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Oncology Discharge Phone Calls for Active Treatment Patients

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Abstract

Oncology patients are at an increased risk for complications after hospital discharge, which can lead to poor outcomes. To proactively manage oncology patient needs, a team of specialized oncology nurses implemented post-discharge phone calls. Using a descriptive design, with a convenience sample of 30 active treatment oncology patients, patients were called after hospital discharge using a semi-structured questionnaire tool focused on identification of patient needs and measurement of nursing care required to close gaps in care. The study found 73.3% of patients had a problem with symptom management, 56.7% with medication management, 33.3% with equipment or services, 70% with plan of care, and 23.3% with psychosocial needs. Nursing intervention was measured on a zero-to-four scale. Further use of Friedman's rank test showed that plan of care related issues required more complex nursing intervention. The scale formulated by this pilot study demonstrates an effective way to measure nursing quality, which could be applied to a range of other nursing issues. The major limitation of the study was the sample size. However, findings from the study indicate specialized nursing care is essential to oncology patients after hospital discharge.

Key words: DNP Project, Cancer nursing care after hospitalization, Nurse care management

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Problem

Oncology patients are at increased risk for treatment-related complications, disabling side effects and unplanned hospital admissions. Furthermore, gaps in transition from hospital to home, can lead to poorer outcomes for oncology patients. Although discharge planning and hospital readmissions have been well studied, the role of outpatient oncology nursing has yet to be defined. Oncology patients often call the cancer center with post-discharge needs. To prevent these issues, it was identified the nurses could implement discharge phone calls, which would allow for identification of a patient's needs and measurement of nursing intervention required at home for oncology patients on active treatment.

Purpose

This quality improvement project focused implementation of a semi-structured questionnaire tool during a planned nurse telephone call to active oncology patients. This questionnaire tool, developed using evidence-based practice, was used to support patient needs, close gaps in transition of care, and quantify the value of oncology nursing after discharge.

Goals

This project focused on the role of oncology nurse care managers (RNCMs) in preventing crisis situations by proactively managing oncology patient's needs after hospital discharge.

Objectives

There were two objectives for the study, First, to identify the problems and the frequency of those problems that active oncology patients were experiencing after hospital discharge. Problems are grouped into categories: medication related issues, symptom management needs, problems with equipment or services, psychosocial needs and issues surrounding plan of care. Second, to quantify the level of nursing intervention used to meet the needs of the patient and compare which problems require complex nursing intervention.

Plan

This pilot study employed a descriptive design using quantitative data and field notes focused on the nurse's assessment. Thirty patients, selected by convenience sampling, were called using the questionnaire tool 24-to 72-hours post-discharge. The questionnaire tool was built into the electronic health record Data was then collected into a data collection tool for analysis.

Outcomes and Results

Of the 30 patients, 73.3% of patients had a problem with symptom management, 56.7% with medication management, 33.3% with equipment or services, 70% with plan of care, and 23.3% with psychosocial needs. Friedman's rank test was used to determine that plan of care related issues required more complex nursing intervention with a mean score of 3.72 over symptom management with a mean rank score of 3.60.

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This project could not have been completed without the help of my DNP Chair, Dr. Kathleen Whalen, who spent countless hours working with me on this defense; Dr. Kathleen Jablonski, Clinical Nurse Specialist, who jumped at the chance to mentor me without a moment's hesitation; Dr. Cheryl Krutchke, who contributions were invaluable to the statistical analysis; and Rosalie Newton, grandmother, and cheerleader, who was integral to the editing process. Thank you to each of you, for I am eternally grateful.

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Oncology patients often require unique and intricate nursing care over the course of their treatment. Cancer is a life-changing event that requires close guidance through the healthcare system to provide good patient outcomes. As patients transition through the continuum of care, lack of formal integration between systems can lead to fragmentation in care (Aubin, et al., 2012). Oncology patients undergoing active treatment for cancer are at an increased risk of experiencing complications related to transition fragmentation (Antonuzzo, et al., 2016). After hospital discharge from both planned and unplanned admissions, these patients are particularly vulnerable. A semi-structured post-discharge phone call will ease the transition from hospital admission to home for oncology patients by preventing post-discharge problems. Further measurement of the nursing care provided during this time helps to quantify the nursing care required. This paper is focused on a Doctor of Nursing (DNP) project aimed at describing the needs of patients after hospital discharge. The paper reviews the practice problem, synthesizes the current literature, provides background and rationale for this quality improvement project, details the project plan and results, and recommends implications for change.

Problem Recognition and Definition

Problem Statement

When a patient is diagnosed with cancer, the oncology team decides the course of treatment to provide the patient. This usually includes a combination of surgery, radiation, and chemotherapy or biotherapy. Some therapy plans only include one or two of these modalities, and some all three. Each area is managed by a specialty oncologist. Radiation therapy is managed by a radiation oncologist. A surgical oncologist is consulted for surgery if necessary but will often hand off care to the medical oncologist when surgery is complete. Chemotherapy and biotherapy are managed by the medical oncologist. The medical oncologist follows the patient into survivorship or surveillance. Each patient has a care team. The medical oncology care team is composed of an oncologist, a nurse practitioner or physician assistant (APP), a medical assistant (MA) and a registered nurse care manager (RNCM). If a patient is undergoing radiation treatment, the radiation nurses also follow the patient until radiation is complete, at which time care is handed over to the medical oncology care team. Intravenous agents are administered in the clinic by specialized oncology infusion nurses. The RNCMs manage oral therapies and serve as a point of contact for all oncology patients. The RNCM role is revolutionary in the outpatient oncology care setting. This nurse influences every part of the patient experience acting as telephone triage, navigator, case manager, clinic nurse, right-hand to the physician and care coordinator. Nursing care management is considered one of the top 20 priorities recommended for national action to transform the healthcare system (Garnett, et al., 2020). The role of the RNCM is to follow the patient throughout the course of their cancer treatment to aid in symptom and medication management, troubleshoot barriers, improve transitions of care, give patients a point of contact at the cancer center and ensure care is progressing as expected. Aside from the chemotherapy education session prior to starting any new treatment, the RNCM rarely interacts with patients face to face. The majority of work for this role is done over the phone or through the electronic patient portal, called My Health Connection. RNCM interventions have been evaluated as effective in 81% of studies measuring outcomes related to screening, patient experience, and quality of care (Garnett, et al., 2020).

Oncology patients often experience disabling side effects, potentially life-threatening treatment-related concerns which can lead to poor quality of life, reduced therapeutic compliance and ultimately poorer outcomes (Compaci, et al., 2011). As a result, roughly 60% of patients undergoing active oncology require unplanned hospitalization (Antonozzo, et al., 2016). During the course of hospitalization, the oncologist may or may not be involved in the patient's inpatient care. If the patient is not admitted for a chemotherapy regimen, it is likely the hospitalist team of physicians will manage the inpatient orders. This is further complicated by hospitalists who are unfamiliar with cancer and chemotherapy specific issues. There are more than 100 different chemotherapy agents in use, each with unique side effects and potentially odd complications (Medline, 2020). For example, where a rash could be treated with steroids in the setting of one drug, steroids could complicate another. Upon arriving home, patients often call the RNCM team with a range of unmet needs. The needs may include medication management, symptom management, unknown plan of care, difficulty with equipment or services, or psychosocial needs. Mooney, Whisenant, and Beck, (2019) found patients only call the office with issues 5% of the time. This suggests many problems go unrecognized, resulting in gaps in care at home. This DNP project addresses the problem statement: active oncology patients experience crisis situations at home after hospital discharge, which require nursing assessment and intervention.

Statement of Purpose

By using a semi-structured questionnaire tool during a planned nurse telephone call, post-discharge complications may be prevented before they reach crisis situations, which in turn will result in better overall patient outcomes. In current practice, calls are unstructured. Without a structured questionnaire tool to guide the call, care may be fragmented and inconsistent. This results in missed patient needs and inability to identify gaps in the discharge process ultimately resulting in crisis situations. Use of a questionnaire tool would allow for identification of patient's needs and measurement of the level of nursing intervention during the call. This questionnaire was used quantify the value of a post-hospital discharge nursing phone call in the oncology setting by providing meaningful data about gaps in care. By categorizing problems and quantifying the amount of nursing care required to close gaps post-discharge, it may be possible to articulate the nursing time needed to care for each category of problems.

PICO

The DNP capstone project utilized the "PICO" question format rather than a formal research hypothesis. The PICO acronym stands for: Population or Patient (P), Intervention (I), Comparative Intervention (C), and Outcome (O) (Houser & Oman, 2011). The population (P) of study for this project were oncology patients on active treatment. The intervention (I) was a phone call 24-to 72-hours following hospital discharge, during which a questionnaire was used to guide the call. There was not a comparison (C) for the study as this was a new practice. The outcome (O) of the project was to identify patient needs at home after discharge and measure the level of nursing intervention used to meet those needs. Therefore, the PICO questions for this project read as follows: will a questionnaire tool used by nurses during a phone call 24 to 72 hours after hospital discharge allow for identification of a patient's needs and measurement of nursing intervention required at home for oncology patients on active treatment?

Project Significance, Scope and Rationale

This project was focused on the American Association of Colleges of Nursing (AACN)'s DNP Practice Essential for Clinical Scholarship and Evidence-Based Practice (EBP) (Zaccagnini & White, 2017). This practice essential encompasses a willingness to scrutinize nursing practice, raise the level of professionalism through participation in the generation of knowledge and through scientific and social exchange, and translate research into practice (Zaccagnini & White, 2017). The rationale for this project was based on this practice essential. Implementation of evidence-based interventions is necessary to improve proactive management of patient needs after hospital discharge.

The project was significant to patients, the RNCM team and the cancer center. The cancer center strives to provide the highest level of cancer care available, which means seeking new and better ways of providing care. Increasingly insurance providers are linking quality to reimbursement, making proactive management of care by the RNCM vital. The project was significant to the RNCM team as they work toward transitioning from a reactive to a proactive model of care, where patients are supported across the continuum of care. Poor care coordination by the RNCM is linked with inadequate symptom control, medical errors, and high healthcare costs (Garnett, et al., 2020). Results from this project, which have allowed for identification of the types of problems patients are experiencing, and nursing care provided, lays a foundation for future projects focused on prevention of the issues patients experience most. Proactive management is essential to high-quality, comprehensive cancer care.

The scope of this EBP, quality improvement (QI) initiative, DNP project was limited to a descriptive study of patients in a single care team over a six-month period, at a cancer center in Colorado. Therefore, only patients followed by a single specific oncologist were studied. This allowed for reduction of extraneous variables specific to differences in care providers practice style, diminishing outliers. This study was not meant to develop new knowledge or to be generalized outside the agency where the QI project took place.

Theoretical Foundation

Theoretical framework is important to strengthen evidence (Suh & Myung Kyung Lee, 2017). The theoretical foundation for this project was The Theory of Self-Care Management for Vulnerable Populations, which is a middle-range theory based on Dorothea Orem’s Grand

Theory of Self Care. Visual representation of both theories can be found in Appendix A. The Theory of Self-Care follows positive self-care management improves one’s overall health (Denyes, Orem, Bekel, 2001). Inversely, a lack of self-care for any reason, such as vulnerability, would negatively impact a person's health. Oncology patients are vulnerable for several reasons. An oncology diagnosis often puts physical, psychological, environmental, social, emotional, and financial strain on the patient and family (Periamsamy, et. al., 2017). Additionally, the complexity of cancer treatment places added strain, while the severity of symptoms is often under-reported and under-recognized by healthcare professionals (Gibson & McConigley, 2011).

The Theory of Self-Care Management in Vulnerable Populations examines the relationship between self-care management resources, vulnerability factors and health outcomes (Jenerette & Murdaugh, 2008). Vulnerable populations often face increased cost of care, morbidity, mortality, and unique barriers to care when compared with the general population (Dorsey & Murd, 2003). By addressing intrapersonal factors influencing self-care ability, one would have greater ability to manage illness. The major concepts of the theory include: contextual factors, vulnerability, intrapersonal factors, self-care management, health status, and quality of life (Dorsey & Murd, 2003). Vulnerability can be measured by the number and quality of factors that place a person or population at risk (Dorsey & Murd, 2003). The greater the number and quality of factors, the higher the risk to the person would be. For example, a homeless person who struggles with mental illness who is then diagnosed with cancer would have a greater degree of vulnerability than a person diagnosed with cancer who had adequate resources and support to cope with the diagnosis. As self-care management improves, health status and quality of life will improve (Dorsey & Murd, 2003).

Self-management is critical for a patient’s health (Clark, et. Al, 2008). RNCMs are in a critical position to help patients who are vulnerable from a cancer diagnosis complicated by an unplanned hospital admission. This is often a stressful time filled with barriers to adequate self-care, which presumably increased after hospital discharge. Through use of the questionnaire tool, the RNCM will be able to identify problems related to self-care and help the patient to increase self-care management techniques.

Literature Selection/Systematic Process

A systematic review of the literature was completed to evaluate the literature related to the topic of study. The databases searched include: PubMed, PubMed for Handhelds, MEDLINE, Cochrane Database, EMBASE, CINAHL, and GoogleScholar. Search terms included were “supportive cancer care,” “oncology nurse phone call,” “nurse care management,” “oncology nurse care management,” “oncology care model,” “malignant neoplasm telephone aftercare,” “quality outpatient oncology nurse care coordination,” “nurse care manager,” “oncology/phone call/quality,” “nurse questionnaire tool,” “unplanned admissions, “screening tool oncology,” "post discharge phone call,” “discharge planning,” and “nurse phone call hospital discharge.” The total number of articles reviewed was 367. A total of 38 articles were evaluated and included. Please see Appendix B for an example of one article reviewed. Year of publication was not limited, with publications ranging from 1999 to 2019. The year was not limited to provide a better understanding of the issue over time. Only articles published in English were included. Articles not related directly to hospital discharges or nursing phone intervention were excluded. Articles of low quality were also excluded.

Scope of Evidence

All levels of evidence were included except level V as no articles were found in this category. Melynk and Fineout-Overholt's (2011) table was used to identify the level of evidence for the 38 articles and are identified as follows: seven Level I Systematic Reviews or Meta-Analysis articles, five Level II or randomized, controlled trials, 10 Level III or controlled trials without randomization, four Level IV or case-control and cohort studies, no Level V or systematic review of qualitative or descriptive studies, 10 Level VI or qualitative or descriptive studies, and two Level VII or opinion/consensus based articles. The levels of evidence can be viewed in Appendix C.

Background of Problem and Review of Evidence

The emergent themes identified in the literature review were the emergence of nursing telephone intervention, the use of supportive nursing to reduce hospital readmissions, and lack of a “gold” standard in the areas of nursing telephone intervention and tools used.

Emergence on Nursing Telephone Intervention

In recent years, oncology care has transformed as cancer centers adopt different models of care, such as, shared care, medical home models, and case management, to meet the needs of patients. However, there continues to be a lack of formal conceptual discharge models to aid integration between inpatient care providers, leading to fragmented care (Weiss, et al, 2015). Gaps in discharge planning across the care continuum leads to poor intermediate patient outcomes, such as return to the hospital or readmission (Weiss, et al., 2015). Within the vast network of hospitals and ambulatory care centers, coordination between the inpatient and outpatient teams is challenging. Nurses are often able to identify issues earlier and, therefore, treat sooner (Ysebaert, et al, 2017). As a result, roles like nursing navigation and care management have emerged to aid patients as they progress through treatment and navigate the healthcare system (Yatim, et al, 2019).

In the outpatient oncology setting, highly specialized certified oncology nurses are able to provide quality service, increase patient satisfaction and improve the flow of busy cancer centers (Beaver, et al., 2012). Patient satisfaction is directly related to easily accessible communication complemented by strong interpersonal relationships with their oncology care team, especially when used to improve transitions and continuity of care (Bredart, et al., 2015). Nursing care managers fill gaps in care by serving patients as a point of contact (Valanis, et al, 2007). Nurses have been able to effectively manage oncology symptoms and medications, coordinate care, educate patients, and promote self-management over the phone (Burke, Guo, Prochazka, & Misky, 2014). In fact, nursing telephone intervention is as effective as face-to-face nursing assessment yet has a much lower cost of care (Kripalani, et al, 2019). As a result, nursing telephone intervention has revolutionized oncology care. With the increasing prevalence of oral chemotherapy, new ways to monitor patients are needed to overcome the common barriers like incorrect administration, noncompliance, and delay in seeking treatment for therapy-related concerns (Baldwin & Jones, 2018). Bellomo, (2016) estimated 25% of cancer agents are oral therapies and could be appropriately managed over the phone. Telephone management of patients is used to improve quality of life, reduce chemotherapy toxicity and reduced length of hospital stay (Compaci, et al., & Laurent, 2011).

Supportive Nursing to Reduce Hospital Readmissions

Hospital discharge is cited as a transition during which patients often have trouble, however oncology patients are at an increased risk of complications during this time (Gibson & McConigley, 2016). Handley, Schuchter and Bekelman, (2018) found oncology patients were not only 25% more likely to be readmitted to the hospital, but their symptoms developed over several days, which would imply patients lacked preventative interventions at home after hospital discharge. Patients have reported a lack of support after returning home from the hospital (Lewis, Samperi, & Boyd-Skinner, 2017). Montero, et al., (2016) cites readmissions are preventable with a 48-hour phone call from a nurse and a follow-up visit with the patient's primary oncologist within five days. In oncology, the complexity and diversity among patients can create substantial challenges when planning appropriate discharge services (Hand & Cunningham, 2014). Hospital readmissions continue to be of interest to care providers; yet, a direct causation between preventing readmissions and telephone nursing interventions has not been possible as there are numerous variables outside the realm of nursing (Hoyer, et al., 2018).

Lack of "Gold Standard"

Despite the efforts of hospitals, there continue to be gaps in hospital discharges related to assessment, planning, and coordination (Weiss, et al., 2017). Lack of communication, complex social needs and availability of resources can lead to problems when patients arrive home (Socwell, et al., 2018). One study found, discharge instructions are likely to be forgotten or poorly understood (Daniels, et Al., 2016). Compounded by the complexity of oncology treatments and diversity among patients, discharge planning faces substantial challenges (Hand & Cunningham, 2014). For example, inappropriate discharge of metastatic cancer patients could lead to critical issues and death (Tanaka, et al., 2017). Salamany, et al. (2018) utilized a pharmacist to conduct post-discharge phone calls, and while this did not increase patient satisfaction, several medication-related issues were identified. While numerous interventions have been implemented in the oncology setting, there is a lack of gold standard, guidelines, policies, or practice for supportive care services like oncology care management (Harrison, et al., 2011). Hoyer, et al., (2018) was able to identify the problems oncology patients face after discharge most often include symptom management, plan of care, equipment related issues, unknown plan of care and medications related issues. Aranda, et al., (2006) used counseling sessions to determine the common issues faced by cancer patients. These include family issues, treatment-related concerns, fatigue, sleeping difficulty, pain, financial burden, and loss of independence (Aranda, et al., 2006). These same domains have been applied to oncology tools across the board, yet no specific tool applies to oncology nursing phone intervention and is tailored to use with patients following hospital discharge.

Project Plan and Evaluation

Market Analysis

Strengths, Weaknesses, Opportunities, and Threats (SWOT)

SWOT analysis was used to analyze factors which could impact the project. This type of situational analysis provides insight into internal and external factors which could aid or prevent the project (Fortenberry, 2010).

Strengths. The selected population included a variety of cancer diagnoses which reflects the variation of diagnoses within the oncology population. The oncologist and APP were highly experienced, knowledgeable, and organized. The cancer center has a strong emphasis on process improvement and quality assurance to ensure prevention of errors. Within the cancer center, there is a strong sense of teamwork and collaboration. Teamwork and collaboration in combination with interdisciplinary care has been found to reduce unplanned admissions, emergency room visits, length of hospital stay, cost of care, and improve overall patient outcomes (Kreimer, 2018). The cancer center was a large center with many supportive services including oncology specific rehabilitation programs, nutrition, genetic counseling, financial counseling, exercise, navigation, and research. The RNCM team was a strong group of certified nurses with a long history of oncology experience. As this role is still developing, there is room to shape and mold the practices of the nurses. There are technological tools already in place to track which patients have been discharged from the hospital and organize patient caseloads. Finally, the cancer center has strong leadership and many process and quality improvement systems already in place. This ultimately aided the project. Effective healthcare leadership fosters innovation, embraces change, improves quality, reduces errors, builds effective teams, fosters just culture, and creates positive work environments (Huston, 2018).

Weaknesses. Common barriers faced by RNCMs include patient nonadherence, poor engagement, and high burden of documentation and tracking. A single-care-team patient caseload can be large, averaging 500 patients, with 250 of those patients on active treatment. As a result, the nurse may struggle with time to complete calls. Therefore, staff attitudes and approval of the project presented a weakness. Education about the process and the value of this change in procedure was essential to the success of creating this change within the RNCM group. Another major weakness was for nurses who did not utilize the dashboard tool which allows for organization of patient caseloads. This was a relatively new tool and adoption was challenging. The care team chosen to study was required to seamlessly use this tool to ensure patients were not missed. Finally, the questionnaire tool used during the phone call was not a validated tool as there is a lack of consensus in the literature.

Opportunities. Due to the rising cost of healthcare, oncology clinics have been looking for alternative methods of payment and/or care delivery models such as bundled payments, accountable care organizations, or patient-centered medical home models (Aviki, et al., 2018). The RNCM team is essential to a transition to this type of model. The changing environment of healthcare has been forced clinics across the country to find new and inventive ways of improving the care of patients, while cutting the cost. Oncology patients are at high risk for post-discharge complications which can be prevented with adequate follow-up (Gibson & Conigley, 2015). These complications often develop over the course of several days, leaving ample opportunity for the nurse to identify issues (Handley, Schuster, & Bekelman, 2018). When needs are identified, there is an opportunity to intervene early and potentially prevent further issues downstream. Thus, there is potential to improve the quality of care, increase satisfaction and create safer environments, although this project did not measure these outcomes. The project also aided in ensuring the organization maintains market share and trust within the community.

Threats. There was potential to have issues with patients' not answering the phone. Patients were called three times to overcome this threat, which was successful as no patients must be excluded for this reason. Additionally, there was a possible threat of the patient being too ill to conduct the call. This was overcome by building an option for sending patients to the emergency department into the questionnaire tool. Finally, the COVID-19 pandemic was a major threat. The COVID-19 pandemic continues to affect the world through physical, emotional, and economic crises. Near the beginning of the pandemic, in April 2020, hospital revenue fell by 79% in some areas (Lagasse, 2020). As a result, hospital systems became creative with ways to save money, some of which have impacted staffing. Nursing staff across the United States faced high levels of burnout and turnover, which made caring for patients more difficult. Patients, on the other hand chose not to go to the hospital unless their symptoms are severe, which lowered the number of hospital admissions. As the patients often waited to go to the hospital until they were in dire circumstances, they were often sicker than they would have been. As the patients were sicker when they went into the hospital, and there was a lack of space, patients went home sooner than they might have otherwise (Lagasse, 2020).

Driving and Restraining Forces

Driving forces for the project included the numerous potential benefits noted in the literature about the potential utilization of nursing telephone intervention. RNCMs are the bridge between the patient, the care team, the healthcare system, and community resources, and are responsible for clinical oversight, knowledge, and care coordination (Garnett, et al., 2020). Therefore, as this team transitioned to a proactive model of care, they were in a prime position to drastically change the health status of the oncology population. Doctors reported saving an average of 30 minutes per patient when care was well coordinated by RNCMs (Garnett, et. al., 2020). Quality of life is directly related to symptom management (Hintistan, et al., 2017). Another major driving force is the constantly changing healthcare environment. Changes in billing and reimbursement have forced several organizations to look at entirely new models of providing care like the medical home model or oncology care model (OCM) (Roque, et al., 2019). At the same time, reimbursement creates competition to provide the highest quality care. Organizations are under pressure to decrease costs and keep patients safe at home, while improving outcomes (Weiss, et al., 2015). Due to the many driving forces, there was encouragement from senior leadership for the project.

Restraining forces for this project were primarily staff related. The team was overstretched and understaffed at the time of the project. This increased negative attitudes as nurses could perceive increased work being assigned. A series of educational programs was provided to the nursing staff to solidify the need for discharge phone calls. This increased staff awareness to the potential positive impact these calls could have for patients. Other restraining forces were related to nurses who did not routinely use the tools available to them. This impacts the nurse's awareness of which patients were admitted to the hospital and therefore, unawareness of which patients were discharged. If they did not know which patients were discharged, they would not know who needed to be called. Education was provided to each nurse on the team individually about use of the dashboard, which was the tool used to help the nursing staff identify patients' admissions and discharges. A standard work and protocol were also created for use of the dashboard. Leadership presented this work and education to the nurses on several occasions over a year-long period to solidify use and create sustainability.

Needs, Resources, and Sustainability

This project was designed to prevent patients calling the clinic in crisis situations after hospital discharge by proactively managing their needs. The project was dependent on several factors; the patients being discharged from the hospital, RNCMs to make phone calls, and patients answering the RNCM phone call. The resources included phones, the electronic medical record (EMR) in EPIC, computers to access the EMR, nursing time to complete calls, the questionnaire tool built into EPIC, the "dashboard" tool to know when patients were discharged, and a data collection tool. A complete review of the tools listed will be discussed in the study methodology.

Support from senior leadership, doctor and care team approval, involvement, and buy-in were essential for the sustainability of the project. Sustainability was also dependent on the results of the study. If the study had not found value in the practice of discharge phone calls, the process would have ceased. Compaci, et al., (2011) found one-third of nursing telephone calls required complex nursing management, suggesting there is potential for the project to identify a range of needs. Sustainability is improved when the staff is engaged in the changes and there is continual growth, which is why they were included in creation of the tool (Craig, 2018). Over time, as healthcare changes, the use of the phone call may need to change as well, and this change will need to come from the RNCM team. Leadership support will be required to maintain compliance of the tool, as well as the unit-based council to monitor the need for change and implement as appropriate.

Feasibility, Risks, and Unintended Consequences

To test feasibility of this pilot study, the study team first conducted an in-depth process mapping of the patient experience, a root-cause analysis, and a gap analysis. As a result, the team identified the discharge phone call as a feasible option to prevent the problem. The team, composed of experts in oncology care, then built the questionnaire tool based on the literature. Once the tool was designed, it was tested, revised, and retested until it was able to meet the needs of both nurses and patients. The questionnaire tool was then reviewed to ensure it met EBP standards.

There was no risk of harm to subjects with this QI project. Both structured and unstructured calls are made by the RNCM to the patients in the population on a routine basis. Thus, this structured phone call was not unlike the normal job functions of the RNCM position. As with any call made by the RNCM team, there is potential to miss a patient need. During review of past cases within the cancer center, it was discovered that while patients were called before experiencing crisis, the staff did not address the specific detail leading to the problem. For this reason, it was decided the questionnaire tool needed to be structured. There was an instance during the pilot where a patient called with several needs the day following the discussion with the nurse. However, the patient’s condition had changed since the phone call, so no needs would have been identified at the time of the original discharge phone call.

During the pilot study, the RNCM team found the structured questionnaire tool was helpful to guide them during calls, although this was not measured. As a result, they decided to create similar tools for other types of phone calls, such as calling patients after their first dose of chemotherapy. As an unintended consequence, this QI study has spurned several other projects along the same lines. The unit-based council formed a team focused on preventing emergency room visits and unplanned admissions.

Stakeholders and Project Team

The project team included Whitney Archer, project team lead; Kathleen Whalen, DNP Chair; Kathleen Jablonski, CNS and DNP mentor; JoAnn Lovins, Oncology Service Line Director; Erin Stewart, Nurse Manager; and Melissa Sandoval, RNCM. The care team doctor, Anne Kanard, MD, and the advanced practice provider, Katherine Berdell, PA also played a significant role while not directly on the project team. The stakeholders included patients, the RNCM team, doctors, APP's, MA's, cancer center ancillary staff, senior organizational leadership, and the inpatient oncology team.

Cost-Benefit Analysis

According to Garnett, et al., (2020), gaps in care management cost an average of $25 to $45 billion annually due to complications that could have been avoided. On average, patients with effective care coordination at John Hopkins Community Health Partnership saved $4,295 per episode due to fewer emergency room visits and fewer follow-up visits (Khullar & Chokshi, 2018). Heath (2016) argues utilization of a population health model encourages patient engagement, which not only prevents costly catastrophic events but boosts patient retention rates. Patients no longer returning to a practice have significant effects on lost revenue. One study found care management was able to improve continuity of care by 52%, effect change in patient’s health behavior 21%, improve patient self-management by 15%, improve patient treatment adherence by seven percent, and reduce patient overall healthcare costs by four percent (Garnett, et al., 2020).

Quality can be difficult to translate into cost savings, yet cost-effectiveness needs to be measured. In the oncology setting, quality is often measured using quality-adjusted life-years or QALYs (Goldstein, 2016). QALYs are a ratio between the cost of extending life for one year, based on $100,000 per life-year or LY and health states like cancer which can subtract from quality of life (Goldstein, 2016). While QALY cannot be used to measure coverage, reimbursement, or incentive programs in the United States, it may be useful in determining if quality of life is improved by a single intervention and the cost of the improvement (Devlin & Lorgelly, 2017). By improving transitions of care and addressing patient’s needs proactively, the nurse may be able to improve a patient’s QALY from 0.4 to 0.6 on a zero-to-one scale, this could compute to thousands of dollars. This multiplied by thousands of patients is a major cost benefit.

The cost of this QI project was absorbed by the cancer center; therefore, the following figures represent a projected cost. There was no actual cost for the project. Nurse staffing costs include the time spent placing phone calls. The average time spent on post-discharge phone calls was 10 to 24 minutes (Hintisan, et al., 2017). A total of 30 patients were called, with an average call time of 24 minutes, indicating 12 hours were spent on calls. The average nursing hourly wage in Fort Collins, Colorado is $30.95 (PayScale, 2020). Applied to 12 hours, the cost of nursing labor to call patients was $371.40. For the pilot, a single nurse conducted calls. If education was provided to all 15 nurses on the team, the education may cost $464.25 for an hour-long session not including development time. Education was not included in the budget for the pilot as only a single nurse was used. Of note, the nurses are salaried employees, which means they are not paid for overtime and are expected to complete the work. An hourly wage was used only for the purposes of estimation. These nurses' focus on population management and post-discharge care easily could be argued to be a part of their job description. No additional supplies or space were necessary, so these were not priced. To develop the tool, five nurses participated in 10, one-hour meetings, which represents a cost of $1,547.50. To build the tool into EPIC, a single nurse spent three hours, which would have cost $92.85. The five nurses on the team spent one hour developing the process for the phone calls which represents a cost of $152.70. Office supplies like paper and pens were provided by the organization. Meeting rooms were used at the cancer center during business hours. Therefore, as this space and equipment was not being used, but was available, it was not included in the budget. Additionally, the phones, the electronic health record or EHR, nurses' salaries, and all other materials were provided by the site. There was no actual cost to the investigator. However, is it important to note that if the study were to be replicated, the time of the DNP student would need to be accounted for. The DNP student's time was more than 800 hours, representing a cost of $24,760.00. Therefore, the total projected cost for the project was $26,760.00. Please see Appendix D for a table representing the budget for the project. It is important to note, if this were a not a student-led project, the time would have been vastly truncated and completed by the clinical nurse specialist employed by the cancer center. This reduction in time would equate to a reduction is cost to replicate the project.

Mission, Vision, and Goals

The mission of the project was to improve care transitions between hospital and home by providing comprehensive cancer care to oncology patients utilizing innovative solutions. The vision of the project was to develop the RNCM role toward a proactive population management approach. The goal for the project was for RNCMs to prevent crisis situations following hospital discharge by identifying patient problems early. To do this, the team developed and tested a questionnaire tool to guide the nurse through a post-discharge phone call.

Outcome Objectives

There were two primary outcome objectives for the post-discharge phone call. First, identify the problems and the frequency of those problems active oncology patients were experiencing after hospital discharge. Problems were grouped into five categories: medication related issues, symptom management needs, problems with equipment or services, psychosocial needs and issues surrounding plan of care. Second, quantify the level of nursing intervention used to meet the needs of the patient and compare which problems require complex nursing intervention. Please refer to Appendix E for a review of the project timeline.

Logic Model

The inputs for this project were oncology certified RNCM nurses to conduct calls, phones to complete calls, the EMR, staff time and collaboration, and EBP to support the phone call content. To begin, the team created the questionnaire tool, and then educated the care team physician and APP about the process. Next, there was a roll-out of the intervention to implement discharge phone calls using the tool. This included providing an overview of the project to the RNCM team, so they are aware and able to divert questions about the project to the appropriate resources. Constraints for the project included time to conduct the phone calls, existing culture, ability to reach patients and protocol limitations. If the RNCM was unavailable to make the call, the back-up RNCM would make the call that day. After identification of the problem, nurses intervened to meet the needs of patients as per their normal practice. The nursing interventions were then measured on a five-point scale. The intended outcome was for patients to be well supported at home through increased levels of self-care management and knowledge about oncology management. Long-term outcomes for the project included improving patients' satisfaction using low-cost and effective interventions across the system. This intervention was one link in the chain toward proactive and comprehensive oncology care management to improve oncology related outcomes in the outpatient setting. Please see Appendix F for a visual representation of the Logic Model.

Population and Sampling Parameters

The target population was oncology patients who were managed at the UCHealth Harmony Cancer Center and who had recent discharge from the hospital. The population was selected via convenience sampling over a period of six months. Sampling over a six-month period was adequate to provide enough variation to obtain a representative sample of the population and obtain homogeneity. This type of sampling was utilized so the researcher could select people who were available and met study criteria (Terry, 2018). Convenience sampling is used when the investigator utilizes participants who are the most accessible or easy to reach (Terry, 2018). The major disadvantage of this type of sampling is risk of investigator bias.

Power analysis can be used prior to data collection to determine the smallest sample size suitable to determine the effect of a specific test on the desired level of significance (Polit, 2009). Statistical power is determined by significance level, sample size, power, and effect size (Polit, 2020). Effect size is "a measure of the strength of the relationship between variables in the population" (Polit, p.126, 2009). For this study it was not possible to calculate the effect size for several reasons. First, comparison of two groups was not possible. Effect size is typically taken from a pilot study; however, as this study is a pilot, there is no comparative data available (Suresh & Chandrashekara, 2012). Not only is there the absence of a comparison group, but also a comparison questionnaire or study of any kind. This type of study has not been done before, and thus would be difficult to compare to another. As the tool was developed for the use of this study, further investigation would be required before utilizing it in different groups and studies, at which point comparisons could be made. During the year prior to the study, an average of 10 patients were admitted to the hospital each month. However, some months, there were as few as two to three patients. Using this as a baseline, it was estimated at least 30 patients would be included in the study.

The QI study population included oncology patients with solid tumors on active treatment at the UCHealth Harmony Cancer Center by a single doctor. Other inclusion criteria included access to a telephone and ability to speak English. The doctor selected treats a variety of cancer diagnoses and stages. Active treatment is defined as patients on chemotherapy, biotherapy, hormonal agents, and all metastatic patients regardless of treatment type. Radiation and surgery were not considered as part of the inclusion criteria. Patient-specific demographic data collected included: age group in increments of five years, oncology diagnosis and stage, race if known and insurance type. Language barriers can threaten the credibility, transferability, dependability, and confirmability of qualitative data during the translation process if these barriers are not addressed by methodology (Squires, 2009).

Hematological malignancies were excluded as these patients often have unique issues and require more care planning from the nurse (McCaughan, et al., 2019). Patients discharged on hospice were excluded from the population as they have unique needs post-discharge and hospice nurses often provide most of the nursing intervention. Patients were to be called up to three times daily and then excluded if the nurse is unable to reach them after three attempts. However, during the study, no patients had to be excluded for this reason. Patients discharged from other healthcare systems were excluded as this was not traceable in the EHR and the project was contingent on this alert to know which patients to call. Patients who were readmitted were not excluded as this should not impact the nature of the call or the aim of the study. Data was collected to know if the patient had been readmitted. The nature of the call would be the same if the patient were readmitted and therefore did not alter the data. Additionally, as patient information was de-identified at the time of collection, it was impossible to know if the same patient was counted twice.

During this QI study, the investigator monitored the entire patient population for hospital discharges. As patients who met the inclusion criteria were discharged, they were called and an offer to discuss their needs was extended. If the patient opted to accept the discharge call, the RNCM investigator proceeded with the study protocol. If the patient opted not to accept the call, they would be asked if there was anything the nurse could help with. During the study, no patients who met the inclusion criteria opted not to participate. A total of 30 patients were included in the study.

Setting

The setting for this EBP project was the UCHealth Cancer Center in Fort Collins, Colorado. The cancer center is under the umbrella of the north UCHealth oncology service line. The project was further limited to the RNCM team, which is a part of the medical oncology department. The cancer center is home to medical, surgical and radiation oncology, as well as genetic counseling, nutrition, research, oncology rehab and wellness, oncology counseling, social work, navigation, acupuncture, massage, exercise programs, and the cancer registry office. Each year the cancer center diagnoses roughly 5,000 new cancers (Carmen Edens, personal communication, 2019). The cancer center was the optimal setting for this pilot as there were the appropriate resources, need for the project, and dedication to continual quality improvement.

The medical oncology department is home to nine doctors and seven APPs. While the cancer center is in Fort Collins, Colorado, it is important to note there are two sister centers in Loveland, Colorado and Greeley, Colorado as well as another infusion center in Fort Collins who also see the cancer center patients. All these facilities work together to create a comprehensive network of care across northern Colorado. The cancer center draws patients not only from northern Colorado, but many patients travel to the center from Nebraska and Wyoming with some patients traveling five to six hours each way for care. The doctor whose care team was utilized for the population of study travels one day every other week to Yuma, Colorado, which is a small town in Eastern Colorado. This allows patients to receive oncological care who are not able to travel great distances. Other doctors within the clinic also have similar outreach clinics in other areas, for example, Estes Park, Colorado and Laramie, Wyoming.

QI Project EBP Design and Appropriateness for Outcome Objectives

This pilot EBP project employed a descriptive design that included the collection of quantitative data and field notes. A descriptive study design was appropriate as the study did not aim to examine causation, but rather to investigate the phenomena to provide data for further hypotheses (Terry, 2018). According to Terry (2018), the goal of descriptive research is to make the investigator more familiar with the focus of investigation, so more precise questions can be asked. For example, there has been much research about the effects of phone calls on hospital readmissions. However, the literature has not been able to determine causation due to variation in practice, poor study quality, variety of outcome measures, and lack of validated instruments (Hand & Cunningham, 2014). Hoyer, et al., (2017) was also unable to determine causation for similar reasons but found patients often had issues with understanding discharge instructions, medication reconciliation, or inadequate follow-up. The literature review demonstrated several studies that investigated the problems faced by patients after hospital discharge. However, more investigation is required to find out the role nursing plays in the resolution of these problems. This gap in the literature provides justification for the use of a descriptive design for this QI EBP project that focused on identifying what role nursing plays in the resolution of the patient's problems.

Variables

Independent Variable. The independent variable of study, or the intervention, was the nursing phone call using a guiding questionnaire. The phone call utilized a questionnaire tool built into a nursing note in the EHR. The RNCMs make numerous phone calls to patients for a variety of reasons. However, there was no current process for phone calls specifically after hospital discharge. Without a guiding questionnaire tool for the RNCM to use during the call, it is impossible to ensure all potential problem areas would be addressed. For example, perhaps the nurse calls the patient, and the call is absorbed by a discussion about symptom management. Without the tool to prompt the nurse about medications or plan of care, there would be potential for these areas not to be discussed.

Dependent Variable. The dependent variables were the issues the patients experienced, and the nursing intervention used to manage those issues. The nursing intervention was dependent on the problem. For example, if the patient were experiencing a problem with medications, the intervention would focus on medication, but the dependent variable would be different. If the problem were simply that the patient did not understand their medication, the nurse intervention would be education. If the patient did not have the medication and needed a refill, the nurse intervention would be to solve the refill problem. Refill problems can be as simple as sending an order to the pharmacy, or more complicated involving multiple phone calls to pharmacy, setting up delivery of medication, and ensuring the patient receives the medication and begins on the correct day.

Extraneous Variables. Nursing specific extraneous variables include variation in nursing style and relationship with the patient. Variation in nursing style was mitigated by limiting the calls to a single care-team. As the nurse follows patients from the beginning of treatment through the entire course of their care, they often develop strong relationships over time. Time spent on the calls could be variable as this may be different depending on how well the nurse knew the patient. A new patient could require a more in-depth assessment than a patient whom the nurse has spoken to regularly over the course of several years. The variable was mitigated by close adherence to the structure of the questionnaire for all patients surveyed.

Patient specific extraneous variables included reason for admission, oncology diagnosis, stage and treatment plan, length of hospital stay, age, gender, race, health literacy, family support and insurance type. Healthcare barriers like insurance issues, social support problems and transportation issues can cause an increase in the intensity of RNCM resources the patient requires (Garnett, et al., 2020). Nursing specific extraneous variables were mitigated by limiting the calls to a single care team of providers. While the majority of calls were conducted by the care team nurse, there was a back-up nurse to make the calls if needed. Documentation of which nurse performed the calls was not collected. Patient-specific extraneous variables were mitigated by the structure of the tool. The tool was designed to identify the needs of patients despite extraneous variables. The tool was designed to encompass any issue the patient could experience, rather than specific issues they may experience related to the extraneous variables. This enabled the tool to be used on a wide spectrum of patients.

Study Instruments

The Questionnaire Tool. Please see Appendix G for an example of the tool before and after completion by the nurse. The questionnaire began with a thorough review of the chart, prior to the phone call. During the review, the dates of admission and discharge, reason for admission, cancer diagnosis and treatments, pertinent labs, upcoming appointments, inpatient and outpatient notes, discharge recommendations and medications were reviewed. The hospital discharge instructions are called the AVS or after visit summary and are found in a note in the EHR. The AVS is given to patients to take home upon discharge and was used for the RNCM to complete medication reconciliation and review discharge instructions with the patient if needed. Once the chart review was complete, the nurse initiated the call. During the call, the nurse addressed five categories: medication management, symptom management, equipment and home services, plan of care, and psychosocial needs. These five categories were chosen based on a comprehensive review of the literature. Research suggested the areas patients often need help with include managing symptoms, education to promote self-management, coordination among care providers, medication safety, enlisting help from social and community supporters, discharge planning, accuracy, timeliness, and clarity of medical information (Burke, et al., 2014). Each area was a mix of open- and close-ended questions designed to engage the patient while allowing for nursing assessment.

During the call, the nurse addressed each of the five areas and responded according to the problem. For example, for medication management, the nurse completed a medication reconciliation, noting any medication changes during hospitalization. The nurse then asked if the patient had the medications they needed. If the patient had the medications, the nurse answered the question with “yes” and moved on to the next question. If the patient answered “no,” the nurse identified why the patient did not have the medication. Common answers might include, "my daughter has not picked it up from the pharmacy yet," or "I did not think I needed the anti-nausea medication because I have not had any nausea, but I will pick it up if needed," or "I need a refill," or "The pharmacy won't fill my medication without pre-authorization." Based on the reason the patient did not have the medication, the nurse decided if intervention was needed. If a refill was needed, the nurse used the medication refill process, or if pre-authorization was needed, the nurse assisted with this process. The RNCMs are a highly specialized group of nurses with standardized tools to deal with any of the issues that may arise during calls.

Each problem area had a corresponding nursing intervention score, graded on a zero-to-four scale. This portion of the questionnaire tool was completed after the call finished. The nursing intervention score identified what action the nurse took based on the problem. The scores increased with intensity of needs and nursing resources. A score of zero indicated there were no issues or needs identified. A score of one indicated low risk, in which nursing assessment and education only were required. A score of two indicated potential risk, during which the nurse assessed, educated, and completed a task to meet the needs of the patient, such as refilling medication or making an appointment. A score of three indicated the patient was at risk and required ongoing nursing monitoring and intervention past the phone call. Finally, a score of four indicated there was an urgent need requiring input from the doctor or APP. For example, regarding symptom management, perhaps the nurse would ask, "How are you feeling" and if the patient responded, "I feel amazing, better than ever, I am eating well and even the antibiotics have no side effects," the nurse would score this a zero or no risk, no needs identified. If the patient said, "I am feeling ok, but I have no appetite," the nurse might ask more questions about what they were able to eat and provide some education about ways to improve nutrition. This would be a score of one or low risk because the nurse only used assessment and education or information. The patient would be at low risk because they could manage their health at this point and the nurse would not be concerned about the patient. If the patient said, “I am so constipated, I have not had a bowel movement since before I was admitted to the hospital,” the nurse asked more assessment questions and employed a bowel regimen. This would include recommendations about stool softeners and a plan for the next phases of care if a patient were unable to have a bowel movement. The nurse then needed to follow-up later the same day or the next day to ensure the patient was able to have a bowel movement. This scenario warranted a score of three or at-risk because the nurse assessed, educated, intervened, and was going to monitor for improvement, resolution, or another intervention. The patient would be at-risk because while they were able to care for themselves at home, there was potential for complications without monitoring. Finally, a score of four was useful when the patient said something like, “actually my nose has been bleeding for four hours and I can’t get it to stop; I am beginning to feel rather lightheaded.” In this situation, the nurse was aware of the patient’s recent lab work and history from the beginning of the tool, and thus knew the patient was at risk for thrombocytopenia due to the chemotherapy regimen they were taking. The nurse would involve the doctor or APP and plan for the patient to come into the office immediately or return to the emergency room. This patient was no longer at risk, rather there was a serious problem requiring care. It should be noted, a score of four was not reported during the study and these were hypothetical examples used for tool development as opposed to actual events that occurred.

The questionnaire tool was built into a customizable note in the EHR. To use the tool, the nurse opened a nursing note and rather than free texting a note, employed the questionnaire tool. The nurse accessed what is called a “dot phrase” which contains the tool. In EPIC, the EHR in use, charting is completed in “encounters.” Each area of the clinic has unique types of "encounters" which serve their specific purposes of charting. For example, during a hospital admission, all the charting during the entire hospitalization by staff, nurses, doctors, ancillary staff, would be in a single encounter. In the clinic, the doctors use a unique "encounter" to chart office visits and the infusion nurses use a unique "encounter" to document chemotherapy and biotherapy administration. Some encounters employ "dot phrases" and some do not. For example, an office visit will use a "dot phrase" which ensures standardized areas are documented by all doctors. RNCM nursing documentation is primarily done in "triage encounters." In the "triage encounter," there is functionality to pull in pre-populated protocols. For example, if the nurse notes the reason for this "triage encounter" is diarrhea, a protocol for diarrhea will populate into the protocol sections. The protocols in use are evidence-based. This prompts the nurse to document answers to "yes/no" questions. A question might be, is the patient having more than six stools in 24 hours. If the answer is "yes," this prompts the nurse to bring the patient into the office, whereas if the answer is "no," the nurse moves on to the next question, until a disposition for the patient is determined. In addition to the protocols, the nurse documents in a blank "notes" section. In this section, the nurse has the option to free text a note, or to use what is called a "dot phrase." When a "dot phrase" is used, the nurse types in the name of the phrase, in this case ".amboncdcnote." Once this was typed in, a note containing the questionnaire tool was populated into the notes section. The note had several blank areas that must be filled in. For example, the note might look something like this. "Patient was discharged on *** from ***." The nurse cannot sign the note until all the *** areas have been addressed. Some of the *** areas also had the option to pre-populate drop-down menus of potential answers when selected. The nurse presses the "F2" button to move through the blank fields and fill in information during the call. This allows the nurse to document the call quickly and effectively without typing each section in.

Once the nursing documentation was complete, the nurse has the option to save the encounter, send or route the encounter to another member of the care team, or set a date for future follow-up by the nursing staff, which then populates onto the nurses "dashboard."

The Dashboard. This is an innovative tool refined and used by the RNCM team, which is a comprehensive list of all the active treatment patients in the cancer center. Each RNCM can add patients to this list when they begin treatment and remove patients from the list when appropriate, if ever. This list can then be sorted to include only a specific RNCM's care team of patients. The RNCM can use this list for several functions, first to sort which patients need to be called on a specific day and for what reason. They can also use this tool to see which patients are admitted, how much care coordination time has been spent on a single patient in the current calendar month, and at what risk the patient has been deemed: high, medium, or low based on data pulled from the EMR such as, age, number of comorbidities, presence of barriers, etc. See an example of the dashboard in Appendix H. This is only an example of what the dashboard looks like as the actual tool in production contains patients' protected health information and cannot be displayed without violation of patients' privacy.

Data Collection Tool. The data collection tool was used to collect the data in a way that de-identified the patient information. This was necessary as the questionnaire tool was housed inside the electronic medical record. Patients were coded one through 30. Once the data was collected, there was no way to know which patient was number 11 and which patient was number 25. The patient-specific data tracked was: age group, in ranges of five years, reason for hospital admission, oncology diagnosis, stage and treatment plan taken from the most recent oncologist note, length of hospital stay in number of days, if it was a readmission within 30 days, type of insurance and race if known. No individually identifiable health information was collected, which is defined as name, geographical identifiers smaller than a state, dates directly related to an individual, phone number, fax number, social security number, medical record number, health insurance beneficiary number, account number, certificate or license number, vehicle identifiers, device identifiers and serial numbers, web uniform resource locators, also known as URLs, internet protocol address numbers, also called IP addresses, biometric identifiers like fingerprints, full face photography, or any other unique identifying number (HIPPA Journal, 2020).

Intervention-specific information collected included: what category of problem the patient had and corresponding nursing intervention score, which symptoms were discussed, if the patient had access to the medications they needed, which equipment and/or services the patient was utilizing at home, if the patient understood the discharge instructions, number of days to oncology follow-up appointment, if the patient found the call helpful and free text nursing comments or field notes. Categories of problems were collected as a yes or no question to indicate the patient either did or did not have an issue in that category. The nursing intervention score was collected on a zero-to-four scale. Comments included details only and were not patient-specific. These details, or field notes were important to understand why the patient got the score they did and gave the investigator insight into what types of needs fell under the five problem groups, allowing for further definition of these groups. For example, patients discharged with oxygen, not in use because the oxygen provider did not deliver. RN was able to resolve. Please see Appendix I for an example of the data collection tool including context-specific information and a data dictionary.

Protection for Human Rights.

This DNP capstone project did not meet the federal definition of human subject research as it does not seek to develop or contribute to generalizable knowledge (OHRP, 2016). There were no anticipated harmful effects related to this QI project; in other words, the study posed no more than minimal risk because the probability and magnitude of harm or discomfort was no greater than would be encountered during routine nursing care (National Institute of Health [NIH], 2020). As the RNCM role is almost entirely telephone-based, usual practice in this setting constitutes telephone conversations with specialized nursing staff. While there was no specific process or procedure for discharge phone calls, the nurses routinely engage in calls with patients for various reasons like symptom or medication management. The questions asked during the call would not differ from questions asked during routine nursing care. Rather, the study focused on utilizing a tool to organize the questions to collect data.

The basic elements of informed consent included a description of the investigation, risk and discomforts, benefits, alternative procedures or treatments, confidentiality, compensation, and medical treatment in the event of an injury, contact for questions, voluntary participation, and withdrawal (Food and Drug Administration [FDA], 2014). At the beginning of each call, the RNCM explained to the patient the reason for the call was to review discharge needs and asked them if they had time to run through the questionnaire. This gave patients the choice to participate in the call. Informed consent was not needed as this was a QI EBP project. However, asking patients to participate increased the protection for their autonomy. Data was housed on UCHealth computers which are protected and utilize secure access. These computers are encrypted and require complicated and frequent password changes. Data itself was also secured with a password known only to project team members. The investigator passed both CITI for human researcher for social behavioral research investigators and biomedical research investigators in February 2020. Please see Appendix J for completion certificates.

Instrument Reliability and Validity for the Questionnaire Tool

This section of the paper will focus primarily on the questionnaire tool, which was the focus of the project. The dashboard does not require review, as it was not created for this project and is simply a tool used by the team. The data collection tool was simply a collection of the answers found by the questionnaire tool and thus reliability and validity cannot be separated out for this tool.

Reliability and validity are tools used to ensure research has rigor or is trustworthy (Morse, et al., 2002). Reliability indicates the instrument is consistent and will give the same results if the project were to be replicated (Terry, 2018). The parts of the tool that employ close-ended questions where the answer would be “yes or no” should give more uniform results than the open-ended questions. Therefore, both types of questions were used. As this was a pilot study, it would likely be difficult to replicate results without a larger sample size. However, before reliability can be established in a larger population, it is important to ensure the tool is valid. A major threat to reliability is the data collection process. If data is collected without appropriate planning, this may alter the result. Therefore, the data collection tool was constructed. Planning for data collection using this tool prevented missing data and ensured a uniform collection process with each phone call. Place and time may also threaten reliability. If the project were to be replicated, the patients called would be different and could have an entirely different set of issues. Theoretically, a six-month time frame ought to be a long enough time to overcome this. Additionally, as the hospital discharge process influences the issues patients experience, it is possible this could not be replicated in another place where the population is different.

Validity indicates the instrument is measuring what it is intended to measure (Terry, 2015). As the phone call questionnaire tool was not a validated tool there was no guarantee it measures what was intended. The aim of the questionnaire tool was to identify what problems patients are experiencing and how the nurse responded, with education, intervention, or physician involvement. To prevent this issue, the tool was created by a team of oncology nursing experts using EBP. The nurses investigated the discharge process from the time of admission to the time patients were calling in crisis to identify which gaps ought to be covered by the tool. As a part of this investigation, they received input from all stakeholders. The nurses then began collecting data about the patients who called in a crisis and documented those needs. The team was not able to find a tool in the literature which would fit the aim and purpose of the call, so they developed the questionnaire tool. The nurses then tested the wording of individual questions to see how patients might respond. The questions were then revised based on feedback from the nurses. The nurses ran several scenarios, and the tool was revised several times until a working tool could be devised.

Since each patient situation is unique, nursing judgement can play a role in validity. For example, a patient is experiencing diarrhea. The nurse does an assessment and gives recommendations and scores this as “low risk.” However, another nurse with the same assessment may feel ongoing monitoring is required, which may cause the nurse to score the patient as “at risk.” Education on how to use the tool was provided to mitigate the risk. Additionally, in the case of symptom management, the nurses ought to utilize the care protocols in place for specific symptoms as these are validated decision tools.

There are several categories of validity, including content validity, construct validity, and criterion validity (Heale & Twycross, 2015). Content validity refers to the instrument adequately covering the content; in this case the tool needs to be broad enough to cover any issue a patient may face (Heale & Twycross, 2015). Brief screening tools are comparable to comprehensive screening tools in ability to identify patient needs (Girgis, et al., 2012). Construct validity refers to the ability to draw inferences from the tool (Heale & Twycross, 2015). For example, will a higher nursing intervention score demonstrate the needs of the patient accurately or could there be other reasons for the increased score? Tracking and evaluation of extraneous variables was necessary to evaluate the tool for this type of validity. Construct validity was measured by homogeneity, that the tool had one construct, convergence, that the instrument measured similar concepts to other tools, and theory evidence (Heale & Twycross, 2015). Criterion validity refers to the tool's ability to measure the same variable as other tools (Heale & Twycross, 2015). In this case, criterion validity was difficult because the tool was developed for the project and there were no tools like it. Future studies are required to prove reliability and validity.

Data Collection and Intervention Procedure Protocol

Implementation of the project began after the primary investigator received Institutional Review Board (IRB) approval from the Regis University. The Regis IRB Approval Letter can be viewed in Appendix K. The project was reviewed by the UCHealth IRB and approved as a QI project independently of the Regis IRB. As the project was determined to be a QI project by UCHealth, a site approval letter was the only organization requirement. The site approval letter can be viewed in Appendix L. The RNCM received alerts through the EHR when a patient was admitted to any hospital within the healthcare system. The RNCM then utilized the "dashboard" to know when patients were discharged. The RNCM monitored the dashboard daily to ensure phone calls were made in a timely fashion. Using the report, the nurse was able to sort the patients by the most recent hospital discharge date. These tools enabled the nurse to identify which patients required a post-hospital discharge phone call. Patients should ideally be called the day following discharge. Timing of calls was important to the success of the pilot (Harrison, et al., 2011). However, as the clinic is closed on weekends and holidays, the nurses called the patients the following business day. The nurse began by asking the patient if they had time to talk about how they were doing, giving them the option to participate. If the patient accepted the call, the RNCM used the questionnaire tool and tracked data. If the patient opted not to proceed with the call, the RNCM offered to discuss any needs or problems the patient has and proceed with the call in a manner consistent with the role of the RNCM. No patients opted not to participate. During the call, the nurse would utilize the questionnaire tool seen in Appendix G. Using the questionnaire tool, the nurse identified and met the needs of the patient. When the call was complete, the nurse tracked data using the data tracking tool, seen in Appendix I which did not use any identifying patient information to protect the privacy of patients. Please see Appendix M for a flow map of the study protocol.

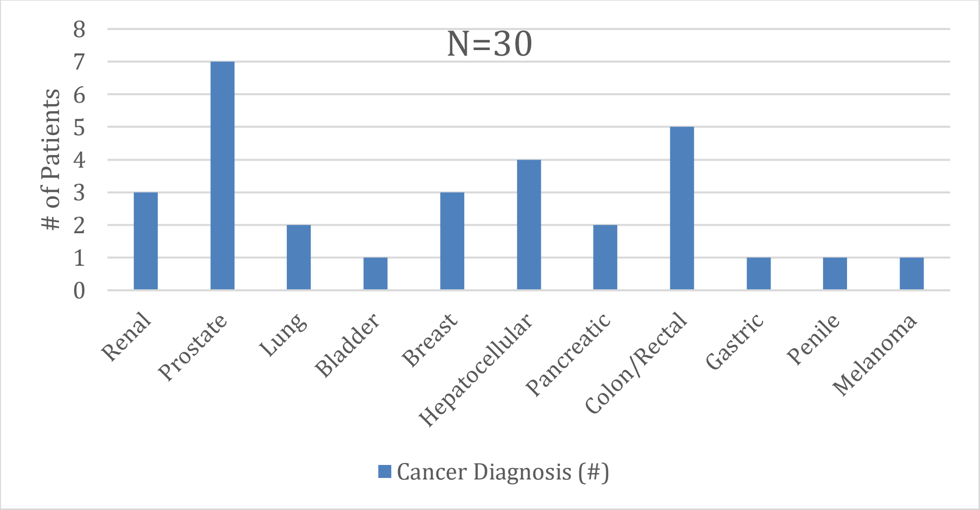
Project Findings and Results

The data collected was composed of quantitative and field notes. Quantitative data is defined as data that can be quantified in numerical form (Polit, 2009). Thus, each set of quantitative data was coded numerically. For example, for questions to which the answer was “yes,” were coded as “1,” and “no” was coded “2.” The data was then put into SPSS for analysis. Nursing level of intervention was abbreviated as NIL for input into SPSS. All the data was coded, except for the symptoms patients experienced and field notes, composed of free text nursing comments about the situation or patient comments. The symptoms were reviewed for trends, of which many were the same. The free text nursing comments or field notes were reviewed to give a better understanding of why patients scored the way they did on the questionnaire tool.

Patient demographic data collected revealed a further picture of the population as a whole and provided insight into specific reasons for the frequency of problems and nursing interventions. Thirty patients were included in the QI study. Reason for admissions showed 63.3% were admitted for cancer related reasons, whereas 36.7% were admitted for reasons not related to their cancer diagnosis. Cancer diagnoses included renal, prostate, lung, bladder, breast, hepatocellular, pancreatic, colon, rectal, gastric, and penile. Figure 1 show the number of patients per cancer diagnosis that were included.

Figure 1

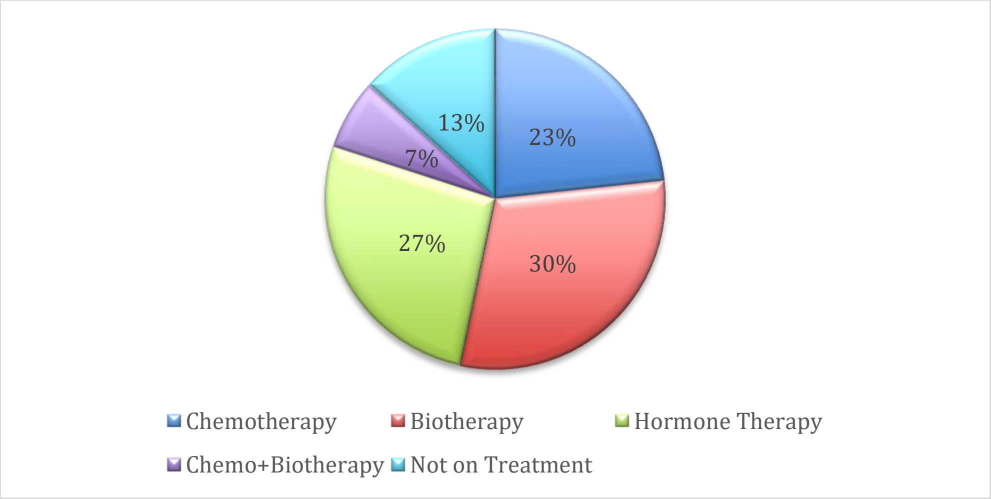
Cancer Diagnosis (#)



Age varied from 41 to 90, with most common age group ranging from 71 to 75. The most common length of stay was one day; however, the longest admission was 8 days, with a median of 3 days. The majority of patients, 86%, had stage IV cancer, with only a single patient in each of the other stages, 0, I, II, III. Treatment modalities ranged from chemotherapy, biotherapy, and aromatase inhibitors to no therapy.

Figure 2

Treatment Modality (%)



Two of the 30 patients were having concurrent radiation. Five patients were admitted for surgery related to their cancer. Eight of the 30 patients or 26.7% were readmissions, including one patient with post-surgical complications. While no patients were self-pay, 50% of the patients had Medicare, 16.7% had Medicaid, 23.3% private insurance, and 10% had Medicare and private insurance. Race showed 83.3% were non-Hispanic and 16.7% were Hispanic, no other races were included as they did not present.

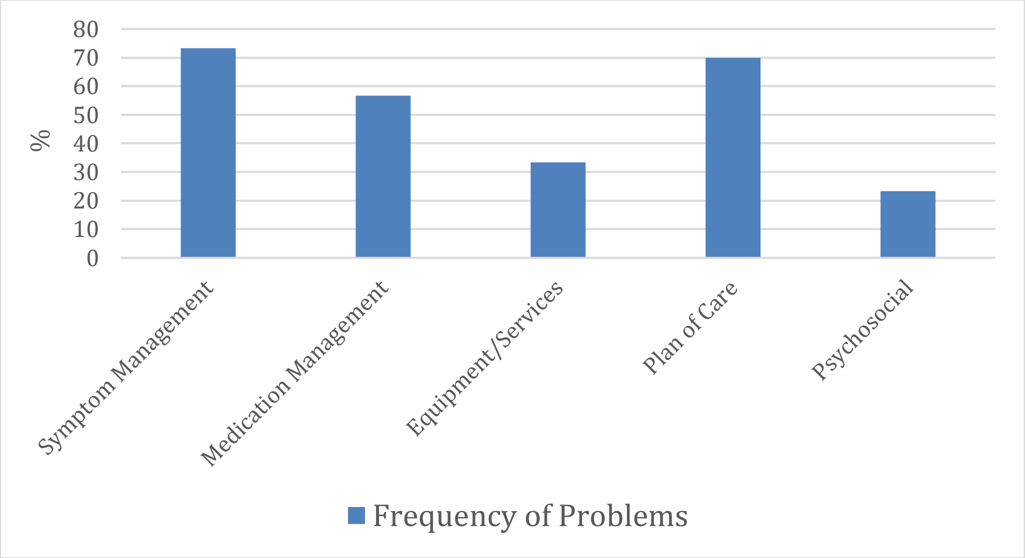
Objective One: Identify Category and Frequency of Problems Experienced After Hospital Discharge

Problems were grouped into categories: symptom management needs, medication-related issues, plan of care needs, issues with equipment or services, and psychosocial needs. Upon review of the results, 73.3% of patients had a problem with symptom management, 56.7% with medication management, 33.3% with equipment or services, 70% with plan of care, and 23.3%

with psychosocial needs. Thus, the most patients had needs in symptom management category. Needs in this category included nursing assessment of symptoms patients had and nursing management of the symptoms. Medication related issues included nursing assessment of medication including a full medication reconciliation, answering questions, clarifying instructions for medications, need for medication refills, complex management of anticoagulants. Of the 30 patients, 13.3% of patients reported they did not have their medications. Patients were discharged with a variety of equipment and services, including: 16.7% that went home with durable medical equipment (DME), 10% with home health (HH) and DME, 6.7% that went home with a wound or ostomy, 6.7% with oxygen, DME and HH, 3.3% with HH alone, and 3.3% with intravenous (IV) therapy, HH, and DME. There were 53.3% of patients that did not go home with equipment; however, some of these had issues with equipment or services that were in place prior to discharge or felt they did not have what they needed. Home health was defined as the need for a nurse, physical therapist, or occupational therapist. DME included walker, cane, crutches, foley catheter, and compression stockings. Of the 30 patients, 13.3% did not understand their discharge instructions, 20% did not have oncology follow-up scheduled at all and only 36.6% had follow-up scheduled within one week. One patient had follow-up scheduled more than two months out, and another more than three months out. Psychosocial issues included patients who lived alone without support, who had caregiver issues, and one patient who required social work to be involved for investigation of safety in the home. Overall, 96.7% found the call helpful. Figure 3 shows the frequency of problems in each area.

Figure 3

Frequency of Problems (%)

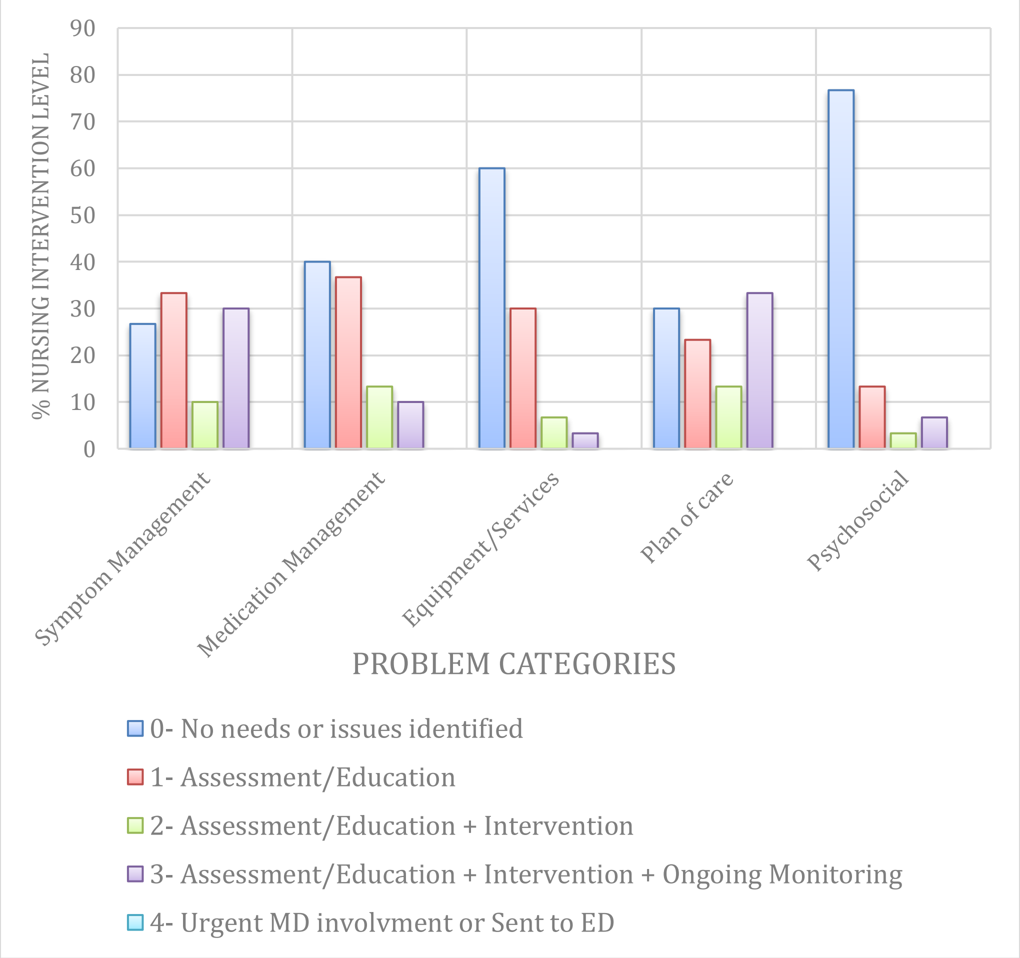


Objective Two: Quantify Level of Nursing Intervention Used to Meet Patient Needs

Each problem area had varied scores of nursing interventions; however, a score of four, indicating the patient was sent back to the emergency room if there was urgent physician involvement needed did not occur. Figure 4 shows a comparison of the scores in each group, while Table 1, found in Appendix N, shows of exact frequency of scores in each category. Most often, symptom management required a score of one, which indicated nursing assessment or education. Plan of care scored three most often, indicating a need for ongoing nursing management. Psychosocial, medication management and equipment/services scored zero most often, indicating there was not a need. A score of two was the most uncommon score across the categories. A Friedman's test showed there was a statistical difference between the levels of nursing interventions in each problem area, $X^2_F(4)=31.351$, $p=.000$.

Figure 4

Frequency (%) of Nursing Intervention Level Scores



Friedman's test is a nonparametric ANOVA used to test the differences in paired groups or repeated measures when there are three or more sets of observations (Polit, 2009). Friedman test was the appropriate test to determine which problems required a more complex nursing score as the independent variable, the questionnaire tool was nominal, and the dependent variable or level of nursing intervention was ordinal. Friedman's Test, seen below in Table 1 was used to rank five dependent groups. The mean rank of plan of care (POCnil) was highest at 3.72, followed by symptom management (SYMnil) at 3.6, medication management (MEDnil) at 3.02, equipment/services (EQInil) at 2.47 and psychosocial (PSnil) at 2.2. This indicates plan of care related problems required the most complex level of nursing intervention in comparison to the other problem areas (Chi-Square 31.351, p .000).

Table 1

Friedman Test Results

Ranks

Nursing Intervention Levels (NIL)	Mean Rank
SYMnil	3.60
MEDnil	3.02
EQInil	2.47
POCnil	3.72
PSnil	2.20

Test Statistics[a]

N	30
Chi-Square	31.351
df	4
Asymp. Sig.	.000

Note: Category names are abbreviated, SYM for symptom management, MED for medication management, EQI for equipment and services, POC for plan of care, PS for psychosocial, and NIL for nursing intervention level.

Linear regression was used to predict which extraneous variables impacted the frequency of problems and score of nursing intervention level. Regression is a statistical evaluation used for prediction of values of a dependent variable based on one or more independent variables (Polit, 2009). Using regression, the outcome variable becomes the dependent variable, and all other variables are called predictors, explanatory, or independent variables (Sullivan, n.d.). In this case, a single dependent variable, in this case the problems and level of intervention for each problem area, against more than one independent variable. Linear regression was run for each of the five problem areas and nursing intervention level scores. Results were as follows:

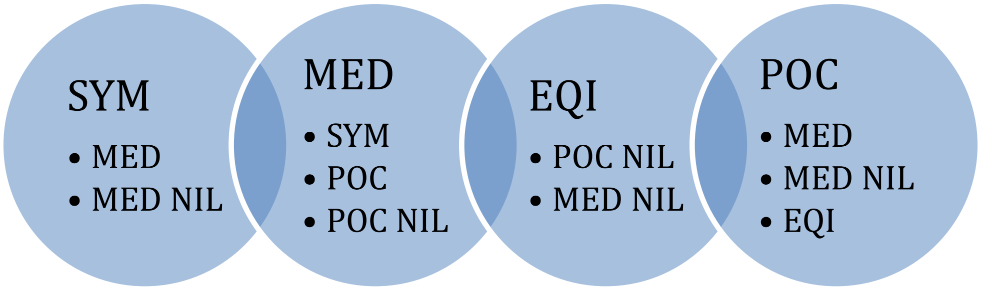
- Symptom management intervention level (F=1.8, p=.132, R^2=.594) was impacted by reason for admission (t=-2.455, p=.026) and cancer diagnosis (t=-2.2527, p=.022).
- Presence or absence of symptom management problems was not impacted by any variables (F=.856, p=.607, R^2=.410).
- Neither medication management intervention score (F=.888, p=.580, R^2=.419), or presence or absence of medication management problems (F=.567, p=.846, R^2=.315) were impacted by any variables recorded.
- Equipment and services intervention score (F=5.140, p=.001, R^2=.807) was significantly impacted by resources (t=5.261, p=.000).
- Presence or absence of equipment and services related problems (F=4.352, p=.003, R^2=.780) were impacted by cancer diagnosis (t=-2.223, p=.041) and resources (t=-3.181, p=.006).
- Plan of care nursing intervention score (F=3.039, p=.019, R^2=.712) was impacted by cancer diagnosis (t=-4.415, p=.000), and treatment modality (t=2.274, p=.037)
- Presence or absence of plan of care related problems (F=4.019, p=.005, R^2=.766) was impacted by cancer diagnosis (t=-4.415, p=.000), treatment modality (t=2.274, p=.037) and resources (t=2.527, p=.022).
- Finally, psychosocial intervention level was not greatly impacted by a specific variable (F=.615, p=.809, R^2=.333) nor was the presence or absence of psychosocial-related issues (F=.739, p=.705, R^2=.375).

Appendix O shows the statistical results of linear regression for each of the nursing intervention levels, whereas Appendix P shows a summary of the results.

Kendall's Tau is a statistical test used to examine correlation coefficient and is used to indicate the magnitude of a relationship between variables measures (Polit, 2009). A full review of these results can be viewed in Appendix Q. Polit (2009) provides a framework for classifying these relationships into weak, moderate, or strong and positive or negative to show how close various data points are related. Although for nominal level variables, the positivity or negatively could be inverse, which does not affect the overall results. Reason for admission had a weak negative correlation to medication level of intervention (p=0.037, $T_b = -0.36$), whereas cancer diagnosis had a moderate positive relationship to plan of care level of intervention (p=0.002, $T_b = 0.465$) and equipment problems had a strong relationship to equipment level of intervention (p=0, $T_b = -0.84$). Various problem areas were found to be related as can be seen in Figure 5. Psychosocial was excluded as it did not correlate.

Figure 5

Correlation of Problem Areas based on Kendall's Tau



Note: Category names are abbreviated, SYM for symptom management, MED for medication management, EQI for equipment and services, POC for plan of care, PS for psychosocial, and NIL for nursing intervention level.

Results Discussed According to EBP Practice Question

The question for this QI study, will a questionnaire tool used by nurses during a phone call 24 to 72 hours after hospital discharge allow for identification of a patient's needs and measurement of nursing intervention required at home for oncology patients on active treatment, was answered by the results of the data analysis. The RNCM was able to identify numerous needs and issues, categorize those problems into five areas, and measure the amount of nursing required to close gaps in care after hospital discharge. Although symptom management had the most frequent issues, plan of care required more complex nursing intervention. During the length of the study, a score of four, indicating urgent involvement of an advance practice provider was required did not occur, showing nursing is able to effectively manage patient issues after hospital discharge. These results imply the RNCM is in an ideal position to reduce care fragmentation after hospital discharge and prevent crisis situations at home. As many of the issues were specific to oncology and had statistical correlation with the cancer diagnosis and plan of care, this would suggest the oncology care team ought to play a role in outpatient discharge follow-up for all active treatment patients.

Limitations, Recommendations, and Implications for Change

This pilot study developed the questionnaire tool, and thus it was not validated, which is the biggest limitation. Rather, this study determined the tool did in theory measure what it intended to measure. However, further research is needed to prove validity. Additionally, patients of varied locations, called by more than a single nurse, and not limited to a single physician would be needed to establish interrater reliability. Of the patients included, only Hispanic and non-Hispanic patients presented. The area where the cancer center is located lacks diversity in comparison to other major cities; however, it may be beneficial to study a larger population, in which more patients could be included. The small sample size also presents a limitation, as does the use of convenience sampling, which opens the study to bias. A larger sample size may show correlation of variables not found in this pilot study. For example, no confounding variables were identified for medication management in the regression analysis, however, this may change with a larger sample.

During data analysis, as only two variables, reason for admission and cancer diagnosis accounted for R^2 of 0.594, further regression of those two variables was attempted; however, this led to a reduction in the R^2 and an increase in the p-value. This would suggest there were confounding variables not identified for data collection. A more in-depth statistical analysis to isolate each individual variable would be warranted; however, this was not explored as this was not needed to thoroughly answer the study question. Using this analysis, it would be possible to identify which variables do not impact the dependent variable, and therefore, do not need to be collected. For example, data about comorbidities and involvement with palliative care were not collected which could have impacted the types of issues a patient experienced, or even need for admission. Considering most of the patients had stage IV cancers, it also could be prudent to explore these variables further. After the revision of these variables, and addition of missing variables, regression could be used to predict the types of problems patients experience and the nursing care required.

The post-hospital discharge call was a valuable tool to identify patient issues. From the field notes, it was identified one patient had fallen at home that day, another had recurrence of cancer requiring further work-up, and several needed complex nurse care management expertise. The patient who was discharged after recurrence of cancer was found to have malignant ascites related to breast cancer. She did not have work-up for new staging or an oncologist appointment scheduled for follow-up. To complicate matters further, she was recently divorced and suffering from anxiety and depression. Another patient, admitted for pneumonia and a new diagnosis of atrial fibrillation, left the hospital against medical advice after refusing intravenous antibiotics and was found to have fevers and multiple medication issues related to Eliquis. These cases exemplify the need for RNCM post-discharge phone calls.

While some of these issues could be prevented by closing gaps upstream, some could not. While the field notes revealed some of the issues could have been addressed by the primary care provider, many were related specifically to the cancer diagnosis, which justifies the use of an oncology-certified nurse to make these calls. Symptom management related issues presented the most frequently, and plan of care issues presented the most complex nursing management. Further study to tailor assessment and interventions toward these problem areas could prove beneficial. Trends in the symptoms recorded include gastrointestinal symptoms, pain, fatigue, and no symptoms at all. Symptom management is extremely important in the setting of cancer treatment for overall patient outcomes (Ysebaert, et al., 2019). However, as problems were identified in each of the five areas, it is arguable each of these areas is worth addressing in the post-discharge time frame. As the study showed many patients did not have immediate oncology follow-up in the form of an office visit, nursing care was successfully able to fill these gaps without urgently involving the oncologist or sending the patient back to the hospital.

The nursing intervention level scores provided a valuable way to measure the amount of nursing needed in each circumstance. This grading method could be applied to other aspects of the RNCM role to further quantify nursing metrics. It could be of interest to explore how this score compared to time spent on various aspects of care. Also of interest was the minimal use of a score of two. A score of two indicated the nurse would assess, give education or information, and complete an intervention. It is possible this score was used less frequently as the intervention often requires monitoring, which would increase the score to three. However, further investigation would be required to confirm this. Considering plan of care required the highest levels of nursing care, it would be worth exploring the reasons for this phenomenon. This gap presents many more questions. Could this be avoided? Would having a scheduler involved in this process decrease post-discharge issues? The Kendal's Tau revealed plan of care was most closely linked with cancer diagnosis, insurance, medication related problems, medication intervention level, and equipment and services issues. The relationship of these variables suggests the RNCM is the best role to coordinate higher levels of both short- and long-term plan of care for the patient.

The use of Kendall's Tau for correlation further showed the relationship between expected variables, such as the relationship of treatment modality to level of nursing intervention for symptom management. Often patients on chemotherapy require more complex nursing management than those on aromatase inhibitors, hormonal treatment for breast cancer. It is debatable as to whether aromatase inhibitors should be defined as active treatment. For the purpose of this QI study, they were included to see if any issues could be identified. Based on the field notes, it was identified that one patient who was discharged on an aromatase inhibitor did not have the needed oncology follow-up. Additionally, this patient was identified to have several other issues requiring intervention by the nurse. While a larger sample size is needed, the weak correlation between treatment modality and symptoms management suggests nursing phone calls would be helpful to all treatment modalities. Cancer diagnosis had a moderate relationship to the patient having their medications, which also warrants further investigation. As there were only four patients (13%) included who did not have their medications, this could change with an increased sample size.

The volume of correlations between variables seeks to confirm the Theory of Self-Management for Vulnerable Populations, which was the guiding framework for the study. Cancer is a life-altering diagnosis with the potential to completely control a patient’s life. Many of the variables were related to the needs of the patient. This project clearly showed how invaluable specialize nursing care is for these patients. The larger number of barriers the patient has, the increased amount of RNCM time and resources, estimating 20% of the patients require 50% of the RNCM coordination due to complexity (Garnett, et al., 2020). The field notes revealed several comments from patients such as, “I was just about to call you,” “I am not sure I could have figured this out without you,” and “I am glad you called, it is nice to have someone to talk to who cares." These statements indicate that despite the correlation of variables, potential need for the call, lack of need for the call or nursing intervention, the phone calls are valuable to the patient. The patient is the highest priority in nursing care.

Summary

Nursing care management is defined as “a collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy for options and services to meet an individual's and family’s comprehensive health needs through communication and available resources to promote patient safety, quality of care and cost-effective outcomes (Garnett, p. 66, 2020). Therefore, it is essential to provide comprehensive cancer care during transition times, such as hospital discharge. Active oncology patients often call the cancer center with crises after hospital discharge. The RNCM is in a perfect position to prevent complications preemptively calling patients after discharge using a guiding questionnaire tool. While patients most often experience symptom management issues, enough problems were identified with medications, equipment, plan of care, and psychosocial needs, that these areas should not be excluded from the questionnaire. The tool also allowed for identification of corresponding nursing care based on the needs of the patient, which revealed plan of care issues require the more complex nursing intervention. Cancer patients are vulnerable to care fragmentation. Without specific, detailed, and evidence-based nursing care in the immediate post-discharge time frame, these patients are open to numerous preventable issues.

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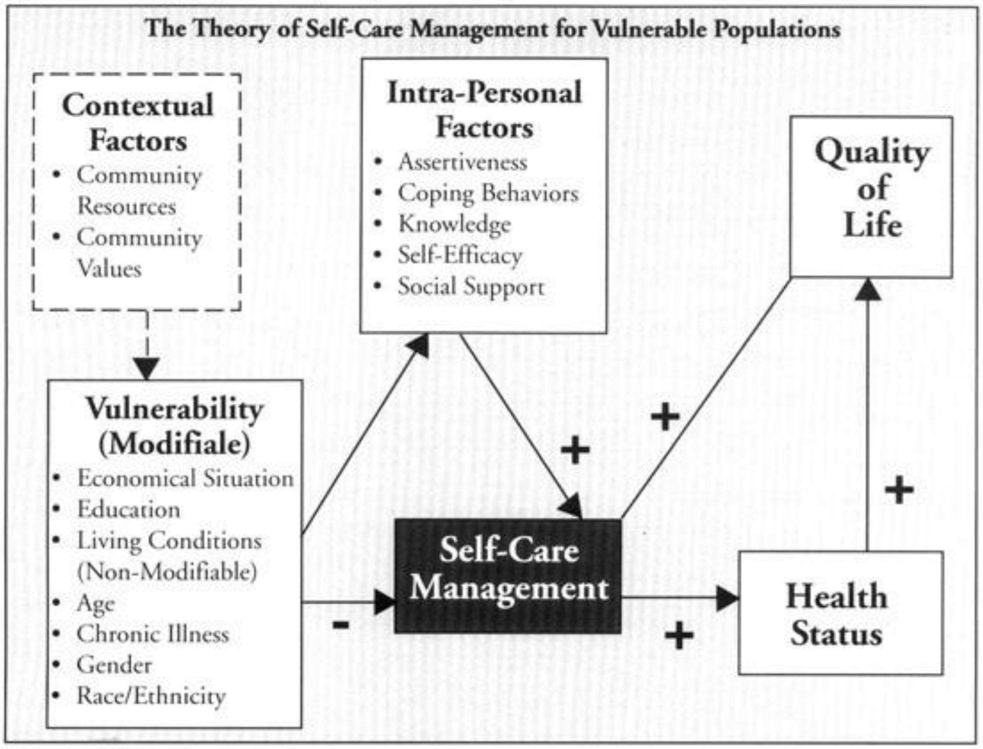
Appendix A

Conceptual Diagram, Theoretical Framework

(Gonzalo, 2014)

Figure 1. The Theory of Self-Care Management for Vulnerable Populations Model



(Gale, n.d.)

Appendix B

Systematic Review of Literature Example

Article/ Journal	**1. Symptom Care at Home.** *Medical Care.*
Author/ Year	Mooney, K. Whisenant, M., & Beck, S. (2019).
Database/ Keywords	PubMed. "Oncology phone call."
Research Design	Well-designed controlled trial without randomization; quasi-experimental.
Level of Evidence	Level III
Study Aim/ Purpose	We developed Symptom Care at Home (SCH), a comprehensive automated PRO system, to overcome gaps in care when cancer patients are at home between clinic visits.
Population/Sample size Criteria/ Power	10 symptoms monitored only during chemotherapy. Number of patients not listed.
Methods/ Study Appraisal Synthesis Methods	Single-variable model; single descriptive study. Descriptive of PRO/SCH systems (patient-reported outcomes/symptom care at home).
Study tool/ instrument validity/ reliability	SCH (interactive voice response system that calls the patient daily; which then alerts NPs); PRO system (measurement tool). Automated tool that uploads to provider dashboard so providers can address needs daily.
Primary Outcome Measures/ Results	Decreased symptom severity from moderate/severe to no/mild. Used single-item scale 1-10 for each symptom. Better overall symptom control during chemotherapy/radiation. Article found the use of the automated system for efficient and continuous monitoring of symptoms to capture change; (2) the need to provide self-care coaching tailored to the pattern and intensity of symptoms, at the time the patient was experiencing those symptoms; (3) automated alerts to providers about unrelieved symptoms to bypass patient reluctance to contact providers; and (4) support for the providers to improve symptom care through dashboards combined with evidence-based decision support.
Conclusions/ Implications	Found patients only call office 5% of the time when they are experiencing symptoms.
Strengths/ Limitations	Unfamiliar measures and scoring algorithms make it more difficult to interpret PROs. Cannot be utilized outside oncology. Sometimes choice among recommended drugs is influenced by insurance plan reimbursement

Funding Source	Wolters Kluwer Health Inc.
Comments	Tools looked at 11 symptoms on 1-10 scale. Nausea, fatigue, sleep disturbance, mood **Application:** Patient’s often do not call the office despite instruction to do so, therefore, other interventions are needed as there is a gap in care when patient are experiencing issues. ** Look back at this tool when creating capstone tool

Appendix C

Scope of Evidence

Levels of Evidence	Number of Articles	Authors and Dates
I Systematic Review or Metanalysis	7	Aubin, et al., (2012); Bredart. Et al., (2015); Burke, et al., (2014); Hand & Cunningham (2014); Handley, Suhuchter & Bekelman, (2018); Mistiaen & Poot, (2006); Suh & Kyung, (2017)
II Randomized, Controlled Trial	5	Aranda, et al. (2006); Girgis, et al., (2011); Harrison, et al., (2011); Salmany, et al., (2018); Ysebaert, et al., (2019)
III Controlled Trial without Randomization	10	Beaver, et al., (2012); Bellomo (2016); Compaci, et al. (2011); Daniels, et al., (2016); Hintistan, et al. (2017); Hoyer, et al., (2017); Kripalani, et al., (2019); Montero, et al., (2016); Mooney, Whisenant, & Beck, S. (2019); Rocque, et al., (2019)
IV Case-control or Cohort Study	4	Moscato, et al., (2003); Swanson, et al., (2019); Socwell, et al., (2018); Tanaka, et al., (2017);
V Systematic Review of Qualitative or Descriptive Studies	0	
VI Qualitative or Descriptive Study	10	Antonuzzo, at al. (2017); Baldwin & Jones, (2018); Coleman, et al., (2017); Fortner, et al., (2006); Gibson & Conigley, (2015); Kelley, Fought & Holmes, (1999); Lewis, Samperi & Boyd-Skinner (2017); Poncia, Ryan, Carver, (2000); Valantis, et al., (2007); Yatim, et al., (2017)
VII Opinion or Consensus	2	Khalifa, Magrabi, & Gallego (2019), Weiss, et al., (2015)

(Melnyk & Fineout-Overholt, 2015)

Appendix D

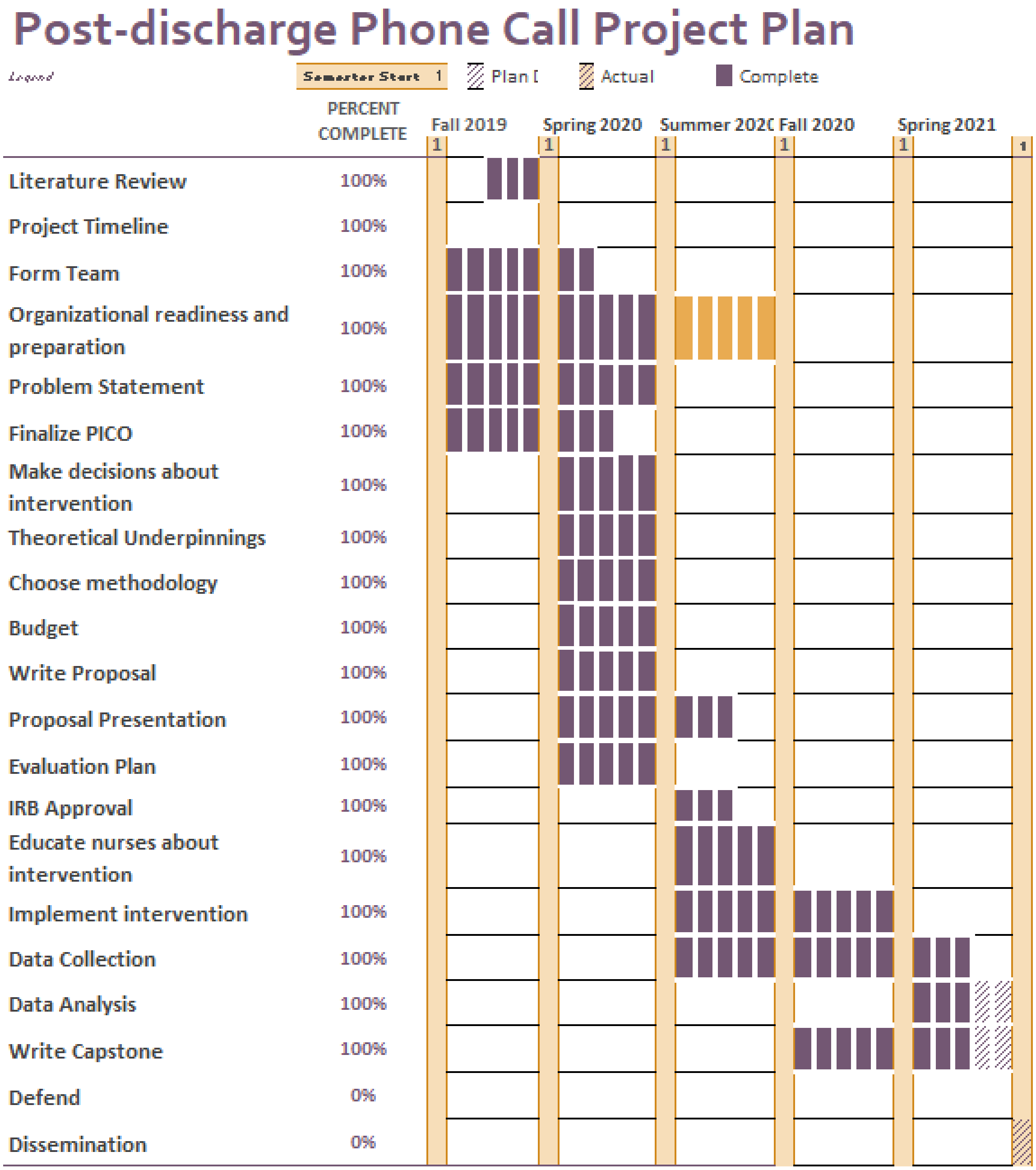
Budget and Resources

Activity	**Projected Cost**
Nursing labor to make calls ($30.95/hour/RN)	**10 patients x 24 minutes = 12 hours x 12 hours = $371.40**
Tool Development	**5 RNs x 10 hours = $1,547.50**
EPIC build	**1 RN x 3 hours = $92.85**
Standard work creation	**5 RNs x 1 hour = $152.70**
DNP student time	**800 hours x $30.95 = $24,760.00**
Total	**$26,923.95**

*** NO actual cost

Appendix E

Timeline

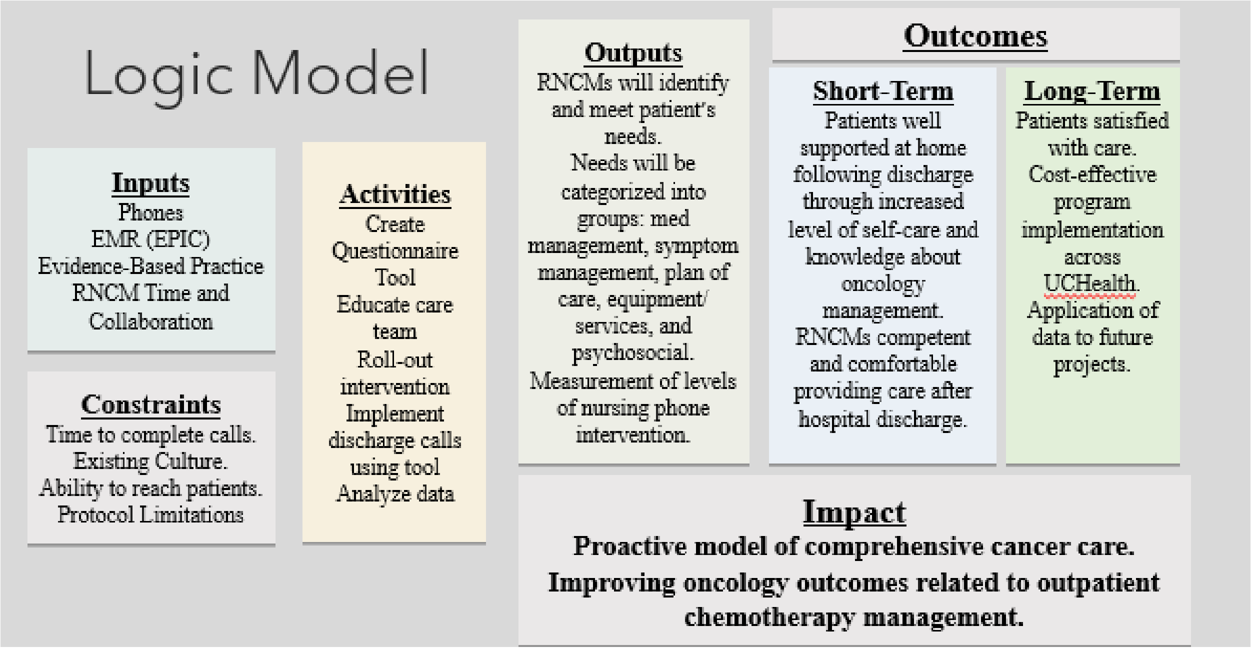


Post-discharge Phone Call Project Plan

	PERCENT COMPLETE
Literature Review	100%
Project Timeline	100%
Form Team	100%
Organizational readiness and preparation	100%
Problem Statement	100%
Finalize PICO	100%
Make decisions about intervention	100%
Theoretical Underpinnings	100%
Choose methodology	100%
Budget	100%
Write Proposal	100%
Proposal Presentation	100%
Evaluation Plan	100%
IRB Approval	100%
Educate nurses about intervention	100%
Implement intervention	100%
Data Collection	100%
Data Analysis	100%
Write Capstone	100%
Defend	0%
Dissemination	0%

Appendix F

Logic Model



Logic Model

Inputs
Phones
EMR (EPIC)
Evidence-Based Practice
RNCM Time and Collaboration

Constraints
Time to complete calls.
Existing Culture.
Ability to reach patients.
Protocol Limitations

Activities
Create Questionnaire Tool
Educate care team
Roll-out intervention
Implement discharge calls using tool
Analyze data

Outputs
RNCMs will identify and meet patient's needs.
Needs will be categorized into groups: med management, symptom management, plan of care, equipment/ services, and psychosocial.
Measurement of levels of nursing phone intervention.

Outcomes

Short-Term
Patients well supported at home following discharge through increased level of self-care and knowledge about oncology management.
RNCMs competent and comfortable providing care after hospital discharge.

Long-Term
Patients satisfied with care.
Cost-effective program implementation across UCHealth.
Application of data to future projects.

Impact
Proactive model of comprehensive cancer care.
Improving oncology outcomes related to outpatient chemotherapy management.

RESOURCES	**ACTIVITIES**	**OUTPUTS**	**SHORT & LONG-TERM OUTCOMES**	**IMPACT**
In order to accomplish our set of activities we will need the following:	*In order to address our problem or asset we will accomplish the following activities:*	*We expect that once accomplished these activities will produce the following evidence of service delivery:*	*We expect that if accomplished these activities will lead to the following changes in 1-3 then 4-6 years:*	*We expect that if accomplished these activities will lead to the following changes in 7-10 years:*
Staff: RNCMs to call patients Phones to call patients EPIC (EMR access) Notification of hospital Admission/discharge date Questionnaire tool Data collection tool Teamwork and collaborations Staff engagement	Create questionnaire tool Educate care team on how to use tool and protocol Collect initial data to identify what types of gaps there may be Explore methods of notification of admit/ discharge Create an evaluation plan	RNCMs will identify and meet needs of patients after discharge. Patients will have plan of care, medications managed, equipment needs met, adequate follow-up, and symptom management. Nursing phone intervention measurements.	**Short**: Patient's will be more satisfied with care. Fewer patients in crisis after discharge. Cost-effective program implementation in the N.Onc Service line. Nurses satisfied with discharge process. Patient's well supported at home through increased level of self-care and knowledge about care for oncology patients. **Long**: Data collection can lead to further quality improvement projects aimed at preventing problems surrounding hospital discharge process Nursing collaborative practice orders for telephone triage.	Cost-effective program can be implemented system wide. Improving oncology outcomes r/t chemotherapy management. Proactive model of comprehensive cancer care for patients.

Appendix G

Questionnaire Tool

Example View Prior to Completion: see data dictionary for coding details of drop-down menus

ONCOLOGY DISCHARGE NOTE:

Patient was discharged from the hospital on ***. RNCM reviewed admission, discharge and pertinent hospitalization notes. Call to patient to follow-up on needs after discharge.

Reason for Admission: ***

Pertinent Labs: reviewed by RNCM.

Oncology Diagnosis: ***

Oncology Treatment Plan: ***

Next Treatment date: ***

Symptom Management: How are you feeling? ***

Do you have any symptoms we have not spoken about? {yes no:315493}

Nursing Intervention: {WA NI Standard:40469}

Medication Management: Discharge medication reconciliation complete: {Yes/No:25653}

Do you have your medications? {WA yes/no medication:40076}

Do you understand medications? {WA yes no reviewed medication instructions:40086}

Nursing Intervention: {WA NI Standard:40469}

Equipment: {WA onc home:40078}

Do you have the equipment you need? {Yes/No:25653}

Nursing Intervention: {WA NI Standard:40469}

Plan of care: Patient does not have standing OIC blood orders. Reviewed hospital discharge AVS with patient.

Do you understand your discharge instructions? {Yes/No describe:314450020}

Next appointment: Oncology: ***

Nursing Intervention: {WA NI Standard:40469}

Psychosocial: Who is helping you at home? ***

Nursing Intervention: {WA NI Standard:40469}

Does patient have questions? {yes no:315493} Answered all questions to patient satisfaction.

Did you find this call helpful? {yes no:315493}

Patient agrees to call with any new or worsening symptoms. Encouraged patient to call clinic with needs.

Example View After Completion: Example with drop-down menus filled in

ONCOLOGY DISCHARGE NOTE:

Patient was discharged from the hospital on 3/3. RNCM reviewed admission, discharge, and pertinent hospitalization notes. Call to patient to follow-up on needs after discharge.

Reason for Admission: Nausea
Pertinent Labs: reviewed by RNCM.
Oncology Diagnosis: Cancer
Oncology Treatment Plan: Soon
Next Treatment date: 3/6/20

Symptom Management: How are you feeling? Yucky.
Are have any symptoms we have not spoken about? Yes; Diarrhea
Nursing Intervention: 0- No issues, no intervention

Medication Management: Discharge medication reconciliation complete: Yes
Do you have your medications? No Which Medication: Zofran Why: Didn't pick up
Do you understand medications? No, Reviewed Medication Instructions
Nursing Intervention: 1- Information/RN assessment only

Equipment: Home Care, Oxygen, DME: Walker, Wound/Ostomy, Palliative Care, PT, OT, Other: bed, None, and IV Therapy
Do you have the equipment you need? Yes
Nursing Intervention: 2- RN assessment + intervention

Plan of care: Patient does not have standing OIC blood orders. Reviewed hospital discharge AVS with patient.
Do you understand your discharge instructions? No, Describe Question about AVS
Next appointment: Oncology: 3/6
Nursing Intervention: 3- RN assessment + intervention + ongoing management/monitoring

Psychosocial: Who is helping you at home? My spouse
Nursing Intervention: 4- Urgent MD involvement or sent to ED
Does patient have questions? Yes; question. Answered all questions to patient satisfaction.

Did you find this call helpful? No
Patient agrees to call with any new or worsening symptoms. Encouraged patient to call clinic with needs.

<u>Data Dictionary for drop-down menus built into EPIC:</u>

***: free text
{yes no:315493}: Smart list with 2 options:
“Yes, ***”
“No”
{WA NI Standard:40469}: Smart list with 5 options:
“0-No issues, no intervention,”

“1-Information/RN assessment only,”
“2-RN assessment + Intervention,”
“3-RN assessment +Intervention +Ongoing management/monitoring,”
“4-Urgent MD involvement or sent to ED.”

{Yes/No:25653}: Smart list with two options:
“Yes”
“No”

{WA yes/no medication:40076}: Smart list with 2 options:
“Yes”
“No, Which medication, ***; Why: ***”

{WA yes no reviewed medication instructions:40086}: Smart list with 2 options:
“Yes”
“No, reviewed medication instructions.”

{WA onc home:40078}: Smart list with 9 options:
“Home Care,”
“Oxygen,”
“DME, ***,”
“IV Therapy”
“Wound/Ostomy,”
“Palliative Care,”
“PT,”
“OT,”
“Other, ***,”
“None”

{Yes/No describe:314450020}: Smart list with 2 options:
“Yes”
“No, Describe, ***”

Appendix H

Dashboard Example

This is an example with one patient, however there could be up to 500 patients on this list.

MRN	Patient Name	DOB	Next CC F/U	KCI Risk Score	Next Appt	Admitted	Last Discharge	CC Reminder	CC Time
123456	*John Doe*	*1/1/1950*	*3/5/20 Date when RNCM is to call next*	*Low, Moderate, High*	*3/15/20 With Oncology*	*Yes/No*	*3/1/20 From inpatient setting*	*Pt hospitalized 3/1, watch for DC and call next day*	*30 min*

Appendix I

Data Collection Sheet

Demographics

Participants	***Coded 1-30***
Age Range	*Grouped by 5 years*
Reason for Admit	*Hospitalization*
LOS	*Length of Stay*
Cancer Diagnosis	*Type of cancer*
Stage	*Of Cancer in recent note*
Treatment	*Chemo/Biotherapy/ Hormonal Agents*
Readmission	*Yes/No; Within 30 days*
Insurance	*Type; private, Medicare, Medicaid, self-pay*
Race	*If known*

Variables/Intervention

Participants	***Coded 1-30***
SYM	*Issue? Yes/no*
SYM NIL	*Level 0-4*
Symptoms	*Which discussed?*
Med	*Issue? Yes/no*
Med NIL	*Level 0-4*
Has Meds?	*Yes/No*
EQI	*Issue? Yes/no*
EQI NIL	*Level 0-4*
Resources	*PT, OT, DME, Pall. Etc.*
POC	*Issue? Yes/no*
POC NIL	*Level 0-4*
DC INS	*Yes/No Understands*
Days to Onc F/u	*# of days from DC*
PS	*Issue? Yes/no*
PS NIL	*Level 0-4*
Helpful?	*Was call?*
Comments	*Free text RN note*

Appendix J

CITI Training Certificates

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** whitney archer (ID: 6067346)
- **Institution Affiliation:** Regis University (ID: 745)
- **Institution Email:** warcher@gmail.com
- **Institution Unit:** oncology

- **Curriculum Group:** Human Research
- **Course Learner Group:** Social Behavioral Research Investigators
- **Stage:** Stage 1 - Basic Course

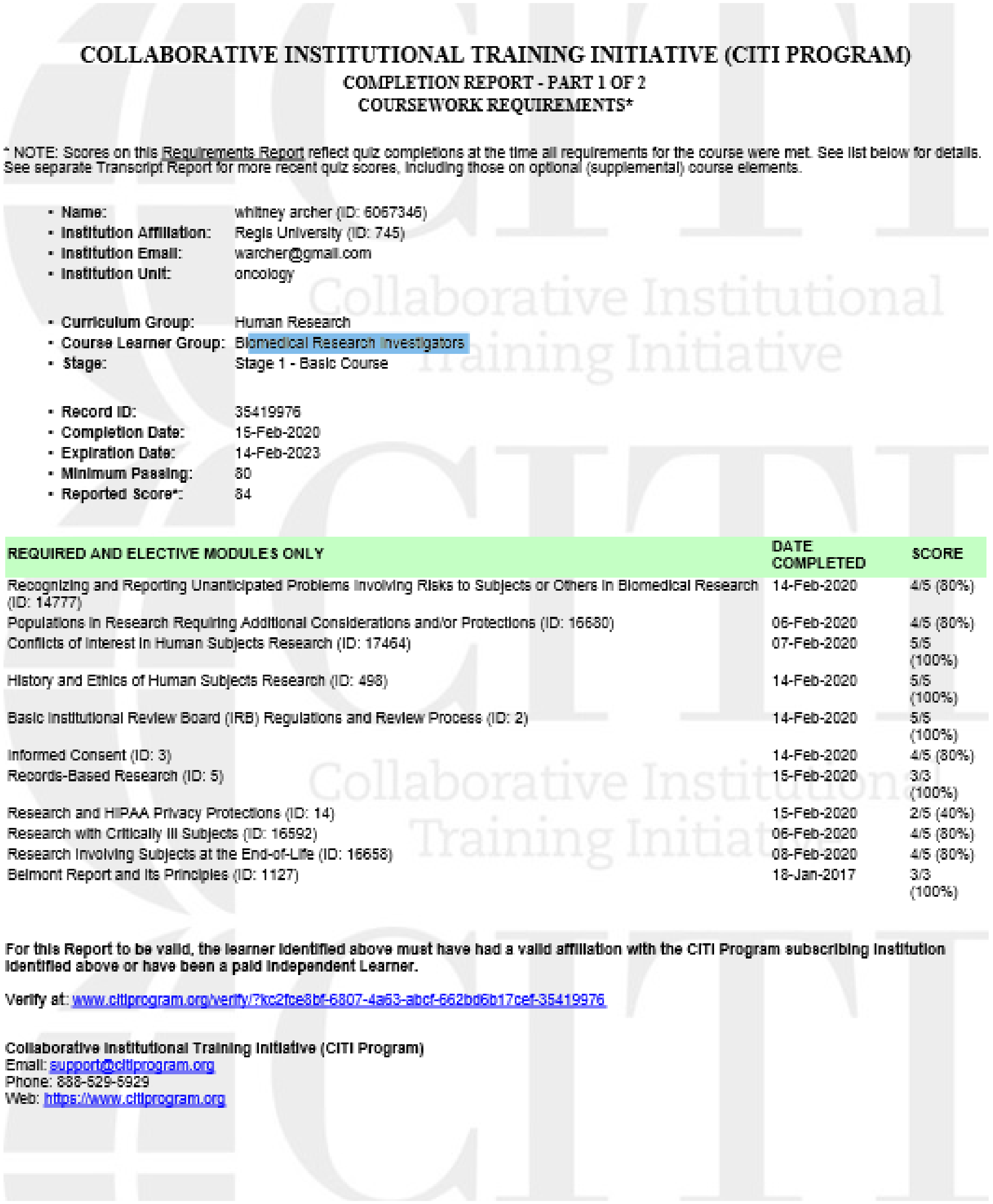
- **Record ID:** 33896660
- **Completion Date:** 08-Feb-2020
- **Expiration Date:** 07-Feb-2023
- **Minimum Passing:** 80
- **Reported Score*:** 87

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	06-Feb-2020	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	06-Feb-2020	4/5 (80%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	07-Feb-2020	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	07-Feb-2020	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	07-Feb-2020	4/5 (80%)
Assessing Risk - SBE (ID: 503)	08-Feb-2020	5/5 (100%)
Informed Consent - SBE (ID: 504)	08-Feb-2020	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	08-Feb-2020	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	08-Feb-2020	4/5 (80%)
Research with Critically Ill Subjects (ID: 16592)	06-Feb-2020	4/5 (80%)
Research Involving Subjects at the End-of-Life (ID: 16658)	08-Feb-2020	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k03cba227-b801-4240-a8c4-b30508389d75-33896660

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org



COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

Name:	whitney archer (ID: 6067346)
Institution Affiliation:	Regis University (ID: 745)
Institution Email:	warcher@gmail.com
Institution Unit:	oncology
Curriculum Group:	Human Research
Course Learner Group:	Biomedical Research Investigators
Stage:	Stage 1 - Basic Course
Record ID:	35419976
Completion Date:	15-Feb-2020
Expiration Date:	14-Feb-2023
Minimum Passing:	80
Reported Score*:	84

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	14-Feb-2020	4/5 (80%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	06-Feb-2020	4/5 (80%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	07-Feb-2020	5/5 (100%)
History and Ethics of Human Subjects Research (ID: 498)	14-Feb-2020	5/5 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	14-Feb-2020	5/5 (100%)
Informed Consent (ID: 3)	14-Feb-2020	4/5 (80%)
Records-Based Research (ID: 5)	15-Feb-2020	3/3 (100%)
Research and HIPAA Privacy Protections (ID: 14)	15-Feb-2020	2/5 (40%)
Research with Critically Ill Subjects (ID: 16592)	06-Feb-2020	4/5 (80%)
Research Involving Subjects at the End-of-Life (ID: 16658)	08-Feb-2020	4/5 (80%)
Belmont Report and Its Principles (ID: 1127)	18-Jan-2017	3/3 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Appendix K

Regis IRB Approval Letter

REGIS UNIVERSITY

REGIS.EDU

Institutional Review Board

DATE: July 7, 2020

TO: Whitney Archer
FROM: Regis University Human Subjects IRB

PROJECT TITLE: [1616838-1] Discharge Phone Calls for Active Oncology Patients
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF NOT RESEARCH
DECISION DATE: July 7, 2020

Thank you for your submission of New Project materials for this project. The Regis University Human Subjects IRB has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations. This project qualifies as a quality improvement study and may proceed as written.

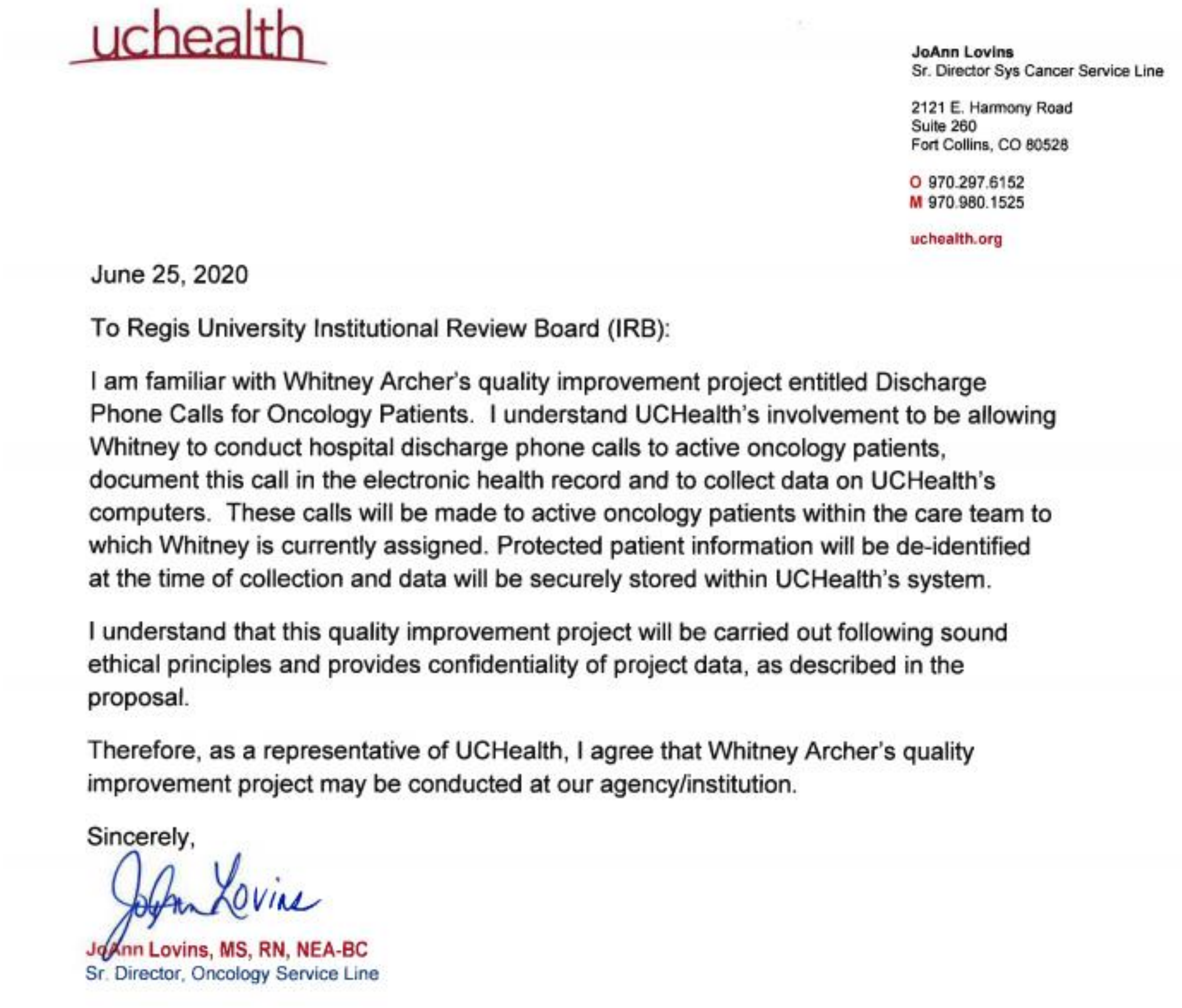
We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Institutional Review Board at irb@regis.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Regis University Human Subjects IRB's records.

Appendix L

Agency Letter of Support



uchealth

JoAnn Lovins
Sr. Director Sys Cancer Service Line

2121 E. Harmony Road
Suite 260
Fort Collins, CO 80528

O 970.297.6152
M 970.980.1525

uchealth.org

June 25, 2020

To Regis University Institutional Review Board (IRB):

I am familiar with Whitney Archer's quality improvement project entitled Discharge Phone Calls for Oncology Patients. I understand UCHealth's involvement to be allowing Whitney to conduct hospital discharge phone calls to active oncology patients, document this call in the electronic health record and to collect data on UCHealth's computers. These calls will be made to active oncology patients within the care team to which Whitney is currently assigned. Protected patient information will be de-identified at the time of collection and data will be securely stored within UCHealth's system.

I understand that this quality improvement project will be carried out following sound ethical principles and provides confidentiality of project data, as described in the proposal.

Therefore, as a representative of UCHealth, I agree that Whitney Archer's quality improvement project may be conducted at our agency/institution.

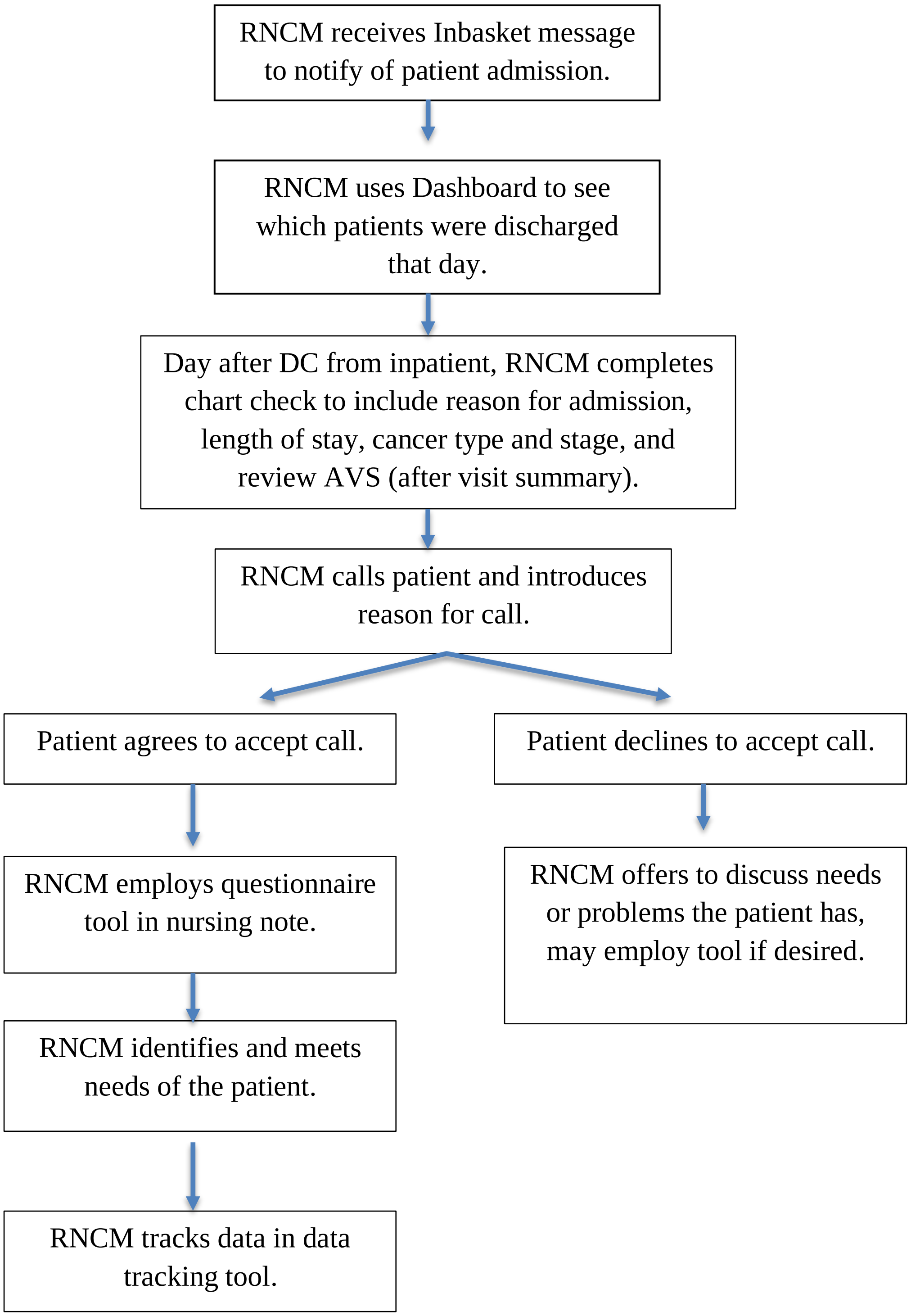
Sincerely,

JoAnn Lovins

JoAnn Lovins, MS, RN, NEA-BC
Sr. Director, Oncology Service Line

Appendix M

Flow Map of Study Protocol



RNCM receives Inbasket message to notify of patient admission.

RNCM uses Dashboard to see which patients were discharged that day.

Day after DC from inpatient, RNCM completes chart check to include reason for admission, length of stay, cancer type and stage, and review AVS (after visit summary).

RNCM calls patient and introduces reason for call.

Patient agrees to accept call.

RNCM employs questionnaire tool in nursing note.

RNCM identifies and meets needs of the patient.

RNCM tracks data in data tracking tool.

Patient declines to accept call.

RNCM offers to discuss needs or problems the patient has, may employ tool if desired.

Appendix N

Frequency of Nursing Intervention Level Scores

	Nursing Intervention Level	Frequency #	Percent
Symptom Management	0	8	26.7
	1	10	33.3
	2	3	10
	3	9	30
Medication Management	0	12	40
	1	11	36.7
	2	4	13.3
	3	3	10
Equipment/Services	0	18	60
	1	9	30
	2	2	6.7
	3	1	3.3
Plan of Care	0	9	30
	1	7	23.3
	2	4	13.3
	3	10	33.3
Psychosocial	0	23	76.7
	1	4	13.3
	2	1	3.3
	3	2	6.7

Appendix O

Linear Regression for Problem Areas and Nursing Intervention Levels (NIL)

Dependent Variable: Symptom Management NIL Score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.771[a]	.594	.264	1.025	.594	1.800	13	16	.132

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.569	13	1.890	1.800	.132[b]
	Residual	16.798	16	1.050		
	Total	41.367	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.987	2.684		2.603	.019
	Age	-.104	.108	-.201	-.959	.352
	LOS	.060	.100	.116	.600	.557
	ReasonForAdmit	-1.428	.582	-.586	-2.455	.026
	CancerDiagnosis	-.247	.098	-.613	-2.527	.022
	Stage	.014	.247	.012	.058	.954
	Treatment	-.173	.195	-.189	-.884	.390
	Readmission	.028	.565	.010	.049	.961
	Insurance	-.205	.208	-.186	-.988	.338
	Race	-.867	.728	-.275	-1.190	.251
	HasMeds	.032	.903	.009	.035	.972
	Resources	.178	.106	.378	1.675	.113
	DcIns	-.094	.663	-.027	-.142	.888
	DaysToOncFU	-.002	.016	-.036	-.139	.891

Dependent Variable: Medication Management NIL Score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.647[a]	.419	-.053	1.006	.419	.888	13	16	.580

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.681	13	.899	.888	.580[b]
	Residual	16.186	16	1.012		
	Total	27.867	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.421	2.635		.160	.875
	Age	.062	.106	.148	.589	.564
	LOS	-.070	.098	-.165	-.714	.486
	ReasonForAdmit	-.604	.571	-.302	-1.058	.306
	CancerDiagnosis	-.064	.096	-.193	-.666	.515
	Stage	.167	.243	.164	.690	.500
	Treatment	-.037	.192	-.049	-.191	.851
	Readmission	-.372	.555	-.171	-.670	.513
	Insurance	.073	.204	.080	.356	.727
	Race	-.080	.715	-.031	-.111	.913
	HasMeds	1.019	.886	.359	1.149	.267
	Resources	.043	.104	.112	.414	.684
	DcIns	.539	.650	.190	.829	.419
	DaysToOncFU	-.020	.016	-.394	-1.271	.222

Dependent Variable: Equipment and Services NIL Score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.898[a]	.807	.650	.459	.807	5.140	13	16	.001

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.092	13	1.084	5.140	.001[b]
	Residual	3.374	16	.211		
	Total	17.467	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.751	1.203		-.624	.541
	Age	-.006	.048	-.018	-.125	.902
	LOS	.017	.045	.051	.380	.709
	ReasonForAdmit	-.137	.261	-.087	-.526	.606
	CancerDiagnosis	.043	.044	.163	.972	.345
	Stage	.126	.111	.156	1.140	.271
	Treatment	.085	.088	.143	.974	.345
	Readmission	-.122	.253	-.071	-.482	.636
	Insurance	.093	.093	.129	.997	.333
	Race	-.005	.326	-.003	-.017	.987
	HasMeds	-.563	.405	-.251	-1.392	.183
	Resources	.251	.048	.820	5.261	.000
	DcIns	.490	.297	.218	1.649	.119
	DaysToOncFU	.000	.007	.012	.066	.948

Dependent Variable: Plan of Care NIL Score

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.844[a]	.712	.478	.905	.712	3.039	13	16	.019

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.386	13	2.491	3.039	.019[b]
	Residual	13.114	16	.820		
	Total	45.500	29			

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.853	2.372		2.046	.058
	Age	-.113	.095	-.210	-1.188	.252
	LOS	-.039	.088	-.073	-.445	.662
	ReasonForAdmit	.016	.514	.006	.031	.976
	CancerDiagnosis	.218	.086	.516	2.526	.022
	Stage	-.312	.218	-.239	-1.428	.173
	Treatment	-.496	.173	-.517	-2.873	.011
	Readmission	-.412	.500	-.148	-.825	.421
	Insurance	-.012	.184	-.010	-.065	.949
	Race	-1.395	.644	-.422	-2.168	.046
	HasMeds	1.307	.798	.361	1.638	.121
	Resources	-.092	.094	-.186	-.979	.342
	DcIns	.764	.586	.211	1.305	.210
	DaysToOncFU	-.005	.014	-.068	-.312	.759

Dependent Variable: Psychosocial NIL Score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.577[a]	.333	-.208	.940	.333	.615	13	16	.809

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.066	13	.544	.615	.809[b]
	Residual	14.134	16	.883		
	Total	21.200	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.505	2.462		.205	.840
	Age	-.023	.099	-.061	-.228	.823
	LOS	-.023	.092	-.063	-.254	.802
	ReasonForAdmit	-.362	.534	-.208	-.679	.507
	CancerDiagnosis	.094	.090	.326	1.049	.310
	Stage	-.169	.227	-.190	-.746	.467
	Treatment	-.051	.179	-.078	-.286	.778
	Readmission	.077	.519	.040	.148	.884
	Insurance	.115	.191	.145	.602	.555
	Race	.141	.668	.063	.211	.836
	HasMeds	-.449	.828	-.182	-.542	.595
	Resources	.068	.098	.203	.701	.493
	DcIns	.451	.608	.182	.742	.469
	DaysToOncFU	.007	.015	.150	.452	.657

Dependent Variable: Symptom Management Problems (Presence or Absence)

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.640[a]	.410	-.069	.465	.410	.856	13	16	.607

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.406	13	.185	.856	.607[b]
	Residual	3.461	16	.216		
	Total	5.867	29			

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.470	1.218		-.386	.705
	Age	.023	.049	.117	.463	.650
	LOS	-.011	.045	-.058	-.249	.806
	ReasonForAdmit	.332	.264	.362	1.257	.227
	CancerDiagnosis	.057	.044	.377	1.289	.216
	Stage	-.005	.112	-.011	-.047	.963
	Treatment	.012	.089	.034	.133	.896
	Readmission	-.228	.257	-.228	-.890	.387
	Insurance	.031	.094	.074	.326	.749
	Race	.492	.331	.415	1.489	.156
	HasMeds	.275	.410	.212	.672	.511
	Resources	-.067	.048	-.380	-1.395	.182
	DcIns	.174	.301	.134	.578	.571
	DaysToOncFU	.000	.007	-.019	-.060	.953

Dependent Variable: Medication Management Problems (Presence or Absence)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.562[a]	.315	-.241	.561	.315	.567	13	16	.846

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.324	13	.179	.567	.846[b]
	Residual	5.043	16	.315		
	Total	7.367	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.996	1.471		.677	.508
	Age	-.010	.059	-.047	-.171	.866
	LOS	.016	.055	.071	.284	.780
	ReasonForAdmit	.178	.319	.173	.558	.585
	CancerDiagnosis	-.010	.054	-.060	-.189	.852
	Stage	.007	.135	.014	.053	.958
	Treatment	.030	.107	.077	.277	.786
	Readmission	.047	.310	.042	.152	.881
	Insurance	-.049	.114	-.106	-.433	.671
	Race	.441	.399	.331	1.104	.286
	HasMeds	-.545	.495	-.374	-1.102	.287
	Resources	.012	.058	.059	.202	.842
	DcIns	-.107	.363	-.073	-.294	.772
	DaysToOncFU	.006	.009	.210	.625	.541

Dependent Variable: Equipment and Services Management (Presence or Absence)

Model Summary

				Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.883[a]	.780	.600	.303	.780	4.352	13	16	.003

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.197	13	.400	4.352	.003[b]
	Residual	1.470	16	.092		
	Total	6.667	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.346	.794		2.955	.009
	Age	.012	.032	.057	.371	.715
	LOS	-.008	.030	-.039	-.273	.788
	ReasonForAdmit	-.086	.172	-.088	-.498	.625
	CancerDiagnosis	-.064	.029	-.397	-2.223	.041
	Stage	-.094	.073	-.189	-1.289	.216
	Treatment	-.073	.058	-.199	-1.267	.223
	Readmission	.318	.167	.299	1.904	.075
	Insurance	-.024	.062	-.054	-.390	.701
	Race	.077	.215	.061	.357	.726
	HasMeds	.099	.267	.071	.370	.716
	Resources	-.100	.031	-.530	-3.181	.006
	DcIns	-.244	.196	-.176	-1.243	.232
	DaysToOncFU	.003	.005	.125	.655	.522

Dependent Variable: Plan of Care Problems (Presence or Absence)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.875[a]	.766	.575	.304	.766	4.019	13	16	.005

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.823	13	.371	4.019	.005[b]
	Residual	1.477	16	.092		
	Total	6.300	29			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.548	.796		1.944	.070
	Age	-.031	.032	-.152	-.957	.353
	LOS	.059	.030	.292	1.981	.065
	ReasonForAdmit	-.025	.172	-.027	-.147	.885
	CancerDiagnosis	-.128	.029	-.813	-4.415	.000
	Stage	.037	.073	.076	.505	.621
	Treatment	.132	.058	.369	2.274	.037
	Readmission	.092	.168	.088	.546	.592
	Insurance	-.146	.062	-.339	-2.371	.031
	Race	.191	.216	.156	.886	.389
	HasMeds	-.155	.268	-.115	-.578	.571
	Resources	.080	.032	.434	2.527	.022
	DcIns	-.354	.196	-.262	-1.800	.091
	DaysToOncFU	.007	.005	.274	1.393	.183

Dependent Variable: Psychosocial Problems (Presence or Absence)

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.613[a]	.375	-.132	.458	.375	.739	13	16	.705

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.014	13	.155	.739	.705[b]
	Residual	3.353	16	.210		
	Total	5.367	29			

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.668	1.199		1.391	.183
	Age	.016	.048	.085	.326	.749
	LOS	-.004	.045	-.022	-.092	.928
	ReasonForAdmit	.238	.260	.271	.914	.374
	CancerDiagnosis	-.060	.044	-.410	-1.363	.192
	Stage	.085	.110	.189	.766	.455
	Treatment	-.001	.087	-.002	-.006	.995
	Readmission	.009	.253	.009	.034	.973
	Insurance	-.047	.093	-.117	-.504	.621
	Race	-.101	.325	-.089	-.311	.760
	HasMeds	.234	.403	.188	.579	.570
	Resources	-.005	.048	-.029	-.105	.918
	DcIns	-.231	.296	-.186	-.781	.446
	DaysToOncFU	-.004	.007	-.169	-.526	.606

Appendix P

Summary of Linear Regression Results

Variable	**Variable**	**P Value**	**t**
SYM NIL (F=1.8, p=.132, R^2=.594)	Reason for Admit	0.26	-2.455
	Cancer Diagnosis	0.22	-2.527
Med NIL (F=.888, p=.580, R^2=.419)	NONE		
EQI NIL (F=5.140, p=.001, R^2=.807)	Resources	.000	5.261
POC NIL (F=3.039, p=.019, R^2=.712)	Treatment	0.011	-2.873
	Race	0.046	-2.168
PS NIL (F=.615, p=.809, R^2=.333)	NONE		
SYM (F=.856, p=.607, R^2=.410)	NONE		
MED (F=.567, p=.846, R^2=.315)	NONE		
EQI (F=4.352, p=.003, R^2=.780)	Cancer Diagnosis	0.041	-2.223
	Resources	0.006	-3.181
POC (F=4.019, p=.005, R^2=.766)	Cancer Diagnosis	.000	-4.415
	Treatment	0.037	2.274
	Insurance	0.031	-2.371
	Resources	0.022	2.2527
PS (F=.739, p=.705, R^2=.375)	NONE		

Note: Category names are abbreviated, SYM for symptom management, MED for medication management, EQI for equipment and services, POC for plan of care, PS for psychosocial, and NIL for nursing intervention level.

Appendix Q

Kendall's Tau Correlation of Variables

Variable	**Variable**	**P Value**	**Correlation Coefficient**	**Weak, Moderate, Strong**	**Positive or Negative**
Age	Insurance	0.008	-0.405	Moderate	Negative
	Days to FU	0.046	0.277	Weak	Positive
LOS	Treatment	0.034	-0.319	Weak	Negative
Reason for Admit	Med NIL	0.037	-0.36	Weak	Negative
	Race	0.03	-0.402	Moderate	Negative
	PS	0.024	0.42	Moderate	Positive
	PS NIL	0.025	-0.403	Moderate	Negative
Cancer Diagnosis	Has Meds	0.005	0.457	Moderate	Positive
	EQI	0.001	-0.53	Moderate	Negative
	EQI NIL	0.011	0.395	Weak	Positive
	Resources	0.005	0.418	Moderate	Positive
	POC	0	-0.564	Moderate	Negative
	POC NIL	0.002	0.465	Moderate	Positive
	Days to FU	0.004	-0.392	Weak	Negative
Treatment	SYM NIL	0.049	-0.306	Weak	Negative
Insurance	POC	0.043	-0.351	Weak	Negative
SYM	SYM NIL	0	-0.738	Moderate	Negative
	Med	0.038	0.385	Weak	Positive
	MED NIL	0.038	-0.358	Weak	Negative
MED	MED NIL	0	-0.724	Moderate	Negative
	POC	0.001	0.602	Moderate	Positive
	POC NIL	0.002	0.536	Moderate	Positive
	Days to FU	0.046	0.315	Weak	Positive

MED NIL	Has Meds	0.035	0.365	Weak	Positive
	EQI	0.028	-0.381	Weak	Negative
	EQI NIL	0.014	0.41	Moderate	Positive
	Resources	0.022	0.364	Weak	Positive
	POC	0.005	-0.483	Moderate	Negative
	POC NIL	0.019	0.374	Weak	Positive
	Days to FU	0.037	-0.307	Weak	Negative
Has Med	Resources	0.008	0.452	Moderate	Positive
EQI	EQI NIL	0	-0.84	Strong	Negative
	Resources	0	-0.625	Moderate	Negative
	POC NIL	0.011	-0.434	Moderate	Negative
	Days to FU	0.03	0.341	Weak	Positive
EQI NIL	Resources	0	0.745	Moderate	Positive
POC	POC NIL	0	-0.632	Moderate	Negative
	Days to FU	0.004	0.448	Moderate	Positive
POC NIL	Days to FU	0	-0.556	Moderate	Negative
PS	PS NIL	0	-0.959	Strong	Negative

Note: Category names are abbreviated, SYM for symptom management, MED for medication management, EQI for equipment and services, POC for plan of care, PS for psychosocial, and NIL for nursing intervention level.