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# Implementation of the State Avoidable Rehospitalizations (STAAR) Initiative in a NP-led Transitional-Care Program to Reduce Readmission Rates and to Provide Safe Transitional Care in Post-Cardiac Surgery Patients: A Quality Improvement Project

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Implementation of the State Action Avoidable Rehospitalizations (STAAR)  
Initiative in a NP-Led Transitional-Care Program to Reduce Readmission Rates and to  
Provide Safe Transitional Care in Post-Cardiac Surgery Patients:  
A Quality Improvement Project

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## Abstract

*Background:* Readmissions after cardiac surgery are often preventable, costly, and potentially life-threatening events. Hospital readmissions may be influenced by low health literacy and ineffective transitional care. The Centers for Medicare and Medicaid Services have included reducing hospital-bundled payment for frequent occurrence of readmissions and episodic care after coronary artery bypass grafting in 2017. *Purpose:* This Quality Improvement project explored the impact of applying the STAAR initiative to reduce unplanned readmissions, and to provide safe transitional care in post-cardiac surgery patients. *Design/Methods:* This was a QI project design with educational and observational methods. The DNP student used the transitional-care toolkit by applying the process of the Plan-Do-Check-Act cycle.

*Implementation Plan/Procedure:* Application of the STAAR initiative as a transitional-care program provided a patient-centered approach. Participants were recruited from the patients' cardiac surgery log who met the inclusion criteria from October 2, 2017 to January 2, 2018 at a tertiary facility in New York City (NYC). Quantitative and qualitative data analyses were compared and analyzed as to whether the STAAR interventions have an impact in providing safe transition and reducing unplanned readmission. *Results/Interpretations:* After 3 months of implementing the STAAR initiative, the readmission rates were lowered from 16.3% to 5%. A z-test, one-tailed yielded at  $p < 0.05$  value, which was statistically significant.

*Implications/Conclusions:* The Advanced Practice Nurse was successful in supporting the transitional-care program. Education was the key of the transitional care. It improved health literacy, increased medication adherence, and it lowered unplanned readmission.

*Keywords:* readmission, transitional care, cardiac surgery, discharge planning, teach-back, and health literacy.

## **Introduction**

Implementation of the State Action Avoidable Rehospitalizations (STAAR) Initiative was the core of a nurse practitioner (NP)-led transitional program to reduce readmission rates and to provide safe transitional care in post-cardiac surgery patients.

Readmissions cause a burden to the United States (US) healthcare system and are cumbersome for the patients. For those reasons, readmissions have become a national priority. Readmission is defined as a successive hospital admission within 30 days after the original hospitalization (Hines, Barrett, Jiang, & Steiner, 2014). According to the Center of Health Information and Analysis (CHIA), the yearly cost of the readmission crisis for the Centers for Medicare and Medicaid Services (CMS) is about \$26 billion, of which \$17 billion is preventable (CMS, 2016c). As stated by Jencks, Williams, and Coleman (2009), one in five Medicare patients is readmitted within 30 days. This care transition crisis costs US hospitals approximately \$17.4 billion every year (Jenks et al., 2009). Reports indicate that almost 20% of the 11.8 million Medicare beneficiaries discharged in 2009 were readmitted within 30 days as well (Jencks et al., 2009). Rehospitalizations among elders represent a quarter of all emergency room (ER) visits. Evidence to date suggests that 75% of the readmissions are avoidable (Fields & Wilding, 2013).

Deficiencies of care can cause serious quality and safety concerns during hospital discharge for vulnerable, elderly post-cardiac surgery patients. The US healthcare system has started to prioritize transitional care. The Patient Protection and Affordable Care Act of 2010 (PPACA) improves care coordination and patient outcomes for hospitalized individuals, a major goal to reduce fragmented care and Medicare costs (Wagner et al., 2012). Recently, the CMS expanded the bundled payment penalty in coronary artery bypass graft (CABG) readmission starting in July 2017 (CMS, 2016a).

Even though numerous transitional interventions have been used nationwide, the results have been insignificant in lowering readmission rates in post-cardiac surgery patients. Many hospitals are focusing to implement better strategies to prevent adverse outcomes and reduce hospital readmissions. However, identification and mitigation of barriers can improve policy and payment reforms that will decrease poor coordination of care and rampant readmissions.

## **Background**

In today's healthcare system, the patients are often discharged *earlier and sicker*, which in turn challenges the hospital's healthcare team to adequately prepare and teach patients and their caregivers to care for themselves in the community setting (Coleman & Berenson, 2004; Naylor et al., 2009). Patients who are readmitted sooner are prone to acquiring hospital-based infection, are at a greater risk for complications, and stress (Fingar & Washington, 2015). In order to reduce the adverse events and provide better patient outcomes, growing evidence suggests that advanced practice nursing (APN) as a transitional-care coach is effective in minimizing unnecessary hospital readmissions (Coleman & Berenson, 2004; Naylor et al., 2009).

The post-hospital care gaps are rampant across home settings. Quality initiatives implementation and transitional coaching are required nationally to prevent the increased readmission rate and CMS payment penalty (CMS, 2016b). Readmission is the product of gaps in the care given by the hospital and transition process (Coleman, 2003; Jencks et al., 2009). Thus, evidence is growing that patient safety is compromised (Coleman & Berenson, 2004; Peikes, Lester, Gilman, & Brown, 2012). Consequently, hospital readmissions are frequent, costly, and yet preventable.

Transitional care is an essential part of continuity of patient care from hospital to home. After the patient is discharged home, persons begin to have self-care responsibility. This is a



daunting task for both patient and caregiver. In addition, it is imperative that healthcare practitioners stay focused to render optimal care during the transition period. Suboptimal discharge planning can result in preventable readmissions. Many organizations, such as the Hospital Quality Alliance and Institute for Healthcare Improvement (IHI), believe that the readmission rates should be categorized as quality indicators and mention that some of the post-cardiac surgery complications are preventable (Allen & Rumsfeld, 2014; National Quality Forum [NQF], 2004).

Hospital discharge planning is designed to provide comprehensible, timely, and easy-to-follow information or instructions to the patient and caregivers (Tilson & Hoffman, 2012). The process starts in the healthcare facility by addressing the need for post-discharge care and coordinating with families and healthcare providers upon discharge. Hence, the discharge processes ensure safety and good quality of care. Therefore, the discharge process is meticulously done to avoid adverse events and unplanned rehospitalization. The hospital personnel who provide different instructions upon discharge are numerous, leading to confusion and frustration for patients and caregivers. Thus, the need is critical for a transitional coach who can reinforce teaching about warning signs or "red flags" (e.g., wound drainage, fever, overall worsening conditions) to avoid premature emergency department (ED) visits (Coleman, Parry, Chalmers, & Min, 2006).

Additionally, low health literacy can pose a threat to a patient's safety and outcomes (Nielsen-Bohlman, 2004). Health literacy refers to a person's ability to understand and retain basic information and services (Weiss, 2007). As discussed by Weiss, about 90 million Americans have difficulty understanding medical facts given by healthcare professionals. Kornburger, Gibson, Sadowski, Maletta, and Klingbeil (2013) describe the teach-back process as

a comprehensive and evidence-based plan that allows nursing staff to clarify instructions, reinforce medication teaching, and teach new skill sets for patient and families at home. Experts state that since the patients have no clear idea about their discharge or follow-up needs, they may be reluctant to adhere with their discharge instructions (Peter et al., 2015). Using the "teach-back" method during hospitalization can improve the transition to home and can provide a safe discharge (Kornburger et al., 2013).

Coronary artery bypass graft (CABG) is one of the most expensive procedures, with mean charges of nearly \$100,000 (Lloyd-Jones et al., 2009). Evidence is mounting that during the post-hospitalization period older adults are at higher risk for adverse events and even death (Coleman et al., 2006). Serious deficiencies in care occur at home, such as poorly executed transitions from one healthcare to another, poor communication between patient and health providers, medication errors, insufficient follow-up with primary care or specialist, and poor self-management (Coleman et al., 2006; Naylor & Keating, 2008; Naylor et al., 2009).

Furthermore, CABG readmissions remain a challenge. According to Hannan et al. (2011), 15.3% of all post-CABG patients discharged home are readmitted within 30 days and 12.9% are readmitted related to the complication of cardiac surgery. Despite efforts to limit readmission rates for older adults coping with post-cardiac surgery and complex conditions, gaps in care persist. Hence, the DNP student applied the best practice for transitional care in post-cardiac surgery patients in reducing unplanned readmissions and providing safe transitional-care coordination.

### **Problem Statement**

The risk of hospital readmission among post-cardiac surgery patients aged 45–75 is caused by incomplete discharge planning, overall low health literacy of patients, and ineffective

systems of transitional care. Despite several transitional programs for cardiac patients, the outcomes are insignificant in preventing readmission for post-CABG patients, as evidenced by lack of early follow-up and low health literacy. The impetus exists to find the ultimate transitional program for post-cardiac surgery patients to deter unplanned readmission and to improve patient outcomes. Therefore, the purpose of this project was to improve transitional care, provide safe transition to home for the patient and families, and to lower the risk of readmission.

### **Organizational "Gap" Analysis of Project Site**

The targeted facility for this project uses broad discharge instructions that have minimal teach-back and poor medications reconciliation. Furthermore, in previous years, the readmission trend in the cardiac service has been about five patients in 30 days. In addition, the hospital uses the LACE tool, which stands for (L) length of stay, (A) acuity of admission, (C) comorbidity, and (E) emergency department visits in the 6 months before admission. The LACE index tool (see Appendix A) is a general tool to predict readmission risks within 30 days, the use of which is led by case managers (Wang et al., 2014). However, the LACE is not accurate in predicting the post-cardiac patients as most of these patients are at risk of readmission without proper transitional care at discharge (El Morr, Ginsburg, Nam, & Woollard, 2017). Additionally, no designated personnel are available to discharge patients on time and perform the teach-back method of the new skill for patient and family to learn. No one receives phone calls when patients have questions or concerns after office hours. Instead, patients present to the ED and receive trivial treatment such as adjustment of medications, post-op pain medication, and wound evaluation.

### **Review of the Literature**

A comprehensive literature search was performed by using PubMed, Google Scholar, Elton B. Stephens Company (EBSCO), Medline, Cumulative Index to Nursing and Allied Health (CINAHL), and Word catalog. Moreover, the New York Medical Center Library and University of Massachusetts Library were utilized for the subsequent search for full-text articles. The DNP student requested articles from both libraries to ascertain full article copies.

The keywords used in the initial research were *readmission*, *transitional care*, *cardiac* and *cardiac surgery*. Additional research was conducted to narrow down the target population to adults, CABG, health literacy, transitional coach, transitional-care program, and home planning

### **Inclusion and Exclusion Criteria**

The inclusion criteria included (a) publication dates limited to 2000 to 2017, (b) adult subjects, (c) journal written in English, (d) prioritized studies done in the US, (e) studies that considered readmission following CABG, (f) peer-reviewed, and (g) studies that made recommendations in transition from hospital to home following CABG or other heart surgeries. Exclusion criteria included articles that (a) were written in foreign languages, (b) used pediatric subjects, (c) were published prior to 1999, (d) had no recommendation for CABG patients, (e) duplicate articles, and (e) scored low on the evidence level.

The proposed QI project considered the results with statistical significance and chose articles with evidence levels from I to III based on Johns Hopkins Nursing evidence-based practice level (Newhouse, Dearholt, Poe, Pugh, & White, 2005). The studies were randomized, prospective cohort, and semi-controlled methods. The initial count found was 354 articles from PubMed, which was filtered down to the search criteria, leading to 50 articles. Eventually, 35 articles were used for cross-referencing. The DNP student assessed each article's abstract and if

needed read the full-text. Many articles on readmissions related to CABG and cardiac surgery were searched from Google Scholar. The DNP student eliminated articles whose subjects had advanced congestive heart failure, were discharged to rehabilitation or nursing home, or had end-stage diseases. Twenty articles were chosen on readmission-reduction programs in post-cardiac surgery, but only 12 were selected based on the strongest clinical evidence. The final count of the literature review yielded 12 articles that are randomized controlled trial (n = 6), retrospective cohort (n = 4), and comparative studies (n = 2). The different interventions were compared and selected based on the best evidence intervention in reducing readmission rates.

The DNP student used the Appraisal of Guidelines for Research and Evaluation (AGREE II) tool in analyzing and evaluating the relevant articles (Brouwers et al., 2010). The tool consists of 23 items comprised of six quality-related domains (Brouwers et al., 2010). According to AGREE II, the domains are the following: scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. A novice researcher can use the AGREE II tool because of its simplicity and adaptability. Two global ratings are given after each domain is scored. Each of the domains and the global ratings are scored on a 7-point scale. The rating is from 1 (strongly disagree) to 7 (strongly agree), and the final score is calculated to percentage (Brouwers et al., 2010). Moreover, the DNP student followed the tool's guidelines and rated them before adopting its recommendations.

### **Models and Evidence of Effectiveness**

Several transitional models are used for older adults with chronic illness such as chronic heart failure (CHF), and chronic obstructive pulmonary disease (COPD) that have varied outcomes in readmission rates reduction. Both the Transitional Care Model (TCM) and the Care Transitions Intervention (CTI) are peer reviewed and facilitated by trained professionals

(Coleman et al., 2006; Naylor et al., 2009). In addition, the TCM consistently improved patient outcomes and reduced healthcare costs, especially for those who engaged with telephonic interventions (Brooten, Youngblut, Deatrick, Naylor, & York, 2003). Since the APNs have in-depth knowledge and clinical skills in assessing acute issues, they can avert preventable readmission (Brooten et al., 2002). These two models are for older adults with chronic illnesses and complex treatments (Coleman et al., 2006; Naylor et al., 2009). Both interventions are comprehensive and most intensive in bridging the gaps of care during transition periods. Both models develop specific care plans and tend to follow up patients within 48 hours after discharge with phone calls and home visits that provide teaching on the patient's disease management and how to recognize medical warning signs (Coleman & Berenson, 2004). Moreover, in CTI the goals are to empower patients and families and to improve quality and safety (Coleman, Parry, Chalmers, Chugh, & Mahoney, 2007). Likewise, the CTI study in 2006 also used transitional coaches led by an APN and resulted to lower readmission rates after 30 days (Coleman et al., 2006). While the 2009 study used a trained RN as a transition coach (TC), it also had lowered rehospitalizations at 30 and 90 days (Parry, Min, Chugh, Chalmers, & Coleman, 2009).

### **Home Visits**

Two prospective cohort studies were done in the same hospital system in New York. The first study deployed the hospital NPs to do home visits. This transitional program was called *Follow Your Heart* (Hall et al., 2014). It improved continuity care for post-CABG patients after home discharge. In addition, it reduced the readmission and death rates after CABG (Hall et al., 2014). The other study used the hospital physician's assistants (PA) to provide home care services for post-CABG patients. It had a significant 25% readmission reduction for the

intervention group on infection, cardiac, and pulmonary symptoms (Nabagiez, Shariff, Khan, Molloy, & McGinn, 2013).

### **Telephonic and Telemonitoring Interventions**

The other study done with the transitional case management (TCM) program has proven to reduce patient readmissions within 7 days of discharge in medical surgical floors compared to nonparticipants (Ahmed & Rak, 2010). The TCM program was led by case managers to educate and teach patients and their caregivers. The main implementation for TCM is telephonic (Ahmed & Rak, 2010). In contrast, another study compared three groups a nursing telephone follow-up, telemonitoring, and a usual care group and did not find any difference among the groups in unplanned hospital readmissions for heart failure patients (Bowles, Holland, & Horowitz, 2009).

### **Multi-Programs**

The STAAR approach has proven to be successful in lowering readmission in CABG patients to 14% (Bates, O'Connor, Dunn, & Hasenau, 2014). According to the IHI, the STAAR has the triple aim in improving quality of care, patient experience, and population health (Boutwell, Jencks, Nielsen, & Rutherford, 2011). Meanwhile the other programs are Project Re-engineered Discharge (RED) and Better Outcomes for Older Adults Through Safe Transitions (BOOST), both of which focused on reducing readmission rates for older adults. The Project RED used a discharge advocate (DA) to educate and enhance post-hospitalization with the emphasis on patient and family within 2 to 3 days after discharge (Jack et al., 2009). The BOOST model identified the high-risk older patients during the admission process, and it lowered the 30 days readmission by 2% (Hansen et al., 2013). Additionally, the Enhanced Discharge Planning Program (EDPP) was led by social workers to call and follow up the patient after 2 days of discharge. The EDPP group was assessed for any further needs while the usual

care group received conventional care. The program had no difference in rehospitalizations after 30 days (Altfeld et al., 2013).

### **Summary of Transitional Models**

The different types of transitional models targeted older adults with comorbidities and CABG patients. Since CABG populations are complex and chronic patients, they deserve an interest in improving quality and surveillance. The CMS launched the penalty on episodic readmission up to 90 days after hospitalization for CABG in 2017. Many plans have been applied to identify the best practices and to monitor the trends in hospital readmission rates.

Furthermore, there is a need to find the best-suited personnel as a transitional-care coach. These studies reviewed the current interventions and the use of different DAs. However, none stood out as the most effective in reducing rehospitalizations and improving patient outcomes for CABG patients. So far, the program that has been tested with post-cardiac surgery patients is implementation of the STAAR initiative, which had a good outcome in reducing preventable readmission. Although it entails a few challenges first, the interventions are difficult and tedious to execute; second, the uncertainty of its effectiveness can prolong the adaptation; and last, the results of the study may not be as meaningful for some organizations to develop quality improvement (QI) data (Mittler et al., 2013).

### **Evidence-Based Practice: Verification of Chosen Option**

Overall, the latest evidence suggests multifaceted interventions based on the STAAR strategy (Bates et al., 2014; Boutwell et al., 2009). The STAAR interventions include medications reconciliation, education, and teach-back method, encouraging caregiver by logging into the patient's portal site, communicating with the patient's primary care physicians, assigning



early follow-up appointment in cardiac clinic, performing post-discharge phone calls within 48 hours, and home visits by RNs.

The STAAR has been proven as one of the best practices for post-cardiac surgery patients (Boutwell et al., 2009). The STAAR core domains of the *How-to Guide* focus on hospital-based interventions are as follows: (a) enhanced admission assessment; (b) effective teaching and learning; (c) real-time patient and family-centered discharge communication; and (d) post-hospital care follow-up (Boutwell et al., 2009). Evidence suggests that nurse-led interdisciplinary interventions have consistently minimized adverse outcomes and improved the quality of transitional care. Thus, the cardiac DNP student implemented the STAAR initiative in post-cardiac surgery patients who were discharged home with the use of the discharge toolkit.

### **Theoretical Framework/Evidence-Based Practice Model**

The theory chosen for this QI project was Watson's theory of caring. According to Jean Watson, the practice of caring is central to nursing (Watson Caring Science Institute, 2017). Nursing is interested in understanding, health, illness, and the human experience (Alligood & Marriner-Tomey, 2010). The Watson theory can help reduce patients' misery and anxiety after discharge from hospital to home by caring, explaining, teaching, preventing illness, and treating patients in a holistic approach (Watson Caring Science Institute, 2017).

### **Application of Theoretical Framework to the QI Project**

Recurring readmissions have been problematic through the years. The CMS is reinforcing the payment guidelines for readmissions. Preventing 30-day readmissions has become a top priority in US health reform. Several problems can arise after transitioning from hospital to home, such as medication discrepancies, lack of medical follow-up, poor communication between providers, and lack of care coordination. Thus, this can lead to unnecessary hospital

readmissions (Coleman et al., 2007). Sometimes patients are discharged with intravenous access, feeding tube, urinary catheter, complex wound machine, and surgical drains; suddenly, the patient and family are given the responsibility to learn and manage their own care.

Anxious patients and caregivers need to remember the discharge instructions. They can be too overwhelmed to follow the instructions and will not be compliant with their medications or post-op care. It is essential for the nurse to start teaching patients the importance of medication, and to do teach-back pertaining to disease management while the patient is still in the facility. When patients are discharged home, they will be given some plan on how to manage their disease process. The visiting nurses (VN) have a very important role to aid seamless transition for the patients who are discharged to home. Reflecting on Watson's theory, the nurses can help patients and family by explaining, teaching, caring, and supporting their needs.

Additionally, the nurses can communicate to the healthcare team about the status or issues of the patients at home. Lack of communication among healthcare providers can lead to poor transitional care (Bell et al., 2009). Effective communication and comprehensive discharge teaching by the nurse can bridge the fragmented care. Therefore, the human caring process can potentiate human health and healing (Alligood & Marriner-Tomey, 2010).

Watson's theory was suitable for the QI project since it focuses on caring, teaching, supporting, and relieving stresses. Moreover, Watson's theory can be applied in the nursing process (Alligood & Marriner-Tomey, 2010).

- First, the nurse assesses the patient at home starting with a physical exam, a complete problem list such as medication reconciliation, risk factors for readmission, and the need for other services (physical and occupational therapy, and speech therapy).

- Second, the nurse plans to solve the problem by explaining the treatment plan and educating the patient on the importance of his/her medication being taken on a regular basis in order to prevent further illness.
- Third, the nurse intervenes in a transpersonal way by clarifying patient's misinterpretation, by attending to his/her dissatisfaction, and easing his/her apprehension level in addition to focusing on the post-op complications.
- Lastly, when the nurse applies Watson's theory of caring to the post-cardiac surgery patients, they are able to understand their disease process and to manage their health effectively (see Appendix B).

Table 1  
Goals, Objectives, and Outcomes (Met/Partially Met/Not-met)

Goals	Objectives	Expected Outcomes	Goals Met
-Propose a QI project for the cardiac surgery patients to the key stakeholders -Launch the QI project in the Fall'17 and complete in the Spring'18 -Improve patient outcomes, and HCAHPS scores -Provide safe transitions Reduce unplanned readmissions -Improve medication reconciliation, and adherence -Decrease post-op adverse events -Provide a better understanding of their disease process in post-cardiac surgery patients	-Meet with the key cardiac stakeholders -Design a discharge toolkit, surveys, and tracking logs -Select the Transitional Team -Train the Transitional Team through daily huddles for 1 week and as needed -Coach the Transitional Team on implementing the transitional care toolkit -Remind patients about the call-back questionnaires and HCAHPS survey in the mail -Apply the transitional care toolkit in Fall 2017 -Collect data in the pre-intervention phase from June to August 2017 and compare the results with post-intervention phase from October to January 2018.	-The stakeholders will approve the QI project -Will provide safe transition across any settings -Patients will be able to care for themselves and will be knowledgeable regarding their health status -HCAHPS scores will be at 4 stars or above -Continuity of care will be improved -The Transitional Care Toolkit will be executed -Medication reconciliation and adherence will increase At least 30% decrease of unplanned readmissions within 30 days in cardiac surgery patients -The QI project will be achieved by March 2018	-The stakeholders approved the QI project (met) -Provided a safe transition across any settings (met) -HCAHPS scores were at 4 stars (met) -Patients came to their clinic visits for continuity of care (met) -The transitional care toolkit was executed accordingly (met) -Increased medication adherence by 47.5% in high confident scale (met) -Increased of health literacy by 30% in high scale (met) -There was 11% decreased of unplanned readmissions within 30 days after 3 months (partially met) -The QI project was achieved in March 2018

			(met)
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**Project Design/Methods**

The DNP Project included a Quality Improvement framework with an educational and evaluation design. The DNP student selected both instructional and observational methods. The process of implementation was assessed, monitored, and managed through the use of the Plan-Do-Check-Act (PDCA) model.

The Institute for Healthcare Improvement (IHI) generally uses the PDCA method for rapid cycle improvement (Lau, 2015). It has cyclical features that can influence and assess the change in small and frequent projects repeatedly (Lau, 2015). Additionally, the QI project provides enlightenment to the patients who have poor understanding of their discharge instructions, which otherwise can lead to inappropriate care choices; thus, the project can contribute to reducing unnecessary readmissions (Coleman et al., 2007). In general, a proper pre- and post-coordination of care can avoid the CMS payment penalty from frequent hospital readmissions, and it can reduce potential adverse events (Coleman, Smith, Frank, Min, Parry, & Kramer, 2004).

The educational method included a toolkit incorporating information about a transitional-care program to inform patients about post-op care and available services. Additionally, the teach/teach-back method was used to help patients understand how to best manage their post-op routine. Moreover, the care transition interventions taught in a patient centered, timely, and designed to improve the quality of care at home. The observation method included by watching the patients to do a return demonstration in doing wound self-care and inquired about recognition of *Red flag* signs and symptoms (fever, leg edema, incisional drainage, and acute symptoms)

from the patients. Occasionally, the DNP student counted pills and compared the numbers of pills from the previous visit to evaluate the patient's adherence. Moreover, the DNP student observed the outpatient follow-up and monitored the number of visits

As a result, the DNP student collected qualitative and quantitative data. The quantitative data included the readmission counts within 30 days after the patients had been discharged from the hospital. Therefore, the DNP student collected all the readmission data from the existing post-cardiac surgery patients' log from June to August 2017. While for the intervention group, the readmissions data was monitored from October 2017 to January 2, 2018. The DNP student compared the existing baseline data for this patient population alongside the STAAR post-cardiac surgery patients within a 3-month period from June 2017 to August 2017. The data collected were analyzed and evaluated in the percentages, pie graphs, and histograms by March 2018.

The DNP student classified the quantitative data and chose to use the Z test with one-tailed level for the post intervention group as to whether there was an effect on the STAAR initiative thus, it was statistically significant at  $p < 0.05$ . In addition, the DNP student closely monitored the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) composite measures quarterly from the hospital's website to ascertain the unit's star rating as to whether a need exists to mitigate the negative outcomes and compared with the departments.

Moreover, the descriptive data were explored for the STAAR strategy group and were compared to the usual care group regarding their demographic and health characteristics. No difference was found in race, marital status, and educational background, with the exception of age. The pre-intervention group was between the ages of 66 and 75, while the post-intervention group was between the ages of 56 and 65, as illustrated in Table 2. The qualitative data included

the making of post-op callbacks, having informal discussions with the transitional team members, data mining, monitoring the (HCAPHS) scores, and journal writing about the QI process.

Table 2

*Participant Demographics Pre- and Post-Intervention*

<b>Variables</b>	<b>Pre- N = 43</b>	<b>Pre-Percentage</b>	<b>Post- N = 40</b>	<b>Post-Percentage</b>
<b>Race/Ethnicity</b>				
Caucasian	8	18.60%	7	17.50%
African American	3	7.00%	1	2.50%
Hispanic	7	16%	6	15.00%
Asians	25	58%	26	65%
<b>Highest Education</b>				
Less than 12th grade	23	53%	25	62.50%
High School Graduate	13	30%	11	27.50%
College Graduate	7	16%	4	10%
<b>Marital Status</b>				
Married	28	65.1%	25	62.5%
Divorced/Separated	6	13.95%	6	15.00%
Widowed	4	7.5%	5	12.50%
Single	5	11.6%	4	10.00%
<b>Gender</b>				
Female	10	19%	6	15%
Male	33	62%	34	85%
<b>Ages</b>				
45–55	7	16%	9	22.50%
56–65	14	32.5%	20	50%
66–75	22	41.50%	11	27.50%

*Note.* The majority were Asian, male, married, between the ages of 56 and 75, and with education lower than 12<sup>th</sup> grade.

**Project Site and Population**

The site was at a tertiary care facility with 580 beds in NYC. It offered multiple specialties including cardiac surgery. The project occurred in the cardiac surgery department, a

demanding milieu with a fast turnover. The department performed about 250 cardiac surgery cases per year, and more than 20 patients were seen in the clinic per week.

The cardiac surgery service had three surgeons, six PAs, and one NP. The cardiac clinic was open from 9 a.m. to 5 p.m., Monday through Friday with an afterhours answering call service. Patients made an appointment for cardiac-related symptoms, surgical second opinion, pre-op evaluation, and post-op visits. The clinic service offered minor procedures such as thoracentesis, wound debridement, incision and drainage, and sutures or staples removal. Moreover, the clinicians treated minor illnesses, superficial wound infection, and adjusted medications according to the patient's symptoms and abnormal objective findings.

The community was set in NYC; per the Statistics Atlas (2015), the population's median age was 45; and the majority of residents were Asians (67.3%), Hispanics (14%), and Whites (11.4%). The majority of the clinic's patients spoke limited English and were underinsured or uninsured. A few were visitors from another country who became ill while visiting NYC. Several patients presented to the ED for acute chest pain and severe shortness of breath, subsequently requiring an immediate open-heart surgery. A number of the patients required public assistance such as medical insurance, free medications, and even temporary housing.

The DNP student obtained the cardiac service log or used the New York State Cardiac Surgery Reporting System (CSRS) to identify patients who were discharged home and who had undergone cardiac surgery from Fall 2017 to Winter 2018. The participants were residents of NYC who live within approximately 50 miles of the project site, were between the ages of 45 and 75, and were willing to partake in the project.

Inclusion criteria were those patients who had undergone CABG, valve(s) repair or replacement, shunt closures, aneurysm repair, cardiac tumor removal, or cardiac thrombectomy.

Exclusion criteria were those patients with end-stage renal disease, chronic obstruction pulmonary disease on ventilator, stage IV cancer, advanced dementia, mental illness, and advanced cardiomyopathy, used/abused intravenous drugs, lived alone or had no family support, were nursing home residents, discharged to rehabilitation, or expired within 30 days post-surgery.

*Setting facilitators and barriers.*

The prime facilitators of the QI project were the same personnel who gave care and evaluated the patient in the unit, clinic, and ED. Additionally, the facility site was convenient to all participants. The cardiac nurses provided the teach-back method for patients and families before discharge to teach them a new skill and the usage of the medication. In addition, the cardiac surgery chairperson, the cardiac director, and the quality improvement director were delighted and supported the QI project done in the cardiac service area.

Some barriers existed to doing the QI project. The first barrier was the participants' socioeconomic situation: Most were uninsured and underinsured, with limited English and low health literacy. For those participants who had financial difficulty and were uninsured, the case managers helped them apply for medical insurance and provided them with a 30-day supply of free medications until the patients could seek the free clinic and receive Medicaid insurance. To avoid poor communication between staff and patients, the facility provided a professional interpreter via phone or qualified staff interpreter for non-English-speaking patients.

The second challenge was the cardiac personnel who resisted participating in the QI project. The DNP student encouraged and coached the unwilling staff toward the purpose of the project. Third, the cardiac service had limited staff to perform the needed tasks. The hiring and training of the new NP was costly. Therefore, the selected cardiac team performed the



multifaceted interventions, which empowered the staff. Since the callback program was a part of the (HCAHPS), the DNP student asked the day assistant nurse manager or charge nurse to execute the telephone survey (Appendix C) for the unit. The last barrier was those patients who had been readmitted to different healthcare facilities and had been discounted from the cardiac readmission list unless the cardiac team was notified and transferred to their cardiac service.

### **Implementation/Procedures**

The QI project was a NP-led transitional program that was implemented in October 2017 to reduce the risk of readmissions, provide safe transitional care, increase medication reconciliation, and improve the quality of care for post-cardiac patients. The DNP student executed the PDCA cycle to use the transitional care toolkit based on the STAAR initiative. Moreover, the DNP student monitored, and managed the initiation of the PDCA cycle for a 3-month period.

Initially, the DNP student met and discussed with the key stakeholders such as the cardiac nurses, PAs, assistant nurse managers, case managers, mentor, patients, unit director, QI director, and cardiac clinical director about applying the multifaceted discharge interventions. In addition, the DNP student selected the **Transition Care Team**, which was composed of six RNs, two PAs, and two case managers based on their experiences and skills. Afterwards, the DNP student explained the multifaceted implementations to the willing participants who agreed to be followed-up and cared for after their cardiac surgery. Later, the DNP student developed surveys, discharge toolkit, tracking logs, and spreadsheets to support the QI project.

The primary leader (DNP student) initially started the discharge process by identifying the high-risk patients during their pre-op evaluation. Especially those patients who had comorbidities, advanced age, low health literacy, poor physical status, and low economic status

were considered high risks and were closely monitored by the lead NP. Additionally, the DNP student surveyed the patients by giving them the health literacy questionnaires and identified high-risk patients who scored a low degree of confidence (score below 10) from the health literacy survey and who had poor understanding of their post-op care, medication adherence, wound care, and disease management, as explained in Appendix D. The transition team employed the transitional care toolkit based upon the patient's need, a discharge method that was not *one size fits all*.

### **Measurement Instruments**

In order to measure the outcomes of this QI project, the following instruments were used: Likert scale, cardiac surgery patients' spreadsheet log, or *Cureatr App*, tracking follow-up visits, health literacy survey, Morisky Medication Adherence Scale (MMAS-4) questionnaires, telephone callback survey, and HCAHPS survey scores. The Hospital Consumer Assessment of Healthcare Providers and Systems is a standardized and publicly reported survey of patients' viewpoints of hospital care (CMS, 2014). The sample HCAHPS composite measures appear as Appendix E. Tracking criteria are effective interventions in preventing poor outcomes for patients with high risks (Allaudeen, Schnipper, Orav, Wachter, & Vidyarthi, 2011). The spreadsheet identified and quantified the chain of readmissions in each month. Moreover, the log is an Excel spreadsheet that contains retrospective data of a patient's demographics, surgery and discharge dates, the surgical procedures, interventions and the actual counts of readmission (Lago, Nanno, & Luziani, 2012). The *Cureatr* is an alert system on the smart phone, in real time (Cureatr, 2015). Many experts mentioned that the medication adherence is a social challenge to optimize patient outcome (Haynes et al., 2008). The Morisky Medication Adherence Scale (MMAS-4) has been proven reliable and has good validity (Morisky et al., 1986).

When the DNP student received a readmission alert from the Cureatr (Appendix F) application, the data were entered in the patients' surgery log sheet (Appendix G). Additionally, when patients were being discharged, the transitional team evaluated the patients at high risk for readmission based on the CSRS risk factors (Hannan et al., 2011). Subsequently, for the teach-back evaluation, the DNP student monitored the confidence level of the post-cardiac surgery patients by using the Likert scale (Agency for Healthcare Research and Quality [AHRQ], 2015).

### **Data Collection/Procedures**

The STAAR initiative purposes are to lower the rate of avoidable rehospitalizations and improve care transitions across settings (Boutwell et al., 2009). Given the effectiveness of the STAAR interventions, the DNP student proposed the application of STAAR interventions for post-cardiac surgery patients ages 45–75, which was led by a NP as a transitional coach. Likewise, the transitional coach can encourage patients to self-manage their post-op care, can maintain continuity of care, and can provide a direct communication between patients and their primary care providers (Coleman et al., 2004).

**Plan:** The DNP student recruited participants from the cardiac patients' surgery log who underwent cardiac surgery from October 2, 2017 to January 2, 2018 at a tertiary facility in NYC. After receiving Institutional Review Board (IRB) approval from the facility and the university, those patients who met the criteria were included as participants in the QI project.

The selected **Transition Care Team** was trained for 10 minutes through daily huddles for a week and as needed to deploy the transitional care toolkit for the intervention group starting in October 2017. The DNP student distributed the discharge toolkit (Appendix H) and explained the use to the transitional team. In addition, the primary leader (DNP student) had an open

communication with the cardiac staff and transitional team on a daily basis for any concerns or issues via email, in person, and telephone.

**Do:** The transitional team executed the transitional care toolkit according to the patient's needs. The DNP student asked all participating post-cardiac surgery patients the questions of the literacy questionnaire upon their discharge. In addition, the DNP student selected the high-risk patients who showed *red flag symptoms* from the literacy survey (Appendix I). For those patients who demonstrated low health literacy, who lacked understanding of their treatment plan or self-management, the transitional team provided teaching and teach-back skills during the discharge period.

In addition, the DNP student gave comprehensive discharge instructions to those patients, explained the importance of self-care, and encouraged them to participate in their own care. Then, the DNP student called the participants within 30 days after their discharge and evaluated their post-op knowledge and skills by using the Likert scale to quantify the performance in medication, wound care, diet, and activity, as explained in Appendix J (AHRQ, 2015).

**Check:** The DNP student noted that a patient's socioeconomic issues played an important role in managing their post-op care. As a result, the DNP student included as Appendix K the Morisky Medication Adherence Scales (MMAS-4) questionnaires (Morisky et al., 1986). The MMAS-4 was used to evaluate the medication adherence because it was easy and quick to administer (scoring the Morisky scale Yes = 0 and No = 1). Thus, the results were obtained on a real-time basis after meeting with the participants. In addition, the DNP student provided education using the teach/teach-back method (Appendix L) especially for those patients who scored low in medication adherence (0 = high, 1–2 = moderate, 3–4 = low). For the medication adherence, the DNP student interviewed the patient to determine the patient's confidence level

during the first clinic visit. During subsequent visits, the DNP student observed and solicited the participants about the medication obedience using the (MMAS-4) survey in the clinic.

At times when the patients brought their medications, the DNP student counted pills and compared the numbers of tablets from the previous visit to evaluate the patient's adherence. In order to avoid potential medication errors and harmful events, the DNP student reconciled the home medicines against the hospital discharge medications to check for any discrepancies, which resulted in the astounding discovery that majority patients were taking the same type of medications; e.g., *Metropolol versus Atenolol*. The DNP student gave extensive instructions regarding the indication, side effects, frequency, route, and dosage of the medication(s). However, for those patients who could not afford their medication, the case manager supplied free medication for a few weeks until they could acquire their insurance.

Moreover, the charge nurse executed post-callback calls within 24 hours of discharge to guide patients regarding their medications and post-op care. The transitional team encouraged the patients to come to cardiac clinic as early as 48 hours after their discharge for follow up. The NP and a surgeon observed and evaluated the patients who presented in the clinic for acute illness, and both decided if the patient warranted a necessary readmission. The lead secretary tracked the compliance of the follow-up visits from the patients' schedule log sheet. Patients who did not come for their follow-up visits received phone calls immediately from the medical secretary, who rescheduled them for the next business day. In order to avoid missed visits, the DNP student notified the visiting nurse at the earliest time to visit the patient. In addition, a 24/7 telephone number was given to the patients for any non-urgent concerns or questions.

**Act:** Overall, the PDCA cycle was successful. The DNP student continued to implement the interventions, to monitor the change in the chosen department, and to iterate the PDCA cycle

as needed. In time, the DNP student plans to adapt the transitional care toolkit in the hope of convincing hospital executives to use the Transitional Care Program throughout the hospital.

Further, the DNP student had the pleasure of displaying the Poster board to the Quality Department during the week of Patient Safety Awareness Symposium and discussed the importance of having the Transitional Care Toolkit available to the hospital executives. Finally, the DNP student was excited to present the QI poster at the University of Massachusetts, College of Nursing and disseminate it on Scholarship Day.

### **Data Analysis/Statistical Analysis**

The DNP student evaluated the distribution of the dependent outcome and independent variables by using percentages, graphs, and frequency distributions. Descriptive statistics were utilized to provide a summary of the overall participants' characteristics and measures of the independent, confounding, and outcome variables. Additionally, the DNP student examined the relationships of the variables by using the one-tailed z-test to compare pre- and post-intervention data with the use of bar and pie graphs. Data were analyzed using the statistical calculator and data analysis in Excel spreadsheets.

### **Results/Analysis**

In the beginning, the DNP student extracted the readmission counts from the cardiac patients' log sheet. The readmission data within 30 days was calculated and compared to determine the impact of the bundled interventions following hospital discharge. Of the pre-intervention group (n = 43), seven patients (16.3%) were readmitted for medical and surgical problems from June to August 2017. Meanwhile, of the post-intervention group (n = 40), two patients (5%) were readmitted for acute issues from October to December 2017. Both patients

presented in ED with acute symptoms (i.e., stroke and hyperglycemia). This occurrence required immediate treatment in the in-patient area.

Equally, the DNP student monitored the cardiac department scores in the HCAHPS survey, compared the HCAHPS results with other departments, and made improvements accordingly. Last September to November 2017, the HCAHPS quarterly report resulted in a rating of four stars in discharge information and post-discharge care and communication about medicines, compared with the prior interventions last March to May 2017, which had been rated only three stars. When the DNP student inquired about the medication adherence of all participants, the results were remarkable. In the pre-intervention group, two out of 40 patients (5%) scored high adherence in the confidence scale. Meanwhile in the post-intervention group, 21 out of 40 patients (52.5%) scored high adherence scale, as shown in Table 3.

Table 3  
*Medication Adherence Within 30 Days*

<b>Pre-MMAS-4 scores</b>	<b>N = 40</b>	<b>Pre- per 100 %</b>
High = 2	2/40	5%
Medium = 14	14/40	35%
Low = 24	24/40	60%
<b>Post-MMAS-4 scores</b>	<b>N = 40</b>	<b>Post- per 100 %</b>
High = 21	21/40	52.5%
Medium = 17	17/40	42.5%
Low = 2	2/40	5%

*Note.* The scoring of the Morisky Scale (Yes = 0 and No = 1). Participants N = 40, the MMAS-4 questions were asked on the first visit, and the evaluation was executed during subsequent visits.

Furthermore, obtaining the health literacy score was an obstacle because some patients were unavailable to answer the evaluation callbacks. The pre-participants (N = 40) had only one patient (2.5%) who answered the callback as very confident on the scale, while of the

post-participants (N = 30) who were solicited, 10 patients (33.3%) responded as very confident on the scale, as demonstrated in Table 4.

Table 4  
*Health Literacy of Participants*

Scores	Pre-intervention	Percentage	Post-intervention	Percentage
Low confident	23	57.5%	4	16.7%
Moderate	16	40%	16	53.0%
High confident	1	2.5%	10	33.3%
Total=	<b>N=40</b>		<b>N=30</b>	

*Note.* This was the callbacks evaluation of the health literacy for Pre- (N = 40) and Post- (N = 30) participants.

Overall, the DNP student determined that the outcomes were statistically significant in lowering the readmission rates. The one-tailed Z- test (yielded at p value = 0.049) was the difference between the two mean values of pre- and post-intervention, as explained in Table 5. Moreover, it had the exceptional results of increasing medication adherence, improving the HCAHPS survey scores, preventing post-op adverse events, and achieving high-quality discharge education.

Table 5  
*Z-Test: Two Samples for Means*

	<i>Pre-intervention</i>	<i>Post-intervention</i>
Mean	14.33	13.33
Known Variance	7	2
Observations	3	3
Hypothesized Mean Difference	1	
z	1.65	
P(Z<=z) one-tail	0.5	



z Critical one-tail	1.64
P(Z<=z) two-tail	1
z Critical two-tail	1.95

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*Note:* The Z-Score was 1.65, and the p-value was 0.049 in the one-tailed z-test. The result was significant at  $p < 0.05$ .

### **Interpretations/Discussion**

Multifaceted interventions in managing and discharging post-cardiac patients reduced adverse events and readmissions. However, the readmission rate is a complex indicator, and some readmissions are not preventable. Those patients who have acute and chronic illness, lack of family support, poor discharge coordination, and low socioeconomic status can potentially lead to readmissions. The DNP student did not explore the planned and unplanned readmissions in detail.

Additionally, the DNP student perceived that the socioeconomic issues had a significant effect on patients participating in the post-op management. Furthermore, an APN was necessary to execute the discharge process, which had many complex responsibilities. The theoretical framework was the foundation of caring, teaching, explaining, preventing adverse events, and managing patients from hospital to home by using the nursing process.

The STAAR implementations included early post-visits, telephone callbacks, education, and face-to-face home visits by RNs that were effective for patients who had undergone high risk-surgery, especially cardiac surgery. The results of this QI project demonstrated that when the teach-back method was initiated prior to discharge and the post-cardiac surgical patients were seen early in the cardiac clinic (within 48 hours after discharge), the implementation was associated with a statistically significant reduction of readmission rates and prevention of adverse events within 30 days.

### **Cost and Benefits Analysis/Budget**

#### **Implementation Cost**

The DNP student collected the data from the EMR in her free time. The cost to start the QI project was nominal, since the project used the same staff in cardiac service for continuity of care and improvement of a patient's experience. The financial investment was nil since no immediate increase of staffing had been required to implement the STAAR and the usual interventions. The DNP student provided in-service to the transitional team during daily huddles for a 1-week period; hence, no additional staff hours were required. At the end, the DNP student provided free pizza for the transitional team to conclude the implementation of STAAR interventions. The QI project was completed in a tertiary facility in cardiac service, where all interventions were carried out (e.g., telephone callbacks, follow-up visits, and teaching, and the teach-back method) during working hours.

#### **Estimated cost savings.**

The average cost of all-cause readmission in 2013 per incident for Medicare was \$13,800 and \$13,300 for Medicaid (Barrett, Wier, Jiang, & Steiner, 2015). The estimated cost in launching the care transition program for post-cardiac surgery patients was nonexistent (Appendix M). Moreover, executing the STAAR initiative in post-cardiac surgery prevented adverse events from medication discrepancies and lack of follow-up with healthcare providers, which averted unplanned readmissions. Consequently, the transitional-care program was necessary for post-cardiac patients to achieve a seamless transition, to provide early follow-up with the cardiac team, to improve quality of care, and to reduce healthcare costs.

#### ***Benefits and value.***

Since July 2017, the CABG surgeries had become a part of the CMS bundled payment penalty; therefore, a transitional care program is required to reduce readmission penalties in cardiac surgery and to provide the highest quality care. Evidence indicates that applying the STAAR initiative could reduce readmission rates and improve the care experience (Bates et al., 2014). The projected cost benefits of the QI project increased because the project averted the financial penalty in CABG readmissions. Furthermore, coordinated transitional care program interventions have enhanced patients' safety and efficiency of care.

### **Timeline**

The QI project launched in Fall 2017 and continued to Spring 2018 (Appendix N). The DNP student led the QI project and emailed the stakeholders to focus on the project's objectives and to discuss any of its issues and resolutions in May 2017. Data were transparent with the stakeholders from the HCAHPS rating scores and the poster board.

The QI project was completed within 6 months, starting in October 2017 and concluding April 2018. The DNP student implemented the bundled interventions in post-cardiac surgery patients and compared the results with the usual care group after a 3-month period. A summary of the different types of transitional care programs was included in this proposal (Appendix O). With long-term good results in applying the STAAR initiative, the Chairman of Cardiac Surgery had agreed to and supported the QI project (Appendix P).

### **Ethics and Human Subjects Protection**

The New York Presbyterian Hospital of Queens (NYPQ) and University of Massachusetts (UMass) IRBs reviewed the QI project. Both IRBs in NYPQ (Appendix Q) and UMass (Appendix R) approved the QI project. All patients admitted to the cardiac service were informed about the Health Insurance Portability and Accountability Act (HIPAA), and the

Transitional Care Program. Data collection was taken from the electronic medical record (EMR) and the cardiac clinic log, which required a password for login. For privacy, the patients identified by codes such as U1, U2, etc. became part of the usual group, and those with codes of S1, S2, etc. were sorted into the STAAR group. The project did not include any identifiable patient information such as names, date of birth, social security number, etc. Only the lead NP, cardiac PAs, and the mentor had password access to the cardiac patients' spreadsheet log. The risk for the patients participating in the QI project was the same as for those participating in the common discharge plan.

### **Conclusion**

Coronary artery bypass surgery is the most expensive of all surgeries, and readmissions post-hospital discharges remain a burden on the US healthcare system. The increased incidence of high mortality warrants the need for improved management and surveillance. Moreover, a small body of promising evidence exists in CABG populations on transitional care programs.

The transition period has been confirmed to be a stressful and confusing time for both patients and caregivers. The APN is in a unique position to coordinate and collaborate with the healthcare team, patients, and families. The application of a multifaceted Transitional Care Program directed by an APN after hospital discharge focused on good communication and coordination of services, which achieved considerable results for post-cardiac surgery patients in lowering unplanned readmission, increasing health literacy, improving medication adherence, and preventing adverse events at home. The application of the transitional care toolkit had empowered staff and promoted safe transition from hospital to home.

The DNP student established that one of the risk factors for post-cardiac surgery patients was having low socioeconomic status. As a result, a paradigm shift occurred in our post-op

teaching, and in reinforcing the medication regimen, and in follow-up plans with other healthcare providers. Therefore, education was the key part of the care transition. Implementing effective teaching and teach-back and providing to patients all the resources they need before discharge are all especially useful for the patients who have low health literacy, no insurance, and limited finances, as these patients are predisposed to adverse events and readmissions.

Further work is warranted to discover the best interventions for post-cardiac surgery patients and to find out which practitioner (such as a transitional coach) is best suited to promote safety, reduce cost, and decrease unplanned readmissions.

Overall, the goals and the objectives of this QI project were met. The DNP student plans to continue the transitional care program and to disseminate it during Nurse's Week to other departments of the hospital.

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*Appendix A***LACE Index Tool**

"L" stands for the length of stay of the index admission.

"A" stands for the acuity of the admission.

"C" stands for co-morbidities, incorporating the Charlson Co-Morbidity Index.

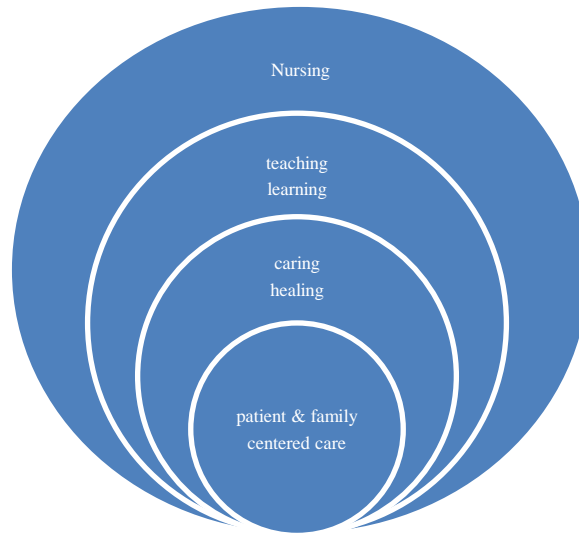
"E" stands for the number of Emergency Department visits within the last 6 months.

A score of 0–4 = Low; 5–9 = Moderate; and a score of  $\geq 10$  = High risk of readmission.

*Note:* Adapted from "LACE index tool," by Wang et al., 2014

*Appendix B*

**The Holistic Approach**



The holistic approach, adapted from "Watson's theory"  
(Watson Caring Science Institute, 2017).

*Appendix C***Post-Discharge Telephone Survey**

## Post-discharge Phone Call Documentation Form

Patient name: \_\_\_\_\_

Caregiver(s) name(s): \_\_\_\_\_

Relationship to patient: \_\_\_\_\_

Discharge date: \_\_\_\_\_

Surgery Date: \_\_\_\_\_

Surgical procedure: \_\_\_\_\_

Interpreter needed. Y/ N Language/Dialect: \_\_\_\_\_

Pacific Interpreter # \_\_\_\_\_

Ask patient about his or her condition

1- Are you taking the medications on the discharge list? Yes/ no

2- Are you having post- op pain? Yes/no

3- Is there drainage from your incision site? Yes/no

4- Are you experiencing chest discomfort/palpitations/dizziness/ shortness of breath/leg edema?

5- Do you have any fever (&gt; 101.0F), and chills? Yes/no

Who was contacted in the cardiac clinic? \_\_\_\_\_

Gone to the ER/urgent care (specify): \_\_\_\_\_

Gone to another hospital/MD (name): \_\_\_\_\_

Spoken with visiting nurse (name): \_\_\_\_\_

Call Completed: Y/ N

With whom (patient, caregiver, both): \_\_\_\_\_

Consultations (if any) made after phone call: \_\_\_\_\_

 None Call MD Call Cardiology Call outpatient pharmacy Other-follow up in cardiac clinic

Time for missed calls/attempts: \_\_\_\_\_

Time for initial phone call: \_\_\_\_\_

Caller's Signature \_\_\_\_\_



*Appendix D***Health Literacy Patient Survey**

## Instructions:

Please answer the questions below about the care provided by the NYPQ Cardiac surgery service. Your answers will help us learn how well people in your provider's practice explain things to you and make it easy for you to take care of your health.

Date:

Name:

1. During your hospitalization, how often did the cardiac team explain things in a way that was easy to understand?

- Never
- Sometimes
- Usually
- Always

2. How often did staff use pictures, drawings, or handouts to explain things to you?

- Never
- Sometimes
- Usually
- Always

3. How often did the staff use plain, non-medical language?

- Never
- Sometimes
- Usually
- Always

4. How often did the staff in this service explain the purpose of taking each medicine?

- Never
- Sometimes

Usually

Always

5. How often did the staff explain to you how much to take of each medicine and when to take it?

Never

Sometimes

Usually

Always

**Scores rating: never (0), sometimes (1), usually (2), and always (3)**

**Low = 0-5, marginal = 6-10, adequate = 15**

*Note.* Adapted from AHRQ Health Literacy Universal Precautions Toolkit, 2<sup>nd</sup> edition, and CAHPS surveys.

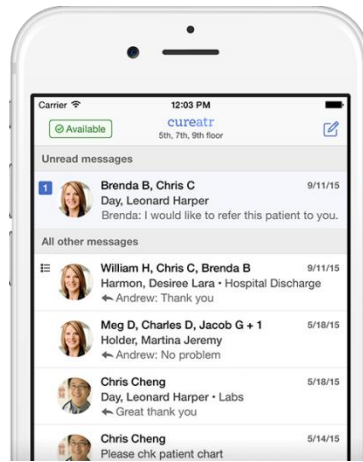
*Appendix E***HCAHPS Composite Measures**

1. Communication with Nurses (Q1, Q2, Q3)
2. Communication with Doctors (Q5, Q6, Q7)
3. Responsiveness of Hospital Staff (Q4, Q11)
4. Pain Management (Q13, Q14)
5. Communication about Medicines (Q16, Q17)
6. Discharge Information (Q19, Q20)
7. Care Transition (Q23, Q24, Q25)

*Note.* Adapted from Centers of Medicare and Medicaid Services. (2014). HCAHPS: Patients' perspectives of care survey.

*Appendix F*

**Cureart App**



*Note:* Adapted from Cureart, 2015

Appendix G

Patients' Cardiac Surgery Spreadsheet Log (October 2, 2017–January 2, 2018)

	AGE	GENDER	DOS	SURGEON	TYPE OF SURGERY	CALL BACKS	Teach Back-Interventions	READMISSION	CONDITION	HOME CARE
<b>OCT.2,17</b>										
S1	G 71	M	10/2/2017	SL	CABGx2 LIMA	yes	med. rec.			yes
S2	A 68	M	10/5/2017	SL	AVR (#23 pc)	yes	med.rec.			yes
S3	R 55	M	10/5/2017	SL	C2SVG	yes	med. Rec.			yes
S4	P 52	M	10/6/2017	SL	c3lima	yes	Med.Adj.			yes
S5	C 45	M	10/11/2017	DA	C4lima	yes	med.rec.			yes
S6	R 52	F	10/16/2017	SL	C3LIMA	yes	med. rec.	READMITTED	PLEURAL EFF.	yes
S7	L 52	M	10/18/2017	DA	C3lima/IABP	yes	wound care			yes
S8	L 52	M	10/19/2017	DA	C3LIMA	yes	med.rec.			yes
S9	A 60	M	10/23/2017	DA	C2LIMA	yes	Med.Adj.			yes
S10	N 66	M	10/24/2017	SL	C2LIMA	NA	Med.Adj.			yes
S11	L 63	M	10/25/2017	DA	C3LIMA	yes	med.rec.			yes
S12	H 54	M	10/31/2017	DA	C2lima/pre-op IABP	yes	med. Rec.			yes
<b>NOV.1, 17</b>										
S13	A 65	M	11/2/2017	SL	C2lima	yes	Med.Adj.			yes
S14	Y 68	M	11/2/2017	SL	OPC1LIMA	NA	Med.rec			yes
S15	N 68	M	11/6/2017	DA	C2LIMA/preop IABP	yes	Wound care			yes
S16	B 48	M	11/6/2017	DA	C2LIMA	yes	Med.adj.			yes
S17	N 74	M	11/7/2017	DA	OPC1LIMA	yes	Wound care			yes
S18	R 62	M	11/8/2017	SL	C3LIMA	yes	INR CHECK			yes
S19	H 58	F	11/9/2017	SL	C2LIMA	yes	Wound care			yes
S20	L 60	M	11/10/2017	DA	C2LIMA	NA	Med.adj.			yes
S21	D 57	M	11/13/2017	SL	C1LIMA	NA	Med. Adj.			yes
S22	C 55	M	11/14/2017	SL	C2LIMA	yes	Med Adj.			yes
S23	M 51	M	11/14/2017	SL	CABGx3 LIMA	NA	Med. Adj.			no
S24	M 70	F	11/16/2017	SL	C3LIMA/AVR (#19 pc) C2LIMA/Pre-op IABP	yes NA	Med.adj.	READMITTED	CVA	no
S25	T 61	M	11/16/2017	SL	IABP	NA	Med.adj.			yes
S26	R 75	F	11/17/2017	DA	C2LIMA	yes	Wound care			yes
S27	Z 52	M	11/21/2017	DA	C3lima	yes	Med.adj.			yes
S28	L 62	M	11/27/2017	SL	C2LIMA	yes	Med.rec. /PLEURAL EFF. S/P TAP in IR			yes
S29	L 61	M	11/28/2017	SL	C2LIMA	yes	Med. Rec.			yes
S30	X 58	M	11/29/2017	DA	C4lima	NA	Med.rec			no
S31	R 63	F	11/30/2017	SL	C3lima/pre-op IABP	NA	wound care wound care/INR check			yes
S32	V 75	M	11/30/2017	SL	CABGx2 LIMA	yes	check			yes
<b>DEC. 1,17</b>										
S33	C 60	M	12/1/2017	SL	c2lima	NA	med.adj.			yes
S34	C 66	M	12/4/2017	SL	c3lima	yes	med.adj.			yes
S35	L 68	M	12/6/2017	SL	C3lima	yes	MED. ADJ.			yes
S36	N 60	M	12/6/2017	DA	type A dissection repair	NA	med.rec			yes
S37	F 64	M	12/19/2017	DA	C2LIMA	yes	INR check			yes
S38	A 62	M	12/22/2017	SL	C3lima	yes	wound care			yes
S39	I 51	M	12/27/2017	SL	C2lima	yes	Med.adj.			yes
<b>JAN.2,18</b>	<b>JAN.2, 2017</b>									
S40	R 63	M	1/2/2018	SL	C2lima	yes	Med.rec.			Yes

Appendix H

**NP-Led Transitional Care Toolkit**

<b>Health literacy</b>	<b>Follow-up</b>	<b>Disease management</b>
1-Provide education on post op care	1-Make post-op call (within 24 hrs after discharge)	1-Perform complete medication reconciliation upon discharge Restart home medics as needed
2-Apply teach-back method e.g. dressing changes, tube feeding, IV therapy etc.	2-Provide early clinic visit(within 48 hours)	2-Supply medication for 30 days, preferably generic medications
3-Give medical hand out about the disease process	3-Supply visiting RN's and home attendant within 48 hours	3-Educate patient about the importance of balanced Nutrition. (Cardiac/Diabetic/Renal/low Vitamin K diet), etc.
4-Offer a complete DC summary to patient upon discharge	4-Encourage pt. to make an appointment with PMD/other provider	4-Activity Instruct patient NOT to do strenuous activity and prohibit driving for 6 weeks; Pt. may shower after 1 week of surgery
5-Show drawing, picture, diagram, etc. when discussing the plan of care	5-Offer to call the 24 hours hotline for non emergent issues <b>(718-670-2610)</b> <b>/24 hours</b> -Allow patient to go ED for acute symptoms	5-Supply DME (oxygen, walker, wheelchair, commode, hospital bed shower chair, and bath lift) as needed
6-Recognize the <b>Red Flag signs</b> e.g. fever, chills, incision redness and drainage, acute chest pain and shortness of breath	8-Provide effective communication between healthcare providers	6-Refer to Cardiac rehab after 1 month of surgery and after medically cleared by a cardiologist
7- Explain in detail about the new medications	7- Call and give handoff to PMDs/referring MDs	7-Instruct patient/ family to call clinic and speak NP when problem arises during office hours. Call the service line during after hours
8-Provide an interpreter to patient and family as needed	8-Offer home services (PT,OT, ST) as needed	8-Schedule blood test/diagnostic testing appropriately

Legend: PT-Physical therapy, OT- Occupational therapy, ST- Speech therapy,  
DME- Durable Medical Equipment, DC- discharge, PMD- Primary Medical Doctor

*Appendix I***Red Flags for Low Health Literacy**

- Frequently missed appointments.
- Incomplete registration forms.
- Non-compliance with medication.
- Unable to name medications, or explain purpose or dosing.
- Identifies pills by looking at them, not reading label.
- Unable to give coherent, sequential history.
- Asks fewer questions.
- Lack of follow-through on tests or referrals.

*Note.* Adapted from Agency for Healthcare Research and Quality (2015). Health Literacy: Hidden barriers and practical Strategies. Retrieved from <http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy/toolkit/tool3a/index.html>





*Appendix K***Morisky Medication Adherence Scales: MMAS-4**

1. Do you ever forget to take your medication?
2. Are you careless at times about taking your medication?
3. Sometimes if you feel when you take the medication, do you stop taking it?
4. When you feel better; do you sometimes stop taking the medication?

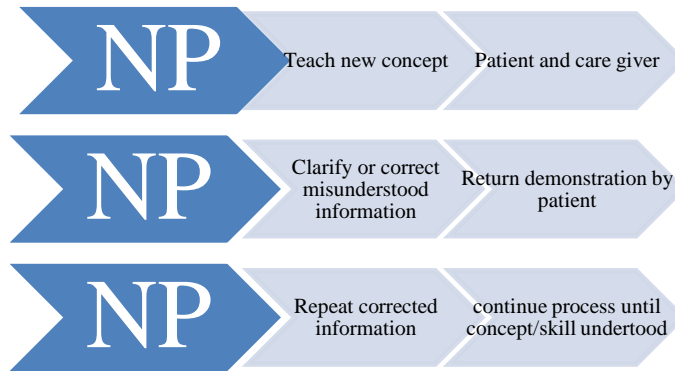
Scoring the Morisky Scale: Yes = 0 and No = 1

<b>Adherence</b>	<b>MMAS-4 Score</b>
High Adherence	0
Medium Adherence	1-2
Low Adherence	3-4

*Note.* Adapted from Morisky, D.E., Green, L.W., Levine, D.M. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. *Med Care* 24: 67–74. doi: 10.1097/00005650-198601000-00007

*Appendix L*

**Teach-Back Method**



**What other questions do you have?**

*Appendix M***Cost and Benefit Analysis**

Initial cost starting the NP- led STAAR initiative

**Costs:**

Daily huddles training:

10 minutes x 6 RNs=\$0

5 minutes X 2 case managers=\$0

5 minutes x 2 PAs =\$0

---

Total for education and training \$ 0

**Materials:**

Discharge brochures \$ 0

**Total expenses \$ 0**



*Appendix O*

**Summary of Transitional Programs**

<b>Interventions</b>	<b>STAAR</b>	<b>TCM/CTI</b>	<b>Project RED</b>	<b>BOOST</b>	<b>FYH</b>
Post-op calls	yes	yes	yes	yes	yes
Post-op home visits	yes	yes	yes	yes	yes
Enhanced assessment of discharge needs	yes	yes	yes	yes	yes
Communication between healthcare team	yes	yes	yes	yes	yes
Medications reconciliation	yes	no	no	yes	yes
Teaching	yes	no	no	no	yes
Teach back method	yes	no	no	no	no
Early post op clinic follow up in cardiac clinic	yes	no	no	no	no

Legend: State Action on Avoidable Re-hospitalizations, Transitional Care Model, and Care transitions Intervention, Project Re-engineered, and Better Outcomes for Older Adults Safe Transition, Follow Your Heart

*Appendix P***Agreement Letter**

Samuel J. Lang, MD  
Chairman, Cardiothoracic Surgery  
Professor Clinical Cardiothoracic Surgery

NewYork-Presbyterian/Queens  
56-45 Main Street, 35-Rm.387  
Flushing, NY 11355

TEL 718 670 1137  
FAX 718 661 7404

August 10, 2017

Department of Cardiothoracic Surgery  
New York-Presbyterian Queens  
56-45 Main Street  
Flushing, NY 11355

University Of Massachusetts at Amherst  
Department of Nursing

To Whom It May Concern:

We are thrilled and excited that our very own Nurse Practitioner, Araceli Carrera will be implementing the STAAR (State Action Avoidable Rehospitalizations) initiative to reduce unplanned readmission and provide safe transitional care and improve quality of care for our cardiac surgery population. The QI project will commence in the Fall of 2017 to Spring 2018 in our cardiac clinic. She has our full support and collaboration.

If you have any further questions, please do not hesitate to e-mail or contact the department.

Sincerely,

A handwritten signature in cursive script, appearing to read 'S. Lang'.

Samuel J. Lang, MD  
Chairman of Cardiothoracic Surgery  
New York-Presbyterian Queens

*Appendix Q***NYPQ IRB Approval**

Institutional Review Board  
Lang Research Center

NewYork-Presbyterian/Queens  
56-45 Main Street, 2nd Floor  
Flushing, NY 11355

TEL 718 670 2914  
FAX 718 661 8730

nmg9001@nyp.org

To: Araceli Carrera, NP-C  
From: Phyllis August, MD, MPH  
Date: October 5, 2017  
Re: Implementation of State Action Avoidable Rehospitalization (STAAR) Initiative in a NP-Led Transitional-Care Program to Reduce Readmission Rates and to Provide Safe Transitional Care in Post-Cardiac Surgery Patients: A Quality Improvement Project

---

The NYP\Queens Institutional Review Board (IRB) has reviewed the revised projects' title and determined that the above proposed project still does not meet the definition of research involving human subjects as per federal regulations (45CFR46.102); therefore, it may be conducted without further IRB review.

Please note that the IRB must be notified promptly if the project is revised to include any component that may be classified as human subjects' research, i.e. if any data will be summarized and published. Any part of a quality improvement project (QI) that includes research methodologies, the federal regulations that protect human research participants may apply.

If you have any questions or require any assistance, please do not hesitate to contact me at 718-670-2914 or via email at [paugust@med.cornell.edu](mailto:paugust@med.cornell.edu).

*Appendix R***UMass IRB Approval**

University of Massachusetts Amherst  
 Human Research Protection Office  
 Mass Venture Center  
 100 Venture Way, Suite 116  
 Hadley, MA 01035

Office of Research Compliance  
 voice: (413) 545-3428  
 fax: (413) 577-1728

**MEMORANDUM – Not Human Subject Research Determination**

Date: September 25, 2017  
 To: Araceli Carrera, Nursing

**Project Title: Implementation of the State Action Avoidable Rehospitalization (STAAR) Initiative in a NP-Led Transitional-Care Program to Reduce Readmission Rates and to Provide Safe Transitional Care in Post-Cardiac Surgery Patients: A Quality Improvement Project**

**IRB Number: 17-163**

The Human Research Protection Office (HRPO) has evaluated the above named project and has made the following determination based on the information provided to our office:

- The proposed project does not involve research that obtains information about living individuals.
- The proposed project does not involve intervention or interaction with individuals OR does not use identifiable private information.
- The proposed project does not meet the definition of human subject research under federal regulations (45 CFR 46)

Submission of an IRB application to University of Massachusetts Amherst is not required.

**Note: This determination applies only to the activities described in the submission. If there are changes to the activities described in this submission, please submit a new determination form to the HRPO.**

Please do not hesitate to call us at 413-545-3428 or email [humansubjects@ora.umass.edu](mailto:humansubjects@ora.umass.edu) if you have any questions.

*Iris L. Jenkins*

Iris L. Jenkins, Assistant Director  
 Human Research Protection Office



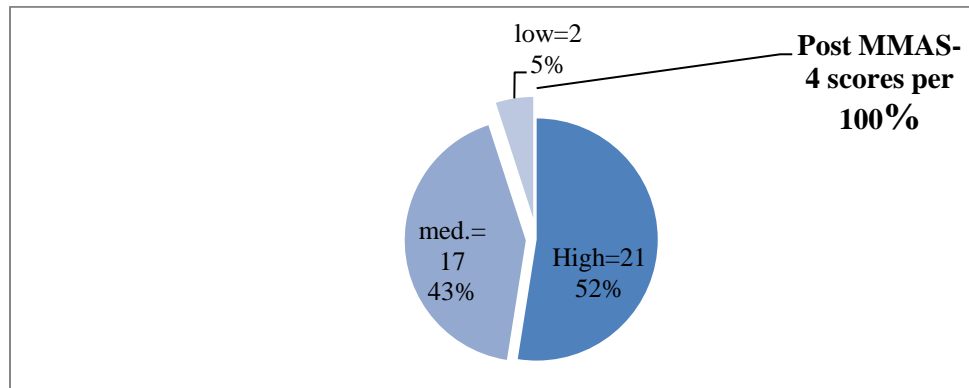
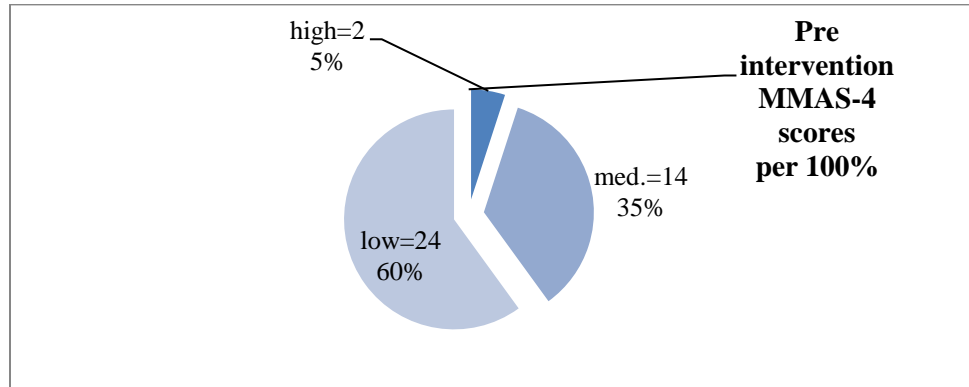


Figure 1. Medication Adherence within 30 days

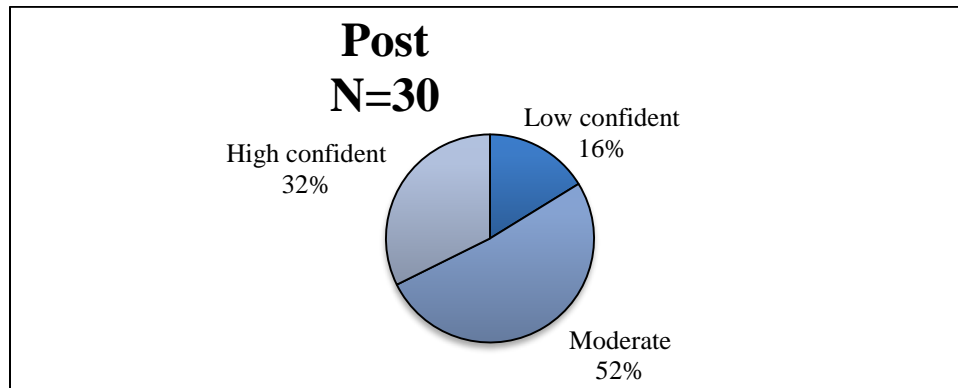
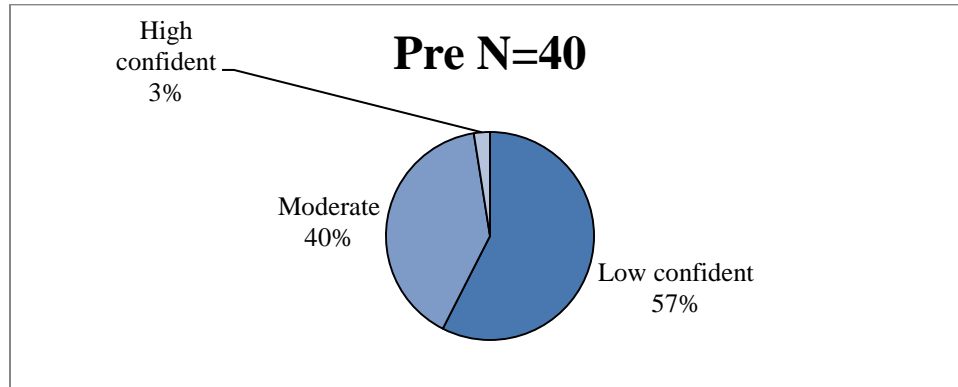
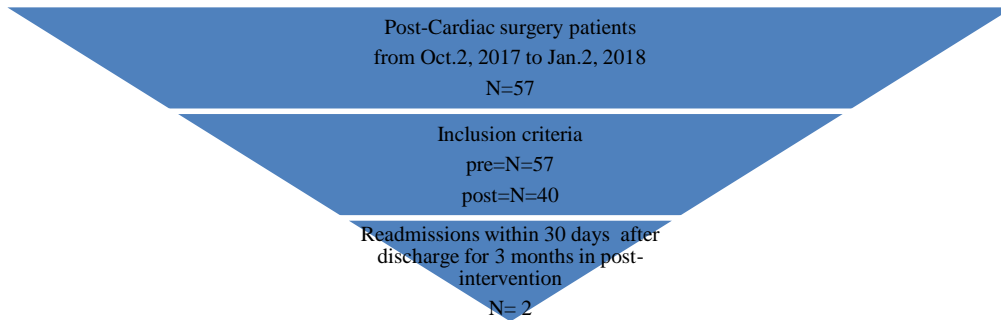


Figure 2. Health Literacy Scale

Table 6  
*Readmission Rates Within 6 Months Period*



DATA COLLECTION WITH INCLUSION CRITERIA for 3 months									
Month	All participants	Pre-intervention with criteria	# readmission	%	Month	All Participants	Post-intervention with criteria	# readmission	%
2017	n=	n=			2017	n=	n=		
June	19	17	2		Oct.	17	12	1	
July	18	13	3		Nov.	26	20	1	
Aug.	16	13	2		Dec.	15	8	0	
Total=	N=53	N=43	7	16.3%		N=57	N=40	2	5%

*Note.* Pre participants N=43 and Post participants N=40 with the inclusion criteria

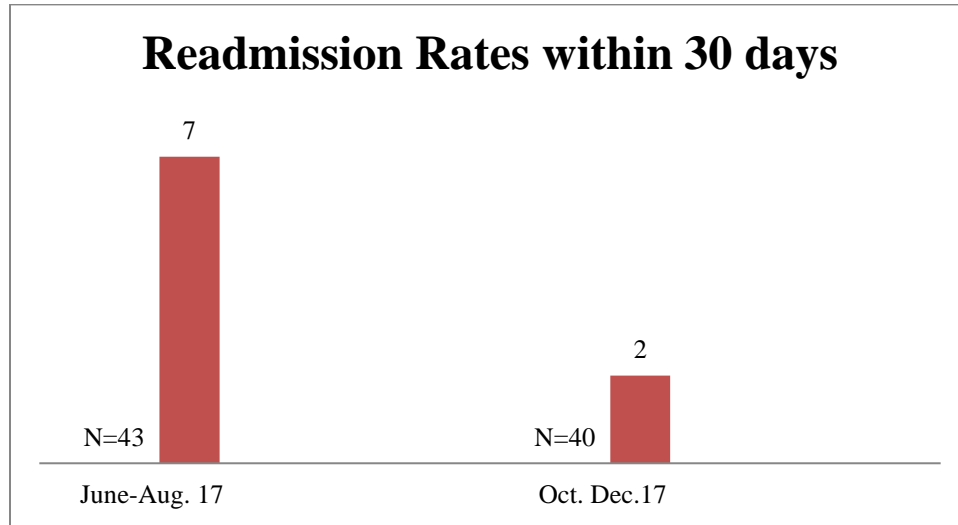


Figure 3. Readmission Rates from June to December 2017