# Nursing telephone follow-up to reduce 30-day readmissions and post-discharge complications for the Adult Hemodialysis Patient

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**Abstract**

Recurrent hospital readmissions are responsible for considerable health care costs, with readmission rates in patients with end stage renal disease (ESRD) remaining as high as 35.2% within 30 days of discharge (USRDS, 2014). Studies have shown that a considerable percentage of readmissions are preventable through effective discharge planning and patient follow-up after discharge (Mistiaen & Poot, 2006). Providing telephone follow-up (TFU) is a high-quality, low-cost method of providing health information, advice, and the recognition of complications early after hospital discharge (Mistiaen & Poot, 2006). This project examined the effectiveness of an evidence-based quality improvement process implemented in an Acute Inpatient Renal Unit providing post-discharge telephone follow-up by experienced dialysis nurses. To enhance the experience of the dialysis patient's transition from an acute care setting to a home setting, a series of systematic processes were implemented to standardize unit workflow, in addition to utilization and leveraging of the hospital's electronic medical record (EMR) system to document patient post-discharge progress and outcomes, using a scripted telephone follow up procedure. This quality improvement project compared pre-intervention data to post-intervention data to evaluate the impact on 30-day readmissions and post-discharge complications in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients. The overall readmission rate decrease by 17% and the 30-day readmission rate decreased by 3.8%. Coordinated and targeted discharge phone follow-up has the potential to benefit this vulnerable patient population.

Keywords: *chronic kidney disease, end-stage renal disease, telephone call, post-discharge follow-up, 30-day readmissions*

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Nursing telephone follow-up to reduce 30-day readmissions and post-discharge complications for the Adult Hemodialysis Patient

Nationally, readmission rates have been comparatively higher (27%) in adult hemodialysis patients compared to other chronically ill populations: 25% in congestive heart failure and 18% in chronic obstructive pulmonary disease. The US Centers for Medicare and Medicaid Services (CMS) added the standardization readmission ratio (SRR), a measure of hospital readmissions for patients on dialysis, to the End-Stage Renal Disease Quality Incentive Program ESRD (QIP) beginning with payment year 2017. Approximately 17% of dialysis patient readmissions occurred in the first three days after hospital discharge, a period during which the patient may have not yet returned to their previous dialysis unit. The Medicare Payment Advisory Commission estimated that three-quarters of those 30-day readmissions may have been preventable, citing fragmentation of care (poor communication and inadequate coordination) when the patient transitioned from the acute care setting to home as just one of many important factor influencing dialysis patient readmissions (Payne, 2012).

## Background

### Chronic Kidney Disease

Chronic kidney disease (CKD) is defined by the presence of kidney damage or decreased kidney function for three or more months (KDIGO, 2012). An estimated 14 % of adults in the United States (U.S.) have varying levels of illness related to CKD (United States Renal Data System [USRDS], 2014), and Medicare spent more than $50 billion on chronic kidney disease among people 65 and older, and $31 billion on those with End-Stage Renal Disease (Sarin et al. 2015). Research demonstrates the correlation between mortality and CKD, diabetes,

hypertension, cardiovascular disease, and higher body mass index (≥30 kg/m2; BMI) (Go et al., 2004, Coresh et al., 2007).

**End-stage Renal Disease**

Decreased kidney function (defined as estimated glomerular filtration rate [eGFR] <60 mL/min/1.73 m2) for three or more months distinguishes CKD from ESRD, which was indicated by an eGFR of <15 ml min-$^{1}$ 1.73 m $^{-2}$. ESRD is often associated with significant co-morbidities (KDIGO, 2012). ESRD beneficiaries accounted for approximately 6% of total Medicare spending, although they comprised 1% of the total beneficiary population. Combined CKD and ESRD account for almost a quarter of the U.S. budget, a small percentage higher than the cost of congestive heart failure at $20.9 billion (Sarin et al. 2015, USRDS, 2015).

**Hospital Readmission Reduction Program**

In the 2001 report "Crossing the Quality Chasm: A New Health System for the 21$^{st}$ Century", the Institute of Medicine (IOM) proposed patient centered care as one of six specific aims for improvement of United States healthcare delivery system quality. The Hospital Readmissions Reduction Program (HRRP) under Section 3025 of the Affordable Care Act established a Medicare diagnosis-related group (DRG) payment reduction for hospitals that exceed the adjusted national average readmission rate for three major diagnoses: acute myocardial infarction, congestive heart failure, and pneumonia (Go et al., 2004). To foster patient-centered, outcome-oriented quality health care for patient receiving hemodialysis, CMS implemented the ESRD Quality Initiative Program (QIP). The ESRD QIP measures are disease oriented and use laboratory-based indicators such as hemoglobin, phosphorus and calcium. General consensuses support any effort to reduce readmission rates in hemodialysis patients, although many healthcare providers question the validity and lack of scientific evidence

supporting CMS's ESRD QIP. Although there has been a modest decrease in hemodialysis patents readmission rates, caring for hemodialysis patients is complex, as these patients are admitted nearly twice a year with infections or cardiovascular related events.

## Project Purpose and Rationale

Hemodialysis patients are at particularly high-risk for readmission after discharge. Each readmission increases the patients' chances of an adverse event, such as worsening anemia, systemic infections (bacteremia), cardiovascular events (arrhythmias, myocardial infarct) and even death. Academic Medical Centers face enormous financial pressures to streamline their clinical, educational, and research activities, as a result of changing reimbursement landscape. The influx of Medicaid patients, a shifting burden of commercial payment and Medicare payments due to value-based purchasing, makes it difficult to provide services to the communities they serve.

A model to reduce avoidable readmissions by enabling better care coordination for hemodialysis patients has the potential to improve the quality of healthcare, reduce healthcare cost and improve the health of not only the dialysis patient population but the chronically ill patient population over all.

The HRRP and similar impending national health care laws aimed at reducing avoidable readmissions have promoted a shift to increasing research on the topics of patient's confidence and mastery of managing their chronic medical condition compared to previous research on their medical knowledge post-discharge. This project examined the effectiveness of a quality improvement (QI) process providing post-discharge telephone follow-up by experienced dialysis nurses to reduce 30-day readmissions and post-discharge complications in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients.

## Framework

The Chronic Care Model (CCM) is the conceptual framework for the QI project because it focuses on patients with chronic medical conditions (see figure 2). The CCM offers a multidimensional solution to improve chronic disease management through the identification of the essential elements of a health care system that encourage high-quality chronic disease management (Wagner, 2001). The Chronic Care Model developed by Ed Wagner, MD, MPH, Director of the MacColl Institute for Healthcare Innovation, Group Health Cooperative of Puget Sound, and colleagues of the Improving Chronic Illness Care program with support from The Robert Wood Johnson Foundation (IHI, 2016). With the idea that effective chronic disease management requires appropriate medical therapy, an organized delivery system, self-management support, and patient-oriented community resources to help the patient and family cope with the challenges of living with chronic conditions, CCM was designed to change the routine delivery of ambulatory care. Researchers incorporated elements of care coordination and case management in the groundwork and developed of interventions; CCM has been proven useful in research and practice to improve care for chronically ill patients by making patient-centered care easier, thereby improving the welfare of patients with a variety of chronic conditions.

The greatest improvements in health outcomes are achieved by increasing provider expertise and skill, educating and supporting patients, making care delivery more team-based and planned, and making better use of registry-based information systems (Coleman et al. 2016). The model's three overlapping spheres (the community, the health system, and the provider organization) were designed to inform patients, promote self-management, and strengthen the provider-patient relationship with the aim of transforming daily care for patients with chronic

illness. The chronic care model identified six essential elements: community resources and policies, health care organizations, self-management support, delivery system design, decision support, and clinical information system essential to improving clinical outcomes. CCM is shown to improve care for chronic disease and reduce disparities, and is used as a framework for national activities like the National Kidney Education Program (NKDEP). The NKDEP integrated the CCM's goal to engage and engender patients and communities and encourage proactive health care providers to develop efficient and effective health care systems to disseminate science-based kidney disease education.

Chronically ill hemodialysis patients have numerous clinical problems, including anemia, mineral and bone disorder (MBD), malnutrition, inflammation, vascular access-related infection, and volume management that required assessment and continuous monitoring. The continuous adjustments to the hemodialysis patient's plan of care to slow the progression of the disease required ongoing interaction between the patient and the healthcare system. Effective chronic disease management requires a collaborative, organized healthcare network linked with available resources for patients who require continuous care from multiple providers (Wagner et al., 2002). For this project, disease and case management (controlling symptoms, preventing complications, and promoting a lifestyle that will delay disease progression) were key components to the management of the hemodialysis patients with chronic medical conditions (Mattke et al. 2015; Rothman and Wagner, 2003).

## Review of the Literature

### Methods of Review

Prominent national organizations such as the Institute of Healthcare Improvement (IHI) (Boutwell et al. 2009), the Agency for Healthcare Research and Quality (AHRQ), and the

National Quality Forum (NQF) endorse care transition programs such as the Reengineered Hospital Discharge Program (Project Red) (Jack, 2013), Better Outcomes by Optimizing Safe Transitions (BOOST), and Care Transitions Intervention (CTI) (Coleman et al., 2006) as effective programs to reduce avoidable readmissions of chronically ill patients across the U.S. An integrative literature review was conducted to examine the impact of telephone follow-up to reduce 30-day readmissions rates in the adult hemodialysis patient. As this was a relatively new concept, the DNP student hypothesized that high-level quantitative evidence examining the impact of telephone follow-up as the only intervention in our hemodialysis population would be limited. A systematic search was conducted of the CINAHL, PubMed, PsycINFO, and Web of Science electronic databases. The keywords utilized in the search were "*telephone*", "*telephone intervention*", "*follow-up*", "*readmission*", and "*patient readmissions*". The limitations imposed on all searched articles included: full-text articles, published from 2010 to 2016, written in the English language, and studies conducted in the United States, Canada and Continental Europe. For this review the inclusion criteria were: (1) the intervention (TFU) was delivered within the first month after discharge; (2) outcomes were measured up to but not limited to 36 months after discharge. Exclusion criteria included the following: (1) non-English language; (2) studies for which it was impossible to determine whether telephone follow–up was an intervention; (3) the effects of TFU could not be calculated; (4) case series, commentaries and editorials. Randomized clinical trials, quasi-experimental (non-randomized comparison cohort studies), case studies, multiple case series, descriptive studies, and expert opinion studies were all evaluated for inclusion in this review. The search began using the electronic databases Pubmed and CINAHL. The keywords "*telephone*" and "*telephone intervention*" returned 68,576 citations, "*readmission*" and "*patient readmissions*" returned 18,993 citations, and "*follow-up*" returned

1,034,165 citations. Citations from both databases were then summed, resulting in 1,808 total citations. When searching the Joanna Briggs database, the following keywords were used: "*telephone intervention*", "*readmission*", and "*discharge follow-up*." The keyword "*telephone*" returned 29 citations, "*readmission*" returned 153 citations, and "*discharge follow-up*" returned 29 citations. These citations were summed, resulting in three initial citations. A search of the PsycINFO database using the keywords "*discharge follow-up*", "*readmission*", and "*telephone intervention*" returned seven citations. A search of the Web of Science database using the keywords "*discharge follow-up*", "*readmission*", and "*telephone intervention*" returned 69 citations. A search of the Cochrane Library using the keywords, "*kidney disease*," "*interviews",* and "*30-day readmission"* identified one complete systematic review that met the inclusion criteria. From all databases, a total of 275 articles were found using the keywords. Review of all titles led to only 21 studies meeting the inclusion criteria. Ancestry searches of the reference lists of relevant articles were also performed, and local experts in the fields of nephrology and nephrology nursing were consulted for additional relevant literature. Additional evidence was obtained from national websites focused on the care of patients with chronic conditions (i.e., Agency for Healthcare Research and Quality [AHRQ], National Quality Forum [NQF], and Institute of Medicine [IOM]). A total of seven studies were selected and analyzed (see figure 1).

**Findings**

TFU was successfully implemented in internal medicine patients. A 2009 randomized study (Braun et al. 2009) of 400 internal medicine patients was conducted to determine if TFU reduced readmissions by improving medical treatment, increased patient satisfaction, and compliance. Acute Coronary Syndrome was the most common cause of hospitalization in the study group, with an average age 62.0 in the control group and 63.9 years in TFU group. TFU

took place one week and one month after discharge. Overall, 87% of the patients in the TFU group noted an increase in satisfaction. With three of the five parameters used to measure patient satisfaction showing significance: information about medications ($P<0.0001$), quality of in-hospital treatment ($P<0.001$) and quality of therapy by the primary care providers after discharge ($P<0.001$), compliance increased from 82% in the control group to 90.7% in the TFU group ($P=0.04$) (Braun et al. 2009).

TFU also demonstrated success in the hospital setting. A retrospective cohort study (Harrison et al. 2011) was conducted to determine if follow-up discharge calls ensured patients' understanding and adherence to discharge orders following discharge. Discharge calls, delivered by trained nurses, provided education and support for eleven chronic conditions (chronic kidney disease, end-stage renal disease) associated with increased hospital utilization. The study found that males over the age of 65 who were admitted had a longer initial hospitalization and an increased likelihood of readmission within 30 days, with 30% of all readmissions occurring within seven days or fewer of being discharged. Participants who received discharge calls were 23.1% less likely to be readmitted within 30 days of discharge ($P=0.043$), compared to those who did not. The project was estimated at a cost savings of approximately $1.4 million (Harrison et al., 2011).

The use of TFU demonstrated benefits in hospital to home transitions. A 2006 Cochrane review (Mistiaen & Poot, 2006) identified 33 studies measuring the effects of telephone follow-up (TFU) in 5,110 patients initiated by hospital-based health professionals for patients discharged to a home setting from an acute hospital setting. The review noted no adverse effects related to telephone follow-up as an intervention, citing that telephone follow-up is an excellent means of exchanging information, providing health education and advice, managing symptoms,

recognizing complications early, and giving reassurance to patients after discharge. Some research has shown that telephone follow-up is easy to implement and that patients appreciate such calls.

TFU by a pharmacist unveiled improvements in outcomes. A 2014 retrospective review (Sanchez et al., 2015) of 401 patients discharged from an adult internal medicine service at Boston Medical Center utilized telephone follow-up calls by a healthcare professional (pharmacist) as part of a comprehensive discharge protocol to reduce discharge medication discrepancies and the incidence of unplanned hospital readmissions. The review found that the rate of unplanned readmissions was significantly reduced in the intervention group, compared with the unable-to-contact group (0.227 vs. 0.519, $p<0.001$). With the exception of a higher prevalence of substance abuse in the non-intervention group (41.9% vs. 21.3%, $p<0.001$), patients unable to be contacted by the healthcare professional after their hospital discharge were more likely to be readmitted or visit the emergency department in the 30 days following discharge.

In addition to reduced readmission, cost may be reduced by TFU. A 2009 randomized control trial (Jacket et al.) of 749 patients was conducted to determine whether a specially trained healthcare professional providing patient education, medication reconciliation, and teaching could decrease readmissions in a large and ethnically diverse urban population. A health professional (pharmacist) telephoning participants 2 days' post-hospital discharge resulted in a 30% decrease in hospital utilization (readmissions) in 30-day follow-up, and had a cost benefit of $386,759 lower cost in the RED group due to 32% less use of the hospital. The outcomes were limited by the fact that the study was conducted at a single site, and that the outcome assessments were sometimes reliant on by participant reports. The study sample was younger and had fewer

co-morbid conditions than those in other studies; therefore, results may not be generalizable to all patient groups.

However, not all TFU interventions point to clear outcomes. A different 2014 retrospective observational study (Harrison et al.) utilized an adapted standardized post-discharge telephone script based upon Project RED to target 5,507 patient discharges home from the Medicine Service at UCSFMC. The service, which participated in the care transition program Project BOOST, admitted approximately 4,000 patients per year, of which 15.8% were readmitted within 30 days of discharge. Results indicate that patients who received a call and completed the recommended telephone intervention were 29% less likely to be readmitted (AOR 0.7; 95% CI: 0.55-0.91) (Harrison et al. 2014). As an unfortunate result of the problematic nature of readmission reduction, the study noted no significant impact of the health professional (nurse) telephone calls on 30-day readmission rates after adjusting for the likelihood of calls attempted (AOR 0.91; 95% CI: 0.69-1.20). Also, it was acknowledged that the effectiveness of the post-discharge phone call program was determined to be heavily dependent upon whether patients were able to answer the phone.

Yet, proactive TFU calls may be more beneficial than passive approaches to follow-up. A 2014 prospective cohort study (Stella et al. 2014) involved 308 hospitalized or outpatient surgery patients who were provided additional support via an advice line (AL) in combination with a list of symptoms selected by their discharging physician as being relevant to the patients' specific conditions. The study showed that 31% to 47% of calls occurred within 24 or 48 hours of discharge, with 63% of the calls coming from surgery patients despite surgery patients accounting for only 38% of the discharges. The most common issues were uncontrolled pain, questions about medications, and aftercare instructions (e.g. the care of surgical wounds). The

rates of 30-day readmissions and urgent or emergency care visits were higher for patients who called the AL than for those who did not (15% vs. 4% and 30% vs. 7%, respectively, both $P < 0.0001$), but sample sizes were too small to accommodate robust matching or multivariate analysis.

## Summary of Literature Review

There was large variety both within and across the studies included in the review. TFU calls were made by a variety of health professionals (nurses, pharmacists) to improve patient compliance with medical or drug regimens, or to ease the transition from the hospital to home. The review also noted significant differences in the time after discharge in which the calls were made, the frequency and duration of the calls, and the format and content of the calls. TFU was noted to improve medical treatment and reduce avoidable readmissions by increasing patient adherence to discharge orders, and to decrease post-discharge medication discrepancies by increasing medication reconciliation

### Limitations & Strengths

The heterogeneity of samples, sample sizes, variables of interest, and instruments included in the studies reduced the overall generalizability of the studies. Despite the limited number of studies on telephone follow-up to reduce 30-day readmissions, a comprehensive discharge plan incorporating telephone follow-up as a single intervention may be more successful than TFU as part of a bundle approach.

## Implications for Nursing

The Institute of Medicine (IOM) identified quality improvement projects that promote communication and collaboration between the patient and healthcare providers as a key to improving health care (IOM, 2001). It seems plausible that the rate of avoidable readmissions

may be reduced through the enhancement of core discharge planning, improving the transition and care coordination for the ESRD patient between healthcare settings (Boutwell et al. 2009). More evidence-based quality initiatives enhancing coaching and education, and providing support for patient self-management, may improve the health-related quality of life (HRQOL) for patients with chronic illnesses like ESRD. Studies are inconclusive in determining the overall effectiveness that telephone follow-up calls have on reducing 30-day readmissions. A promising intervention, however, was a post-discharge telephone script adapted from Project Red, which assessed the patient's knowledge of their follow-up plan, discharge medications, and contact information for questions related to recovery.

**Project RED**

Developed by researchers at Boston University Medical Center, the RED (re-engineered discharge, see figure 3) intervention was founded on 12 discrete, mutually reinforcing components and has proven to reduce readmissions and yield high rates of patient satisfaction. RED promoted an evidence-based discharge process and the timely post-discharge reevaluation of the hemodialysis patient in addition to offering education, encouragement, and the reinforcement of dialysis discharge instructions. The components of Project RED formed the basis of a structured telephone follow-up (TFU) intervention to improve the transition of hemodialysis through the process of discharge to home. The patient's understanding of their current diagnosis, treatment plan, and contact information for care of worsening symptoms was an integral part of a safe and effective discharge process (Agency for Healthcare Research and Quality [AHRQ], 2016).

Typical failures in the discharge process included fragmented communication, poor quality of discharge information, poor patient preparation, and variability in discharge

instruction. These factors greatly affected a patient's ability to fully comply with their discharge treatment plans, as only 42% of patients discharged were able to correctly state their discharge diagnosis, 37% of patients were able to state the purpose of all their medications, and 14% knew their medication's common side effects (Makaryus & Friedman, 2005). In a 2009, randomized study (Greenwald, Denham & Jack, 2007), which implemented components at a large urban university hospital by nurse discharge advocates, participants randomized to the intervention group had a lower rate of 30-day hospital utilization (emergency department visits and readmissions) (Greenwald, Denham & Jack, 2007).

### Research Question

Does post-discharge telephone follow-up (TFU) reduce 30-day readmissions and post-discharge complications in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients?

## Method

### Rationale for Project

This project examines the effectiveness of a systematic quality improvement process providing a scripted post-discharge telephone follow-up by an experienced dialysis nurses to reduce 30-day readmission and post-discharge complications in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients.

### Hypotheses

The investigator hypothesized that providing a scripted post-discharge telephone follow-up by experienced dialysis nurses would reduce 30-day readmissions and post-discharge complications in a sample of adult hemodialysis patients.

### Protection of Human Subjects

The investigator submitted the quality improvement project to the Institutional Review

Board for Health Sciences Research (IRB-HSR) to verify the approach and ensure patient safety prior to beginning data collection. The IRB-HSR designated this project as exempt. The investigator also met with the renal nurse manager and clinical nurse specialist of the Acute Inpatient Renal Unit to review the purpose of the project, answer any outstanding concerns, and obtain the permission to proceed.

**Definition of Terms**

For the purpose of this project, the following terms were defined:

**Acute kidney injury (AKI)** Also known as acute kidney failure or acute renal failure, AKI is a sudden decline in renal function triggered by any number of conditions, such as shock, trauma, drug toxicity, acute glomerulonephritis, vasculitis, or obstruction to urine flow.

**Clinical Data Repository (CDR)** A locally developed, enterprise-wide data warehouse containing longitudinal data on over 900,000 patients.

**Chronic Care Model (CCM)** Organizing framework for improving chronic illness care, and a tool for improving care at both the individual and population level.

**Chronic kidney disease (CKD)** A condition in which there is a progressive loss of kidney function which, over time, may lead to end-stage renal disease.

**Diagnosis Related Groups (DRG)** The DRG classification system divides possible diagnoses into more than 20 major body systems and subdivides them into almost 500 groups for the purpose of Medicare reimbursement (American Health Lawyers Association 5th ed., 2011).

**End-stage renal disease (ESRD)** A condition in which a person's kidney function is inadequate to support life.

**Electronic medical record (EMR) systems,** an electronic record of health-related information on an individual created, gathered, managed, and consulted by authorized clinicians

and staff within one health care organization.

**Glomerular filtration rate (eGFR)** Rate in ml/ min/1.73 $m^2$ of the volume of plasma filtered by the kidney. Rates of filtration may be measured directly or estimated based on formulae that employ combinations of an individual's age, gender, and height, and on levels of serum creatinine, blood urea nitrogen, and serum albumin. GFR is traditionally considered the best overall index to determine renal function.

**Hemodialysis** The process of removing toxins from the blood by diffusion through a semi-permeable membrane.

**Kidney Disease Outcomes Quality Initiative (KDOQI)** Established in 1995 by the National Kidney Foundation to improve patient outcomes and survival by providing recommendations for optimal clinical practices in the areas of dialysis adequacy, vascular access, and anemia.

**National Institutes of Health (NIH)** The federal focal point for medical research in the U.S. and one of eight health agencies of the Public Health Services, which are part of the Department of Health and Human Services.

**Peritoneal dialysis** Dialysate (fluid) is introduced into the abdominal cavity and uremic toxins is removed by diffusion across the peritoneum.

**Readmission** A readmission is a subsequent hospital admission in the same or a different hospital within 30 days following an original admission (or index stay) (Barrett et al., 2012).

**Stage 5 CKD** Patients in Stage 5 CKD have end stage renal disease (ESRD) with an eGFR of 15 ml/min or less.

**Telephone follow-up** A nursing intervention from the Nursing Interventions Classification (NIC) defined as providing results of testing or evaluating a patient's response and

determining potential for problems as a result of previous treatment, examination, or testing, over the telephone.

**Metropolitan statistical area** (**MSA**) A geographical region with a relatively high population density at its core and close economic ties throughout the area.

**USRDS** The United States Renal Data System (USRDS), sponsored directly by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) is a national data system that collects, analyzes, and distributes information about chronic kidney disease (CKD) and end-stage renal disease (ESRD) in the United States.

## Project Design

The quality improvement project incorporated a pre-post descriptive design to compare aggregate 30-day readmission rates in adult hemodialysis (Stage 5 CKD & ESRD) patients and post-discharge complications in patients' pre- and post-intervention.

## Methods

The aim of this quality improvement project was the systematic integration of an evidence-based TFU process to improve the quality of care and decrease readmissions for adult hemodialysis (Stage 5 CKD & ESRD) patients.

### Setting

The hospital was a 600-bed academic medical center, with a Level 1 trauma center, primary and specialty clinics, and nationally recognized cancer and heart centers (UVA Health Systems, 2015). The hospital employed over 6,000 employees; registered nurses (RNs) accounted for 2,300 of the jobs. The Renal Unit performed hemodialysis, peritoneal dialysis, continuous renal replacement therapy, and therapeutic apheresis on the dialysis unit, in addition to portable hemodialysis treatments at the inpatient bedside. Off-campus services were provided

to dialysis patients at a rehabilitation hospital and a transitional care hospital (Scope of Service, UVA Health Systems; 2015).

**Program Description**

This project focused on the health systems delivery design to influence care coordination and planning to ensure that patients are adequately trained to manage their chronic conditions to ensure the best outcomes. To enhance the experience of the dialysis patient's transition from the acute care setting to home, the project utilized components of Project Red in the development of a series of systematic processes to standardize unit workflow, in addition to the utilization and leveraging of the hospital's electronic medical record (EMR) system to document the patient progress and outcomes. This project examined the effectiveness of an evidence-based quality improvement process implemented in an Acute Inpatient Renal Unit providing a scripted post-discharge telephone follow-up by experienced dialysis nurses. The project involved the comparison of EMR data pre-follow-up implementation to post follow-up implementation and its effect of the follow-up call on reducing post-discharge complications and 30-day readmissions in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients.

**Description of the Sample**

A convenience sample of all hemodialysis patients (Stage 5 CKD & ESRD) admitted to the AMC who received greater than or equal to one dialysis treatment on the Acute Inpatient Renal Unit during their hospital stay between July 1, 2016, ending September 31, 2016.

**Inclusion criteria**

The 2015 pre-intervention population consisted of all adult patients with Stage 5 CKD and ESRD admitted to the AMC who greater than or equal to one dialysis treatment through the Acute Inpatient Renal Unit during their hospital stay. The 2016 post-intervention population

included all adult patients with Stage 5 CKD and ESRD admitted to the AMC who greater than or equal to one dialysis treatment through the Acute Inpatient Renal Unit during their hospital stay and who had a follow-up phone call as part of the QI initiative beginning July 1, 2016, ending September 31, 2016.

**Exclusion criteria**

Patients were excluded if they met the following criteria: under the age of 17, Stage 1-4 CKD, and patients with Stage 5 CKD not receiving dialysis, in addition to patients with AKI and patients on peritoneal dialysis. Patients receiving chemotherapy, radiation therapy, and rehabilitation, and cases of death on first admission and admission for 24-hour observation were excluded from the comparison.

## Measures

### 30-day readmission

The primary outcome measures (30-day readmissions) were obtained from the Clinical Data Repository (CDR). 30-day readmissions were measured as aggregate data using the designated patient population and time frame. 30-day readmissions were counted from the documented day of discharge from the hospital. Any subsequent visit to the hospital resulting in an admission after the initial discharge was included. Emergency depart events, clinic visits and renal dialysis appointments were not included. Only admissions to the designated AMC were captured, any admissions to outside facilities were not available for inclusion. The 30-day readmission measure was reported as aggregate data because patient-level data was not obtainable.

### Post-discharge complications

The Renal Unit Discharge Follow-up questionnaire was a nine-question document used

to identify post-discharge complications (see figure 5). The questionnaire also addressed elements of provider communication and patient satisfaction, yet, post-discharge status was a key measure within the follow-up questionnaire. Potential post discharge complications were identified through telephone discussions with an experienced dialysis nurse. The questionnaire targeted post-discharge complications such as falls with or without injury, any unexpected change in health status, the in ability to obtain or adhere to the medication plan/medical supply use, as well as adherence to the follow up appointments with medical teams and follow-up discharge dialysis appointments. The elements were recorded yes, no or n/a through the acute care renal unit discharge questionnaire.

Additionally, the follow -up questionnaire addressed communication with providers and the patient as well as and patient satisfaction with the overall hospital experience. The elements were recorded yes, no or n/a thru the renal unit discharge questionnaire.

**Compliance**

The compliance measure focused on the clinician ability to connect with the patient via the scripted telephone follow up plan using the acute care renal unit discharge questionnaire. Elements such as number of call made, the ability to contact the patient and the ability to complete the follow-up questionnaire were measured. These measures were self-reported by the experienced dialysis nurse making the follow up telephone call and recorded in the EMR by the dialysis nurse assigned to telephone follow-up on the specific day.

**Demographics**

In addition to the dates of discharge and readmission, post-discharge complications and overall questionnaire information, demographic data including gender, age, race, ethnicity and region of residence were collected in aggregate form for each patient population.

**Procedures**

The telephone follow-up project was designed to ensure the early detection of post-discharge complications, address patient concerns and reinforce adherence behaviors in the adult hemodialysis patient. During the telephone follow-up, the designated nurses utilized the "Post-Discharge Questionnaire" tool in the EMR, using open-ended, semi-structured questions in order to focus on key areas, such as adherence to follow-up instructions, schedule outpatient dialysis appointment and medication reconciliation, yet allowing for flexibility. The dialysis nurse's specialty knowledge and experience was pivotal in making initial assessments, identifying medical problems, and setting mutually beneficial goals based on the nephrologist's discharge instructions. The follow-up protocol including "Offering Discharge Support Handout", "Renal Unit Discharge Follow-up Questionnaire", and "Renal Unit Patient Triage Algorithm" were developed specifically for the project by the Doctorate of Nursing Practice (DNP) student, in collaboration with the University Health System Renal Unit leadership. Current literature and the advice of content experts in the field of nephrology nursing were consulted to develop the quality improvement project that best optimized human and institutional resources.

In an effort to build on standard work and improve the Renal Unit discharge process, the "Post-Discharge Questionnaire" was developed (see figure 5). Face validity for the content of the "Post-Discharge Questionnaire" was obtained from key stakeholders, the renal nurse manager, and renal clinical nurse specialist when project approval was sought. Using clinical expertise and experience, questions were analyzed for grade level appropriateness and association with targeted goals of the follow up telephone call. The contents of the "Post-Discharge Questionnaire" were also validated by a panel of experts in the fields of medicine and nursing; in addition to multiple nursing scholars and Doctorate of Nursing Practice (DNP) from

various backgrounds of Patient Safety and Quality Improvement.

Twenty-Five Renal Unit staff members (1- RN Clinician 4, 6-RN Clinician 3, 16-RN Clinician 2 and 3-Patient Care Assistants) were individually instructed by the DNP student and provided with written materials (see figures 4 and 5) on the purpose and content of project during the Renal Unit Skills Fair in April 2016. To ensure project reliability, retraining and participation in the project's main intervention (telephone follow-up) was limited to no more than five dialysis discharge nurses (1-CNS, 1-Clinician 4, 3-Clinician 3). In addition to retraining, the "Renal Unit Post Call Tip Sheet" was developed to support the discharge nurse in the access and utilization of the electronic version of the Discharge Questionnaire in the EMR (see figure 10*)*. In the inpatient setting, the dialysis nurse spent an average of 12 individualized hours a week at the bedside providing hemodialysis treatments. During this period, the dialysis nurse annotated the patient's and/or care partner's needs in the EMR to be reviewed by the dialysis discharge nurse.

The dialysis discharge nurse conducted an additional assessment of the patient and/or care partner's educational needs when the patient was stable enough to transfer to the Renal Unit for dialysis treatment. The patient's telephone number was verified against the admission documentation obtained in the patient's electronic medical record and annotated on the "Renal Unit Discharge Summary for Outpatient Dialysis Units" and the "Discharge Planning Worksheet (see figures 7 and 8). Both worksheets were collectively kept in a Discharge Coordinator binder, which provided access to all healthcare staff, involved with the discharge of each patient, allowing for real-time updates and a streamlined communication process. Dialysis patients received additional discharge instructions from the dialysis discharge nurse while in the renal unit prior to discharge, as well as a copy of the telephone follow-up handout "Offering Discharge

Support" indicating the availability of the discharge dialysis nurse and the contact number if needed (see figure 4). If no objections were verbalized by the patient or care partner, the discharge support handout was provided to remind the patient to expect a follow-up telephone call from the dialysis discharge nurse to discuss his/her current condition and to address additional questions or concerns. The dialysis discharge nurse annotated that the telephone follow-up handout was provided to the patient/family member on the updated "Renal Unit Discharge Summary for Outpatient Dialysis Units" and the "Discharge Planning Worksheet" (see figures 8 and 9). The dialysis discharge nurse assigned to telephone follow-up duties called the patients at to home within the 48-hour time frame, making only two attempts to contact the patient. As the definition of post-discharge period varies the team decided the 48-hour time frame would best meet the needs of the patient and workflow. A voice message was left if the patient was unavailable, asking the patient to call back the discharge nurse on duty the next day between 8 AM and 5 PM. The patient was considered lost to follow-up if no contact was made; if the patient did not call back or telephone follow-up was refused.

Once patient contact was made, the dialysis nurse conducted a brief interview using open-ended, semi-structured questions to focus on key areas, documenting the interview on the electronic version of the discharge questionnaire in the EMR (see figure 6). The "Post-Discharge Questionnaire" was designed to support the decision-making process of the discharge nurse while on the phone with the patient. A direct link was incorporated into the questionnaire to aid the discharge nurse advising the patient, if he/she noted any changes in the patient's condition. The link took the discharge nurse to the "Renal Unit Patient Triage Algorithm" which assisted the discharge nurse in advising the patient to either follow up with their Primary Care Provider as scheduled; follow up with the PCP immediately; or go to their nearest emergency department or

call EMS (see figure 7). In the event that the patient was advised to immediately contact their PCP or go to the nearest ED, the discharge nurse documented the interaction in the EMR and text paged the Nephrology fellow on duty, following the institution's text page protocol, informing of the patients' status.

**Data Analysis**

A retrospective group analysis was conducted comparing pre-intervention 2015 demographic information in the Clinical Data Repository (CDR) to post 2016 data. The CDR is a locally developed, enterprise-wide data warehouse containing longitudinal data on over 900,000 patients. All data in the CDR is HIPAA compliant and de-identified.

Descriptive statistics were computed on pre-and post-intervention groups. Patient responses from the follow-up phone calls were also analyzed. The percentage of "yes" and "no" responses to the discharge follow-up questionnaire were calculated. Data related to calls attempted, calls completed, and no contact were also analyzed. Additionally, discharge follow-up questions were evaluated to explore patient and provider collaboration, medications compliance, and access to dialysis care.

## Results

### 30-day Readmissions

#### 2015 Patient Characteristics

The 2015 pre-intervention group was comprised of 149 patients; and included 197 visits. Based upon pre-established definitions of readmission with renal complications, 56 visits of the 197 visits (28.4%) occurred within 30 days after discharge. Of the 197 visits registered between July 1st, 2015 and September 30th, 2015, 118 (59.9%) of those were admitted from the ED. Of the 149 patients identified, 55 % were male, 58.4% were White, 39.6% African American, with

the remaining 2% identifying as Hispanic and Native American. Patients' ages of 45 and over accounted for a combined 81.2% of the admissions (Table 3). Medicare beneficiaries accounted for 83.9% of the total inpatient visits. Roughly half of all patients were 100% indigent, which accounts for 41% of the analyzed population. Patients residing within the surrounding metropolitan statistical area (MSA) accounted for 18.9% (Table 4).

**2016 Patient Characteristics**

The 2016 post-intervention group was comprised of 171 patients; who accounted for 231 visits. Based upon pre-established definitions of readmission with renal complications, 57 of the 231 visits (24.6%) occurred within 30 days after discharge. Of the 231 visits registered between July 1st, 2015 and September 30th, 2015, 128 (55.4%) of those were admitted from the ED. Of the 171 patients identified, 57.9 % were male, 53.8% were White, 41.5% African American, with the remaining 4.7% identifying as Hispanic, Native American or other. Patient's ages of 45 and over accounted for a combined 80.7% of the admissions (Table 3). Medicare beneficiaries accounted for 78.4%. More than half of all patients were 100% indigent, which accounts for 56% of the analyzed population. Patients residing within the surrounding metropolitan statistical area (MSA) accounted for 24% (Table 4).

A larger percentage of patients were not admitted to the hospital post discharge in 2016 as compared to 2015 (69% and 52% respectively). Additionally, fewer 30-day readmissions were noted in 2016 than 2015. The percentage of patients admitted within 30 days was 28.4% in 2015 and reduced to 24.6% in 2016. Statistical significance could not be analyzed on the aggregate data set.

**Follow-up Questionnaire**

The patients' responses to the follow-up question were categorized by topic. The percentage of yes and no responses were calculated. Of the 62 patients identified, six patients were readmitted for post-discharge complications. Of the six patients readmitted, one patient was readmitted for complications related to hypoglycemia, two patients were actively seeking medical attention during the process of follow-up and two patients had died. Of the 62 patient encounters analyzed, 87% noted no unexpected changes, 84% had contact with a dialysis healthcare provider prior to discharge and 86% had no further questions regarding follow up care (Table 5). Furthermore, 74% were able to fill their discharge medications and 68% were able to take their discharge medications to their dialysis center for medication reconciliation. There were no reported incidents of falls, despite the population being at a higher risk. Overall satisfaction with their dialysis care was high, as 80% rated their care as "good" to "very good" (Table 5).

For the 2015 population (n = 197), the average length of stay was 8.6 days, with the range being from 1 to 67 days. At an average cost of 4,124.34 dollars per day, the analysis of the reimbursements showed a loss of 669.87 dollars per patient visit per day, resulting in a total average loss to the facility of 5,760.95 dollars per patient average stay (8.6 days) (Table 5). For the 2016 population (n = 231), the average length of stay was 8.9 days, with the range being from 1 to 67 days. At an average cost of 7,691.07 dollars per day, the analysis of the reimbursements showed a loss of 2,594 dollars per patient visit per day, resulting in a total average loss of 23,085.68 dollars per patient average stay (8.9 days) (Table 6).

**Compliance Assessment**

Of the 100 patient encounters reviewed, a compliance rate of 71% was achieved in the early stages of the TFU project, as 29 patient encounters were excluded and 71 patient

encounters were included (figure 11). Of those 71 encounters, 57 (80 %) had a call attempt by a nurse and 14 (20%) encounters had no documentation recorded. Of those 57 calls, 22 patients (38%) were contacted by the nurse to complete the post-discharge intervention. Otherwise, a message was left 18 times (32%), and no answer was noted 17 times (30%). The remaining 29 (29%) encounters had no call attempt made. Three (10%) patients refused the opportunity and 26 (90%) were excluded because they did not meet the requirement for follow-up.

**Strengths**

The project was designed to improve the discharge teaching process, improve patient outcomes in the hemodialysis population, and examine the effectiveness of a systematic quality improvement process.

The implementation of the project standardized unit workflow and allowed for real-time updated documentation of patient progress as well as streamlined communication between all healthcare staff involved with the discharge process. As previously no evidence-based process for monitoring hemodialysis patients after discharge existed at the facility, a new TFU process was developed for the Acute Renal Unit. Sustainability for the project was ensured by embedded the process in the EMR and daily practice.

The team limited participation in the TFU to no more than five dialysis nurses to ensure reliability in the project. The increase in patient load within the renal unit required the nurses to be taken off the project at times, which limited the amount of time dedicated to the intervention. Another strength identified was the favorable patient feedback of the follow-up phone calls and enhancing the positive aspects of compassion, as caring for chronically ill patients can be associated with considerable moral distress.

**Limitations**

A significant part of the project focused on improving the systematic disconnects in the renal unit discharge process resulting from fragmentation of the patient's discharge information and planning. The major commitment to process improvement limited the time dedicated to reevaluate the process and improve areas in need. The use of aggregate data and the inability to access patient-level data, limited the ability to directly report clinical outcomes on patients receiving the follow-up phone call. The use of aggregate data also limited the ability gather clinical outcomes on patients who did not receive TFU that may have been at a higher risk for readmission. There was a lack of control for deviation and adherence to the script.

### Further Projects

Although the results of the project showed a downward trend in the number of 30-day readmissions, a longitudinal study of greater duration and analysis at the patient level would more definitively demonstrate the relationship between post-discharge telephone follow-up and 30-day readmission in the adult hemodialysis population.

## Conclusion

Implementation of this project has the potential to reduce readmissions and complications in the hemodialysis patient population through improved post discharge care coordination, resulting in reduced healthcare costs and improved quality of life. The telephone follow up call has the potential to address changes to the CMS' End-Stage Renal Disease Quality Incentive Program and provide improved discharge care for patients with chronic kidney disease. Furthermore, the results of the project point to an intervention that may address the Medicare Payment Advisory Commission's concerns about preventable readmissions and a strategy to enhance communication and coordination for this vulnerable patient population.

In alignment with the Chronic Care Model, the scripted telephone follow up intervention appears to be a strategy to improve patient outcomes through enhanced communication. The results of this project demonstrated a trend toward reduced re-admission rates, achieved through the enhancement of core discharge planning, patient education and increased communication and collaboration between patient and health care providers.

**Products of the DNP Project**

A complete project report was written and presented to the School of Nursing to complete the requirements for the DNP degree. The project intervention and results were reviewed and redesigned as directed by stakeholders of this project. The Protocol for the project was created and submitted for approval per hospital guidelines. The abstract (Appendix D) accepted by the ANNA Journal will be presented at the ANNA 48th National Symposium in Washington D.C. on April 7th through 10th, 2017. Furthermore, the Manuscript (Appendix E) will be submitted following the *Nephrology Nursing Journal* guidelines (Appendix C).

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| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Braun et al. (2009) | N=400<br><br>Internal Medicine Department | Randomized-control trial | TFU took place one week and one month after discharge. Three months later, members of both groups were contacted by telephone. | Satisfaction:<br>● Increased in the TFU group vs control group by 6–12% in most fields<br>● 87% of patients in the TFU group indicated that earlier telephone contact increased their satisfaction.<br>● 78.2% of the patients in the control group reported that they performed the tests recommended at discharge<br>● 86.5% reported that they received explanations regarding their medications.<br>● In the TFU group, this percentage was increased significantly to 86.9% (P=0.02) and 96.7% (P=0.0001), respectively.<br>● 93% of the patients in the TFU group as compared to 84% in the control group reported improvement in their symptoms. A non-significant trend towards fewer readmission was observed in the TFU group (26% vs 35% P=0.062). |

| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Jack et al. (2009) | N = 749<br><br>Intervention group: n=370<br><br>Control: n=368<br><br>Age 18 or older hospitalized from home, English speaking, has a telephone, plans to be discharged to home.<br><br>**Setting:** large urban hospital that serves low-income, ethnically diverse population. | Randomized-control trial<br><br>Randomized assignment<br><br>. | A reengineered hospital discharge program to decrease re-hospitalization randomized trial. **Intervention:** A specially trained nurse discharge advocate (DA) provides: patient education; medication reconciliation and education; instruction about red flags; teach-back learning process; coordination of physician appointments and follow- up testing; evidence-based written discharge plan shared with patient and all providers.<br><br>A clinical pharmacist telephoned participants 2 days post hospital discharge. | ● 30% decrease in hospital utilization (ED or hospitalization) in 30- day follow-up.<br>● Reduced costs per subject enrolled.<br>● A package of discharge interventions reduced hospital utilization within 30 days of discharge.<br>● Cost benefit: $386,759 lower cost in RED group due to 32% lower use of hospital<br>● Limitations: The study was a single site study. Outcome assessments were sometimes relied on by participant report. The study sample were younger and had fewer comorbid conditions than those in other studies thereby results may not be generalizable to all patient groups. |

| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Harrison et al. (2011) | N = 30,272<br><br>Participants in this study included all 30,272 members from a large commercial health plan with Medicare Advantage who were enrolled in a chronic disease management program and who had a hospital admission for any reason during calendar year 2008 | Retrospective Cohort | **Intervention:** Members who received a telephone call within 14 days of discharge and were not readmitted prior to that call comprised the intervention group<br><br>**Comparison:** all other members formed the comparison group. | ● Older age, male sex, and increased initial hospitalization length of stay were associated with an increased likelihood of readmission ($P < 0.001$).<br>● Receipt of a discharge call was associated with reduced rates of readmission.<br>● Intervention group members were 23.1% less likely than the comparison group to be readmitted within 30 days of hospital discharge (P1⁄40.043).<br>● These findings indicate that timely discharge follow-up by telephone to supplement standard care is effective at reducing near-term hospital readmissions and, thus, provides a means of reducing costs for health plans and their members. |

| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Harrison et al. (2014) | N=5,507<br><br>Patients discharged home from the Medicine Service at a tertiary care academic medical center between November 2010 and May 2012.<br><br>The study took place on the Medicine Service at the UCSFMC, a 600-bed academic medical center. | Retrospective Observational | **Intervention:** Patients received two telephone call attempts by a nurse within 72 h of discharge. Nurses followed a standard script to address issues associated with readmission.<br><br>**Comparison:** no call attempt, call attempted not completed | ● Patients who received a call and completed the intervention were significantly less likely to be readmitted compared to those who did not [155 (5.8 %) vs. 123 (8.6 %), $p < 0.01$].<br>● In multivariable models adjusting for socio-demographic and clinical covariates alone, completing a post-discharge telephone call intervention was associated with lower odds for readmission (AOR 0.71; 95 % CI: 0.55–0.91).<br>● However, when models adjusted for the likelihood of receiving the phone call using the propensity score, no association between call receipt and readmission was observed (AOR 0.91; 95%CI: 0.69–1.20).<br>● Effectiveness of post-discharge phone call programs may be more related to whether patients are able to answer a phone call than to the care delivered. |

| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Mistiaen, Poot (2006) | N=33<br><br>This review included 33 studies measuring the effects of telephone follow-up (TFU) in 5110 patients initiated by hospital-based health professionals, for patients discharges home from an acute hospital setting. | Systematic Review | **Intervention:** Telephone follow-up (TFU) initiated by a hospital-based health professional (medical, nursing, social work, pharm....) to a patient who is discharged to his/her own home setting (including a relative's home).<br><br>The TFU has to be performed at least once within the first month after discharge.<br><br>**Comparison:** Usual care, or other types of hospital follow-up. | ● Outcome: Studies were of poor methodological quality<br>● No included study had a low risk of bias: (7, moderate risk; 26, high risk)<br>● A high degree of clinical diversity and statistical heterogeneity in several elements,<br>● Most studies had small sample sizes. |

| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Sanchez et al. (2015) | N=277<br><br>Patients discharge to home from the family medicine service at Boston Medical Center<br><br>Total 401 patients identified; 124 patients were unable to be contacted | Retrospective Chart Review | **Intervention**: Patients received telephone intervention<br><br>**Comparison:** Patients unable-to-contacted/no intervention | ● Baseline characteristics did not differ between the two groups, with the exception of a higher prevalence of substance abuse in the nonintervention group (41.9% vs 21.3%, $p<0.001$).<br>● Unplanned hospitalization (visits/patient) was significantly reduced in the intervention group vs. unable-to-contact group (0.227 vs 0.519, $p<0.001$).<br>● A total of 128 interventions and spent an average of 22 minutes on each telephone intervention. |

| Authors | Subjects and Setting | Design | Intervention and Comparison | Outcomes |
|---|---|---|---|---|
| Stella et al. (2014) | N=308<br><br>Denver Health Medical Center, a 525-bed, university-affiliated, public safety-net hospital | Prospective Cohort | **Intervention:** Patents were given paperwork that listed the telephone number of the advice line (AL) and instructions on when to call the AL or PCP<br><br>**Comparison:** None | ● 612 problems or concerns reported (mean ± standard deviation number of complaints per caller = 2 ± 1)<br>● 31% and 47% of the calls occurred within 24 or 48 hrs. of discharge<br>● The median time from hospital discharge to call was 3 days [{IQR}, 1-6,]<br>● The large majority of which (71%) were symptom-related<br>● Sixty-five patients, representing 21% of the cohort, reported 81 problems understanding or executing discharge instructions<br>● Information collected from patient-initiated calls to our AL identified several aspects of our discharge processes that needed improvement |

**Table 2.**

***30-day Readmission Rates***

| **Variable** | 2015-year group | 2016-year group |
|---|---|---|
| Patients | n=149 | n=171 |
| Cases (visits) | 197 | 231 |
| Inpatient cases (visits) from ED | 118 (59.9%) | 128 (55.4%) |
| | | |
| Total number | 197 | 231 |
| No readmissions | 103 (52%) | 159 (69%) |
| 0-30 days | 56 (28.4%) | 57(24.6%) |

**Table 3.**

***Population Demographics***

| **Variable** | 2015-year group | 2016-year group | Comparison from previous year |
|---|---|---|---|
| Patients readmitted | n=149 | n=171 | up by 14.7% |
| Gender: | | | |
| Male | 85 (55%) | 99 (57.9%) | up by 16.5% |
| Female | 67 (45%) | 72 (42.1%) | up by 7.5% |
| **Age** | | | |
| 18 - 44 years | 28 (18.8%) | 33 (19.3%) | up by 17.8% |
| 45 - 64 years | 72 (48.3%) | 94 (55%) | up by 30.5% |
| 65 years and over | 49 (32.9%) | 44 (25.7%) | down by 10.2% |
| **Race or Ethnicity** | | | |
| White | 87 (58.4%) | 92 (53.8%) | up by 5.7% |
| African American | 59 (39.6%) | 71 (41.5%) | up by 20.3% |
| Hispanic, Native American or Other | 3 (2%) | 8 (4.7%) | up by 100% |
| **Payer** | | | |
| Medicare | 125 (83.9%) | 134 (78.4%) | up by 7.2% |
| Medicaid | 9 (6.1%) | 6 (3.5%) | down by 33.4% |
| Others | 15 (10%) | 31 (18.1%) | up by 206.6% |
| **Pay Scale** | | | |
| Not indigent | 63 (42.3%) | 75 (43.8%) | up by 19% |
| 100% indigent | 61 (40.9%) | 96 (56.2%) | up by 57.3% |

**Table 4.**

***Region of Residence, According to Group***

| | 2015-year group n=149 | | 2016-year group n=171 | |
|---|---|---|---|---|
| **Region** | **No. Patients** | **Percent (%)** | **No. Patients** | **Percent (%)** |
| Local | 28 | 19% | 41 | 24% |
| Surrounding Counties | 57 | 38% | 60 | 35% |
| Other | 44 | 43% | 70 | 41% |

**Table 5.**

***Renal Unit Discharge Follow-Up Questionnaire***

| | **Patients (n), %** |
|---|---|
| | n = 62 |
| Q.2 Have there been any unexpected changes in your condition since discharge? | |
| Yes | |
| No | (54), 87% |
| N/A | (3), 5% |
| Q.3 Did the Dialysis Nurse or Nephrologist talk to you about your dialysis care and reason you were in the hospital? | |
| Yes | (52), 84% |
| No | (4), 6% |
| N/A | (6), 10% |
| Q.4 Do you have any questions about your dialysis care or your discharge instructions? | |
| Yes | (5), 8% |
| No | (53), 85% |
| N/A | (4), 7% |
| Q.5 Were you able to make it to your scheduled outpatient dialysis treatment? | |
| Yes | (53), 85% |
| No | (4), 7% |
| N/A | (5), 8% |
| Q.6 Were you able to fill your discharge medications? | |
| Yes | (46), 74% |
| No | (10), 16% |
| N/A | (6), 10% |

| Q.7 Will /did you take your medications to your dialysis center? | |
|---|---|
| Yes | (42), 68% |
| No | (16), 26% |
| N/A | (4), 6% |

| Q.8 Have you fallen since your discharge from hospital? | |
|---|---|
| Yes | 0 |
| No | (58), 94% |
| N/A | (4), 6% |

| Q.9 Are you expecting any medical supplies to be delivered to your home? | |
|---|---|
| Yes | (3), 5% |
| No | (54), 87% |
| N/A | (5), 8% |

| Q.10 How would you rate your hospital experience with your hospital care? | |
|---|---|
| Poor | (0), 0% |
| Fair | (8), 13% |
| Good | (25), 40% |
| Very Good | (29), 47% |

**Table 6.**

***Cost Analysis***

| | 2015-year group | | | | 2016-year group | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | Ave. | Min. | Max. | Total | Ave. | Min | Max |
| No. of cases | 231 | | | | 197 | | | |
| Length of Stay | | 8.604 | 1 | 67 | | 8.944 | 1 | 67 |
| Total Charges per day | | 18,110 | 3,082 | 3,082 | | 20,040 | 4,550.3 | 4,550 |
| Costs per Day | | 4,124 | 0 | 0 | | 7,691 | 1690 | 1690 |
| Reimbursement per Day | | -4,794 | -35,640 | 0 | | -5097 | 45,093 | 0 |

**Figure 1: Literature Search Procedure**

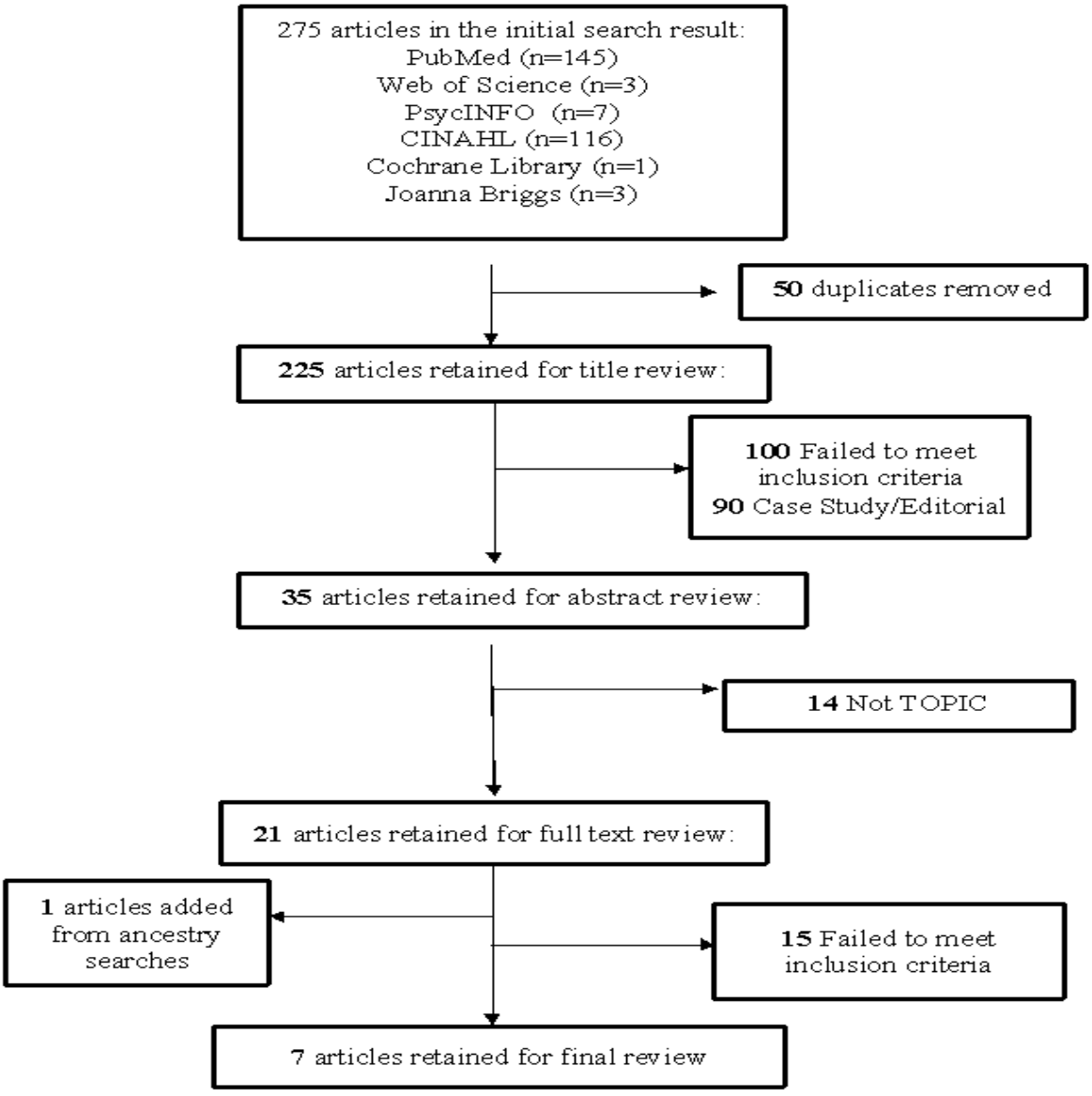
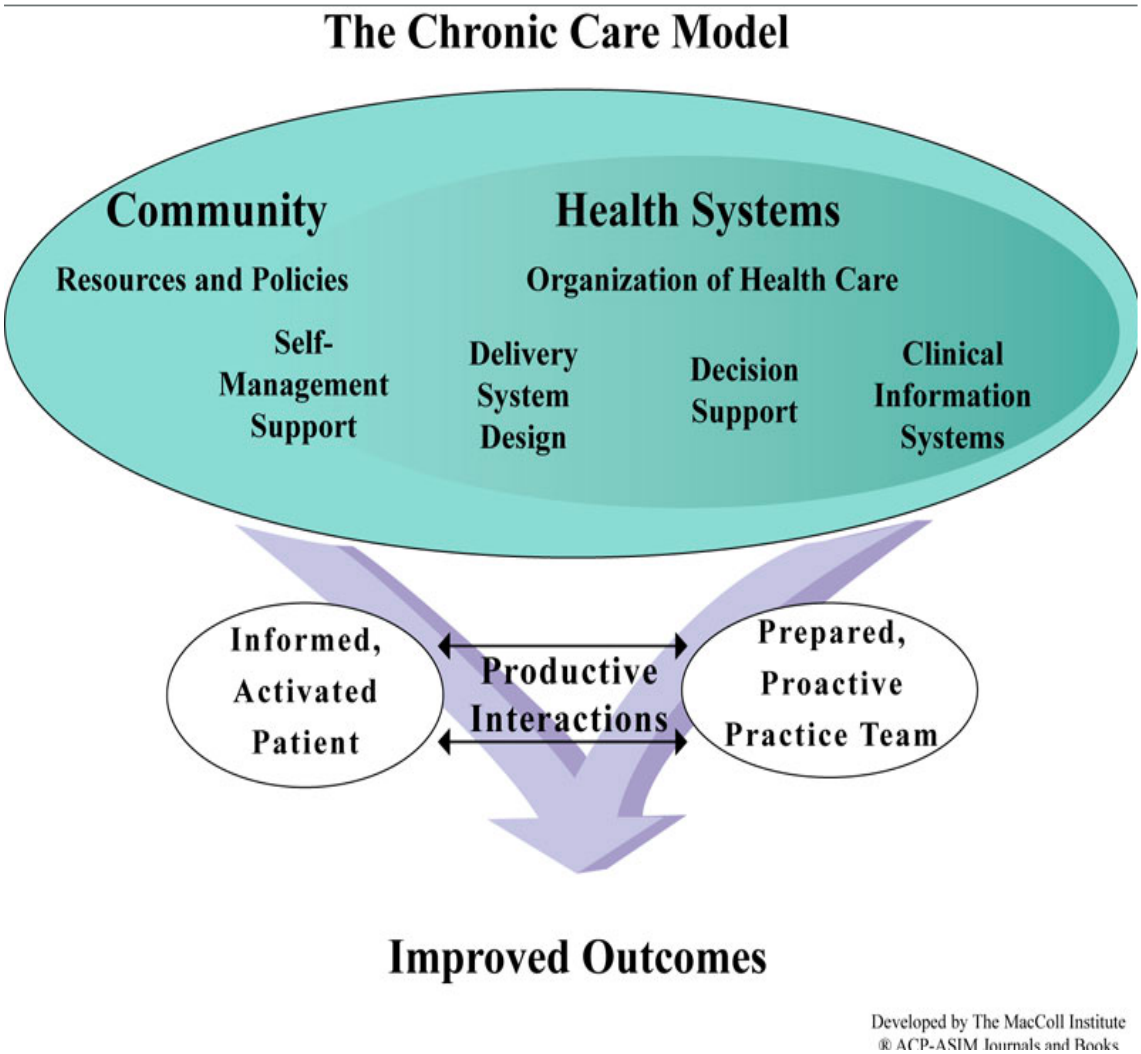


**Figure 2: The Chronic Care Model**




http://www.improvingchroniccare.org/index.php?p=Chronic+Care+Model&s=124

**Figure 3: Components of Re-Engineered Discharge (RED)**

| RED Component | DE Responsibilities |
|---|---|
| **1. Ascertain need for and obtain language assistance.** | ● Find out about preferred languages for oral communication and written materials.<br>● Determine patient and caregivers' English proficiency<br>● Arrange for language assistance as needed, including translation of written materials. |
| **2. Make appointments for follow up medical appointments and post discharge tests/labs.** | ● Determine primary care and specialty follow up needs.<br>● Find a primary care provider (if patient does not have one) based on patient preferences: gender, location, specialty, health plan participation, etc.<br>● Determine need for scheduling future tests.<br>● Make appointments with input from the patient regarding the best time and date for the appointments.<br>● Instruct patient in any preparation required for future tests and confirm understanding.<br>● Discuss importance of clinician appointments and labs/tests.<br>● Inquire about traditional healers and assure that traditional healing and conventional medicine are complementary.<br>● Confirm that the patient knows where to go and has a plan about how to get to appointments; review transportation options and address other barriers to keeping appointments (e.g., lack of daycare for children). |
| **3. Plan for the follow up of results from lab tests or studies that are pending at discharge.** | ● Identify the lab work and tests with pending results.<br>● Discuss who will be reviewing the results, and when and how the patient will receive this information. |
| **4. Organize post-discharge outpatient services and medical equipment.** | ● Collaborate with the case manager to ensure that durable medical equipment is obtained.<br>● Document all contact information for medical equipment companies and at-home services in the AHCP.<br>● Assess social support available at home.<br>● Collaborate with the medical team and case managers to arrange necessary at-home services.<br>● |

| | |
|---|---|
| **5. Identify the correct medicines and a plan for the patient to obtain and take them.** | ● Review all medicine lists with patient, including, when possible, the inpatient medicine list, the outpatient medicine list, the outpatient pharmacy list, and what the patient reports taking.<br>● Ascertain what vitamins, herbal medicines, or other dietary supplements the patient takes.<br>● Explain what medicines to take, emphasizing any changes in the regimen.<br>● Review each medicine's purpose, how to take each medicine correctly, and important side effects.<br>● Ensure a realistic plan for obtaining medicines is in place.<br>● Assess patient's concerns about medicine plan. |
| **6. Reconcile the discharge plan with national guidelines.** | ● Compare the treatment plan with National Guidelines Clearinghouse recommendations for patient's diagnosis and alert the medical team of discrepancies. |
| **7. Teach a written discharge plan the patient can understand.** | ● Create an AHCP, the easy-to-understand discharge plan sent home with patient.<br>● Review and orient patient to all aspects of AHCP.<br>● Encourage patients to ask. |
| **8. Educate the patient about his or her diagnosis.** | ● Research the patient's medical history and current condition.<br>● Communicate with the inpatient team regarding ongoing plans for discharge.<br>● Meet with the patient, family, and/or other caregivers to provide education and to begin discharge preparation. |
| **9. Assess the degree of the patient's understanding of the discharge plan.** | ● Ask patients to explain in their own words the details of the plan (the teach-back technique).<br>● May require contacting family members and/or other caregivers who will share in the care-giving responsibilities. |
| **10. Review with the patient what to do if a problem arises.** | ● Instruct on a specific plan of how to contact the primary care provider (PCP) by providing contact numbers, including evenings and weekends.<br>● Instruct on what constitutes an emergency and what to do in cases of emergency. |
| **11. Expedite transmission of the discharge summary to clinicians accepting care of the patient.** | ● Deliver discharge summary and AHCP to clinicians (e.g., PCP, visiting nurses) within 24 hours of discharge. |

| | |
|---|---|
| **12. Provide telephone reinforcement of the Discharge Plan.** | ● Call the patient within 3 days of discharge to reinforce the discharge plan and help with problem-solving.<br>● Staff DE Help Line. Answer phone calls from patients, family, and/or other caregivers with questions about the AHCP, hospitalization, and follow up plan in order to help patient transition from hospital care to outpatient care setting. |

https://www.bu.edu/fammed/projectred/components.html

**Figure 4: Offering Discharge Support Handout**


# Renal Unit

## Offering Discharge Support

The UVA Renal Unit strives to provide excellent care for you and your care partners during your stay with us. Our goal is to assure you have been provided information to assist you in taking care of yourself at home. In an effort to know how you are after discharge. In a couple of days, we will follow-up with a phone call to you.

A nurse from the Renal Unit will call to see how you are. We may ask about your next dialysis appointment, medications, and how you are feeling in general. Thank you choosing UVA for your care and we look forward to speaking with you.

**Acute Renal Unit**
**PO Box 801451**
**Charlottesville, VA 22908-1451**
**434.924.2188 | Fax 434.982.0797**

**Figure 5: Discharge Follow-up Questionnaire**

***Name:*** ***MRN:*** ***DOB:***
***Date of Discharge:*** ***Discharging Unit:***

**Renal Unit Discharge Follow-up Questionnaire**

This is ***NURSE*** from the UVA Renal Unit calling to see how you are doing since your discharge?

**1.** Are you available to have a short conversation about your care?
1 = Yes 2 = No
If no, ask for a family member or caregiver.
Primary contact: 1 = Family member 2 = Caregiver

**2.** Have there been any unexpected changes in your condition since discharge?
1= Yes 2 = No

**3.** Did the Dialysis Nurse or Nephrologist talk to you about your dialysis care and reason you were in the hospital?
1 = Yes 2 = No 3 = Unsure

Comments: [Free text box for addition information.]

**4.** Do you have any questions about your dialysis care or your discharge instructions?
1 = Yes 2 = No
Comments: [Free text box for addition information]

**5.** Were you able to make it to your scheduled outpatient dialysis treatment?
1 = Yes 2 = No

**6**. Were you able to fill your discharge medications?
1= Yes 2 = No

**7**. Do you take your medications to your dialysis center for medication reconciliation?
1 = Yes 2 = No
Comments: [Free text box for addition information]

**8**. Have you fallen since your discharge from hospital?
1= Yes 2 = No
if Yes, → 1 = Physiological Injury or, 2 = Environmental Injury
→ Patient advised …
1. Injury → 1. Patient advised to go to closest ER
2. Non-Injury →Patient advised to follow up with their PCP.

Comments: [Free text box for patient response and instructions provided.]

***Name:*** ***MRN:*** ***DOB:***
***Date of Discharge:*** ***Discharging Unit:***

**9.** Are you expecting any medical supplies to be delivered to your home?
1= Yes 2 = No
If yes, did they arrive? 1=Yes 2 = No. if, no RN to ask who ordered the supplies?
Ask patient if assistance is needed? ➔ 1=Yes, RN follow-up 2 = No, Patient follow up.

Comments: [Free text box for addition information and instructions provided.]

**10.** How would you rate your experience with your hospital care?
1 = Poor 2 = Fair 3 = Good 4 = Very Good

Comments: [Free text box for addition information.]

**11**. Do you have any questions or is there anything I can help you with? 1= Yes 2 = No
If yes, free text patient's response in comments section.

Comments: [Free text box for addition information.]

**Phone Call #1:** Date & Time: _____ Reached: Yes/No

If No (circle one): ans. machine/no answer/not home/declined/busy/rescheduled/other:

**Phone Call #2:** Date & Time: _____ Reached: Yes/No

If No (circle one): ans. machine/no answer/not home/declined/busy/rescheduled/other

Adapted from Tool 5: How to Conduct a Post-Discharge Follow-up Phone Call. Content last reviewed March 2013. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/professionals/systems/hospital/red/toolkit/redtool5.html

Adapted from Follow Up with Patients: Tool #6. Content last reviewed February 2015. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2-tool6.html

**Figure 6: Electronic Discharge Follow-up Questionnaire**

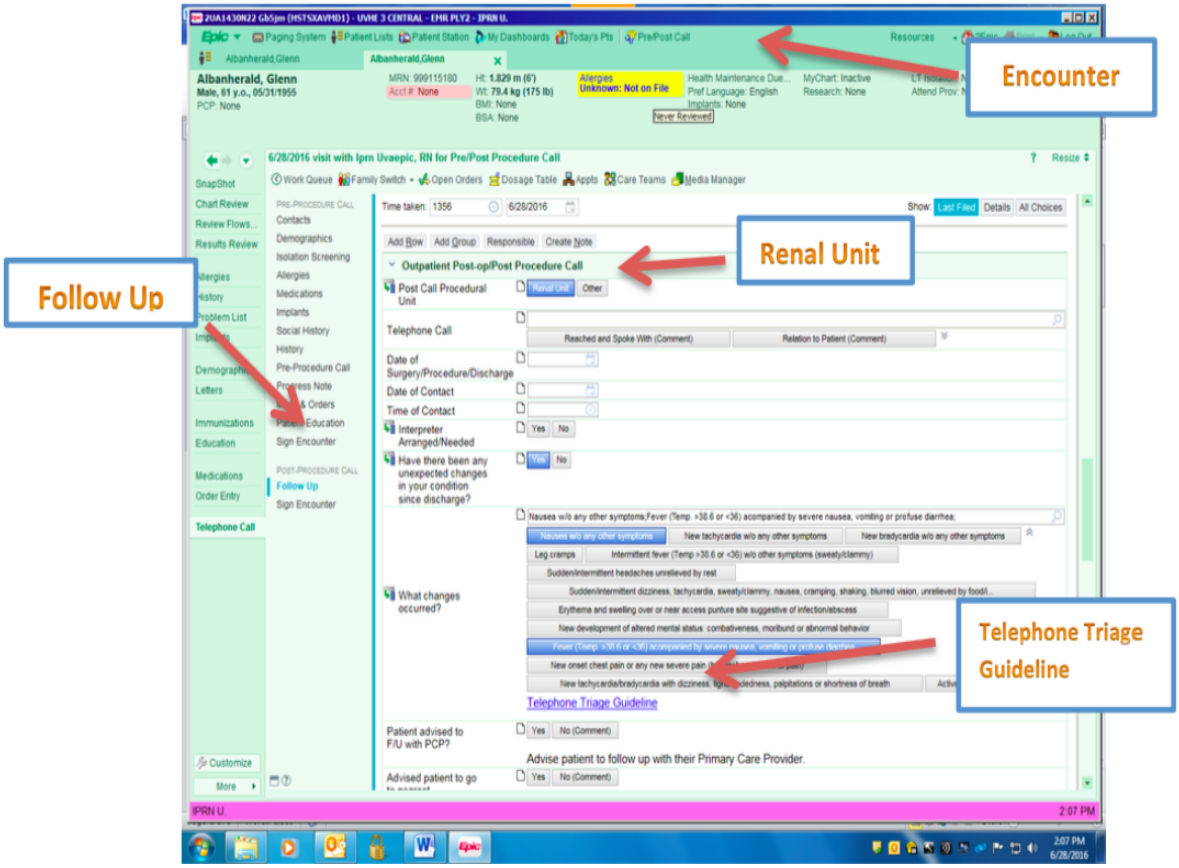
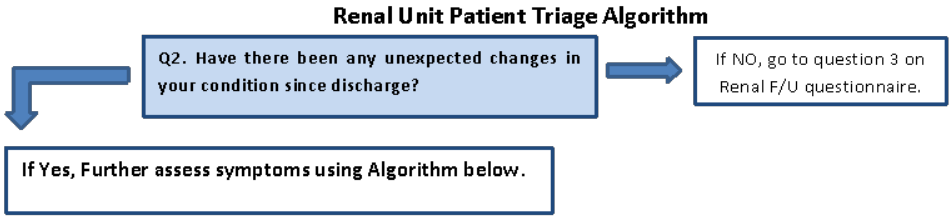


**Figure 7: Renal Unit Support Algorithm**




| Advise patient to F/U with their Primary Care Provider (PCP). | Advise patient to F/U with their Primary Care Provider today. Or arrange same day appointment at the Kidney Center Clinic. If patient refuses, advise patient to go to the nearest Emergency Room if their condition worsens. | Advise patient to get a ride to the nearest Emergency Room or call EMS. |
|---|---|---|
| • Nausea w/o any other symptoms<br>• New tachycardia w/o any other symptoms<br>• New bradycardia w/o any other symptoms<br>• Leg cramps | • Intermittent Fever (Temp. >38.6 or <36.0) w/o other symptoms (sweaty/clammy)<br>• Sudden /intermittent headaches unrelieved by rest<br>• Sudden /intermittent dizziness, tachycardia, sweaty/clammy, nausea, cramping, shaking, blurred vision, unrelieved by food/ice chips<br>• Erythema and swelling over or near access puncture site suggestive of infection/abscess | • New development of altered mental status: combativeness, moribund or abnormal behavior<br>• Fever (Temp. >38.6 or <36.0) accompanied by severe nausea, vomiting or profuse diarrhea<br>• New onset chest pain or any new severe pain (headache, abdominal pain)<br>• New tachycardia /bradycardia with dizziness, lightheadedness, palpitations or shortness of breath<br>• Active and severe bleeding<br>• Erythema and swelling over or near access puncture site suggestive of infection/abscess |

Adapted from Daugirdas, J. T., Blake, P. G., & Ing, T. S. (2012). *Handbook of dialysis*. Lippincott Williams & Wilkins.

**Figure 8: UVA Renal Unit Discharge Summary for Outpatient Dialysis Unit**

UVA Renal Unit Discharge Summary for Outpatient Dialysis Unit

Name:_____ MRN/DOB:_____

Admission Date:_____ D/C Date_____

Diagnosis:_____ Ambulatory Status: ☐Wheelchair ☐Stretcher ☐Walks with assistive device ☐ Walks independently ☐Other_____

Isolation Status:_____

Hospital Inpatient Unit:_____ Disposition: ☐Nursing Home ☐Home ☐Rehab ☐ Other_____

Hep B Status:_____

HGB & Date:_____ ESA & Dose:_____

Culture Date & Results:_____

Abx Name:_____Dose:_____ Frequency:_____ Stop Date:_____

TW Wgt_____ Adm. Wgt_____ D/C Wgt_____

Access Type/Issues:_____

_____

Procedures during hospitalization:_____
_____

Pertinent dialysis Information:_____

---

_____

Renal Fellow:_____ Page number 434-982-3500, PIC#:_____

Attending:_____

Dialysis Unit:_____ Vein Mapping by vascular surgeon? ☐ Yes ☐No ☐ Discussed ☐Referred ☐ Seen in Hospital ☐Scheduled_____

Days:_____Time_____

Transportation Needs:_____

First Treatment date:_____(new to dialysis during admission)

Report called to:_____

Renal Unit RN:_____

☐ Post D/C phone call handout reviewed and given to patient

UVA Renal Unit – Box 801451-Charlottesville, VA 22908-Phone 434-924-2188-Fax 434-982-0797

**Figure 9: Renal Unit Discharge Planning Worksheet**

Patient: DOB: DC phone call handout given to pt: ☐
Adm. Date: Adm. DX: DC Date:

**Discharge Planning Work Sheet (use for all patients requiring a new appt.)**

| **Task To Be Completed** | **Date & Initials** | **Comments: explain the plan to get the task completed (who is responsible, what needs to be done, when it will be done, etc.)**<br><br>**DATE & INITIAL ALL ENTRIES** |
|---|---|---|
| **Modality**: (circle one)<br><br>ESRD AKI<br>Hemo PD Home Hemo | | |
| Admission to the dialysis unit arranged & confirmed with the nephrologist, Unit leader, or admission coordinator.<br><br>**Dispo:** Home SNF Rehab<br><br>Accepting Dialysis Unit:<br><br>MWF or TTS<br><br>Date to Start:<br><br>Time to Start:<br><br>Forward labs with hepatitis status within 30 days, dialysis flowsheets, D/C summary or recent progress note with problem list and medication list to accepting dialysis unit.<br><br>Hep B Status:<br><br>Non-Reactive or Reactive<br><br>Date: | | |

UVA Renal Unit 12/2015 NOT PART OF MEDICAL RECORD

**Figure 10: Renal Unit Post Call Tip Sheet**

## Renal Unit Post Call Tip Sheet

### Customizing you toolbar (For initial setup only)

1. Sign in to Epic and customize your tool bar.

2. Go to the **Epic button** then scroll down to **customize this menu** .
3. Drag the encounter tab and pin it to the top tool bar, then close the window.

### Accessing the Renal Unit Follow-up Questionnaire

1. Under the **available lists** heading go to the **recently discharged** folder on the left and double click to open.
2. In the subfolder, select the **recently discharged folder** and select either **24H discharge or 4 day discharge**.
3. Select your discharged patient and open chart.
4. Select **encounter**.
5. In the pop-up window, select the highlighted patient; select **new.**
6. In the **Type list** search box click the magnifying glass , locate and highlight Pre/Post procedure then choose **accept**, and then **accept** again.
7. Locate and select the **Follow Up** label under the **Post-Procedure Call** label on the left.
8. Select then **Renal Unit tab to open the Telephone Follow-up Questionnaire.**

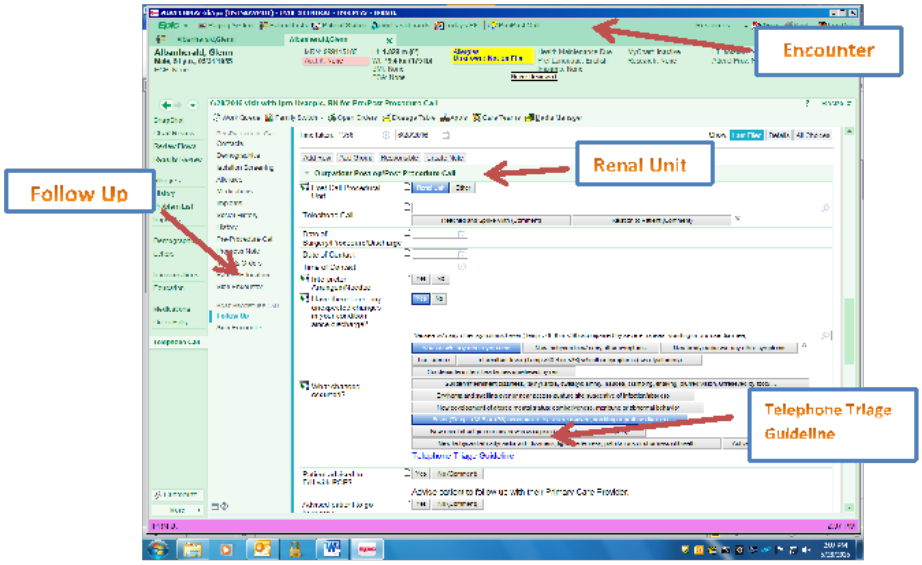


**Figure 11: Renal Unit Triage Guidelines**

## Renal Unit Triage Guidelines

1. The Renal Unit Triage guidelines are triggered by a **"Yes"** response to "Have there been any unexpected changes in your condition since discharge? "

2. What changes occurred?

3. The Renal Nurse will advise the patient depending on the patient's response and severity of the symptoms.

   a.) Patient advised to F/U with PCP?

   b.) Advised patient to F/U with PCP today or same day apt in **Ambulatory Clinic**?

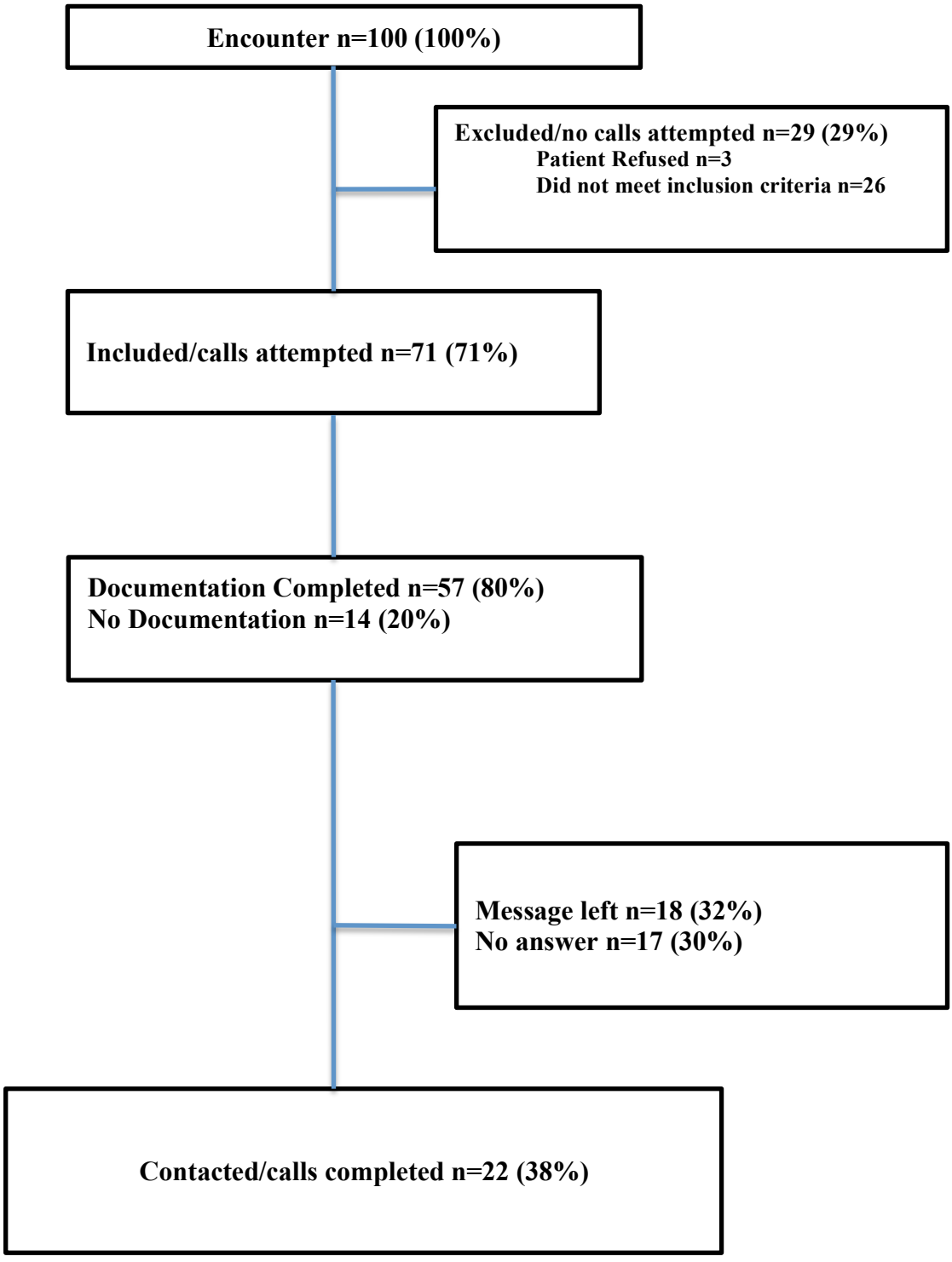
   c.) Advise patient to go to nearest Emergency Room? **(Page the Nephrology Fellow!)**

**Notify the Nephrology Fellow of patients coming to the ED and update the progress note!**

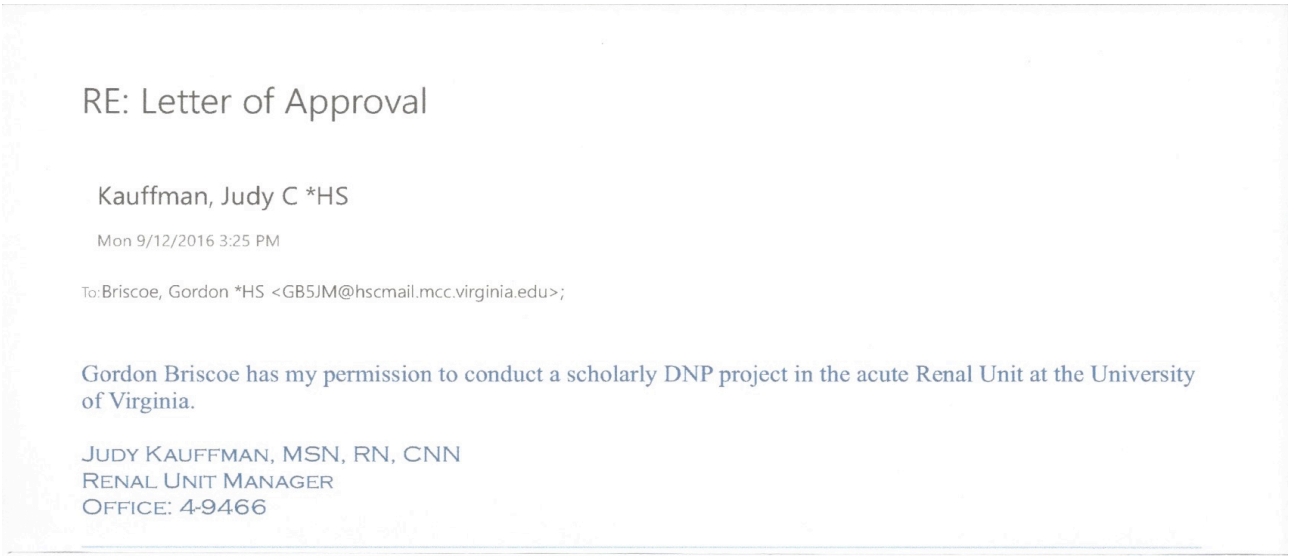
4. Have you fallen since your discharge from the hospital?

Physiological factor**(s)** e.g. cognition, vision, balance, strength, hypotension or environmental factor(s) e.g. loose carpets, wires, dark stairways or corridors. (Depending on the severity of the injury advise the patient to follow up with their Primary Care Practitioner or go to the nearest Emergency Room.

**Figure 12: Initial Compliance Assessment**



**Appendix A: Letter of Approval**



RE: Letter of Approval

Kauffman, Judy C *HS

Mon 9/12/2016 3:25 PM

To: Briscoe, Gordon *HS <GB5JM@hscmail.mcc.virginia.edu>;

Gordon Briscoe has my permission to conduct a scholarly DNP project in the acute Renal Unit at the University of Virginia.

JUDY KAUFFMAN, MSN, RN, CNN
RENAL UNIT MANAGER
OFFICE: 4-9466

## Appendix B: IRB Letters of Approval

UNIVERSITY of VIRGINIA IRB-HSR

**Institutional Review Board for Health Sciences Research**

**ROUTING FORM**

**IRB-HSR#:** 19319 **OR** **Submission #** ____ **Submission Date:** ____

***The IRB-HSR cannot process this request without one of these numbers.***

**Complete this form and attach it to the top of ALL submissions to the IRB-HSR Office.**

**Which IRB staff member did you work with on the pre-review of this submission?** Amy Blackman

*IMPORTANT: If multiple documents are submitted, they must be submitted with a Document Submission Form.*
*You are encouraged to submit all large documents (e.g. sponsor's protocols, investigators brochures) on a CD. They must be in PDF format. The IRB # and Submission Date of the CD must be written directly on the CD.*
*A Document Submission Form must be submitted with the CD.*

**If another IRB is the IRB of record for this protocol, check an IRB below:**
- ☐ NCI CIRB (NCI Cooperative Group protocols)
- ☐ NeuroNEXT CIRB (NeuroNEXT protocols)
- ☐ Fred Hutchinson CIRB (CITN protocols)
- ☐ Western IRB-(NCI Cooperative Group)
- ☐ Other: *Name* _____

***For IRB- HSR office use only***

**Receipt Date:**

**Type of Submission:**
- ☐ New Grant
- ☐ New Protocol-Exempt/ Coded/ Not Engaged
- ☒ New Protocol Expedited
- ☐ New Protocol- Full Board
- ☐ Follow up to Requests from Full Board Review of: ☐ New Protocol ☐ Modification
- ☐ Modification - Attach Appropriate Modification Forms : ☐ Personnel Change
- ☐ Adverse Event Report
- ☐ Advertisement
- ☐ Protocol Violation/Enrollment Exception
- ☐ Status Report
- ☐ Study Closure
- ☐ Other, *Specify*: _____
- ☐ IND/IDE Annual Report
- ☐ Revised Investigator Brochure

***Check one item below***
- ☐ No changes required to protocol or consent
- ☐ Changes required to protocol or consent (attach Modification Request Form and revised protocol and or consent)

**CONTACT INFORMATION**

Provide contact information for a representative who can answer any questions the IRB might have concerning this submission: Approvals/receipt of acknowledgments will also be sent to the person listed below.

Contact Name: Gordon Briscoe / Beth Quatrara Phone Number: 210-709-8300 cell.

E-Mail Address: gb5jm@virginia.edu Messenger Mail Box #: 800135

**Select how you would like the IRB to send the approval/receipt of acknowledgment to you.**
- ☒ Return reply in messenger mail
- ☐ I will pick up reply at Davis 5- Room 5293 Pick up Box
- ☐ I will pick up reply from Morton Drive

*Replies not picked up within 5 week days will be sent to the contact via Messenger Mail.*
*The IRB-HSR is unable to send approvals via regular mail unless the individual is not physically located at UVa.*

**Comments:**

**University of Virginia**
**Institutional Review Board for Health Sciences Research**
**HIPAA Privacy Board**

| **IRB - HSR # 19319** | | |
|---|---|---|
| **Event:** Approval New Protocol - Expedited | **Type:** Protocol | **Sponsor(s):** **Sponsor Protocol #:** **Principal Investigator:** Beth Ann Quatrara, DNP, RN, CMSRN, ACNS-BC |
| **Title:** Nursing telephone follow-up to reduce 30-day readmissions for the Adult Hemodialysis Patient | | |
| Assurance: Federal Wide Assurance (FWA)#: 00006183 | | |
| Certification of IRB Review: The IRB-HSR/HIPAA Privacy Board abides by 21CFR50, 21CFR56, 45CFR46, 45CFR160, 45CFR164, 32CFR219 and ICH guidelines. This activity has been reviewed in accordance with these regulations. | | |
| **Event Date:** 28 September 2016<br>**Protocol Expiration Date:** 27 September 2017<br>**Number of Subjects:** 700<br>**HSR Protocol Version Date:** 23 September 2016<br>**Data Security Plan Date:** 23 September 2016 | | |
| **Current Status:** Open to enrollment | | |
| **Consent Version Dates:** | | |
| **Committee Members (did not vote):** | | |

**Comments:** The IRB determined the protocol met the criteria for approval per the federal regulations and was approved.

It is open to enrollment.

The purpose of this study is to examine the effectiveness of a quality improvement process that was implemented in the Acute Renal Unit and provided post-discharge telephone follow-up by certified dialysis nurses.

The study will involve a chart review the comparison of data pre-phone call implementation between July 1, 2015-September 31, 2015 to post-phone call implementation between July 1, 2016-September 31, 2016 and its effect on reducing post-discharge complications and 30-day readmissions in a sample of adult hemodialysis patients.

There is no outside sponsor for this study.

N= 700 Ages= 18 years and greater

No additional committee approvals are required

No compensation

---
REGULATORY INFORMATION:

The IRB determined this protocol met the criteria of minimal risk.

Protocol Expedited by Category #5: Research involving materials (data, documents, records or specimens) that have been collected solely for non-research purposes (such as medical treatment and/or diagnosis).

This protocol has been granted a Waiver of Consent to identify potential subjects via 45CFR46.116.

This protocol has been granted a waiver of consent under 45CFR46.116 for the main study.

This protocol has been granted a waiver of HIPAA authorization under 45CFR 164.512(i)(2) for the main study.

The following HIPAA identifiers will be collected: MRN, dates, age over 89.

The minimum necessary PHI to be collected includes: Demographics, diagnosis associated with each readmission, access issues (infection, malfunction, replacement, other), Volume overload, Hypo-/Hypertension and electrolyte disarray, General Medical conditions including diabetes, cardiac and access related infections, date of discharge and date to readmission.

Subjects may not be contacted by any method (email, phone, in person etc.) to obtain more information for this study without additional IRB-HSR approval.

No identifiable health information will be taken or shared outside of the UVa HIPAA covered entity.

---
PLEASE REMEMBER:
* If an outside sponsor is providing funding or supplies, you must contact the SOM Grants and Contracts Office/ OSP regarding the need for a contract and letter of indemnification. If it is determined that either of these documents is required, participants cannot be enrolled until these documents are complete.
* You must notify the IRB of any new personnel working on the protocol PRIOR to them beginning work.
* You must obtain IRB approval prior to implementing any changes to the approved protocol or consent form except in an emergency, if necessary to safeguard the well-being of currently enrolled subjects.
* If you are obtaining consent from subjects, prisoners are not allowed to be enrolled in this study unless the IRB-HSR previously approved the enrollment of prisoners. If one of your subjects becomes a prisoner after they are enrolled in the protocol you must notify the IRB immediately.
* You must notify the IRB-HSR office within 30 days of the closure of this study.
* Continuation of this study past the expiration date requires re-approval by the IRB-HSR.
---

The IRB-HSR official noted below certifies that the information provided above is correct and that, as

## Appendix C: Nephrology Nursing Journal Guidelines for Authors

Nephrology Nursing Journal

*Journal of the American Nephrology Nurses Association*

# Guidelines for Authors

The *Nephrology Nursing Journal (NNJ)* is the official publication of the American Nephrology Nurses Association (ANNA). The *NNJ* is a refereed clinical and scientific publication that provides current information on a wide variety of subjects to facilitate the practice of professional nephrology nursing. Its purpose is to disseminate information on the latest advances in research, practice, and education to nephrology nurses and to positively influence the quality of care provided.

The *NNJ* welcomes both solicited and unsolicited manuscripts and suggestions for articles. Manuscript queries should be submitted to BethUlrich@aol.com. All materials must be original and submitted for the exclusive use of the *NNJ*.

Complete author guidelines can be found at the ANNA website, www.annanurse.org/journal. What follows is a summary of the *NNJ* guidelines.

## Manuscript Preparation

All manuscript contents should adhere to the guidelines established by the *Publication Manual of the American Psychological Association (APA)*, 6th edition.

**Technical Format.** Manuscripts should be submitted using MS Word, in a 12-point font, double-spaced, and one-inch (1") margins. Preferred font is Times New Roman. Body text should be indented at the beginning of each paragraph. A running header (shortened title) and page number should be included at the top of each page of the manuscript except for the title page. Length of submitted manuscripts varies with content. Manuscripts should be submited as one file (i.e., Title Page, Author Information, Abstract, etc.) unless separate files are absolutely necessary.

Reference software programs (including MS Word standard programming) should NOT be used.

**Headings.** NNJ uses three levels of headings in the body of the manuscript:

**First Level** (bold, left-justified, underlined, Arial font)

**Second Level** (bold, left-justified, Times New Roman font)

**Third level.** (bold, at the start of the paragraph, Times New Roman font)

**Author information and biographical statement.** Include the author(s) name(s) on a separate page, indicating primary author, and the contact address, telephone number(s), and email address for the primary author.

Include a 2-sentence autobiographical statement for each author describing current employment, credentials, and (if applicable) ANNA chapter and ANNA positions.

**Disclosure statement.** Include a statement signed by all authors that the contents, in whole or in part, have not been previously reported, and are not under consideration for publication elsewhere, nor will be, until a decision is made by the *NNJ* Editor.

**Abstract.** Include a complete succinct abstract of 75-100 words for all manuscripts.

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Author, A.A., & Author, B.B. (2012). Title of chapter. In A. Editor & B. Editor (Eds.), *Title of book* (pp. xxx-xxx). Location: Publisher.

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Photographs may be digital or hard copy prints. Digital photographs must be of a resolution at least 300 dpi or a minimum of 1280 x 960 pixels. Hard copy prints must be 4" x 5" or larger, of good contrast, and printed on glossy paper.

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Updated 2/2016

# Appendix D: ANNA Abstract

**Implementation of nursing telephone follow-up to reduce 30-day readmissions for the Adult Hemodialysis Patient**

**Problem:** Recurrent hospital readmissions are responsible for considerable health care costs, with readmission rates in patients with end stage renal disease (ESRD) remaining as high as 37% within 30 days of discharge (USRDS, 2014). Studies show a considerable percentage of readmissions are preventable through effective discharge planning and patient follow-up after discharge (Mistiaen & Poot, 2006).

**Approach:** A systematic literature review was conducted to identify an evidence-based process to reduce post-discharge complications and readmission rates in dialysis patients. A 2006 Cochrane review identified telephone follow-up (TFU) as a high-quality, low-cost method of providing health information, advice, and the recognition of complications early after hospital discharge (Mistiaen & Poot, 2006).

**Solution:** This project examines the effectiveness of an evidence-based quality improvement process implemented in an Acute Renal Unit providing post-discharge telephone follow-up by experienced dialysis nurses. To enhance the experience of the dialysis patient's transition from the acute care setting to home, a series of systematic processes were implemented to standardize unit workflow, in addition to utilization and leveraging of the hospitals electronic documentation system (EMR) to document the patient progress and outcomes. The study involves the comparison of EMR data pre-follow-up implementation to post follow-up implementation and its effect on reducing post-discharge complications (e.g., blood pressure and diabetes management) and 30 day readmissions in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients.

**Outcomes:** Of 100 patient encounters reviewed a compliance of 71% was achieved in the early stages of the TFU project (29 patients were excluded and 71 patient encounters were included). Of those 71 encounters, 57 (80 %) had a call attempt by a nurse and 14 (20%) encounters had no documentation recorded. Of those 57 calls, 22 patients (38%) were contacted by the nurse; the post-discharge intervention was completed, a message was left 18 times (32%), and no answer was noted 17 times (30%). The remaining 29 (29%) encounters had no call attempt made. Three (10%) patients refused the opportunity and 26 (90%) were excluded because they did not meet the requirement for follow-up.

**Implications:** Knowledge gained from understanding the effect of post-discharge telephone follow-up by experienced dialysis nurses will allow for either continuation or adaptation of the current telephone follow up program. This can benefit society by providing discharged patients with an optimized process to decrease complications and readmissions, thus reducing costs and increasing satisfaction in addition to overall well-being.

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**Appendix E: Manuscript for submission to *Nephrology Nursing Journal***

# Nursing telephone follow-up to reduce 30-day readmissions and post-discharge complications for the Adult Hemodialysis Patient

Hospital readmissions are responsible for considerable health care costs, with rates in end-stage renal disease patients as high as 35.2% within 30 days of discharge (USRDS, 2014). Studies point to the considerable percentage of readmissions that are preventable through effective discharge planning and patient follow-up after discharge (Mistiaen & Poot, 2006). Telephone follow-up (TFU) is a high-quality, low-cost method of providing discharge follow up. This project examined the effectiveness of an evidence-based quality improvement process in providing post-discharge telephone follow-up to adult hemodialysis patients by experienced dialysis nurses through standardized unit workflow and leveraging of the electronic medical record (EMR). The project included an analysis of EMR data pre- and post -project implementation and its effect on 30-day readmissions and post-discharge complications.

Keywords: *chronic kidney disease, end-stage renal disease, telephone call, post discharge follow-up, 30-day readmissions*

# Nursing telephone follow-up to reduce 30-day readmissions and post-discharge complications for the Adult Hemodialysis Patient

## Introduction

The Institute of Medicine (IOM) identifies quality improvement projects that improve communication and collaboration between the patient and healthcare providers as a key to improving health care (IOM, 2001). Avoidable readmissions may be reduced through the enhancement of core discharge planning, improving the transition and care coordination for the ESRD patient between health care settings (Boutwell et al. 2009). More evidence-based quality initiatives enhancing coaching, education, and providing support for patient self-management may improve the health-related quality of life (HRQOL) for patients with chronic illness like ESRD. Studies remain inconclusive in determining the overall effectiveness that telephone follow-up calls have on reducing 30-day readmissions.

### Chronic Kidney Disease

Chronic kidney disease (CKD) is defined by the presence of kidney damage or decreased kidney function for three or more months (KDIGO, 2012). An estimated 14 % of adults in the United States (U.S.) have varying levels of illness related to CKD (United States Renal Data System [USRDS], 2014), with Medicare spending more than $50 billion on chronic kidney disease among people 65 and older, and $31 billion on those with End Stage Renal Failure (Sarin et al. 2015).

### End-stage Renal Disease

Decreased kidney function (defined as estimated glomerular filtration rate [eGFR] <60 mL/min/1.73 m2) for three or more months distinguishes CKD from ESRD, which was indicated by an eGFR of <15 ml min-$^{1}$ 1.73 m $^{-2}$. ESRD is often associated with significant co-morbidities

(KDIGO, 2012). ESRD beneficiaries accounted for approximately 6% of total Medicare spending, although they comprised 1% of the total beneficiary population. Combined CKD and ESRD account for almost a quarter of the U.S. budget, a small percentage higher than the cost of congestive heart failure at $20.9 billion (Sarin et al. 2015, USRDS, 2015).

**Purpose of Project**

This project examines the effectiveness of a systematic quality improvement process providing scripted post-discharge telephone follow-up by an experienced dialysis nurses to reduce 30-day readmission and post-discharge complications in a sample of adult hemodialysis (Stage 5 CKD & ESRD) patients.

## Framework

The Chronic Care Model (CCM) is the theory/conceptual framework for the project because it focuses on patients with chronic medical illness. The CCM offers a multidimensional solution to improve chronic disease management through the identification of the essential elements of a health care system that encourage high-quality chronic disease management (Wagner, 2001). Proven effective in research and practice, the groundwork for CCM developed from research and was translated into interventions to facilitate patient-centered care and improve care for chronically ill patients.

Increasing providers' expertise and skill, educating and supporting patients, making care delivery more team-based and planned, and making better use of registry-based information systems led to the greatest improvements in health outcomes (Coleman et al. 2016). The model's three overlapping spheres: the community, the health system, and the provider organization, are designed to inform patients, promote self-management, and strengthen the provider-patient relationship with the aim to transform daily care for patients with chronic

illness. CCM has been shown to improve care for chronic disease and reduce disparities and has been used a framework for national activities like the National Kidney Education Program (NKDEP). The NKDEP integrates the CCM's goal to engender and engage patients and communities, prepared and proactive health care providers, and efficient and effective health care systems to disseminate science-based education.

Chronically ill hemodialysis patients have numerous clinical problems, including anemia, mineral and bone disorder (MBD), malnutrition, inflammation, vascular access-related infection, and volume management that require assessment and continuous monitoring. The continuous adjustments to the hemodialysis patient's plan of care to slow the progression of the disease requires ongoing interaction between the patient and the healthcare system. Effective chronic care management requires a collaborative, organized healthcare network linked with available resources for patients that require continuous care from multiple providers (Wagner et al., 2002). For this project, disease and case management (controlling symptoms, preventing complications and promoting a lifestyle that will delay disease progression) are key components to the management of patients with chronic conditions (Mattke et al. 2015; Rothman and Wagner, 2003).

## Methods

### Setting

The hospital was a 600-bed academic medical center (AMC), with a Level 1 trauma center, primary and specialty clinics. Renal patient care is provided across the spectrum from ambulatory to intensive care to rehabilitation. The renal unit staff perform hemodialysis, peritoneal dialysis, continuous renal replacement therapy, and therapeutic apheresis on the dialysis unit, in addition to portable hemodialysis treatments at the inpatient bedside. Off-

campus services were provided to dialysis patients at a rehabilitation hospital and a transitional care hospital.

**Description of the Sample**

A convenience sample of all hemodialysis patients (Stage 5 CKD & ESRD) admitted to the AMC who received greater than or equal to one dialysis treatment on the acute inpatient renal unit during their hospital stay were included.

**Inclusion criteria**

The pre-intervention population consisted of all adult patients with Stage 5 CKD and ESRD admitted to the AMC who received greater than or equal to one dialysis treatment through the acute renal unit during one year. The 2016 post-intervention population included all adult patients with Stage 5 CKD and ESRD admitted to the AMC who greater than or equal to one dialysis treatment through the acute inpatient renal unit during the subsequent year. A subject of patients who were exposed to the 3month follow-up phone call initiative were also included.

**Exclusion criteria**

Patients were excluded if they met the following criteria: under the age of 17, Stage 1-4 CKD, and patients with Stage 5 CKD not receiving dialysis, in addition to patients with AKI and patients on peritoneal dialysis. Patients receiving chemotherapy, radiation therapy, and rehabilitation, and cases of death on first admission and admission for 24-hour observation were excluded from the comparison.

## Measures

**30-day readmission**

The primary outcome measures (30-day readmissions) were obtained from an institutional database. 30-day readmissions were measured as aggregate data using the

designated patient population and time frame. 30-day readmissions were counted from the documented day of discharge from the hospital. Any subsequent visit to the hospital resulting in an admission after the initial discharge was included. Emergency department events, clinic visits and renal dialysis appointments were not included. Only admissions to the designated AMC were captured, any admissions to outside facilities were not available for inclusion. The 30-day readmission measure was reported as aggregate data because patient-level data was not obtainable.

**Post-discharge complications**

The "Post-Discharge Questionnaire was a nine-question document used during the telephone follow-up call to identify post-discharge complications. The questionnaire also addressed elements of provider communication and patient satisfaction, yet, post-discharge status was a key measure within the follow-up questionnaire. Potential post discharge complications were identified through telephone discussions with an experienced dialysis nurse. The questionnaire targeted post-discharge complications such as falls with or without injury, any unexpected change in health status, the in ability to obtain or adhere to the medication plan/medical supply use, as well as adherence to the follow up appointments with medical teams and follow-up discharge dialysis appointments. The elements were recorded yes, no or n/a through the acute care renal unit discharge questionnaire.

Additionally, the follow -up questionnaire addressed communication with providers and the patient as well as and patient satisfaction with the overall hospital experience. The elements were recorded yes, no or n/a thru the renal unit discharge questionnaire.

**Compliance**

The compliance measure focused on the clinician ability to connect with the patient via

the scripted telephone follow up plan using the acute care renal unit discharge questionnaire. Elements such as number of call made, the ability to contact the patient and the ability to complete the follow-up questionnaire were measured. These measures were self-reported by the experienced dialysis nurse making the follow up telephone call and recorded in the EMR by the dialysis nurse assigned to telephone follow-up on the specific day.

**Demographics**

In addition to the dates of discharge and readmission, post-discharge complications and overall questionnaire information, demographic data including gender, age, race, ethnicity and region of residence were collected in aggregate form for each patient population.

**Procedures**

The telephone follow-up project was designed to ensure the early detection of post-discharge complications, address patient concerns and reinforce adherence behaviors in the adult hemodialysis patient. During the telephone follow-up, the designated nurses utilized the "Post-Discharge Questionnaire" tool in the EMR, using open-ended, semi-structured questions in order to focus on key areas, such as adherence to follow-up instructions, schedule outpatient dialysis appointment and medication reconciliation, yet allowing for flexibility. The dialysis nurse's specialty knowledge and experience was pivotal in making initial assessments, identifying medical problems, and setting mutually beneficial goals based on the nephrologist's discharge instructions. The follow-up protocol including "Offering Discharge Support Handout", "Renal Unit Discharge Follow-up Questionnaire", and "Renal Unit Patient Triage Algorithm" were developed specifically for the project. Current literature and the advice of content experts in the field of nephrology nursing were consulted to develop the quality improvement project that best optimized human and institutional resources.

In an effort to build on standard work and improve the discharge process, the "Post-Discharge Questionnaire" was developed for the population of interest. Face validity for the content of the "Post-Discharge Questionnaire" was obtained from key stakeholders, the renal nurse manager, and renal clinical nurse specialist. Using clinical expertise and experience, questions were analyzed for grade level appropriateness and association with targeted goals of the follow up telephone call. The contents of the "Post-Discharge Questionnaire" were also validated by a panel of experts in the fields of medicine and nursing; in addition to multiple nursing scholars and clinicians from various backgrounds within patient safety and quality improvement.

Twenty-Five Renal Unit staff members (RNs and Nursing Assistants) were individually instructed and provided with written materials on the purpose and content of project during the Renal Unit Skills Fair in April 2016. To ensure project reliability, retraining and participation in the project's main intervention (telephone follow-up) was limited to no more than five dialysis discharge nurses. In the inpatient setting, the dialysis nurse spent an average of 12 individualized hours a week at the bedside providing hemodialysis treatments. During this period, the dialysis nurse annotated the patient's and/or care partner's needs in the EMR to be reviewed by the dialysis discharge nurse.

The dialysis discharge nurse conducted an additional assessment of the patient and/or care partner's educational needs when the patient was stable enough to transfer to the renal unit for dialysis treatment. The patient's telephone number was verified against the admission documentation obtained in the patient's electronic medical record and documented discharge nurse. Information/worksheets pertaining to the dialysis patients being discharged were collectively kept in a discharge binder, which provided access to all healthcare staff, involved

with the discharge of each patient, allowing for updates and a streamlined communication process. Dialysis patients received additional discharge instructions from the dialysis discharge nurse while in the renal unit prior to discharge, as well as a copy of the telephone follow-up handout indicating the availability of the discharge dialysis nurse and the contact number if needed. If no objections were verbalized by the patient or care partner, the discharge support handout was provided to remind the patient to expect a follow-up telephone call from the dialysis discharge nurse to discuss his/her current condition and to address additional questions or concerns. The dialysis discharge nurse annotated that the telephone follow-up handout was provided to the patient/family member in the Discharge Coordinator binder.

The dialysis discharge nurse assigned to telephone follow-up duties called the patients at to home within the 48-hour time frame, making only two attempts to contact the patient. As the definition of post-discharge period varies the team decided the 48-hour time frame would best meet the needs of the patient and workflow. A voice message was left if the patient was unavailable, asking the patient to call back the discharge nurse on duty the next day between 8 AM and 5 PM. The patient was considered lost to follow-up if no contact was made; if the patient did not call back or telephone follow-up was refused.

Once patient contact was made, the dialysis nurse conducted a brief interview using open-ended, semi-structured questions to focus on key areas, documenting the interview on the electronic version of the discharge questionnaire in the EMR. The “Post-Discharge Questionnaire” was designed to support the decision-making process of the discharge nurse while on the phone with the patient. In the event that the patient was advised to immediately contact their Primary Care Provider or go to the nearest ED, the discharge nurse documented the interaction in the EMR and text paged the nephrology fellow on duty, following the institution’s

text page protocol, informing of the patients' status.

**Data Analysis**

A retrospective group analysis was conducted comparing pre-intervention demographic information to post-data. Descriptive statistics were computed on pre-and post-intervention groups. Patient responses from the follow-up phone calls were also analyzed. The percentage of "yes" and "no" responses to the discharge follow-up questionnaire were calculated. Data related to calls attempted, calls completed, and no contact were also analyzed. Additionally, discharge follow-up questions were evaluated to explore patient and provider collaboration, medications compliance, and access to dialysis care.

## Results

**30-day Readmissions**

**Pre-intervention Patient Characteristics**

The pre-intervention group was comprised of 149 patients; and included 197 visits. Based upon pre-established definitions of readmission with renal complications, 56 visits of the 197 visits (28.4%) occurred within 30 days after discharge. Of the 197 visits registered during the 3month designated time of interest, 118 (59.9%) of those were admitted from the ED. Of the 149 patients identified, 55 % were male, 58.4% were White, 39.6% African American, with the remaining 2% identifying as Hispanic and Native American. Patients' ages of 45 and over accounted for a combined 81.2% of the admissions (Table 2). Medicare beneficiaries accounted for 83.9% of the total inpatient visits. Roughly half of all patients were 100% indigent, which accounts for 41% of the analyzed population. Patients residing within the surrounding metropolitan statistical area (MSA) accounted for 18.9%.

**Post Intervention Patient Characteristics**

The post-intervention group was comprised of 171 patients; who accounted for 231 visits. Based upon pre-established definitions of readmission with renal complications, 57 of the 231 visits (24.6%) occurred within 30 days after discharge. Of the 231 visits registered between July 1st, 2015 and September 30th, 2015, 128 (55.4%) of those were admitted from the ED. Of the 171 patients identified, 57.9 % were male, 53.8% were White, 41.5% African American, with the remaining 4.7% identifying as Hispanic, Native American or other. Patient's ages of 45 and over accounted for a combined 80.7% of the admissions (Table 2). Medicare beneficiaries accounted for 78.4%. More than half of all patients were 100% indigent, which accounts for 56% of the analyzed population. Patients residing within the surrounding metropolitan statistical area (MSA) accounted for 24%.

A larger percentage of patients were not admitted to the hospital post discharge time frame after the intervention as compared to the same time pre-intervention (69% and 52% respectively). Additionally, fewer 30-day readmissions were noted post-intervention. The percentage of patients admitted within 30 days was 28.4% in pre-intervention time frame and reduced to 24.6% in the post-intervention time frame. Statistical significance could not be analyzed on the aggregate data set.

**Follow-up Questionnaire**

The patients' responses to the follow-up question were categorized by topic. The percentage of yes and no responses were calculated. Of the 62 patients identified, six patients were readmitted for post-discharge complications. Of the six patients readmitted, one patient was readmitted for complications related to hypoglycemia, two patients were actively seeking medical attention during the process of follow-up and two patients had died. Of the 62 patient encounters analyzed, 87% noted no unexpected changes, 84% had contact with a dialysis

healthcare provider prior to discharge and 86% had no further questions regarding follow up care. Furthermore, 74% were able to fill their discharge medications and 68% were able to take their discharge medications to their dialysis center for medication reconciliation. There were no reported incidents of falls, despite the population being at a higher risk. Overall satisfaction with their dialysis care was high, as 80% rated their care as "good" to "very good" (Table 3).

**Compliance Assessment**

Of the 100 patient encounters reviewed, a compliance rate of 71% was achieved by the nurses in the early stages of the TFU project, as 29 patient encounters were excluded and 71 patient encounters were included. Of those 71 encounters, 57 (80 %) had a call attempt by a nurse and 14 (20%) encounters had no documentation recorded. Of those 57 calls, 22 patients (38%) were contacted by the nurse to complete the post-discharge intervention. Otherwise, a message was left 18 times (32%), and no answer was noted 17 times (30%). The remaining 29 (29%) encounters had no call attempt made. Three (10%) patients refused the opportunity and 26 (90%) were excluded because they did not meet the requirement for follow-up.

**Strengths**

The project was designed to improve the discharge teaching process, improve patient outcomes in the hemodialysis population, and examine the effectiveness of a systematic quality improvement process.

The implementation of the project standardized unit workflow and allowed for updated documentation of patient progress as well as streamlined communication between all healthcare staff involved with the discharge process. As previously no evidence-based process for monitoring hemodialysis patients after discharge existed at the facility, a new TFU process was developed for the acute renal unit. Sustainability for the project was ensured by embedding the

process in the EMR and instituting the TFU calls as a daily practice.

The team limited participation in the TFU to no more than five dialysis nurses to ensure reliability in the project. Another strength identified was the favorable patient feedback regarding the follow-up phone calls and enhancing the positive aspects of compassion, as caring for chronically ill patients can be associated with considerable moral distress.

### Limitations

A significant part of the project focused on improving the systematic disconnects in the renal unit discharge process resulting from fragmentation of the patient's discharge information and planning. The use of aggregate data and the inability to access patient-level data, limited the ability to directly report clinical outcomes on patients receiving the follow-up phone call. The use of aggregate data also limited the ability gather clinical outcomes on patients who did not receive TFU that may have been at a higher risk for readmission. Furthermore, there was a lack of control for possible deviation from and adherence to the script.

### Further Projects

Although the results of the project showed a downward trend in the number of 30-day readmissions, a longitudinal study of greater duration and analysis at the patient level would more definitively demonstrate the relationship between post-discharge telephone follow-up and 30-day readmission in the adult hemodialysis population.

## Conclusion

Implementation of this project has the potential to reduce readmissions and complications in the hemodialysis patient population through improved post discharge care coordination. The telephone follow-up call has the potential to address recent changes to the CMS Quality Incentive efforts to reduce 30-day readmissions and provide improved discharge care for patients

with chronic kidney disease. Furthermore, the results of the project point to an intervention that may address the Medicare Payment Advisory Commission's concerns about preventable readmissions and a strategy to enhance communication and coordination for this vulnerable patient population.

**Table 1.**

***30-day Readmission Rates***

| **Variable** | Pre-intervention year group | Post-intervention year group |
|---|---|---|
| Patients | n=149 | n=171 |
| Cases (visits) | 197 | 231 |
| Inpatient cases (visits) from ED | 118 (59.9%) | 128 (55.4%) |
| | | |
| Total number | 197 | 231 |
| No readmissions | 103 (52%) | 159 (69%) |
| 0-30 days | 56 (28.4%) | 57(24.6%) |

**Table 2.**

***Population Demographics***

| **Variable** | Pre-intervention group | Post-intervention group | Comparison from previous year |
|---|---|---|---|
| Patients readmitted | n=149 | n=171 | up by 14.7% |
| **Gender** | | | |
| Male | 85 (55%) | 99 (57.9%) | up by 16.5% |
| Female | 67 (45%) | 72 (42.1%) | up by 7.5% |
| **Age** | | | |
| 18 - 44 years | 28 (18.8%) | 33 (19.3%) | up by 17.8% |
| 45 - 64 years | 72 (48.3%) | 94 (55%) | up by 30.5% |
| 65 years and over | 49 (32.9%) | 44 (25.7%) | down by 10.2% |
| **Race or Ethnicity** | | | |
| White | 87 (58.4%) | 92 (53.8%) | up by 5.7% |
| African American | 59 (39.6%) | 71 (41.5%) | up by 20.3% |
| Hispanic, Native American or Other | 3 (2%) | 8 (4.7%) | up by 100% |
| **Payer** | | | |
| Medicare | 125 (83.9%) | 134 (78.4%) | up by 7.2% |
| Medicaid | 9 (6.1%) | 6 (3.5%) | down by 33.4% |
| Others | 15 (10%) | 31 (18.1%) | up by 206.6% |
| **Pay Scale** | | | |
| Not indigent | 63 (42.3%) | 75 (43.8%) | up by 19% |
| 100% indigent | 61 (40.9%) | 96 (56.2%) | up by 57.3% |

**Table 3.**

***Renal Unit Discharge Follow-Up Questionnaire***

| | **Patients (n), %** |
|---|---|
| | n = 62 |
| Q.2 Have there been any unexpected changes in your condition since discharge? | |
| Yes | |
| No | (54), 87% |
| N/A | (3), 5% |
| Q.3 Did the Dialysis Nurse or Nephrologist talk to you about your dialysis care and reason you were in the hospital? | |
| Yes | (52), 84% |
| No | (4), 6% |
| N/A | (6), 10% |
| Q.4 Do you have any questions about your dialysis care or your discharge instructions? | |
| Yes | (5), 8% |
| No | (53), 85% |
| N/A | (4), 7% |
| Q.5 Were you able to make it to your scheduled outpatient dialysis treatment? | |
| Yes | (53), 85% |
| No | (4), 7% |
| N/A | (5), 8% |
| Q.6 Were you able to fill your discharge medications? | |
| Yes | (46), 74% |
| No | (10), 16% |
| N/A | (6), 10% |

| Q.7 Will /did you take your medications to your dialysis center? | |
|---|---|
| Yes | (42), 68% |
| No | (16), 26% |
| N/A | (4), 6% |

| Q.8 Have you fallen since your discharge from hospital? | |
|---|---|
| Yes | 0 |
| No | (58), 94% |
| N/A | (4), 6% |

| Q.9 Are you expecting any medical supplies to be delivered to your home? | |
|---|---|
| Yes | (3), 5% |
| No | (54), 87% |
| N/A | (5), 8% |

| Q.10 How would you rate your hospital experience with your hospital care? | |
|---|---|
| Poor | (0), 0% |
| Fair | (8), 13% |
| Good | (25), 40% |
| Very Good | (29), 47% |

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