI and CMS goals of quality, affordable, and accessible health care (IHI, 2015; CMS, 2015). The data supports prehabilitation's ability to positively impact patient satisfaction and post-operative infection rates among obese TJR patients.

*Key Words:* obesity, prehabilitation, joint replacement, post-operative complications

## Prehabilitation Impact on Post-operative Risk, Readmission Rates and Patient Satisfaction

### Introduction and Background

The United States (US) health care system is the most costly in the world, accounting for 17% of the gross domestic product (CMS, 2014). In 2004, there were 1.07 million total joints replaced in the US. As a result of an aging population and increasing prevalence of obesity, this number is predicted to grow to over 4 million by year 2030 (Canale, 2009; Mihalko, 2014).

The Centers for Disease Control and Prevention (CDC) defines obesity as a body mass index (BMI) greater than 30. Over 34% of Americans are obese (CDC, 2013). Statewide, 25% of Idahoans are found to be obese (Idaho Department of Health and Welfare, 2013). Patients with a BMI over 30 and 40 are 8.5 and 32.7 times, respectively, more likely to require a total knee replacement than those with a normal BMI (Mihalko, 2014).

Obese total joint replacement (TJR) patients are 4.79% more likely to have significant complications such as aseptic loosening, venous thromboembolism, all-cause readmissions and, peri-prosthetic infection (Bozic, et al., 2012; Jansen, et al., 2012). The in-hospital risk of complications for obese TJR patients is nearly eight times higher than the population of TJR patients with normal weight (Bozic, et al., 2012). These complications are costly to treat (Bozic, et al., 2012; Kurtz, et al., 2005).

Research has demonstrated exercise programs have positive physiologic impacts on diabetic patients (Sigal, 2004). In addition, evidence supports that prehabilitation contributes to improved function and enhanced patient satisfaction among orthopedic patients (Brown, Topp, Bronsky, & Scott Lajoie, 2012; Gilbey, et al. 2013; Jagers, et al., 2007; Rooks, et al., 2006). Therefore, it is reasonable to explore prehabilitation as a potential pre-surgical intervention for obese TJR patients.

The Triple Aim Initiative (TAI) health care improvement plan is an effort to decrease the complexity of health care provision through early identification of problems and solutions that prevent/delay access and implementation of care (IHI, 2014). Merging the TAI goals with the CMS performance improvement program provides a basis to evaluate practice measures impacting the post-operative morbidity measures for TJR patients (IHI, 2015; CMS 2015). Other outcomes were developed to measure patient satisfaction goals set by CMS.

The Scholarly Project outcome measures included program development, prehabilitation participation, patient follow-up rates, post-operative infection rates, 30-day all-cause readmission rates, and patient satisfaction. Data was collected from participant exercise logs, NexGen scheduling program, Press Ganey Patient Satisfaction Tool (PGPST) (see Appendix I), and PowerChart database.

### **Problem Statement**

Prehabilitation has been identified as an intervention that may positively impact TJR outcomes among obese patients (Baillot, Mampuya, Comeau, Meziat-Burdin, & Langois, 2013). The inquiry question directing this project was: Do obese (BMI >30) patients undergoing TJR for treatment of degenerative joint disease who participate in a four-week prehabilitation program have decreased post-operative infections, fewer all cause 30-day readmission rates, and improved patient satisfaction rates compared to patients undergoing TJR who do not participate in a prehabilitation program?

### **Review of Literature**

The purpose of this review was to identify evidence regarding prehabilitation programs and their impact on TJR outcomes. The key words include: obesity, prehabilitation, joint replacement, and post-operative complication. The search engines CINHALL, MEDLINE,

PUBMED, Sport discuss, and Google were utilized to perform the literature search. The professional journals reviewed include a variety of evidence levels, ranging from systematic reviews (II) to expert opinion (VII) (see Appendix A). The professional articles utilized included evaluation of one or more of the following: obesity, prehabilitation, pre- and post-operative function, and pre- and post-operative self-reporting, and diabetic activity recommendations.

An analysis of the evidence revealed that participation in a pre-surgical prehabilitation program improves pre-operative function and strength (Baillot, et al. 2013; Brown, et al., 2012; Gilbey, et al. 2002; Jack, et al., 2011; Mayo, et al., 2011; Rooks, et al., 2006; Topp & Page, 2009; Vincent, et al., 2002). Further evidence suggests prehabilitation may reduce length of stay, complication rates, and admissions to rehabilitation hospitals (Rooks, et al., 2006; Santa Mina, Scheede-Bergdahl, Gillis, & Carli, 2015; Valkenet, et al., 2011). Prehabilitation is feasible with short-term benefits in the obese, elderly and chronically ill populations (Baillot, et al., 2012; Mnatzaganian, Ryan, Norman, Davidson, Hiller, 2012; Sigal, 2004; Nelson, et al. 2007).

Though prehabilitation is a relatively new orthopedic service, with limited high quality studies to draw from, the concept of improved physical health for emotional and physical wellbeing has been amply demonstrated (Nelson, et al., 2007). Leaders in orthopedic services recommend the promotion of physical activity in older adults with an emphasis on moderate intensity aerobic activity, muscle-strengthening activity, reduced sedentary behavior, and risk management (Nelson, et al. 2007). The evidence suggests that the development of a TJR prehabilitation program may positively impact outcomes for obese TJR patients.

### **Theoretical Model**

The Institute for Health Care Improvement TAI goals of improved patient experience, accessibility to care and cost per capita fiscal responsibility, combined with the CMS



performance improvement program provide a framework for the development of the prehabilitation project (IHI, 2015; CMS, 2015). This framework informed outcome measures and data collection tool decisions (see Appendices C, I & K). The goal of the project was to create a prehabilitation program and evaluate its effect on post-operative complications of TJR and, patient satisfaction. This process required a low-cost program, as prehabilitation is not directly reimbursable. The cost savings must be recognized with improved reimbursement through recognition of fewer post-operative readmissions, performance improvement from CMS, and higher volume referral rates due to high patient satisfaction.

### **Project Process**

The participants performed a structured cardiovascular and strength training routine (see Appendix K) guided by a certified trainer at the YMCA. This routine was to be completed once weekly with the trainer and twice weekly at home. The data collected from the participants was then compared to the comparison group.

Outcomes were evaluated by the following measures; the number of enrollees (Outcome #1), Institutional Review Board (IRB) approval and submission of final report to stakeholders (Outcomes #2), comparison of patient satisfaction rates (see Appendix I) (Outcome # 3), comparison of readmission rates (Outcome #4), comparison of deep infection rates (Outcome #5), implementation of contract with the YMCA for prehabilitation services (Outcomes #6 & 7), evaluation of the rate of completion of the exercise log (see Appendix J) among participants (Outcome #8), the rate of completion of the exercise program among all participants (Outcome #9), evaluation of the rate of delivery of prehabilitation information (see Appendix J) provided to participants (Outcome #10), evaluation of the rate of follow-up appointments kept by participants (Outcome #11), and evaluation of communication between participants and

providers from Press Ganey patient satisfaction tool (PGPST) (see Appendix I) scores (Outcome #12).

The participant inclusion criteria were: Obese (BMI >30) patients of one hip and knee reconstruction surgeon's practice, planning a primary TJR (hip or knee) within eight weeks. Patients unable to attend the training, those unable to speak English, and those with a BMI of less than 30 were excluded from participation in this project. The total number of participants desired was 25 participants and 25 comparison participants (Outcome #1).

Readmission and deep joint infection rates (Outcomes # 4 & 5) were collected from the PowerChart electronic medical record database. Readmission and infection rates were compared between the participants and the comparison population.

Once enrolled the participants received an exercise log, pictorial depiction of the exercise routine, and YMCA/home participation instructions (Outcome #10). The log was utilized to record their participation both at home and YMCA (Outcomes # 8 & 9). When the participants completed the program and returned the exercise log they were provided with a \$40.00 Visa to reimburse for travel costs.

Follow-up appointment attendance data was collected from the NexGen patient scheduling system. The rate of follow-up attendance was evaluated for each of the participants (Outcome #11).

Patient satisfaction (Outcomes #3 &12) was measured by the PGPST. All participants were provided with a PGPST at the five-six week post-operation follow-up visit.

### **Settings**

The settings for this project included the patient's home, the hip and knee reconstruction clinic, the participating hospital (operating room and joint replacement unit), and the YMCA

Wellness Center. The Pacific Northwest city population the participating hospital/surgeon serves is approximately 210,000 (United States Census Bureau, 2014). The hospital and participating clinic is located in the state capital city. The city civilian labor force is 68.2% with a median income of \$49,209 per household (United States Census Bureau, 2014). This is an urban with two large hospital systems. The participating hospital is a member of the Sisters of the Holy Cross Catholic Health System; a system of health and wellness services that extend into a tri-state area.

### **Population**

The participant group included all consenting patients meeting the inclusion criteria that participated in the prehabilitation program. The comparison group did not participate in the prehabilitation intervention. Originally, the comparison group was planned to be obese TJR patients from the same clinic who were unable to attend the prehabilitation training, however, due to lack of participation, the comparison group was change to the same surgeon's 2015 general TJR population.

### **Sources of Data**

The PGPST (see Appendix I) was utilized to capture the patients' satisfaction. The PGPST is a Likert-type questionnaire that delves into the patient's perspective of the facility, nursing, surgical and ancillary health care provided (Outcomes # 3 & 12). Each patient completed the PGPST at the five-six week post-operation period.

A query of the PowerChart database identified readmissions to the hospital within the 30-day post-operation time period (Outcome #4). This data was further evaluated to identify any participants with deep joint infection (Outcome #5). Deep joint infection was defined as any identified bacterial growth from joint synovial fluid or capsular tissue.

Data was collected from the exercise log. This tool provided data on participation rates (Outcomes # 8, 9 &10). The NexGen patient scheduling database was utilized to track rate of follow-up appointments kept for participants (Outcome #11).

### **Data Collection Procedures**

The sample was purposeful sampling, a non-random method of sampling where information-rich cases are collected for study in-depth (World Health Organization, 2015). This sampling is not the best practice for avoiding bias; however, in a situation where the patient must be willing to participate and must reside in the immediate locale, randomization was not possible.

Due to efficiency constraints in a busy office it was necessary to only use one evaluator in clinic. While this may be interpreted as an area of bias (one evaluator examining patients) it may also be interpreted as providing consistency to the study.

The data collected by the nursing staff included medical record number, surgery to be performed, age, height, weight, and BMI. The PGPST was provided to the patients at the five to six week post-operative visit. The PowerChart database informatics nurse (IN) queried the database for all participants for 30-day post-operative all-cause readmissions and supplied this data to the program leader for analysis. The same IN queried the database for all TJR patient readmissions for the same surgeon for the previous year. The project manager collected the prehabilitation participant's exercise logs at the first post-operative visit.

The project manager collected enrollment and prehabilitation education material distribution data at the time of consent (Outcome #1, 2, 8 & 10). Patient satisfaction data was collected from the participants' PGPST (Outcome #3 &12). The comparison group satisfaction results were collected from the comparison group PGPST results reported by Press Ganey

Incorporated (Outcomes #3 & 12). Demographic data collected on the exercise log, PowerChart, and NexGen were utilized to capture the characteristics of the participants and comparison group (Outcomes #4, 5, 8, 9 & 11). Electronic mail was utilized to communicate and secure partnership with the YMCA (Outcomes #6 & 7).

## **Evaluation**

### **Data Analysis**

This performance improvement project was designed to evaluate the development, implementation, and outcomes of a prehabilitation program for obese TJR patients. Data was collected from participants upon entrance, during participation, and at the conclusion of the project. At the beginning of the project patient demographics collected on the exercise log and cardiac risk tool included: gender, height, weight, body mass index, age, past medical history, and anticipated surgery. During the participation phase, each participant entered data on an exercise log that included: dates the exercises were performed, where the exercises were performed (YMCA, home, or other gym), and any additional comments the participants chose to share. The final data collection occurred at five to six week follow up visit when the PGPST (see Appendix I) was completed.

Measurable project outcomes as identified in the Logic Model (see Appendix C) were compared between the participants and the comparison group. The outcomes included rate of participation (Outcome #1), approval from the IRB (short-term Outcome #2), delivery of final project report to Boise State University and participating health system stakeholders (long-term Outcome #2), rate of patient satisfaction (Outcome #3), rate of 30-day all-cause readmission (Outcome #4), rate of deep joint infection (Outcome #5), service contracted with the YMCA and check-in process at the YMCA (Outcome #6 & 7), rate of completion of the exercise log

(Outcome #8), rate of completion of the program (Outcome #9), rate participants received educational data on prehabilitation (Outcome #10), rate of follow-up appointments attended (Outcome #11), and quality of communication as reported on PGPST (Outcome #12).

The original recruitment goal was 25 participants and 25 comparison patients from a single surgeon's current total joint replacement patient load. The actual number of participants recruited was 6, a 76% reduction from the desired participation numbers. Recruitment difficulties also arose when trying to recruit non-participants. Therefore, the surgeon's total joint replacement patient population from 2015 was utilized as the comparison group.

Three males and three females consented to participate in the program (Outcome #1; see Appendix L). All recruited participants had BMIs greater than 30. The average BMI of the participants was 41 with a range of 31-50. The average age of participant was 57.7 years with a range of 55-67. Participant numbers 1, 4, 5, and 6 underwent total knee arthroplasty; participant 2 had a total hip arthroplasty. Demographic, medical history, participation rates, and outcomes are detailed in Appendix M.

Outcome #2 had short and long-term measures. Short-term Outcome #2 required IRB approval. The short-term Outcome #2 was met when the IRB granted approval. Long-term Outcome #2 required the completion and submission of the project final report to Boise State University and participating health system stakeholders. Both reports will be presented by May 30, 2016.

Outcome #3 compared PGPST scores (see Appendices I & N). Three participants evaluated their satisfaction (PGPST) at the five-six week follow-up appointment (see Appendix M & N). The participant overall assessment of satisfaction rate was 100%, the comparison group reported a satisfaction rate of 93%; this is a seven percent point improvement (see Appendix N).

Outcome #4 compared all cause 30-day readmission rates. In 2015, the participating surgeon performed 237 primary total joint replacements with a 4.6 % readmission rate. This compares to a 25% readmission rate for study participants. The low number of participants may have skewed the rate of readmissions. The literature confirms participation in a prehabilitation program reduces all-cause 30-day readmission rates (Silver & Baima, 2013).

Outcome #5 evaluated the rate of deep joint infections. There were no deep joint infections in the participant group. The comparison group had a 0.8% 30-day deep infection rate.

Outcomes #6 and #7 evaluated the process of completing a contract with the YMCA to provide prehabilitation services and scheduling appointments at the YMCA. The contract was successfully completed through electronic mail communications between the Program Director and the YMCA Wellness Program Director. The original check-in process allowed the participant to contact the wellness center to schedule the first training session. Participant 1 was delayed in contacting the wellness center. The check in process was amended to have the trainer contact the patient to schedule the first session. This change was then applied to participants 2, 3, 4 and 5. Participant 6 did not communicate with the trainer. The rate of successful check-in for initiation of the exercise program was 50% (see Appendix M).

Outcome #8 evaluated completion of the exercise log. Participants 1, 2, 4, and 5 completed and returned the log to the Program Director at the first follow-up visit. The exercise log was completed by of 100% of participants (see Appendix M). The terminology used by the participants in the comment section of the exercise log varied. For example, some utilized check marks, some word descriptors; others used numbers and exercise identifiers. The varying terminology made analysis difficult.

Outcome #9 evaluated the rate of completion of the prehabilitation exercise program. Only participants 2 and 4 performed the program as designed. Participants 1 and 5 reported performing the exercises at home three days weekly; this is a 50% completion rate. Participant 3 had a cardiovascular event prior to beginning the program. Participant 6 consented but did not make contact with the trainer. This resulted in the participant not training at all. Participants 3 and 6 who did not begin the program were not included in the data analysis.

Outcome # 10 evaluated the delivery of prehabilitation information to intended participants (see Appendix K). The prehabilitation information was provided to 100% of the participants.

Outcome # 11 evaluated attendance of follow up appointments by participants. A review of the scheduling database revealed 100% of participants kept their scheduled follow up appointments.

Outcome #12 evaluated communication between participants and providers. The PGPST (see Appendix I) data analysis demonstrated that 100% of the participants rated communication with providers higher than the comparison group (see Appendix N). The range of percentage improvement for questions regarding communications was from 1-8.9% improvement (see Appendix N).

The budget was created and maintained by the project manager (Outcome #13). Due to a low enrollment rate, expenditures were well below the projected amounts (see Appendix E).

### **Inferences Relating To Project Outcomes**

Evidence reveals barriers to participation include fear of exercise, increased pain with activity, cost of participation, and travel requirements (Rooks, et al., 2006). These same factors may have contributed to this project's low enrollment rate (Outcome #1). Those who did



participate in this project (Outcome #1) reported an increased sense of strength and satisfaction with the program. Participants made statements such as “Mark (the trainer) said I did very well!” and “I’m so glad I participated. Even though I thought it was going to hurt, it did not,” “Thank you for including me I felt so much better going into surgery.” These patient statements suggest—and the literature supports—that if patients are able to overcome their negative perceptions regarding physical exercise and participate in prehabilitation, they may develop a sense of improved strength and satisfaction (Mayo, et al., 2011; Topp & Page, 2009; Silver & Baima, 2013).

Short-term Outcome #2 was achieved when IRB approval was obtained. Long-term Outcome #2 will be completed when the final report is presented to Boise State University and to hospital administrative stakeholders. The continued administrative support suggests that the hospital system will continue to support low-cost, accessible, evidence-based health care interventions.

The 7% increase in overall patient satisfaction rates (see Appendix N) infers that patients who participate have better overall satisfaction (Outcome #3) with the TJR process. Patients with higher satisfaction rates may refer others to this program for TJR.

Existing evidence suggests that prehabilitation may lower readmission rates (Santa Mina, et al., 2015). The 25% readmission rate among this program’s participants is thought to be a reflection of the small participation numbers rather than a direct result of the prehabilitation program (Outcome #4). A recent study examining hospital length of stay and readmission rates of surgical prehabilitation participants provided promising findings on prehabilitation’s role in economical and sustainable healthcare models (Santa Mina, et al., 2015). Sustainable healthcare models include those systems with low rates of post-operative

complications and high rates of patient satisfaction. Implementing a prehabilitation program may contribute to the participating hospital system continuing as an economical and sustainable healthcare model.

The TJR surgical service has a low overall deep joint infection rate (0.08%). The outcome desired was to lower the rate of deep infections 1% (Outcome #5). The participant data demonstrates a 0.08% reduction in post-operative deep infections.

Partnering with the YMCA Wellness Program director and trainer was successful (Outcome #6). The two parties shared a similar focus on improving health prior to surgical intervention. This led to an effective initiation process and selection of a practice/training site for the prehabilitation program.

A challenge encountered was TJR patients' lack of willingness to travel to the site. This suggests that while TJR patients acknowledge the benefit of participation, the hurdle was to get them to participate. Future sites of the prehabilitation program will need to be more accessible.

One patient consented to participate, however, failed to communicate with the trainer. This suggests that restructuring the enrollment process may increase participation.

The exercise log and prehabilitation education materials were provided to each participant immediately after informed consent (Outcomes #8 & 10). Submission of the log was dependent on the participants returning to the first follow-up appointment. This two-stage process had a 100% success rate. The terminology used by the participants on the exercise log varied. Analysis would be enhanced with clarification regarding the type of information that participants enter in the exercise log; a sample log may be of benefit.

The process of initiating and attending the first appointment was initially challenging (Outcome #9). This challenge may be due to the amount of information provided at the

diagnostic/surgery scheduling appointment. Once the process was amended to have the trainer initiate contact with the participant, the process improved.

The participants had a 100% follow-up appointment attendance (Outcome #11). This rate of follow-up could be considered a success as it suggests that participants did not require admission to a rehabilitative facility as they were able to keep their initial follow up appointment.

When measuring patient satisfaction on communication with nursing and providers, participants rated the staff and providers higher than the comparison group (see Appendix N) (Outcome # 12). This data suggests that participants' questions, concerns, information on medications, diagnosis, and follow up care were better than those of the comparison group. The 6.9% improvement in perception of nursing courtesy, concern, and assistance with medical problem(s) between the participant and general TJR population implies that increased time with the patient improves patient satisfaction (see Appendix N).

The continued support of the program by administrators and surgeons infers that the hospital system is ready to adopt the prehabilitation program and implement it among all TJR patients. Future challenges include ongoing funding, physical site development, and the development of additional education materials. Additional sites may improve participation throughout the communities served by the hospital system. With additional education materials the TJR population may better understand the potential benefits of a pre-operative prehabilitation program, which may further enhance participation.

### **Gaps and Effectiveness**

Low enrollment affected the ability to draw conclusions from the data analysis (Outcome #1). The combination of low enrollment and one readmission created an abnormally elevated 30-day all-cause readmission rate in the participant group (Outcome #4).

Data was not collected from all potential participants. In hindsight, having information from those who declined to participate would have provided data regarding barriers to participation. Such information may have provided insight to recruitment process improvements.

Many of the outcome measures attained positive results including the achievement of IRB approval (Outcome #2), completing YMCA contracting and process of enrollment (Outcomes #6, 7, & 10), and funding of the program through the Saint Alphonsus Foundation grant (Outcome #13). Other successes include; a 0.8% reduction of deep joint infections (Outcome #5), 50% rate of program completion (Outcome #9), 75% completion of the PGPST, a 7% improvement in overall patient satisfaction rates (Outcome #3 & 12), and 100% attendance at post-operative follow-up appointments by participants (Outcome #11).

The positive economic and social impact of the project was demonstrated through the relatively low cost of program development, the reduced rate of post-operative infections, and improved patient satisfaction (Outcomes # 3, 5, 12, and 13). A surgical group reporting lower complication rates with higher patient satisfaction could lead to improved reimbursement and increased community referrals. The social cost savings of one infection could be quantified by patient, family, and community health savings (Hansen & Bozic, 2011).

This program serves as an example of a nurse-driven quality improvement project. The success of the project and adoption of a prehabilitation program for all TJR patients may inspire other nurses to develop and implement quality improvement projects. Furthermore, the role of the nurse as an integral participant in the provision of quality health care is illuminated.

### **Unanticipated Consequences**

This performance improvement project had several limitations. Most notably, 24% of the projected enrollment and only 16% of the projected number of participants were met (Outcomes #1 & 9).

Due to lack of interest among potential participants, synchronous enrollment of participants and non-participants was abandoned (Outcome # 1). The low recruitment numbers for the comparison group led to general population of TJR patients for the year 2015 becoming the comparison group. This change required the participation group be compared to all TJR patients, rather than only those with similar body habitus.

Another unanticipated limitation involved the data collection from the exercise log (Outcome #8). The variety of terminology participants used on the exercise logs made it difficult to interpret the data (Outcome # 8).

Several unanticipated consequences arose in relation to the use of the PGPST (see Appendix I) (Outcome #12). Garnering approval to utilize the tool was a lengthier process than anticipated, which ultimately shortened the time available for participant recruitment. In addition, Press Ganey Associates, Inc., policy required the surgeon and nurse practitioner cease collecting surveys from their non-participant patients for the length of the data collection time period. This resulted in the interval loss of patient satisfaction data from the general patient population (Outcome #12).

The evaluation of the PGPST data was also challenging. The administrative personnel responsible for data assimilation were slow to communicate with the Press Ganey liaison for question weighting data. This lack of communication caused a delay in data interpretation for the project (see Appendix N).

**Financial Analysis**

The first year of the project had a budget of \$6006.25 (see Appendix E). With low participation rates a total of \$1690.00 was actually spent. The costs incurred were for IRB, trainer wages, and travel reimbursement for participants (see Appendix E). The funding grant has been approved to allocate residual funds for another performance improvement project.

When evaluating the cost per participant it must be considered that only two participants utilized the trainer. Participant 1 scheduled training sessions three times and did not participate at any time. The trainer was paid for all scheduled hours. Each participant received a \$40.00 Visa for travel costs. These were provided without requirement for actual participation with the trainer; therefore, the actual cost per participant was \$422.50, \$229 over the projected cost of \$193 per participant (see Appendix E).

The cost benefit analysis originally reported estimated one readmission cost savings (Outcome # 4). With only four participants and one readmission the cost savings were not realized as predicted.

**Barriers to Project Implementation**

Low enrollment was the greatest barrier to project implementation (Outcome #1). Several factors may have contributed to the low numbers. There were a greater number of complex patients that did not meet enrollment criteria during the recruitment period. Thus, there were fewer primary joint replacement patients from which to draw participants. Additionally, patients who declined to participate identified travel costs, time requirements, and negative perceptions regarding exercise as factors that influenced their decision. These barriers to participation were supported by the literature (Dorogo, King, & Brickley, 2009; Rooks, et al., 2006).

An unanticipated barrier that affected enrollment came from the surgeon from whose patient population participants were recruited. He was verbally supportive of the project throughout the planning stages. He ultimately was only able to enroll one patient and was absent from the clinic for an extended period of time during the enrollment that further limited recruitment potential.

### **Recommendations**

The project goals included creating a prehabilitation program that improved patient experience, improved access to care for populations, and encouraged cost per capita fiscal responsibility for the TJR community. The following recommendations are derived from data collected during implementation of the performance improvement project.

The project was a success when evaluating the majority of outcomes (see Appendix O). Most notable outcomes include a 7% improvement in overall patient satisfaction rates (Outcome #3) and the 0.8 % reduction in post-operative infection rates (Outcome #5). Despite failure to meet all outcome measures successfully, this prehabilitation project has informed future efforts aimed at the development of a sustainable program that fulfills the IHI and CMS goals identified (IHI, 2015; CMS, 2015).

The PGPST was lengthy and has limits on its availability for future use. Future patient satisfaction evaluation will need to be more streamlined with a more abbreviated patient satisfaction tool (Outcome #3 & 12).

This project demonstrated low participation and compliance rates (Outcomes #1 & 9). Some barriers to participation (Outcomes #3, 1, & 9) reported in the literature and demonstrated in the data collection include travel time and cost (Rooks, et al., 2009).

In the future, it would be beneficial to include more surgeons and their patient

populations. This would increase the available population of potential participants.

The literature suggests that prescribing prehabilitation as an evidence based care practice may encourage participation at a greater rate than simply informing patients of the practice (Leijon, Bendtsen, Nilsen, Ekberg, & Ståhle, 2008). Providing data on the benefits of the program to the surgeon population and encouraging a prescription process may increase the participation rate.

Weekly contact with participants throughout the prehabilitation program, by either a clinic nurse or a transitional care coach, may enhance compliance and effort. Such contact may also serve to more quickly identify patients who have participation barriers.

Improving access to prehabilitation sites and overcoming fear of participation will be necessary to create a successful TJR prehabilitation program. The hospital system could utilize the project results to further develop the program through electronic media, peer-mentoring and increased numbers of prehabilitation practice sites (Dorogo, et al., 2009; Van der Bij, et al., 2002).

Evidence reveals that prehabilitation programs can improve outcomes in other surgical specialty services (Baillot, et al., 2013; Valkenet, et al., 2011). Such a program could be generalized to sister hospitals with joint replacement and other surgical service programs such as, bariatric, oncologic, and spine (Jack, et al., 2011; Mayo, et al., 2011; Santa Mina, et al., 2014).

### **Maintaining and Sustaining Change**

This program is sustainable through expansion and stakeholder support. Cyclical evaluation for value and satisfaction among practitioners and participants will be necessary for the expanded program.



## **Lessons Learned**

The evaluation portion of the project would have been more meaningful had a greater number of participants enrolled in a shorter time period. Recruitment and data collection took much longer than anticipated, thus limiting the time available for evaluation. The process for evaluation of the data collected from the PGPST was lengthy (see Appendix I). The PGPST is time consuming for the participants to complete.

Finally, despite cardiovascular screening (see Appendix J), one consenting participant dropped out prior to participation due to an emergent cardiovascular event. Risk assessment tools are utilized as predictors of future events. The knowledge derived from this example is: Despite utilization of evidence based cardiac risk assessment (see Appendix J), cardiac events can occur (Goff, et al., 2013).

## **Conclusion**

The population of obese TJR patients is at greater risk of post-operative complications when compared to non-obese TJR patients (Bozic, et al., 2012; Jansen, et al., 2012). Post-operative complications have a major impact on finances for the patient, society, and the health care system (Bozic, et al., 2012).

Participation in a prehabilitation program has demonstrated improved patient satisfaction, improved function, and reduced length of stay (Baker & McKeon, 2012; Gilbey, et al., 2002; Jack, et al., 2011; Rooks, et al., 2006; Topp & Page, 2009; Valkenet, et al., 2011). This nurse-driven performance improvement project has successfully informed on the feasibility of providing a community based, affordable, and accessible evidence based health care practice for obese TJR patients.

The high patient satisfaction rate is one of the successes of the project. Participation in prehabilitation improved over all patient satisfaction by 7%. Another notable success includes a 0.8% reduction in the post-operative infection rate. This reduction correlates to fewer lifestyle changes for the patient and their families that avoid post-operative complications. Fewer post-operative deep infections decrease societal health care expenditures.

This fiscally responsible project supports the addition of prehabilitation as a way to reduce post-operative infections and improve patient satisfaction rates in the obese TJR population. This program has also identified potential barriers to prehabilitation participation (Rooks, et al., 2006).

The limitations of the program, specifically low enrollment and focus on a very specific population, tempers the generalizability of the data. Due to the low enrollment rate the evidence requires future studies necessary to assess clinical relevance. Future evaluation plans should explore barriers to participation and readmission rates with a continued focus on the goals of the IHI Triple Aim Initiative in a larger population.

In conclusion, the goals of improved patient satisfaction and reduced post-operative infection rates are supported by this quality improvement project. This program places the patient at the center of care with the goal of optimal pre-surgical health (White & Dudley-Brown, 2012; Topp & Page, 2009). This program demonstrated evidence-based community accessible health care.

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## Appendix A

## Evidence Table

Article Number	Author/Year	Evidence Type	Sample Characteristics	Results/Recommendations	Limitations	Usefulness	Variable Independent (I) Dependent (D)	Level of Evidence	Citation
1	Baillet, A. (2013)	Controlled without randomization  Convenient	N=8 males N+ 4 females  Awaiting bariatric surgery. 3x/week x12 week's prehabilitation at home and monitored.  Cardiac and resistance exercises were performed.	Prehabilitation is feasible and results in short term benefits, of improved physical fitness, weight loss and improved perception of physical fitness.	Small sample,  No post surgical control group  Recruitment was not defined, some elected to not participate and some that were not able to physically participate were excluded.	Yes  Bariatric patients	I=Prehabilitation program  D=cardiac exercise test, anthropometric variables, body composition, physical fitness, quality of life, physical exercise beliefs	III	Baillet, A., Mampuya, W. M., Comeau, E., Meziat-Burdin, A., & Langois, M. F. (2013). Feasibility and impacts of supervised exercise training in subjects with obesity awaiting bariatric surgery: A pilot study. <i>Obesity Surgery</i> , 23, 882-891. doi: 10.1007/s11695-013-0875-5

2	Baker, C.S. & McKeon, J. M. (2012)	Systematic Review of RCT's	18-65 participants were scheduled for TKA and participated in a lower extremity exercise program pre-operatively compared to a control group.  Seven studies met inclusion criteria.	For all outcomes none were consistently favorable toward preoperative rehabilitation in TKA patients except LOS was decreased	One form of Prehabilitation was evaluated  No information on individual outcomes	Yes	I= addition of Prehabilitation  D= subjective and objective outcomes after TKA compared with non participant TKA patients	I	Baker, C. S., & McKeon, J. (2012). Does preoperative rehabilitation improve patient-based outcomes in persons who have undergone total knee arthroplasty? A systematic review. <i>Physical Medicine and Rehabilitation</i> , 4, 756-767. doi: 10.1016/j.pmrj.2012.06.005
3	Brown, K. (2014)	Random Control Trial	TKA N=31 16-prehab 15 control  Randomized  The exercise program was based on Social Cognitive Theory  Exercise 2x/wk. at home 1x/wk. PT for 8	The results of the SEE and OEE scales indicated that the control participants declined and the prehabilitation exercise group essentially was unchanged.	Only TKA patients were studied.	Yes	I=addition of prehabilitation program  D=Self-efficacy exercise (SEE) and outcome expectations for exercise (OEE).	II	Brown, K., Loprinzi, P., Bronsky, J., Topp, R. (2014). Prehabilitation influences exercise-related psychological constructs such as self-efficacy and outcome expectations to exercise. <i>Journal of Strength and Conditioning Research</i> 28(1), 201-209.

			weeks.  SEE and OEE scales were used 4 times through the study.						
3	Brown, K. (2012)	Random Control Trial	N=18 Exercise TIW, 1 at home and 2 monitored x 8 weeks vs. control of usual activities. Measuring quality of life at 3 mo. PO	Shows evidence of improved QOL 3 months post operatively	Small sample	Yes	I=addition of prehabilitation  D=Eight health-related quality of life domains were assess 3 months post-operation	II	Brown, K., Topp, R., Bronsky, J. A., & Scott Lajoie, A. (2012). Prehabilitation and quality of life three months after total knee arthroplasty: A pilot study. <i>Perceptual &amp; Motor Skills: Physical Development &amp; Measurement</i> , 115(3), 765-774. doi: 10.2466/15.06.10.PM S.115.6.765-774

4	Gilbey, H. (2003)	Random Control Trial	N=76 THA  N=37 Prehabilitation with rehabilitation post-operation.  N=31 normal activity  Evaluate 8 weeks pre-operation, 3,12 & 24 weeks post operation	Prehabilitation does decrease stiffness, & improves strength  Improvements seen in pre and postoperative evaluation	The evaluator of strength and function was not blinded to the participants.  The patient selection only included fit and motivated patients	Yes	I=addition of prehabilitation  D= Lower extremity strength, range of motion & Disease specific outcomes assessment	II	Gilbey, H., Ackland, T.R., Wang, A.W., Morton, A.E., Trouchet, T., Tapper, J. (2003). Exercise improves early functional recovery after total hip arthroplasty. <i>Clinical Orthopaedics &amp; Related Research</i> , 408, 193-200.
5	Heisel, C. (2005)	Prospective Observation	THR N=55  THA N=36  Resurfacing N=19  TKA N=45  All participants were evaluated on function and BMI pre-operatively and one year postoperatively	The mean post-operative weight gain = 1.2 KG  Patients with one joint replacement and no other condition interfering with walking gained mean of 2.9kg  Resurfacing patients gained a mean of 3.2 kg  THA patients	The surgeries performed were by one surgeon in CA. With weight issues across the US differing this may be seen as difficult to generalize	Yes	I=THA  D= weight changes	IV	Heisel, C., Silva, M., Dela Rosa, M., Schmalzried, T. (2005). The effect of lower-extremity total joint replacement for arthritis on obesity. <i>Orthopedics</i> 28 (2), 57-59.

			y	lost 0.2kg TKA pts. gained 1.4 kg					
6	Jack, S. (2011)	Systematic review and meta-analysis of RCT	N=7 studies on hip and knee replacement with multiple points of evaluation	Prehabilitation can improve objectively measured fitness of the elderly patient in the time prior to surgery	No inclusion of obesity information  No defined population	Possibly	I= addition of prehabilitation  D=surgical specific questionnaires, generic HRLQ and well-being questionnaires, & physical activity	I	Jack, S., West, M., & Grocott, M. P. W. (2011). Perioperative exercise training in elderly subjects. <i>Best Practices and Research lineal Anaesthesiology</i> , 25, 461-472. doi: 10.1016/j.bpa.2011.07.003
7	Jaggers, J. (2007)	Case study.	N=2  4 weeks of prehabilitation for TKA patients vs. normal care.  Follow up 12 weeks post-operation to evaluate pain and function	Prehabilitation had a positive effect on function, and proprioception pre-operatively. Post-operatively the subjects had consistently higher function and pain reduction	Minute number  Poor ability to generalize findings	Yes	I=addition of prehabilitation  D=6 MWT, # of times up out of chair in 30 seconds, proprioception, self-report of function	II	Jaggers, J. R., Simpson, C. D., Frost, K. L., Quesada, P. M., Topp, R. V., Swank, A. M., & Nyland, J. (2007). Prehabilitation before knee arthroplasty increases post-surgical function: A case study. <i>Journal of Strength and Conditioning Research</i> , 21(2), 632-634.
8	Mayo, N.E.	Secondary	N=95 completed	Improved functional	High drop-	Yes	I=addition of	II	Mayo, N. E., Feldman, L., Scott, S., Zavorsky,

	(2011)	analysis  (Re-evaluated data from a RCT).	prehabilitation  N=75 evaluated postoperatively  Colorectal surgery patients	capacity with prehabilitation if able to participate	out rate  High deterioration rate due to illness		prehabilitation  D= 6MWT, mental status, QOL,		G., Kim, D. J., Charlebois, P., Stein, B., & Carli, F. (2011). Impact of preoperative change in physical function on postoperative recovery: Argument supporting prehabilitation for colorectal surgery. <i>Surgery</i> , 150(3), 505-514. doi: 10.1016/j.surg.2011.07.045
9	Mnatzaganian, G. (2012)	Retrospective cohort study with controls	1996-9 12,203 men in Perth Western Australia participated in the HIMS study their ht. & Wt. were recorded  2001-04  The same men surviving were re-evaluated. 7% had THA/TKA The medical data during	Of the 857 men 57% had BMI=25-29.9  25% had BMI=>30.  The obese statistically were younger and of lower socioeconomic status.  There was an increased rate of intra-hospital complications in the over-weight and obese	Only men were studied.  The accuracy of the measured wt. vs. ht. may be questioned, as it had to be gathered from two separate sources.  Focused population in Australia may not be generalizable	Yes	I=total joint replacement  D=Post-operative complications	III	Mnatzaganian, G., Ryan, P., Norman, P., Davidson, D., Hiller, J. (2012). Use of routine hospital morbidity data together with weight and height of patients to predict in-hospital complications following total joint replacement. <i>Biomed Central: Health Services Research</i> 12 (380).

			hospitalization was reviewed and compared to ht. & Wt.	populations.	.				
10	Rooks, S. (2006)	Random control trial	108 male and female patients having a THA or TKA were randomized to control vs. 6 weeks of prehabilitation	Participation in prehabilitation improves pre-surgical functional status and strength in THA patients. Additionally prehabilitation reduces the likelihood of referral to post-hospital rehabilitation hospitalization.	Low recruitment numbers, high drop-out rate pre-operatively and post-operatively	Yes	I= total joint replacement  D= pre- and postoperative self evaluations and physical strength and function measurements	II	Rooks, D., Huang, J., Bierbaum, B., Bolus, S., Rubano, J., Connolly, C., Alpert, S., ... Katz J. (2006). Effect of preoperative exercise on measures of functional status in men and women undergoing total hip and knee arthroplasty. <i>Arthritis and Rheumatism</i> 55(5): 700-708.
11	Santa Mina, D., (2015)	Expert Opinion/Technical Review	Review of past and present perspectives on prehabilitation and comment on future opportunities for understanding the practice and benefits	Prehabilitation will likely have significant impacts on positive patient-health and health care costs	Not research	Yes Supports multi-modal prehabilitation activities	N/A	N/A	Santa Mina, D., Scheede-Bergdahl, C., Gillis, C., & Carli, F. (2015). Optimization of surgical outcomes with prehabilitation. <i>Applied Psychology, Nutrition, &amp; Metabolism</i> , 40(9), 966-969. doi.org/10.1139/apnm-2015-0084

			of prehabilitatio n						
11	Sigal, R.J. (2004)	Expert Opinion/ Technical Review	Physical activity and exercise for treatment of Type 2 DM	Exercise:  1. Reduces incidence of progression from impaired glucose tolerance to DM  2. Reduces HA1c  3. Improved glycemic control with resistance training.  4. Improved safety data for populations at risk for CVD.	Not research	Yes  Supportive  DM not joint patients	N/A	NA	Sigal, R. J., Kenny, G. P., Wasserman, D. H., & Castaneda-Sceppa, C. (2004). Physical activity/exercise and type 2 diabetes. <i>Diabetes Care</i> , 27(10), 2518-2539.
12	Topp, R. (2009)	Random control trial	N=54 TKA  Age 50-95  N=28 without prehabilitatio n  N=26 with 5 months of prehabilitatio n  Evaluation 8	Improved outcomes pre operatively and postoperatively with addition of prehabilitation	Population characteristic s were not provided, i.e. age, height and weight.	Yes	I=Prehabilitati on  D= 6MWT, time require to climb two flights of stairs and time to descend two flights of stairs	II	Topp, R. J., Page, P., Swank, A. M., Quesada, P. M., Nyland, J., Malkani, A., & (2009). Improve function before knee replacement surgery. <i>Functional: Exercise and activity for healthy aging</i> , 7(2), 1-8.



			& 1 week preoperatively  4 & 14 weeks postoperatively  6MWT and sit and stand from chair						
13	Valkenet, K. (2011)	Systematic review of controlled trials	N=12 studies  Cardiac, abdominal, and joint replacement surgical patients evaluated by LOS & PO complications	Prehabilitation effectively reduces LOS & PO complications for cardiac and abdominal surgical patients, not for joint replacement patients	Length and type of prehabilitation not standardized	Yes	I=addition of prehabilitation  D=post-operative complication rate and LOS	I	Valkenet, K., Van de Port, I., Dronkers, J. J., De Vries, R. W., Lindeman, E., & Backx, F. (2011). The effects of preoperative exercise therapy on postoperative outcome: A systematic review. <i>Clinical Rehabilitation</i> , 25, 99-111. doi: 10.1177/026921551038080830
14	Vincent, H. (2012)	Systematic review of controlled trials	N=5 retrospective  N= 18 prospective  Studies of physical function before and 1	Functional improvement was found in both groups with greater improvement in <30 BMI group	No standardization of intervention. No standardization of surgical	Yes	I=THA  D=Long term functional outcomes	I	Vincent, H. K., Horodyski, M., Gearen, P., Vlasak, R., Seay, A. N., Conrad, B. P., & Vincent, K. R. (2012, January 1). Obesity and long-term functional outcomes following elective

			<p>year after THA</p> <p>Comparing BMI &lt;30 patients with those &gt;30</p>		<p>approach</p>				<p>total hip replacement. Journal of Orthopaedic Surgery and Research, 7.</p>
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<b>Appendix B</b>					
<b>Synthesis of Evidence Table</b>					
<b>Study/level of evidence</b>	<b>Intervention</b>	<b>Length of Intervention</b>	<b>Population</b>	<b>Results</b>	<b>Measurement</b>
<b>1</b> <b>III</b>	Addition of endurance and strength training 3x/wk. (2 on site, 1 at home)	12 weeks	N=8 females  N=4 males  BMI 51.4 mean	Prehabilitation is feasible and results in short term benefits	Before and after intervention anthropometric measurement, body composition, physical fitness, quality of life and physical fitness beliefs
<b>2</b> <b>VI</b>	Not defined	Not defined	Varied on each study	For all outcomes none were consistently favorable toward prehabilitation, except LOS was reduced for TKA patients	Self reporting of pain, function, motion and independence. WOMAC, KOOS
<b>3</b> <b>II</b>	Addition of resistance, strength and stretching exercises 45 minutes 3x/wk. (2 on site, 1 at home)	8 weeks	N=18  BMI 38.8 mean	Supports improved quality of life 3 months post-operatively	SF-36 (self reporting)  Calculating both physical and mental score separately
<b>4</b> <b>I</b>	Addition of aerobic, strength, mobility and gait training 1 hr. 2x/wk.	8 wks. pre-operative, returning at 3 wks. post-operative to participate in rehabilitation	N=76  N=31 control/BMI 28.2  N= 37 exercise/BMI 27.7	Supports prehabilitation for reduction of stiffness, & improved strength	WOMAC & length of stay

<b>5</b> <b>V</b>	Addition of education & acupuncture, upper and lower extremity strengthening	Varied from 3x/wk. for 8 weeks to 1x/wk. for 6 weeks	12 Studies N=20 AAA surgical patients N=632 CABG patients N=593 Total joint patients from 7 studies	Supports prehabilitation for improving measured fitness prior to surgery	Questionnaires on pre- and post-operative strength evaluation (not specified)
<b>6</b> <b>I</b>	Activity not specified  3x/week	4 weeks	N=2  Exercise BMI 33  Control BMI 23	Supports prehabilitation for improved function, proprioception pre-operatively. Post-operatively subjects had consistently higher function and improved pain control	Before surgical intervention physical strength measurement.  6MWT  Number of times up out of chair in 30 seconds  Proprioception,  WOMAC
<b>7</b> <b>II</b>	Cycling daily	Median 38 days	N=95  BMI not reported	Supports prehabilitation for improved functional capacity	6MWT  SF-36 Short form  Euroqual EQ-5D
<b>8</b> <b>NA</b>	Addition of aerobic, resistance and flexibility exercise	150 minutes/ wk.	Not research	Exercise:  1. Reduces incidence of progression from impaired glucose tolerance to DM 2. Reduces HA1c 3. Improved glycemic control with resistance training 4. Improved safety data for	NA

				populations at risk for CVD	
<b>9</b> <b>I</b>	Addition of resistance strength and stretching exercise  3x/wk. (1 monitor, 2 at home)	4-8 wks.	N= 54  N=28 prehabilitation  N=26 control	Supports improved outcomes post-operatively with the addition of prehabilitation	6MWT  Sit to stand in 30 seconds  Time it takes to ascend 2 flights of stairs  Time it takes to descend 2 flights of stairs
<b>10</b> <b>I</b>	1. Acupuncture & circuit training 1x/wkx6 weeks 2. Knee strength and mobility (not specified) 3x/wkx4 wks. 3. Stretch and strengthening (not specified) 3x/wkx8wks 4. Strength training 30 minutes (length and type not specified) 5. Bicycling and strength (not specified) 3x/wk. x 6 wks.	Varied	N=12 studies  Joint replacement, abdominal or cardiac surgery patients	Supports use of prehabilitation for reduction in LOS and post-operative complications for cardiac, abdominal and total joint patients	Prehabilitation, length of stay
<b>11</b> <b>V</b>	No prehabilitation intervention		Obese patients with THA	Supports prehabilitation for improvement with greater improvement seen in <30 BMI group	Long term functional outcomes in Obese THA patients  Oxford hip score  WOMAC, walk test, chair rise and body transfers

Appendix C						
Logic Model 2015						
Inputs	Activities	Outputs	Objectives	Outcomes		Impact
What we invest	Action	What we do	Measurable	Short-term	Long-term	
Prehabilitation program design and implementation pre-surgery	<ol style="list-style-type: none"> <li>1. Set up enrollment criteria and develop process to enroll 25 prehabilitation patients (PP) and 25 control group patients (CGP).</li> <li>2. Apply for IRB approval from St. Alphonsus</li> <li>3. Query Database to compare satisfaction ratings among PP to CGP.</li> <li>4. Query PowerChart for readmissions data</li> </ol>	<ol style="list-style-type: none"> <li>1. Enrollment process criteria and process developed (including age, gender, and BMI)</li> <li>2. IRB application completed and sent to St. Alphonsus IRB</li> <li>3. Implementing patient satisfaction tool for pilot program use.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enroll 25 PP and 25 CGP in Prehabilitation Program.</li> <li>2. Apply for IRB approval to St. Alphonsus IRB.</li> <li>3. Evaluate patient satisfaction for patients enrolled in Prehabilitation Program.</li> </ol>	<ol style="list-style-type: none"> <li>1. 50% PP and 50% CGP enrolled in Prehabilitation Program.</li> <li>2. IRB approval received from St. Alphonsus IRB in May, 2015</li> <li>3. Patient satisfaction level will be 75% satisfied or highly satisfied with the Prehabilitation Program at 5 weeks post-surgery.</li> </ol>	<ol style="list-style-type: none"> <li>1. 100% PP and 100% CGP enrolled in Prehabilitation Program.</li> <li>2. Annual report submitted to St. Alphonsus IRB in May, 2016</li> <li>3. Patient satisfaction level will be 80% satisfied or highly satisfied with the Prehabilitation Program at 5 weeks post-</li> </ol>	Prehabilitation Program demonstrates reduction in readmission and infection rates when compared to patients who did not participate in the Prehabilitation Program.

	<p>on PP to CGP from date of admission through 12 week follow up.</p> <p>5. Query the rate of infection of PP and CGP.</p>	<p>4. PowerChart for readmissions data checked for pilot program use.</p> <p>5. Infection rate database evaluated for pilot program use.</p>	<p>4. Evaluate readmissions data for patients enrolled in Prehabilitation Program.</p> <p>5. Evaluate the PowerChart data base for readmissions due to deep joint infection</p>	<p>4. Readmission rates decreased by 1% among the PP.</p> <p>5. Infection rates decreased by 1% among the PP.</p>	<p>surgery.</p> <p>4. Readmission rates are less in the PP versus the CPG</p> <p>5. Infection rates less than those compared with non PP among the PP</p>	
<p>Prehabilitation education and exercise plan for patients</p>	<p>6. Secure participation of therapy for physical exercise training at YMCA</p> <p>7. Check in process and exercise regimen developed at the YMCA</p> <p>8. Develop exercise diary for each PP</p>	<p>6. YMCA staff and trainers agreed to participate in Prehabilitation Program.</p> <p>7. Check-in process and exercise regimen agreement secured.</p> <p>8. Exercise diary developed</p>	<p>6. Secure YMCA contract for services for Prehabilitation Program.</p> <p>7. Agreement for check-in process and exercise regimen secured.</p> <p>8. Discuss and distribute exercise log to PPs.</p>	<p>6. YMCA contract for services for Prehabilitation Program completed.</p> <p>7. Check-in process and exercise regimen consistently applied to all PPs.</p> <p>8. 50% of PPs completed the exercise log.</p>	<p>8. 80% of PPs completed the exercise log.</p>	

<p>Prehabilitation Program eligibility and enrollment process</p>	<p>9. Patient enrollment process outlined.  10. Identify eligibility requirements for program participation.</p>	<p>9. Patient enrollment process outlined for Prehabilitation Program. 10. Educational flyer developed identifying eligibility requirements.</p>	<p>9. Implement patient enrollment process for exercise regimen.  10. Distribute educational flyers to all PP and CGP that meet the eligibility requirements</p>	<p>9. 50% of PP completed Prehabilitation Program.  10. All patients receive educational flyers and understand eligibility requirements.</p>	<p>9. 75% of PP completed Prehabilitation Program.</p>	<p>Obese pre surgical patients fewer infections post-surgery when compared to the CPG.</p>
<p>Prehabilitation Program Post-surgery Evaluation</p>	<p>11. Identify and assess each patient on the 7-10 day, 5-6 week and 12 week post-operation days.  12. Develop a process for obtaining the results of the Press Ganey patient satisfaction surveys for the PPs and CPGs.</p>	<p>11. Develop a reflex communication pattern to those patients who do not attend the scheduled follow up appointments. 12. Query the database for the results of the Press Ganey Patient Satisfaction surveys.</p>	<p>11. Contact all PPs and CGPs for return appointments as determined by the Program Director.  12. 80% of PP's and CPG's complete the Press Ganey Patient Satisfaction Survey</p>	<p>11. 50% of PPs attend scheduled appointments for length of program.  12. 75% of PP and CPGs report ease of communication and concerns resolved on the Press Ganey satisfaction survey</p>	<p>11. 90% of patients keep scheduled follow up appointments for length of program.  12. 85% of PP and CPGs report ease of communication and concerns resolved on the Press Ganey satisfaction survey</p>	<p>Patient satisfaction data will demonstrate prehabilitation favorably impacts patient satisfaction, and improves post-operative outcomes at a minimal cost</p>



<p>Prehabilitation Program funding</p>	<p>13. Seek funding sources through grants for program of study</p>	<p>13. Develop an expense budget for transparent reporting of fund disbursement to stakeholders</p>	<p>13. The project manager will maintain the budget within the funding provided.</p> <p>14. The project manager will reapply for further grants based on input from the stakeholders on the success of the program.</p>	<p>13. The project funds will be managed as the proposal outlines.</p>	<p>13. The successful budget management and program implementation will lead to future funding by the stakeholders</p>	<p>13. The community has a low budget program that allows for improved patient satisfaction and improved, reduced risk healthcare.</p>
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Appendix D														
Timeline														
Activity	12/ 2013	01/ 2014	02/ 2014	04/ 2014	06/ 2014	08/ 2014	09- 2014	01/ 2015	05/ 2015	06/ 2015	08/ 2015	09/ 2015	12/ 2015	5/16
Literature Review, mission, vision, problem statement, timeline for project	X													
Timeline	X													
Project Goals and Objectives	X													
1. Apply for IRB approval								X						
2. Achieve IRB approval									X					
3. Begin enrollment of patients									X					
3. Complete enrollment of 50 participants that meet the set population characteristics (est. 5 pts./wk. plus 12 weeks post-op follow up) Goal 50 pt. participants in 5 months, 25 to each randomize to control vs. exercise.											X	X		
4. Achieve 90% participation pre-surgically													X	
5. Educate participants on program requirements and benefits of physical activity												05/15 - 09/15		
6. Address patient concerns or limiting factors that may affect full participation												06/15 - 09/15		



<b>Appendix E Long Term Prehabilitation Budget</b>						
<b>Items</b>	<b>2015 (start up)</b>		<b>2016</b>		<b>2017</b>	
	<b>Annual cost</b>		<b>Annual Cost</b>		<b>Annual Cost</b>	
<b>Personnel expenses</b>						
Program Director*(10 hrs. /week x 9 months)	\$23,400.00		\$23,400.00		\$23,400.00	
Office Nurse (\$20/hr.)*	\$250.00		\$2,250.00		\$2,250.00	
Office MA (\$12/hr.)*	\$150.00		\$1,350.00		\$1,350.00	
Research Assistant (\$15.83/hr.*	\$5,698.80		\$0.00		\$0.00	
Trainer	\$2,906.25		\$8,000.00		\$8,000.00	
Statistician*	\$3,125.00		\$3,125.00		\$3,125.00	
<b>Non-Personnel Expenses</b>						
Education Materials	\$100.00		\$500.00		\$500.00	
Equipment*	\$225.00		\$2,025.00		\$2,025.00	
Exercise Facility	\$0.00		\$0.00		\$0.00	
Travel Reimbursement (participants	\$1,000.00		\$0.00		\$0.00	
IRB	\$2,000.00		\$0.00		\$0.00	
Travel (for Dissemination)	\$0.00		\$3,600.00		\$0.00	
<b>Total Expenses</b>	<b>\$38,855.05</b>		<b>\$44,250.00</b>		<b>\$40,850.00</b>	
<b>In-Kind *</b>	<b>\$32,848.80</b>		<b>\$32,150.00</b>		<b>\$32,150.00</b>	
<b>Grant Funding</b>	<b>\$10,761.25</b>		<b>\$0</b>		<b>\$0.00</b>	
<b>Total Out of Pocket</b>	<b>\$6,006.25</b>		<b>\$8,500.00</b>		<b>\$8,700.00</b>	

The 2016 and 2017 budgets have been increased to include participation of 100 clients annually (total patients 500, 60% obese, estimate of 1/3 living in the Treasure Valley and desiring to participate once weekly for four weeks) \* In Kind

Appendix F						
Expense Budget						
Source of Expense	Expense Description	Dollar value	Type of Cost	Description of Cost	Estimated Volume	Cost Per Unit
		Cost (\$)				
Personnel	Estimated 3 hours per week	\$2,906.25	Variable	Trainer	1	
Prehabilitation Equipment/Supplies	\$ 9.00/band	\$225.00	Variable	Exercise bands	25	\$9.00
Prehabilitation Equipment/Supplies	Education Material Copy costs	\$100.00	Variable	Education Material	25	\$4.00
Project IRB	IRB	\$2,000.00	Fixed	IRB	1	\$1500.00 \$500.00 for each amendment
Travel	\$40.00/PP	\$1,000.00	Variable	Re-imbusement for PP travel	25	\$40.00
	Total Requested	\$6006.25				
	Grand Total	\$6006.25				

<b>Appendix G</b>	
<b>Operating Income</b>	
<b>Statement of Operations 2015</b>	
<b>Revenues</b>	
Grant Funds	10,761.25
<i>Total</i>	<b>\$10,761.25</b>
<b>Expenses</b>	
Education Materials (log, exercise pictorial)	\$100.00
Equipment (exercise band)	\$225.00
Exercise Facility (gifted)	\$0.00
Travel Reimbursement (participants)	\$1,000.00
IRB	\$2,000.00
Travel (for Dissemination 2016)	\$0.00
Trainer (3 hours per week as necessary based on participants each week)	\$2,906.25
<i>Total</i>	<b>\$6231.25</b>
<i>Total</i>	<b>\$4530.00</b>
<b>Operating Income</b>	<b>\$10761.25</b>

<b>Appendix H</b>		
<b>Prehabilitation Cost-Benefit Analysis</b>		
	<b>Total Program Savings (Based on 2017 estimates)</b>	<b>Tangible Primary or Secondary Benefits</b>
<b>Benefits</b>	Reduced readmissions  (1% reduction on estimated 2700 TJR with estimated cost per readmission \$8750= annual savings of \$236250)	Improved patient satisfaction  Improved patient overall health  Reduced patient needs post-operatively (nursing phone calls, unplanned office visits, wound management needs, etc.).
<b>Net Benefits</b>	Total benefits- total costs  \$236,250-\$8,700	= \$227,550
<b>Benefit-cost Ratio</b>	Total benefits divided by total costs  \$236,250/\$8,700=27	For every one dollar spent 27 will be saved

Appendix I Press Ganey Tool

SAMPLE

NURSE/ASSISTANT

- 1. Friendliness/courtesy of the nurse/assistant
2. Concern the nurse/assistant showed for your problem

Comments (describe good or bad experience):

CARE PROVIDER

DURING YOUR VISIT, YOUR CARE WAS PROVIDED PRIMARILY BY A DOCTOR, PHYSICIAN ASSISTANT (PA), NURSE PRACTITIONER (NP), OR MIDWIFE. PLEASE ANSWER THE FOLLOWING QUESTIONS WITH THAT HEALTH CARE PROVIDER IN MIND.

- 1. Friendliness/courtesy of the care provider
2. Explanations the care provider gave you about your problem or condition
3. Concern the care provider showed for your questions or worries
4. Care provider's efforts to include you in decisions about your treatment
5. Information the care provider gave you about medications (if any)
6. Instructions the care provider gave you about follow-up care (if any)
7. Degree to which care provider talked with you using words you could understand
8. Amount of time the care provider spent with you
9. Your confidence in this care provider
10. Likelihood of your recommending this care provider to others

Comments (describe good or bad experience):

PERSONAL ISSUES

- 1. How well staff protected your safety (by washing hands, wearing gloves, etc.)
2. Our sensitivity to your needs
3. Our concern for your privacy
4. Cleanliness of our practice

Comments (describe good or bad experience):

OVERALL ASSESSMENT

- 1. How well the staff worked together to care for you
2. Likelihood of your recommending our practice to others
3. Our response to concerns/complaints made during your visit
4. Overall rating of care received during your visit
5. Overall cheerfulness of our practice

Comments (describe good or bad experience):

Patient's Name (optional)
Telephone Number (optional)

Thank you! Please return the completed survey in the postage-paid envelope. Return to: Survey Processing, 710 Rush Street, South Bend, IN 46601



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123456789

SAMPLE



CLINICIAN & GROUP CAHPS® SURVEY

SURVEY INSTRUCTIONS: Answer each question by completely filling in the circle to the left of your answer. You are sometimes told to skip over some questions in this survey. When this happens you will see an arrow with a note that tells you what question to answer next, like this: ● Yes → If Yes, go to #1

Please rate the care you received on: Precode 1

Please rate the care you received from: Precode 2 YOUR PROVIDER

- 1. Our records show that you got care from the provider named below. Precode 3 Is that right?
O Yes
O No → If No, go to #29

The questions in this survey will refer to the provider named in question 1 as "this provider." Please think of that person as you answer the survey.

- 2. Is this the provider you usually see if you need a check-up, want advice about a health problem, or get sick or hurt?
O Yes
O No
3. How long have you been going to this provider?
O Less than 6 months
O At least 6 months but less than 1 year
O At least 1 year but less than 3 years
O At least 3 years but less than 5 years
O 5 years or more

YOUR CARE FROM THIS PROVIDER IN THE LAST 12 MONTHS

These questions ask about your own health care. Do not include care you got when you stayed overnight in a hospital. Do not include the times you went for dental care visits.

- 4. In the last 12 months, how many times did you visit this provider to get care for yourself?
O None → If None, go to #29
O 1 time
O 2
O 3
O 4
O 5 to 9
O 10 or more times
5. In the last 12 months, did you phone this provider's office to get an appointment for an illness, injury, or condition that needed care right away?
O Yes
O No → If No, go to #7

- 6. In the last 12 months, when you phoned this provider's office to get an appointment for care you needed right away, how often did you get an appointment as soon as you needed?
O Never
O Sometimes
O Usually
O Always

- 7. In the last 12 months, did you make any appointments for a check-up or routine care with this provider?
O Yes
O No → If No, go to #9

- 8. In the last 12 months, when you made an appointment for a check-up or routine care with this provider, how often did you get an appointment as soon as you needed?
O Never
O Sometimes
O Usually
O Always

- 9. In the last 12 months, did you phone this provider's office with a medical question during regular office hours?
O Yes
O No → If No, go to #11

- 10. In the last 12 months, when you phoned this provider's office during regular office hours, how often did you get an answer to your medical question that same day?
O Never
O Sometimes
O Usually
O Always

- 11. In the last 12 months, did you phone this provider's office with a medical question after regular office hours?
O Yes
O No → If No, go to #13

Please use black or blue ink to fill in the circle completely. Example: ●



continued



SAMPLE



CLINICIAN & GROUP CAHPS® SURVEY

SURVEY INSTRUCTIONS: Answer each question by completely filling in the circle to the left of your answer. You are sometimes told to skip over some questions in this survey. When this happens you will see an arrow with a note that tells you what question to answer next, like this: ● Yes → If Yes, go to #1

Please use black or blue ink to fill in the circle completely. Example: ●

NURSE/ASSISTANT

Table with 5 columns: very poor, poor, fair, good, very good. Rows 1: Friendliness/courtesy of the nurse/assistant, 2: Concern the nurse/assistant showed for your problem.

Comments (describe good or bad experience):

CARE PROVIDER DURING YOUR VISIT, YOUR CARE WAS PROVIDED PRIMARILY BY A DOCTOR, PHYSICIAN ASSISTANT (PA), NURSE PRACTITIONER (NP), OR MIDWIFE. PLEASE ANSWER THE FOLLOWING QUESTIONS WITH THAT HEALTH CARE PROVIDER IN MIND.

Table with 5 columns: very poor, poor, fair, good, very good. Rows 1-10: Friendliness/courtesy of the care provider, Explanations the care provider gave you about your problem or condition, Concern the care provider showed for your questions or worries, Care provider's efforts to include you in decisions about your treatment, Information the care provider gave you about medications (if any), Instructions the care provider gave you about follow-up care (if any), Degree to which care provider talked with you using words you could understand, Amount of time the care provider spent with you, Your confidence in this care provider, Likelihood of your recommending this care provider to others.

Comments (describe good or bad experience):

PERSONAL ISSUES

Table with 5 columns: very poor, poor, fair, good, very good. Rows 1-4: How well staff protected your safety (by washing hands, wearing gloves, etc.), Our sensitivity to your needs, Our concern for your privacy, Cleanliness of our practice.

Comments (describe good or bad experience):

OVERALL ASSESSMENT

Table with 5 columns: very poor, poor, fair, good, very good. Rows 1-5: How well the staff worked together to care for you, Likelihood of your recommending our practice to others, Our response to concerns/complaints made during your visit, Overall rating of care received during your visit, Overall cheerfulness of our practice.

Comments (describe good or bad experience):

Patient's Name (optional)

Telephone Number (optional)

Thank you! Please return the completed survey in the postage-paid envelope. Return to: Survey Processing, 710 Rush Street, South Bend, IN 46601



123456789-1  
Precode 1  
Precode 2  
Precode 3



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123456789

Please rate the care you received on: Precode 1

Please rate the care you received from: Precode 2 YOUR PROVIDER

1. Our records show that you got care from the provider named below.

Precode 3

Is that right?

○ Yes  
○ No → If No, go to #29

The questions in this survey will refer to the provider named in Question 1 as "this provider." Please think of that person as you answer the survey.

2. Is this the provider you usually see if you need a check-up, want advice about a health problem, or get sick or hurt?

○ Yes  
○ No

3. How long have you been going to this provider?

- Less than 6 months
- At least 6 months but less than 1 year
- At least 1 year but less than 3 years
- At least 3 years but less than 5 years
- 5 years or more

YOUR CARE FROM THIS PROVIDER IN THE LAST 12 MONTHS

These questions ask about your own health care. Do not include care you got when you stayed overnight in a hospital. Do not include the times you went for dental care visits.

4. In the last 12 months, how many times did you visit this provider to get care for yourself?

- None → If None, go to #29
- 1 time
- 2
- 3
- 4
- 5 to 9
- 10 or more times

5. In the last 12 months, did you phone this provider's office to get an appointment for an illness, injury, or condition that needed care right away?

○ Yes  
○ No → If No, go to #7

6. In the last 12 months, when you phoned this provider's office to get an appointment for care you needed right away, how often did you get an appointment as soon as you needed?

- Never
- Sometimes
- Usually
- Always

7. In the last 12 months, did you make any appointments for a check-up or routine care with this provider?

○ Yes  
○ No → If No, go to #9

8. In the last 12 months, when you made an appointment for a check-up or routine care with this provider, how often did you get an appointment as soon as you needed?

- Never
- Sometimes
- Usually
- Always

9. In the last 12 months, did you phone this provider's office with a medical question during regular office hours?

○ Yes  
○ No → If No, go to #11

10. In the last 12 months, when you phoned this provider's office during regular office hours, how often did you get an answer to your medical question that same day?

- Never
- Sometimes
- Usually
- Always

11. In the last 12 months, did you phone this provider's office with a medical question after regular office hours?

○ Yes  
○ No → If No, go to #13

continued...

SAMPLE

<b>Appendix J</b>			
<b>Cardiovascular Risk Assessment</b>			
<p>ACC/AHA Circle level of activity patient is able to perform</p>	<p>1 MET Self-care</p> <p>Eating, dressing, or using the toilet</p> <p>Walking indoors and around the house</p> <p>Walking one to two blocks on level ground at 2 to 3 mph</p>	<p>4 MET Light housework (e.g., dusting, washing dishes)</p> <p>Climbing a flight of stairs or walking up a hill</p> <p>Walking on level ground at 4 mph</p> <p>Running a short distance</p> <p>Heavy housework (e.g., scrubbing floors, moving heavy furniture)</p> <p>Moderate recreational activities (e.g., golf, dancing, doubles tennis, throwing a baseball or football)</p>	<p>Greater than 10 METS Strenuous sports (e.g., swimming, singles tennis, football, basketball, skiing)</p>
<p>Is patient taking any of the following medications? Circle any patient is taking.</p>	<p>Nitrates, digitalis, or phenothiazines</p>		
<p>Does the patient report history of:</p>	<p>Uncontrolled angina in the last 6 months</p>	<p>Cardiomyopathy severe enough to compromise cardiac functioning</p>	

Appendix K Prehabilitation Exercise Log			
Date of Exercise	Comments	Location	
		Home	YMCA
WK 1			
WK 2			
WK 3			
WK 4			

### Why Not Try Prehabilitation?

Exercise and physical activity are good for just about everyone, including older adults. There are four main types and each type is different. Doing them all will give you more benefits.

- Endurance, or aerobic, activities increase your breathing and heart rate. Brisk walking or jogging, dancing, swimming, and biking are examples.
- Strength exercises make your muscles stronger. Lifting weights or using a resistance band can build strength.
- Balance exercises help prevent falls
- Flexibility exercises stretch your muscles and can help your body stay limber

*NIH: National Institute on Aging*

To ensure the best possible outcome, you can prepare yourself for surgery with prehabilitation, which is defined as physical and/or lifestyle preparation designed to improve recovery time following surgery.

According to the National Institutes of Health, “By improving an individual’s functional capacity through increased physical activity before an anticipated orthopaedic procedure, it seems reasonable to assume that the individual will maintain a higher level of functional ability and rebound more rapidly in the rehabilitation process. Prehabilitation is the process of enhancing functional capacity of the individual to enable him or her to withstand the stressor of inactivity associated with an orthopaedic procedure. A generic prehabilitation program incorporates the components of warm-up, a cardiovascular component, resistance training, flexibility training, and practicing functional tasks.”

Doing pre-surgery exercises for knee surgery, for example, can speed recovery time and reduce the need for in-patient rehabilitation after surgery



### **Hip extension (kick backs), standing**

Begin by looping the middle of the band around the ankle of the exercising leg. Place the ends of the band under the opposite foot to stabilize the band and hold onto the ends. Keeping the knee straight, extend the leg backwards against the band. Hold and slowly return.

*Tip:* Keep your back straight; don't lean over.



### **Ankle calf raise, standing**

Place the middle of the band under the balls of both feet. Hold onto the ends of the band near the hips. Keeping the elbows straight, raise your heels off the floor. Hold and slowly return.



### **Ankle dorsiflexion (foot raises), sitting**

Begin by wrapping the middle of the band around the foot of the ankle that will exercise. Place the ends of the band under the opposite foot to stabilize the band. Hold onto the ends of the band near the knee. Lift your foot upward against the band. Hold and slowly return.



### **Step-up**

Step up onto stairs or steps facing forward. Use the railing or other sturdy object for balance if needed.



### **Lateral step-up**

Step up onto stairs or steps facing the side. Use the railing or other sturdy object for balance if needed.



### Chair squat

Begin with center of band under feet. With hands at sides, grasp ends of bands. Keeping your elbows straight, slowly bend your knees while leaning forward slightly at the hips. Maintain tension in the band. Slowly return to starting position.

*Tip:* Keep your back straight.



### Knee curl, standing

Begin by looping the center of the band around the ankle of the exercising leg. Bring the ends of the band underneath the foot of the opposite leg to stabilize, and hold onto the ends near the knee. Slowly bend the knee, pulling upward against the band. Hold and slowly return.



### Hip abduction (kick outs), standing

Begin by looping the middle of the band around the ankle of the exercising leg. Place the ends of the band under the opposite foot to stabilize the band and hold onto the ends. Keeping the knee straight, kick the leg outward against the band. Hold and slowly return.

*Tip:* Keep your back straight; don't lean over.



### Hip adduction

Securely attach one end of the band to a sturdy object, loop the band above the exercising ankle, then fasten the remaining end securely. Keeping the knee straight, bring the exercising leg inward toward the opposite leg. Hold and slowly return. Use a sturdy object nearby for balance if needed.



### Hip flexion, sitting

Sit in a sturdy chair. Begin by looping the center of the band around the top of the knee of the exercising leg. Bring the ends of the band underneath the foot of the opposite leg to stabilize and hold onto the ends near the knee. Slowly flex the hip against the band, pulling upward. Hold and slowly return.

*Tip:* Keep your back straight; don't lean forward.

## Appendix L

### Consent and Authorization for Quality Improvement Project **Participation In A Prehabilitation Program for the Total Joint Patient**

Principal Investigator: Pamela Fields, RN, BSN, FNP-C, MSN, DNP (candidate)

Co-Investigator: Molly Prengaman, MSN, FNP-C, PhD (candidate)

#### 1. General Information

- a. You are invited to be in a quality improvement project. Before you decide, it is important for you to understand why the quality improvement project is being done. Please take time to read the following information and talk about it with friends and family if you wish. Ask the researchers if you are unclear about any part of the project.

#### 2. Purpose

- a. You are being asked to be in this quality improvement project because you are planning a joint replacement surgery within the next 8 weeks. This project will help project leaders determine if participation in a prehabilitation program improves patient satisfaction, reduces post-operative readmission rates and reduces the post-operative infection rate compared to those who do not participate in a prehabilitation program.

#### 3. Procedures

- a. As a participant, you will be asked to participate in a strength and cardiovascular physical exercise routine at the YMCA wellness center at least once weekly with the assistance of a physical trainer from the YMCA. You will also be asked to perform the same routine at your home. The goal is three sessions weekly either monitored or at home with at least once weekly participation at the YMCA up until your surgery. Your medical chart will be reviewed and data such as height, weight, gender and age will be collected and stored privately for comparison to the control group. You will be asked to respond to a patient satisfaction survey on week 5-6 of your post-operative course.
- b. If you are not able to participate in the prehabilitation program, but you have provided consent to be a control subject, you will continue with your normal lifestyle and you will provide responses to the patient satisfaction survey on week 5-6 post-operation. Your medical chart will be reviewed and data such as height, weight, gender and age will be collected and stored privately for comparison to the participant group.
- c. The project team members are not being paid to perform this evaluation.

#### 4. Number of People

- a. The project leaders expect to include 50 people in this quality improvement project.

#### 5. Risks, Discomforts and/or Potential Side Effects

There are minimal risks involved with the addition of prehabilitation. Persons who do not regularly participate in exercise may be at increased risk of cardiovascular event when starting a

new exercise program. The project leader has screened you and you have been found to have low probability for cardiac events based on the American College of Cardiology/American Heart Association guidelines on perioperative risk for non-cardiac surgery.

- a. Being in this quality improvement project, however, may involve risks that we do not know about or can predict. Patients who do not frequently exercise may have soreness of muscles or joint stiffness. The risks involved in traveling to the YMCA for training are similar to normal daily activities. You will be encouraged to keep well hydrated.
- b. Every consideration to avoid possible breach of confidentiality will be performed, including privacy in the office and secure storage of electronic data.

#### **6. Benefits**

- a. We cannot promise benefits to you for being in this quality improvement project. But possible benefits may include weight loss, improved satisfaction, and reduced post-operative risks.

#### **7. Costs & Payments**

- a. There will be no cost to you for your visits with the YMCA trainer. The project team leaders will provide you with one \$40.00 gift card to use for travel costs. The cost of your surgical intervention, hospitalization and other medical expenses will be billed to you or your insurer in the usual way.

#### **8. Alternative Treatment**

- a. You do not have to participate in this quality improvement project or you may choose to participate as a control subject. Your care and your relationship with your providers will not be affected in any way if you choose not to be in the quality improvement project.

#### **9. New Information**

- a. You will be told about any new information that becomes known during the quality improvement project. If you decide to stop being in the quality improvement project after learning about the new information you can still receive the usual care that is available to you.

#### **10. Removal from Quality Improvement Project**

- a. The team leader may remove you from the quality improvement project without your approval if it is determined that your safety or the safety of the staff is at risk.

#### **11. Voluntary Participation**

- a. Being in the quality improvement project is voluntary. If you decide to participate, you may stop at any time and without giving a reason.
- b. Your decision not to be in or stop being in the quality improvement project will not affect your care or your benefits in any way. You will still receive the usual care that is available to you and it will not affect the relationship you have with your care providers.
- c. If you decide to stop being in the quality improvement project, please contact June Goering, RN at (208) 377-0777. Ceasing participation early is not thought to have any side effects.

#### **12. Contact Information**

- a. You may call the team leader Pamela Fields MSN, FNP-C about any part of this quality improvement project at (208) 377-0777.



- b. If you think you may have been injured from being in this quality improvement project, please call (208) 377-0777 and speak to June Goering, RN

### **13. Confidentiality**

- a. All information in this quality improvement project is kept confidential. The paper patient satisfaction surveys will be converted to computer images and these images will be stored on the secure Saint Alphonsus database. Only people who work on this quality improvement project will have access to your information. For this quality improvement project, the project leaders are requesting demographic information. Due to the make-up of Idaho's population, the combined answers to these questions may make one individual person identifiable. The project leaders will make every attempt to protect your confidentiality. However, if you are uncomfortable answering any of these questions, you may leave them blank.
- b. Results of this quality improvement project may be presented or published. Your identity will not appear in any publication or presentation.
- c. People from the Saint Alphonsus research department, may inspect records that identify you. Your name and other identifying information will be kept private. The quality improvement project team will do everything they can to keep your records private, but cannot guarantee this.

### **14. Your Rights**

- a. If you have any concerns about your rights as a participant or wish to discuss problems about the quality improvement project you do not feel you can discuss with the project leader, please call the Saint Alphonsus Research Integrity Office at (208) 367-8897.

### **15. Project Related Injury**

- a. If you are injured from being in this quality improvement project, medical care is available to you at any medical facility of your choosing. Minor issues may be treated in a non-urgent fashion at the Saint Alphonsus Medical Group Hip and Knee Reconstruction Clinic.
- b. Saint Alphonsus does not have a program to pay you if you are hurt or have other bad results from being in the quality improvement project. The costs for any treatment or hospital care would be charged to you or your insurance company.

### **16. Authorization for use of Your Protected Health Information**

- a. You are being asked to authorize Boise State Doctorate of Nursing Program and Saint Alphonsus Regional Medical Center and its medical staff to use and/or disclose your health information for quality improvement project purposes. Consistent with state and federal laws concerning the privacy of health information, Saint Alphonsus is requesting your authorization to use and/or disclose your health information as part of a performance improvement project that may include providing you with treatment. This health information may include but is not limited to age, weight, height, gender, rates of satisfaction and post-operative complications and readmissions.
- b. Others who may have access to this information for this quality improvement project include, but are not limited to the Saint Alphonsus Institutional Review Board, Food and Drug Administration (FDA), the Office of Civil Rights (OCR), the Office for Human Research Protection (OHRP), or authorized people at Saint Alphonsus Medical Group Hip and Knee Reconstruction clinic.

- c. If the person or organization that receives your health information is not a health care provider or a health plan covered by federal privacy regulations, your health information above may be re-disclosed and no longer protected by these regulations.
- d. This Authorization is in effect until it is revoked or it expires.
- e. Please understand that you may refuse to sign this authorization. You may revoke this Authorization at any time by sending written notification of your decision to the following address, except to the extent that action has been taken in reliance on this Authorization:

Saint Alphonsus Regional Medical Center  
 Attn: HIPAA Privacy Officer  
 Organizational Integrity Program  
 1055 N. Curtis Road, Boise, Idaho 83705

- f. You may inspect and/or copy any of your health information that is used or disclosed under this authorization.
- g. Access to this information may be suspended until the completion of the performance improvement project.
- h. Revoking this authorization may result in the quality improvement project related treatment being provided you to end.

**17. Patient Consent**

- A. I understand that my participation in this quality improvement project is entirely voluntary and that I have the right to refuse to continue if I so desire without any fear of prejudice to my future medical treatment. My signature below indicates that I have decided to participate in the quality improvement project after having been advised of the risks, benefits and alternatives and having read the information provided, and having had the opportunity to ask and have my questions answered.
- B. I understand that the information collected during this study will remain confidential, and I acknowledge the possibility that the National Institute of Health, Food and Drug Administration, or other sponsors may inspect the records.
- C. I understand that a copy of the consent and authorization form I am signing will be returned to me.

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Participant name (printed)

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Participant Signature

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Date

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Name of Person Obtaining Consent/Authorization

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Signature of Person Obtaining Consent/Authorization

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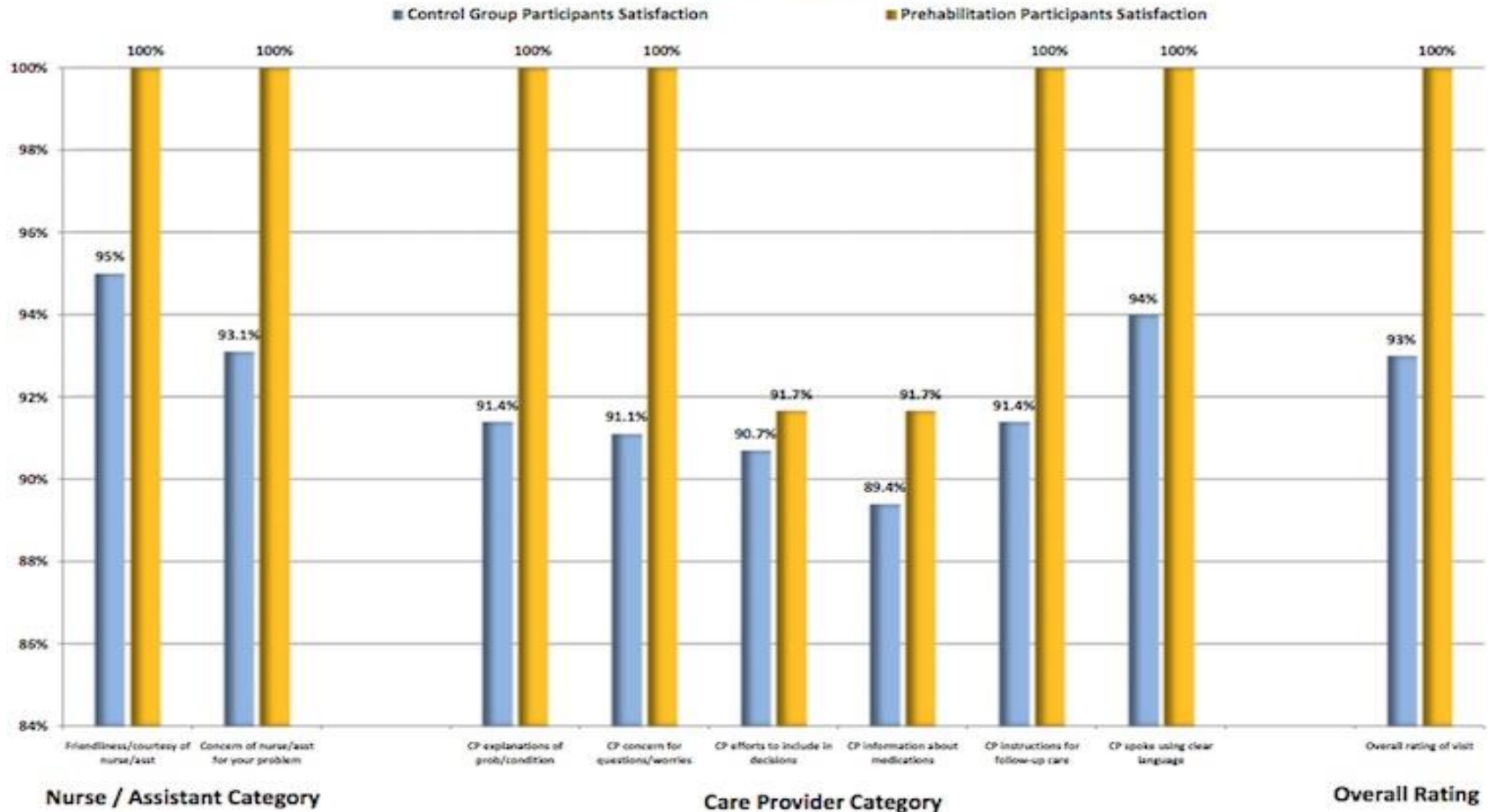
Date

Appendix M						
Participant Data						
	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6
Demographics (Age, Gender, BMI)	64/F/41	60/F/31	/M	55/M/50	52/F/42	67/M/32
Pertinent past medical history	Gastric bypass	HTN, GERD, Hypothyroidism, Anxiety		HTN, sleep apnea, hypotestosteronism	Asthma, COPD, HTN, Tobacco use 1 pack per day	HTN/Insulin dependent DM
Surgery performed	TKA	THA	None	TKA	TKA	TKA
Times participating (total, with trainer, at home or gym on own)	10/0/10	13/4/9	0/0/0	29/5/24 (4 at gym without trainer)	25/0/25	0/0/0
Prehabilitation program participants will experience a lower rate of post-operative infections than non-participants in the 12-week post-operative period	No post-operative infection	No post-operative infection	No data The participant did not participate and did not have surgery	No post-operative infection	Patient was re-admitted in 30 day post-operative time for cellulitis, not related to surgery	No data, participant did not schedule prehabilitation program appointments
There will be fewer readmissions for the prehabilitation participant population with comparison to the general population of primary joint replacement patients during the 12-week post-operative period.	No 90 day readmission	No 90 day readmission	No data The participant did not participate and did not have surgery	No 90 day readmission	Patient was re-admitted in 30 day post-operative time for cellulitis, not related to	No 90 day readmission

					surgery	
Participants will report greater satisfaction than the non-participants report at the 5-6 and 12-week week follow up visit.	No data received	See Appendix N as PGPST was anonymous	No data The participant did not participate and did not have surgery due to cardiac event prior to surgery	See Appendix N as PGPST was anonymous	See Appendix N as PGPST was anonymous	No data received
<p>Chronic obstructive pulmonary disease (COPD)</p> <p>Hypertension (HTN)</p> <p>Diabetes Mellitus (DM)</p> <p>Gastroesophageal reflux disease (GERD)</p>						







Appendix N Patient Satisfaction Data







**Patient satisfaction comparison between Control Group Participants and Prehabilitation Participants**



**Patient satisfaction comparison between Control Group Participants and Prehabilitation Participants**

	Control Group Participants Satisfaction	Prehabilitation Participants Satisfaction
<b>Nurse/Assistant</b>		
Friendliness/courtesy of nurse/asst	95%	100%
Concern of nurse/asst for your problem	93.1%	100%
<b>Care Provider</b>		
CP explanations of prob/condition	91.4%	100%
CP concern for questions/worries	91.1%	100%
CP efforts to include in decisions	90.7%	91.7%
CP information about medications	89.4%	91.7%
CP instructions for follow-up care	91.4%	100%
CP spoke using clear language	94%	100%
<b>Overall Assessment</b>		
Overall rating of visit	93%	100%

<b>Appendix O</b>			
<b>Project Score Card</b>			
<b>Outcome(s)</b>	<b>Intervention</b>	<b>Goal Measure</b>	<b>Project Completion Data</b>
#1 Enrollment	Enroll 25 participants and 25 comparison group	100%	24% of expected 
#2 IRB Approval	Apply for and receive IRB approval for project	Approval	Approval Received 
#3 Patient Satisfaction	Participants complete Press Ganey for scoring of satisfaction	75%-80% satisfaction rates reported	100% 
#4 Readmission Rates	Review PowerChart for all-cause readmission rate for comparison (4.6%) and participant groups	Decrease readmission rate by 1%	24% readmission rate 
#5 Deep Joint Infection	Review PowerChart for deep infection readmission rate for comparison (0.8%) and participant groups	Decrease deep infection rate by 1%	0% Deep infections 
#6 YMCA Contracting	Secure participation from YMCA	Successful partnership	Partnership secured 

#7 YMCA Check in and participation process	Participants receive the same check in and exercise process	100%	Check in was ammended, for flow and 100% of participants did receive same exercises 
#8 Exercise Log	All participants receive the exercise log	50% complete and return the log	100% received 100% returned 
#9 Prehabilitation Participation	Implement patient enrollment process for exercise regimen	50% of participants complete the program	50% completed 
#10 Prehabilitation Education	Distribute educational flyers to all PP and CGP	100% of participants receive prehabilitation information	100% 
#11 Follow up appointments	Schedule and contact participants for scheduled post-operative follow up appointments	90% of participants keep follow up appointments	100% kept follow up appointments 
#12 Communication	Query the database for the results of the Press Ganey Patient Satisfaction surveys.	85% of participants report ease of communication	100% of participants reported higher levels of communication (Appendix M) 
#13 Funding	Develop an expense budget for transparent reporting of fund disbursement to stakeholders	The successful budget management and program implementation will lead to future funding by the stakeholders	The budget was maintained, and plans for expansion of the program are supported by the administration. 