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# Impact of Post-Hospital Discharge Follow-up Phone Calls on 30-day Readmission Rates

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This Doctor of Nursing Practice (DNP) Project is approved as a credible and independent investigation by a candidate for the DNP degree and is acceptable for meeting the project requirements for this degree. Acceptance of this DNP Project does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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## Abstract

Introduction: The rate at which patients get readmitted to any hospital within 30-days of their initial admission is known as the 30-day hospital readmission rate. These readmission rates are costly but can be prevented. The two common causes for hospital readmissions include lack of understanding regarding patient medications and post-discharge follow-up with the provider. Post-discharge follow-up calls help to clear these misunderstandings and is beneficial in reducing readmission rates.

Methods: The literature search was conducted through the website of NIH National Library of Medicine, PubMed database and Google Scholar search using the keywords listed below. The review of 36 peer-reviewed, evidence-based articles that met the inclusion criteria was completed.

Gaps: There was a gap in the evidence as to what makes an effective telephone follow-up program. Literature gap exists on who is the ideal person to make the call, the frequency, timing, and the content of the calls. There were limited studies to derive conclusions considering multiple diagnoses of patients and multi-factored outcomes.

Recommendations for Practice: Several studies recommended post-discharge telephone follow-up calls in reducing 30-day hospital readmissions.

*Keywords:* Post-discharge telephone follow-up, causes of 30-day hospital readmissions, most-common causes of hospital readmissions, implementation, and adaptation of Re-engineered Discharge (RED) toolkit

# Impact of Post-Hospital Discharge Follow-up Phone Calls on 30-day Readmission Rates

## Introduction

The rate at which patients get readmitted to any hospital within 30-days of their initial admission is known as the 30-day hospital readmission rate (Boccuti & Casillas, 2017). Hospital readmissions that occur within 30-days of the initial admission are costly and have poor patient outcomes (Mcllvennan et al., 2015). The Affordable Care Act established the Hospital Readmission Reduction Program in 2012, which requires the Centers for Medicare and Medicaid Services to reduce reimbursement to the hospitals with readmission rates higher than the national average (Branowicki et al., 2017; Mwachiro et al., 2019; Zuckerman et al., 2016). The recent national 30-day unplanned hospital index readmission rate is at 11.6% (Berry et al., 2018). Post-discharge follow-up phone calls are one of the economic and effective strategies recommended to reduce 30-day hospital readmission rates (Briscoe et al., 2018; Mols et al., 2019; Odeh et al., 2019).

## Significance

The financial penalties to hospitals due to increased 30-day hospital readmission rates are an incentive for facilities to institute evidence-based strategies to reduce readmission rates (Mcllvennan et al., 2015; Mwachiro et al., 2019; Zuckerman et al., 2016). The common, potentially preventable, causes of readmissions include lack of post-discharge follow-up with a provider, lack of knowledge regarding medications, and lack of understanding on whom to contact after discharge (Auerbach et al., 2016; Covert et al., 2016; Karunakaran et al., 2018; Malhotra et al., 2016). Post-discharge follow-up phone

calls to patients within 48 hours of discharge can help to address misunderstandings related to medications and follow-up appointments and is beneficial in reducing readmission rates (Mwachiro et al., 2019; Sultan et al., 2018).

Hospital readmission rates are an essential measure of quality care because of the association with increased mortality and health care costs (Mwachiro et al., 2019; Wu & Hall, 2018). Approximately 12% of the hospital readmissions (11.6%) are preventable (Berry et al., 2018; Hospital Care Data, 2020). There is a variation in the readmission rates across the patients' age and the medical diagnoses. The major preventable readmission diagnoses include congestive heart failure, ischemic cardiomyopathy, chronic obstructive lung disease, and diabetes (Troung et al., 2018). However, a 30-day hospital readmission rate is higher for people of all ages with multiple comorbidities (Berry et al., 2018). The readmission rate for Chronic Obstructive Pulmonary Disease (COPD), MI (Myocardial Infarction), heart failure, pneumonia, stroke, hip/total knee arthroplasty nationally is 20.2%, 17%, 22%, 16.9%, 12.7%, and 4.8% respectively (Hospital Care Data, 2020).

**PICOT question**

A PICOT question was developed to guide the search for evidence. The PICOT question guiding this review of literature is: Among adult patients hospitalized without a diagnosis of heart failure on a telemetry floor (P), how does the utilization of RED Toolkit (I) compared to current practice (C) impact the 30-day hospital readmission rates (O) over six weeks (T)?

## Methods

The literature search was conducted through the website of NIH National Library of Medicine, PubMed database and Google Scholar search using the terminologies: *post-discharge telephone follow-up, causes of 30-day hospital readmissions, most common causes of hospital readmissions, uninsured have higher readmission rates, post discharge telephone calls among aortic valve replacement, implementation* and *adaptation of RED Discharg*e. Articles that were published in the last five years, published in English, and have study participants older than 18 years of age were included in the evidence. Articles that required the use of text messages or automated telephone call as interventions, education programs as interventions, home visit for follow-up or conducted phone calls to evaluate treatment/procedure were excluded. The search was narrowed down using the inclusion and exclusion criteria leaving 38 articles that were analyzed for this project.

## Grading of the Evidence

The Johns Hopkins Nursing Evidence-Based Practice Tool was used to analyze the strengths, weaknesses, limitations, and quality of selected articles. This tool uses a quality rating scale that can be used to grade both research and non-research evidence. On this grading tool, the evidence is rated on a hierarchy as level I, level II, level III for research evidence and Level V for non-research evidence. Level IV applies to clinical practice guidelines and position statements. Likewise, the evidence is rated as high (A), good (B) and low (C) quality (Dang & Dearholt, 2017). There were eight Level IA, ten level IB, seven level IC, one level IIB, five level IIIA, four level IIIB, one level IVA, two level VA quality ratings for the selected articles (Appendix A).

## Evidence Findings

The articles were reviewed and summarized into four major themes that are relevant to the PICOT question. The four themes include (a) factors for 30-day readmissions, (b) reducing 30-day readmissions, (c) telephone calls, and (d) RED Toolkit used for post discharge follow-up telephone calls.

**Factors for 30-day readmissions.** Factors affecting 30-day hospital readmissions include factors related to the health care system, provider, and patient factors. Lack of care coordination, early discharge, limited ability to directly transfer patients to other facilities, and health care systems covering underprivileged populations are some healthcare system factors leading to increased 30-day hospital readmissions (Gershon et al., 2019; Nijhawan et al., 2019). On the contrary, providers' factors include inadequate discharge education, missed or delayed diagnoses, and inadequate communication between provider at transition. Similarly, poor understanding of disease, lack of adherence to medications or follow-up, substance abuse, lack of transportation, and social stigma and denial related to diseases such as Human Immunodeficiency Virus (HIV) are some of the identified patient factors increasing 30-day hospital readmissions (Auerbach et al., 2016; Covert et al., 2016; Karunakaran et al., 2018; Malhotra et al., 2016; Nijhawan et al., 2019).

Patients' factors are complicated and play a significant role in 30-day readmission rates. Socio-economic factors related to patients is one of the major patient factors affecting 30-day hospital readmissions. Insurance status is a determinant factor for hospital readmission among all racial/ethnic groups. Without insurance, people have limited access to outpatient follow-up and thus may increase the risk for admission. The

risk of readmission is higher among patients with Medicare and Medicaid compared with those with private insurance among all racial/ethnic groups. This is believed to be related to high complexity care, social context, comorbidities and end of life patients served by Medicare and Medicaid. The national insurance coverage rate is higher for Hispanic (41%) and African American (25%) adults than White (15%) adults. However, African Americans have a higher readmission rate compared to Whites (Basu et al., 2018).

Uninsured patients with fewer economic and community resources have a higher tendency for readmissions within 30 days (Nijhawan et al., 2019). Since safety net hospitals treat more uninsured patients with fewer economic and social resources, they are at a disadvantage for increased 30-day readmission rates (Nijhawan et al., 2019). Recurrent admissions are likely despite appropriate treatment in patients with immune compromised states such as advance HIV infection (Nijhawan et al., 2019).

Patients with a diagnosis of COPD have higher rates of 30-day readmissions (20%) compared to other chronic medical conditions (Gershon et al., 2019). Other associated factors with COPD that play a role in increased readmission rate are elderly, male gender, residents of urban area, and leaving the hospital against medical advice (AMA); however, it is not clear why these factors are associated with increased readmissions. It is possible these factors are tightly associated with socio-economic status of the studied populations. Likewise, previous hospitalizations or emergency visits, a previous intensive care unit stay, longer history of COPD, presence of other comorbidities such as cardiovascular diseases, asthma and cancer also increase the risk (Gershon et al., 2019). Unlike for COPD, female gender was identified as a risk factor for hospital readmissions among patient with alcoholic hepatitis whereas older age

contributed to reduced risk. Leaving AMA, ascites, and history of bariatric surgery were associated with earlier readmissions, whereas discharge to skilled nursing-facility reduced this risk (Garg et al., 2019).

Hospital readmissions are higher for children transitioning to adulthood and in the presence of mental health disorders and multiple chronic conditions (Berry et al., 2018). Among older adults, septicemia, heart failure, and fall-related injuries are identified as the most common causes leading to 30-day hospital readmission (Hoffman et al., 2019). Pain, wound complications, surgical and non-surgical site infections, venous thromboembolism, gastrointestinal and cardiovascular complications are associated with higher 30-day readmission among surgical patients (Curtis et al., 2019; James et al., 2016; Knighton et al., 2019). Likewise, old age, female gender, dependency on dialysis, COPD, and presence of pericardial effusion are associated with a higher risk of readmission for acute pericarditis (Sreenivasan et al., 2020). It is not clear why these various factors are associated with readmission. However, some of these factors might be linked with other socio-economic factors and severity of the disease conditions.

**Reducing 30-day readmissions.** Patients perceive hospitals to be contributing to their readmission. This perception was found more among people with poorer functional status at the time of discharge. Patients perceive lack of readiness during discharge as the main reason for readmission. Thus, patients recommended improvement in discharge timing, follow-up, home health and skilled services to reduce 30-day hospital readmission rates. Although providers' perspective contradicted this perception, case managers believed there are opportunities to improve the discharge process in about half

of the readmissions (Smeraglio et al., 2019). Thus, it is important to address patient's perception of the factors contributing to readmission to reduce readmission rates.

Discharge planning should begin at the time of admission and should continue after discharge. Identifying high risk patients prior to discharge and focusing on social factors along with underlying comorbidities in the discharge process is a recommended approach to reduce 30-day hospital readmissions (Gershon et al., 2019). Incorporation of social solution along with medical intervention is also recommended to reduce 30-day readmissions among safety net patients. Post-hospital follow-up to review patient's symptoms, ensure patients obtained their medication, and understood how to take the medication was a suggested approach by patients, hospital staff, and providers to reduce preventable readmissions among HIV positive patients (Nijhawan et al., 2019).

Emphasis has been placed to identify individual barriers, deliver patient-centered education in the patient's language and use the teach back method to ensure understanding (Nijhawan et al., 2019). Multiple studies recommended post-discharge telephone follow-up to reduce readmission rates (Branowicki et al., 2017; Briscoe et al., 2018; Mols et al., 2019, Odeh et al., 2019). Post-discharge telephone follow-up is a good intervention to assess patients discharged with new Continuous Positive Airway Pressure (CPAP) machine to ensure the CPAP fits well and the patient is adhering to CPAP use. CPAP adherence is associated with a decrease in all-cause and cardiovascular cause of 30-day readmissions. The diagnoses for preventable readmissions include congestive heart failure, ischemic cardiomyopathy, obstructive lung disease, and diabetes, all of which are associated with obstructive sleep apnea (OSA) (Troung et al., 2018).

Post-discharge telephone follow-up conducted on polypharmacy patients helped in reducing 30-day hospital readmission rates by 10% and 90-day hospital readmission rates by 15.2% (Odeh et al., 2019). Post-discharge telephone follow-up has been evidenced as a successful approach in reducing 30-day readmission rates among same day percutaneous intervention (PCI) patients and adult patients on hemodialysis (Briscoe et al., 2018; Mols et al., 2019). On the contrary, the post-discharge telephone follow-up did not show any reduction in 30-day readmission rates among patients with aortic valve replacement (Danielsen et al., 2020). This is believed to be the result of lack of optimal preparation for the nurses conducting the telephone calls. Thus, the nurses conducting the telephone calls should be prepared to address the gap in the care continuum, and should focus on individualized care (Danielsen et al., 2020).

Likewise, no association was noted on 30-day hospital readmission rates among Aboriginal people with chronic problems such as cardiovascular disease, diabetes, respiratory disease, and renal diseases and post-discharge telephone follow-up calls (Jayakody et al., 2018). However, positive impact was noted on preventing complication and improving symptoms of anxiety, depression, and overall perception of health (Danielsen et al., 2020; Jayakody et al., 2018). This indicates that even if the post-hospital discharge telephone follow-up call does not necessarily reduce readmission rates for all diagnoses, it is likely to have positive health outcomes.

**Telephone calls.** Telephone follow-up is a high-quality, low-cost method of providing discharge follow-up (Briscoe et al., 2018). Telephone follow-up is useful for typically hard-to-reach, high risk patients requiring post-discharge care if the patients have access to telephone services (Hodaloya et al., 2020). In the reviewed literature,

telephone calls were used as an intervention for post-hospital discharge follow-up (Briscoe et al., 2018, Carlock et al., 2020; Hodalova et al., 2020, Mols et al., 2019, Odeh et al., 2019, Tsilimingras et al., 2017). However, there were variations in timing, frequency, duration of the call, the script used, the person completing the telephone calls as well as the impact on reducing 30-day readmission rates.

Post-discharge telephone calls can be made from two days after discharge to up to nine months post-discharge based on protocol (Carlock et al., 2020; Hodalova et al., 2020; Mackridge et al., 2018; Mols et al., 2019; Tsilimingras et al., 2017). However, the greatest number of readmissions occur the day after discharge, indicating the need for early follow-up telephone calls (Gershon et al., 2019). Telephone calls that were made within two to five days of discharge had reduction in 30-day hospital readmission rates along with other positive outcomes (Mols et al., 2019).

Post-discharge telephone calls conducted for 15 minutes had a positive impact on reducing the 30-day readmission rates (Mols et al., 2019). Hodalova et al. (2020) recommend that having pre-designed content, allocated timing and the cut-off points for telephone follow-up would greatly improve the outcomes. Some studies report multiple follow-up phone calls to a patient (Hodalova et al., 2020; Odeh et al., 2019). In a study conducted by Odeh et al. (2019) with three different follow-up phone calls, there was a significant reduction in 30-day readmission, (10%) as well as the 90-day readmission rates (15.2%).

Telephone follow-up calls were made by several medical and non-medical staff in the literature reviewed, mostly by nurses and pharmacists (Bell et al., 2016, Briscoe et al., 2018; Mols et al., 2019; Odeh et al., 2019; Tsilimingras et al., 2017; Yang, 2017).

However, who made the post-discharge follow-up phone calls also varied by the purpose of the call and to what population was the call being made. The role of the person making the telephone calls also impacts the outcomes. In a study by Odeh et al. (2019), clinical pharmacists conducted the post-discharge follow-up calls on patients with polypharmacy with positive outcome on 30-day reduction rate, whereas in Jayakody et al. (2018), Aboriginal health professionals conducted the phone calls on Aboriginal patients with no reduction in 30-day readmission rates (Carlock et al., 2020). Post-discharge telephone follow-up calls conducted in the patient's native language helps to ensure better understanding of the health care information provided to the patients (Karunakaran et al., 2018; Nijhawan et al., 2019).

Multiple studies that had a significant reduction in 30-day readmission rates had nurses conduct post-discharge telephone follow-ups (Briscoe et al., 2018; Mols et al., 2019). Several studies showed that post-discharge telephone follow-up conducted by pharmacists did not reduce 30-day readmission rates but were helpful in avoiding pharmaceutical problems (Bella et al., 2016, Yang, 2017). Jayakody et al. (2018) found that patients with multiple comorbidities had a lower chance of receiving 48-hour follow-up and thus recommendation has been made to prioritize high-risk patients. Approximately 35% of patients experiencing medication changes reported medicine related problems post-discharge (Mackridge et al., 2018). Post-discharge telephone follow-up call was appreciated by the neurosurgery patients and was believed to be feasible approach by the nurses (Sutiono et al., 2018). Overall, post-discharge telephone calls made by the nurses within 48 hours of discharge, using a pre-designed script in the patient's native language for at least 15 minutes seem to be the most effective strategy.

**RED Toolkit:** Limited evidence was found in the use of tools for post-discharge telephone follow-up calls. Despite the evidence that post-hospital discharge follow-up interventions have largely positive outcomes, there are limitations regarding various aspects of their execution. There are a few standard techniques adopted by many groups; however, these methods are not without limitations. Hodalova et al. (2020) utilized telephone follow-up calls that included questionnaires examining the quality of life, frailty, employment status, and the feasibility of telephone follow-ups. Briscoe et al. (2018) utilized the Post Discharge Questionnaire tool in the EMR that has open-ended, semi-structured questions that focus on adherence to follow-up instructions, medications, and scheduled outpatient dialysis appointments.

The RED toolkit was developed by the Boston University Medical Center (BUMC) that includes a comprehensive discharge process (Agency for Healthcare Research and Quality [AHRQ], 2013; BUMC, 2014). This toolkit is used and adapted by different healthcare systems in the United States. Some hospitals are able to integrate the RED toolkit fully into their discharge process whereas others have adapted the toolkit (Mitchell et al., 2017). Some of the components include patient education, medication reconciliation, communication with and among health professionals, and follow-up care. Incorporating these components in the discharge process prepares patients for safe transition from hospital to home (Mitchell et al., 2017).

The literature does not indicate exactly the time required to complete post-discharge telephone calls using the RED toolkit. However, it is believed to be a lengthy process by many health care organizations. Therefore, some hospitals adapted the RED

toolkit by deleting some parts of the original toolkit to prevent repetition and save time. This adaption of the tool was found to save potential time and confusion (Mitchell, 2017).

The RED toolkit has resulted in the reduction of the readmission rates by 30 percent (AHRQ, 2013; BUMC, 2014; Mitchell et al., 2017). Mitchell et al. (2017) in their study showed five contextual factors on which California hospitals adapted and implemented the toolkit and its sustainability. These factors include leadership effectiveness, implementation strategies, implementation teams, leadership support, and attention to developing sustainable long-term plans. Hospitals that were able to fully implement the RED toolkit showed higher satisfaction with the use of the tool. However, modification of the tool was common and was a more sustainable quality improvement model (Mitchell et al., 2017). Taylor et al. (2019) recommended avoiding cold calling whenever possible. This indicates the need for using pre-discharge questionnaire and approval, which is also listed in RED toolkit.

**Gaps in the Literature**

The literature review identified several gaps, mostly on the patient population studied, self-report bias, and effective telephone follow-up program (Jayakody et al., 2018; Lee et al., 2016). There was not enough evidence to determine if patients discharged to hospice or a nursing home could benefit from a post-hospital discharge follow-up and usually, these patients were excluded in studies (Lee et al., 2016). Limited findings were available on patients with cognitive impairment or relying on caregivers (Nijhawan et al., 2019).

The literature lacks analyzing other factors such as disease severity or patient characteristics that could potentially have affected 30-day hospital readmission rates.

However, this can cause selection bias in the patient population and generate results that have low generalizability to other practice settings (Lee et al., 2016). There is a gap noted among patients admitted under observation status. It is not clear whether their admissions within 30-days should be considered a readmission or not (Mcllvennan et al., 2015).

As much as the benefits of post-discharge follow-ups are discussed, concerns have been brought about the self-report bias in telephone follow-ups (Lee et al., 2016). There is a gap in the evidence as to what makes an effective telephone follow-up program. Emphasis has been placed on the need for further research to establish the ideal person to make the follow-up call, the frequency and timing of calls, the content of the calls, and to identify the potential patient, health system, and country differences in telephone follow-up interventions (Jayakody et al., 2018). There was a lack of a standard tool used, consistency in information provided to the patients regarding medications or staff providing the education making the findings less generalizable as to whether the replication of the intervention will lead to the same benefit (Mackridge et al., 2018).

**Recommendations for Practice**

A post-hospital discharge telephone follow-up call is recommended for reducing 30-day readmission rates in patients with diagnoses that are likely to be admitted to the medical- surgical floor (Branowicki et al., 2017; Briscoe et al., 2018; Mols et al., 2019; Odeh et al., 2019). Post-discharge telephone follow-up is recommended to address patients' factors accounting for hospital readmissions (Mwachiro et al., 2019; Sultan et al., 2018). During the post-discharge telephone follow-up calls, it is important the caller delivers the message in the patients' native language to ensure better understanding of the health care information provided to the patients (Karunakaran et al., 2018; Nijhawan et

al., 2019). It is recommended to avoid cold calling if possible because of its negative association with patient outcomes (Taylor et al., 2019).

The use of pre-designed scripts is suggested for optimal timing for post-discharge telephone calls (Hodalova et al., 2020; Odeh et al., 2019). This suggests the need for a pre-discharge questionnaire for obtaining patient information/ preferences regarding post-discharge telephone follow-up calls. The RED toolkit has both the pre-discharge and post-discharge questionnaire and is highly recommended in the reduction of the 30-day hospital readmission rates (AHRQ, 2013; BUMC, 2014; Mitchell et al., 2017).

Furthermore, the recommendation is made to have an allocated duration, optimal timing and the cut-off points for telephone follow-ups to improve the outcomes in the different patient populations (Hodalova et al., 2020; Odeh et al., 2019). Telephone calls that are made earlier, within two to five days of discharge and conducted by nurses for about 15 minutes is recommended to reduce 30-day hospital readmission rates (Briscoe et al., 2018; Mols et al., 2019).

## Conclusion

There is a huge risk associated with 30-day readmission rates for health care facilities as they may be financially penalized. Therefore, the interventions to reduce this readmission rate are important. The evidence-based studies to reveal the factors that can be addressed to decrease 30-day readmission rates are growing. Post-discharge follow-up telephone calls are one of such methods, which are inexpensive and effective and has potential to reduce the 30-day readmission rate. There is some literature on this intervention method showing decrease in the readmission rate. However, the findings are

far from being conclusive and gap in literature exists for various diagnosed diseases and various departments of health care facilities from where the patients were discharged.

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## Appendix A

## Evidence Table

| **Date:** | | **EBP Question:** | | | | | |
|---|---|---|---|---|---|---|---|
| **Article Number** | **Author and Date** | **Evidence Type** | **Sample, Sample Size, Setting or *Not Applicable*** | **Findings That Help Answer the EBP Question** | **Observable Measures** | **Limitations** | **Evidence Level, Quality** |
| 1 | Auerbach, 2016 | Observational study | 1000 | Factors were found for the prevention of likely 30-day readmission | 30-day readmission | Subjective nature of the data | IIB |
| 2. | Basu, 2018 | Retrospective meta-analysis | 7,302,286 | Insurance coverage is associated with 30-day readmission rate and the risk is further modified with different ethnic/racial background | 30-day readmission | No data on post-discharge care coordination | IB |
| 3 | Bell, 2016 | RCT | 851 | Pharmacist led post-discharge follow up did not reduce 30-day readmission | 30-day readmission or ER visit | Use of non-clinical person making the initial follow-up call | IB |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | Berry, 2018 | Meta-analysis | 31,729,762 | 30-day unplanned readmission rate in the USA is 11.6% in overall | 30-day unplanned hospital readmissions | Data used for analysis was national database, which does not include readmissions in different states. | IIIA |
| 5 | Boccuti, 2017 | Policy paper | NA | Medicare penalties assessed on hospitals will increase in 2017 compared to 2016. | 30-day readmission | Not having specific percentage of readmission rate as a goal, but rather compare with national average. | IVA |
| 6 | Branowicki, 2017 | Meta-analysis | 7952 | Follow-up calls and home visits was associated with lower likelihood of readmission. | 3-month readmission | Studied on wide time-range for readmissions | IIIB |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | Briscoe, 2018 | RCT (Retrospective) | 320 | Reduction in 30-day readmission of renal patients with follow-up phone calls | 30-day readmission | Use of aggregate data and inability to individual patient level data | IA |
| 8 | Carlock, 2020 | RCT | 402 | Reduction in 30-day complications post-discharge associated with telephone follow-up within 10 days | 30-day complications post-discharge | Recall bias and significant number of patients were not followed up | IA |
| 9 | Covert, 2016 | Retrospective case control | 384 | Both patient and process level factors contribute 30-day readmission rate | 30-day readmission | Inconsistent data used for the study | IA |
| 10 | Curtis, 2019 | Meta-analysis | 188,251 | Reduction in 30-day readmission following total knee arthroplasty (TKA) from 2012-2016 | 30-day readmission | No follow-up intervention on patients | IIIB |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | Danielsen, 2020 | Prospective RCT | 288 | 24/7 hotline intervention failed to reduce 30-day all-cause readmissions | 30-day readmission | Heterogeneity in person involved as multiple staffs will answer the calls | IB |
| 12 | Danielsen, 2020 | Descriptive quantitative | 288 | Integration of user experience is important in clinical trial studies | 30-day readmission | Mixed nature of data between RCT and retrospective design | IC |
| 13 | Garg, 2019 | Meta-analysis | 61,750 | 30-day readmission rate with alcoholic hepatitis (AH) is 23.9% | 30-day readmission | Use of database information, which might not include admissions in different states | IIIA |
| 14 | Gershon, 2019 | Meta-analysis | 126,013 | 30-day readmission for COPD patients in Ontario Hospitals, Canada is 19.4% | 30-day readmission | Individual level data missing in the study | IIIA |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15 | Hodalova, 2020 | RCT | 91 | Telephone follow up after critical care discharge is feasible option to get follow-up information | Feasibility of telephone follow-up on patients discharged from critical care | Follow up calls were made 3-6 months post discharge | IB |
| 16 | Hoffman, 2019 | Meta-analysis | 8,382,074 | Post-discharge fall related injuries (FRIs) are a leading cause of 30-day readmission in patients with cognitive impairment. | 30-day unplanned hospital-wide readmission. | Likelihood of overlap between diagnosis related groups | IIIB |
| 17 | James, 2016 | Meta-analysis | 1,163 | 26% of 30-day readmission after Radial cystectomy are modifiable. | Modifiable factors of 30-day readmission | Person patient data not included | IIIA |
| 18 | Jayakody, 2018 | Meta-analysis | 18,659 | No difference in 28-day readmission or mortality following 48 hours telephone follow up in chronic disease associated treatment of aboriginal people population of Australia. | 28-day readmission or mortality | Variability in the implementation of follow up program | IIIA |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19 | Karunakaran, 2018 | Retrospective Cohort | 17,284 | One of the strongest risk factors for 30-day hospital readmissions among diabetic patients include lack of a post-discharge out-patient visit within 30 days | All cause 30-day hospital readmission | Confounding bias with the use of retrospective data | IB |
| 20 | Knighton, 2019 | RCT (Retrospective) | 885 | Half of 30-day readmissions following vascular surgery are potentially avoidable | 30-day readmission | Selection bias with retrospective chart review | IA |
| 21 | Lee, 2016 | RCT | 11,985 | Discharged to home patients after hospitalization for heart failure have lower chance of 30-day readmission provided cardiology or general medicine follow-up within 7 days | 30-day readmission | Unmeasured confounders and residual treatment selection bias | IC |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 22 | Mackridge, 2018 | RCT (Cross-sectional) | 444 | Role of pharmacists to convey information after discharge should be improved in north-west England | Patients' knowledge regarding changes of their treatment plan post discharge | Heterogenous data between hospitals | IC |
| 23 | Malhotra, 2018 | Retrospective cohort | 130 | Early readmission is common in Patients with Inflammatory bowel disease. | 30-day readmission | Residual confounding effect with use of administrative data | IB |
| 24 | Mcllvennan, 2015 | Narrative Lit Rev | NA | Hospital readmission reduction program has both pros and cons | 30-day readmission | Lack of discussion of comprehensive outcomes | VA |
| 25 | Mitchell, 2017 | RCT | 64 | Sustainability of RED strategy is only possible if hospitals adopt it as a transformational process rather than patient safety | Implementation of RED strategy | Relies of subjective interviews | IC |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 26 | Mols, 2019 | RCT | 294 | Nurse-led motivational follow-up did not influence adherence to antiplatelet therapy after percutaneous coronary intervention (PCI) but reduced the hospital readmissions | Adherence to antiplatelet therapy, readmission | Selection bias | IA |
| 27 | Mwachiro, 2019 | RCT | 83 | Patients receiving follow up call within 24-48 h post-discharge stayed out of hospital longer | 30-day readmission | Small scale study | IA |
| 28 | Nijhawan, 2019 | RCT | 86 | The 30-day readmission metric should be adjusted for safety net institutions and patients with AIDS | 30-day readmission | Lack of generalizability | IC |
| 29 | Odeh, 2019 | RCT | 859 | Post-discharge follow-up led by pharmacists can reduce 30- and 90-day readmission rates | 30- and 90-day readmission | Single center trial, lack of generalizability | IA |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 30 | Smeraglio, 2019 | RCT | 178 | Readmitted patients often feel that the cause of their readmission is hospital system | Opinions on factors of readmission | Feeling bias, small sample size | IB |
| 31 | Sreenivasan, 2020 | Meta-analysis | 2740 | 30-day readmission after acute pericarditis is common and associated with increased mortality | Readmission | Personal patient data missing | IIIB |
| 32 | Sultan, 2018 | RCT | 217 | More than half of 30-day readmission can be prevented with proper follow-up at surgery department, Aga Khan University, Pakistan | Factors contributing 30-day readmission | Lack of generalizability | IB |
| 33 | Sutiono, 2018 | RCT | 178 | Follow-up telephone after neurosurgery is a feasible option in developing countries | Feasibility of follow-up | Lack of pre-study baseline data | IC |
| 34 | Taylor, 2019 | RCT | 778 | Cold calling to patients as a follow-up should be avoided | Reaction of patients | | IB |
| 35 | Truong, 2018 | RCT (Retrospective) | 345 | 30-day readmission rate is associated with nonadherence to CPAP | 30-day readmission | Single site study, Lack of generalizability | IA |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 36 | Tsilimingras, 2017 | RCT | | Increase in post-discharge adverse effect was observed with early follow-up visits after discharge | Post-discharge adverse effects | Information bias | IC |
| 37 | Yang, 2017 | RCT (Case cohort) | 62 | Pharmacist led medical management follow-up did not improve 30-day readmission | 30-day readmission | Small scale study | IB |
| 38 | Zuckerman, 2016 | Systematic review | 3387 | There is a correlation between readmission trends and hospitals' responses to incentives to reduce readmission as per ACA. | 30-day readmission | Unexplained causes for change in readmission trends | VA |

## Appendix B

### Table 1: Grading of Evidence

| Strength of Evidence | Quality of Evidence | | |
|---|---|---|---|
| | Grade A (High Quality) | Grade B (Good Quality) | Grade C (Low Quality) |
| Level I | 8 | 10 | 7 |
| Level II | | 1 | |
| Level III | 5 | 4 | |
| Level IV | 1 | | |
| Level V | 2 | | |
| Total | 16 | 14 | 6 |

# Appendix C

## John Hopkins Nursing Evidence-Based Practice Model

### Evidence Level and Grading Table

| Evidence Levels | Quality Ratings |
|---|---|
| **Level I**<br>Experimental study, randomized controlled trial (RCT)<br>Explanatory mixed method design that includes only a level I quaNtitative study<br>Systematic review of RCTs, with or without meta-analysis | **QuaNtitative Studies**<br>**A High quality**: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence.<br>**B Good quality**: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.<br>**C Low quality or major flaws**: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn. |
| **Level II**<br>Quasi-experimental study<br>Explanatory mixed method design that includes only a level II quaNtitative study<br>Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis | **QuaLitative Studies**<br>No commonly agreed-on principles exist for judging the quality of quaLitative studies. It is a subjective process based on the extent to which study data contributes to synthesis and how much information is known about the researchers' efforts to meet the appraisal criteria.<br>*For meta-synthesis, there is preliminary agreement that quality assessments of individual studies should be made before synthesis to screen out poor-quality studies[1].*<br>**A/B High/Good quality** is used for single studies and meta-syntheses[2].<br>The report discusses efforts to enhance or evaluate the quality of the data and the overall inquiry in sufficient detail; and it describes the specific techniques used to enhance the quality of the inquiry. Evidence of some or all of the following is found in the report:<br>• Transparency: Describes how information was documented to justify decisions, how data were reviewed by others, and how themes and categories were formulated.<br>• Diligence: Reads and rereads data to check interpretations; seeks opportunity to find multiple sources to corroborate evidence.<br>• Verification: The process of checking, confirming, and ensuring methodologic coherence.<br>• Self-reflection and scrutiny: Being continuously aware of how a researcher's experiences, background, or prejudices might shape and bias analysis and interpretations.<br>• Participant-driven inquiry: Participants shape the scope and breadth of questions; analysis and interpretation give voice to those who participated.<br>• Insightful interpretation: Data and knowledge are linked in meaningful ways to relevant literature. |
| **Level III**<br>Nonexperimental study<br>Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only, with or without meta-analysis<br>Exploratory, convergent, or multiphasic mixed methods studies<br>Explanatory mixed method design that includes only a level III quaNtitative study<br>QuaLitative study Meta-synthesis | **C Low quality** studies contribute little to the overall review of findings and have few, if any, of the features listed for high/good quality. |

| Evidence Levels | Quality Ratings |
|---|---|
| **Level IV**<br>Opinion of respected authorities and/or nationally recognized expert committees or consensus panels based on scientific evidence<br>Includes:<br>• Clinical practice guidelines<br>• Consensus panels/position statements | **A** **High quality:** Material officially sponsored by a professional, public, or private organization or a government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise clearly evident; developed or revised within the past five years<br>**B** **Good quality:** Material officially sponsored by a professional, public, or private organization or a government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise clearly evident; developed or revised within the past five years<br>**C** **Low quality or major flaws:** Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the past five years |
| **Level V**<br>Based on experiential and nonresearch evidence<br>Includes:<br>• Integrative reviews<br>• Literature reviews<br>• Quality improvement, program, or financial evaluation<br>• Case reports<br>• Opinion of nationally recognized expert(s) based on experiential evidence | **Organizational Experience (quality improvement, program or financial evaluation)**<br>**A** **High quality**: Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial, or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence<br>**B** **Good quality**: Clear aims and objectives; consistent results in a single setting; formal quality improvement, financial, or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence<br>**C** **Low quality or major flaws**: Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial, or program evaluation methods; recommendations cannot be made<br>**Integrative Review, Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference**<br>**A** **High quality**: Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field<br>**B** **Good quality**: Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions<br>**C** **Low quality or major flaws**: Expertise is not discernable or is dubious; conclusions cannot be drawn |

## Appendix D

## Permission to Use

**John Hopkins Nursing Evidence Based Practice Model and Tools**

Thank you for your submission. We are happy to give you permission to use the JHNEBP model and tools in adherence of our legal terms noted below:

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- You may not modify the model or the tools without written approval from Johns Hopkins.
- All reference to source forms should include "©The Johns Hopkins Hospital/The Johns Hopkins University."
- The tools may not be used for commercial purposes without special permission.

If interested in commercial use or discussing changes to the tool, please email ijhn@jhmi.edu.

## Appendix E

## Contact Sheet From RED Toolkit

**Patient Name:** _____

OK to send letter (Y / N)

**Address**
Street _____ Apt # _____

City, State _____ ZIP Code _____

Email address _____

**Preferred spoken language:** _____

**Interpreter needed?** (Y/N) _____

**Preferred phone number: __ home __ cell phone __ work**

**Home Phone:** ( ) _____ OK to leave message? (Y/N)_____

Best time to call: _____

**Cell Phone:** ( )_____ OK to leave message? (Y/N)_____

Best time to call: _____

**Work Phone:** ( ) _____ OK to leave message? (Y/N)_____

Best time to call: _____

## Appendix F

***Modified Script From Oneida Healthcare, Oneida,NY***

***TRANSITION SERVICES "After Hospital Care Plan"***

Patient name: Acct #:

Date:

110. Hello, my name is from Oneida Healthcare. I am hoping to talk to you about your medical issues, to see how you are doing, and if there is anything I can do to help you. Do you mind if I ask you a few questions so I can see if there is anything I can help you with? Isthis a good time to talk? It will probably take about 15 minutes or so.

111. Before you left the hospital, I spoke to you about your main problem during your hospitalstay. This is also called your "primary discharge diagnosis." Can you tell me the main reasonyou were in the hospital?

112. Do you have any questions for me about your diagnosis? Is there anything I can betterexplain for you?

113. Since you left the hospital, do you feel your main problem, , has improved, worsened, ornot changed?

114. Have any new medical problems come up since you left the hospital?

115. Can you bring your new or changed medications to the phone, please?

116. I'm going to ask you a few questions about your new or changed medications to see if there is anything I can help you with. We will go through your new or changed medicationsone by one.

117. What is the name of this medication? The name of it should be on the label.118.

119.

120.

121.

122.

123. What is the strength of the medication? It should say a number and a unit, such as mg,mcg, etc.

1.

124.

125.

126.

127.

128. How do you take this medication? How often do you take it? And at what time(s) duringthe day?

1.

129.

130.

131.

132.

133. Do you know the reason/purpose you are taking this medication?

1.

134.

135.

136.

137.

138. Do you have more medications to review?

139. Have you been using the medication calendar that was given to you on discharge?

140. Do you use a pill box?

141. What questions do you have today regarding your new or changed medications and/ormedication calendar (if using)?

142. Now, I'm going to make sure you and I have the same information about your appointments and tests that are coming up. You were given appointments with your doctor(s)and for lab tests when you left the hospital. Can you please tell me what appointments you have scheduled?

143. What is your appointment for?

144. Are you going to be able to make it to your appointment?

145. Are you weighing yourself on a daily basis? ○ Yes ○ No (If applicable)

*If no, why not?*

*If yes, what was your weight today?*

*Are you aware that your physician needs to be notified if you gain more than 3 pounds*

*in a day or 5 pounds in a week?*

146. Are you using your oxygen as prescribed? ○ Yes ○ No (If applicable)

*If no, why not?*

147. Are you using nebulizer as prescribed? ○ Yes ○ No (If applicable)

*If no, why not?*

148. Before we hang up, I want to make sure that if a medical problem arises, you know what to do. If you're having an emergency, for example, chest pain, trouble breathing, to name a few, you need to call 911 to get an ambulance so you can see a doctor right away. However, if you are having a nonemergent medical problem and want to be seen by your doctor before your next scheduled appointment, you can call your doctor's office directly and ask for an earlier appointment. Does that make sense to you? Do you have any questions about it?

# Impact of Post-Hospital Discharge Follow-up Phone Calls on 30-day Readmission Rates

BY

Sabina Kadariya

A paper submitted in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

South Dakota State University

2021

Abstract

Background/Purpose: Post-discharge follow-up phone calls to patients within 48 hours of discharge helps to reduce readmission rates. Thus, health care facilities are financially motivated to institute evidence-based strategies to reduce readmission rates.

Methods: Post-discharge telephone calls were conducted by the project manager, charge nurses and nurse educators using the Re-Engineered Discharge (RED) Toolkit to all patients without heart failure within two-three days of discharge from the medical-telemetry unit.

Results: There was no significant reduction in 30-day readmission rates post-intervention (*p=0.915, >0.05*), gender wise (*p=0.589*), diagnoses wise (*p=0.891*) and among patients $\leq$ 65 years and > 65 years of age (*p=0.259*). About 70% of the patients readmitted in July, 2021 had not received the post-discharge follow-up calls.

Discussion: Barriers to the successful implementation of the project include time constraints, inability to contact patients on multiple attempts, hearing impairment, and lack of proper baseline data.

Implications for Practice: Post-discharge telephone call is a safe, cost-effective, patient-centered strategy to improve the quality of care. Although it didn't reduce the 30-day readmission rate on this project, it provided opportunity for nurses to address patients' concerns after discharge. Similar future studies are recommended on a larger scale and for a longer time to increase generalizability.

*Keywords:* Post-discharge telephone follow-up, causes of 30-day hospital readmissions, most-common causes of hospital readmissions, implementation and adaptation of RED Discharge

# Impact of Post-Hospital Discharge Follow-up Phone Calls on 30-day Readmission Rates

The Hospital Readmission Reduction Program was established in 2012 under the Affordable Care Act. Based on this program, the Centers for Medicare and Medicaid Services reduces reimbursement to the hospitals if the 30-day readmission rates are higher than the national average (Branowicki et al., 2017; Mwachiro et al., 2019; Zuckerman et al., 2016). The national 30-day unplanned hospital index readmission rate for the United States is at 11.6% on average (Berry et al., 2018). Health care facilities are working towards reducing 30-day readmission rates below this national average.

## Background/Purpose

The financial penalty due to excess 30-day readmissions serves as a motivator to healthcare facilities to implement a quality improvement project to reduce these rates (Mcllvennan et al., 2015; Mwachiro et al., 2019; Zuckerman et al., 2016). The gap in the patients' knowledge related to medications, lack of post-discharge follow-up with a provider, and being unaware of whom to contact after discharge are some of the potentially preventable causes for readmissions (Auerbach et al., 2016; Covert et al., 2016; Karunakaran et al., 2018; Malhotra et al., 2016). Post-discharge follow-up phone calls to patients are beneficial in reducing readmission rates by clarifying the misunderstandings related to medications and follow-up appointments (Mwachiro et al., 2019; Sultan et al., 2018).

## Significance

Hospital readmission rates are associated with increased mortality and healthcare costs and thus, are an important measure of quality care (Mcllvennan et al., 2015;

Mwachiro et al., 2019; Wu & Hall, 2018). Preventable hospital readmission accounts for 12% of all readmissions (11.6%) (Berry et al., 2018; Hospital Care Data, 2020; Nag, 2018). The preventable causes of hospital readmissions include diabetes, congestive heart failure, ischemic cardiomyopathy, and chronic obstructive lung disease (Troung et al., 2018). The national readmission rate for Chronic Obstructive Pulmonary Disease (COPD), MI (Myocardial Infarction), heart failure, pneumonia, stroke is 20.2%, 17%, 22%, 16.9% and 12.7% respectively (Hospital Care Data, 2020).

**PICOT question**

A PICOT question was developed to guide the evidence-based project. The PICOT question was: Among adult patients hospitalized without a diagnosis of heart failure on a telemetry floor (P), how does the utilization of RED Toolkit (I) compared to current practice (C) impact the 30-day hospital readmission rates (O) over six weeks (T)?

**Evidence Findings**

Many factors contribute to increased 30-day hospital readmissions. Early discharge, inadequate discharge education, missed or delayed diagnoses, poor understanding of the disease, lack of adherence to medications or follow-up, lack of adherence to CPAP use, pain, wound complications, infection, lack of transportation, and lack of insurance all were found to increase readmission risk (Curtis et al., 2019; Garg et al., 2019; Gershon et al., 2019; James et al., 2016; Knighton et al., 2019; Nijhawan et al., 2019; Troung et al., 2018). Post-discharge telephone follow-up has been evidenced as a high-quality, low-cost, and successful approach in reducing the 30-day readmission rate (Branowicki et al., 2017; Briscoe et al., 2018; Mols et al., 2019, Odeh et al., 2019).

Evidence showed variations in frequency, timing, duration of the call, and the person doing the telephone calls impact the outcomes (Briscoe et al., 2018, Carlock et al., 2020; Hodalova et al., 2020, Mols et al., 2019, Odeh et al., 2019, Tsilimingras et al., 2017). Patients that were called within two to five days of discharge and given at least 15 minutes of time during the call had a reduction in the 30-day readmission rate (Mols et al., 2019). Many studies in which the nurses conducted the post-discharge follow-up phone calls showed a significant reduction in 30-day readmission rates (Briscoe et al., 2018; Mols et al., 2019). Mitchell et al. (2017) showed a 30% reduction in the readmission rate with the use of the RED toolkit. Some organizations had modified the toolkit and the use of the modified toolkit was shown to be more sustainable for the quality improvement model (Mitchell et al., 2017).

**Gaps**

The literature review did not reveal enough evidence if post-discharge telephone follow-up calls were beneficial to patients with cognitive impairment or discharged to hospice or nursing homes as these patients were excluded in studies (Lee et al., 2016; Nijhawan et al., 2019). It was not clear whether the readmissions of patients on observation status or in non-index hospitals were included in 30 day-readmissions. A literature gap exists in the frequency, timing, duration, and the content of the telephone follow-up calls. There was limited evidence available on the use of standard post-discharge tools, and consistency in the questions asked to the patients during follow-up phone calls making the findings less generalizable as to whether the same benefits are obtained with the replication of the intervention (Mackridge et al., 2018). There were concerns regarding the self-reporting bias in telephone follow-up calls. In addition to this,

there were other factors such as disease severity or patient characteristics that can affect 30-day hospital readmission rates that were not discussed in the literature.

## Recommendations for Practice

Post-discharge telephone follow-up calls that are made by nurses, within two to five days of discharge for about 15 minutes were recommended to reduce 30-day hospital readmission rates in patients admitted to the medical-surgical floor (Branowicki et al., 2017; Briscoe et al., 2018; Mols et al., 2019; Odeh et al., 2019). The use of a pre-designed script for the telephone calls was recommended to complete the phone calls within the allocated duration and optimal timing (Hodalova et al., 2020; Odeh et al., 2019). The use of the patients' native language was recommended during the follow-up calls to ensure patients' better understanding of the information provided to them. In addition, consideration should be made to the patient's socio-economic status, cultural and language differences, and available community resources when developing a post-discharge follow-up strategy (Karunakaran et al., 2018; Nijhawan et al., 2019). The RED toolkit is evidenced to reduce 30-day hospital readmission rates and is highly recommended to use for post-discharge telephone follow-up calls (Mitchell et al., 2017).

## Methods

### *Change Theory*

Lewin's 3-stepped change theory was utilized to guide this evidence-based project. The three steps include - unfreezing, movement, and freezing (Lewin, 1947 as cited in Hussain et al., 2018; Manchester et al., 2014). The Johns Hopkins Nursing Evidence-Based Practice Model that includes three steps- Practice Question, Evidence, and Translation (PET) was used for this project (Dang & Dearholt, 2017). The Five A's

Model of Patient-Centered Care and Self-Management Support which includes assessing, advise, agree, assist and arrange was used in this project (Institute for Clinical Systems Improvement, 2019).

### *Setting*

The project was implemented on a 32-bed combined medical-telemetry unit located in an urban city in the Midwest. The community had an estimated population of 103,107 with 71.1% of the population being Caucasian, followed by 17.4% Hispanic and 4.7% African American (United States [US] Census Bureau, 2019). The typical ratio on this unit was four patients to one nurse. The hospital had an overall readmission rate of 13.7% which was slightly lower than the national average of 15.2% (Hospital Care Data, 2020; Nag, 2018). However, if broken down by patients' diagnoses, the readmission rates for diagnoses such as Myocardial Infarction (MI), Pneumonia, and Stroke were close to the national average (Hospital Care Data, 2020).

Before implementation of the project, the discharge process was started after the admitting physician signed the discharge order. The unit secretary would then make post-discharge follow-up appointments on weekdays. If the discharge occurred over the weekend, the patient/family members would be provided with the contact information to schedule follow-up appointments. The staff nurse assigned to the patient would go over the discharge instructions and then the patient would be released from the hospital. However, for heart failure patients, the heart failure coordinator would make post-discharge telephone follow-up calls in two to three days after discharge.

### *Sample*

The project included all adult patients discharged from a telemetry floor within the previous three days and without a diagnosis of heart failure. This included patients with diagnoses of, but not limited to: Chronic Obstructive Pulmonary Disease, Pneumonia, COVID-19, Myocardial Infarction, Stroke, Urinary Tract Infections and Sepsis. Patients with heart failure were excluded because they already receive post-discharge follow-up phone calls at the facility. Likewise, patients with impaired cognition, difficulty communicating, death prior to discharge or post-discharge, discharge to a nursing home or hospice were excluded from the project. Patients who were readmitted within 48 hours of discharge, lacked a direct contact number, or did not respond after three voice messages to return call, or who did not want post-discharge phone calls were excluded from the project. There were 228 patients that discharged from the medical-telemetry unit. Of these patient, 113 patients met the inclusion criteria and were included in the project.

### *Intervention Tool*

Evidence showed the use of the RED toolkit for post-discharge telephone calls has resulted in the reduction of the readmission rates by 30 percent. The RED toolkit was developed by the Boston University Medical Center and consists of 12 key components of the discharge process including patient education, reconciliation of medications, patients' communication with health professionals, communication among health professionals, and follow-up (Agency for Healthcare Research and Quality, 2013; Boston University Medical Center, 2014; Mitchell, 2017).

The RED toolkit has the script for post-discharge telephone calls adapted by Oneida Healthcare. The project used the same script. This script took about 15 minutes to

complete around 20 questions regarding the patient's symptoms since discharge, medications, follow-up appointments and labs, self-monitoring, and using medical equipment/supplies at home (Agency for Healthcare Research and Quality, 2013; Boston University Medical Center, 2014). See Appendix F. In addition to the actual call time, the caller tracked down the total time required to review patients' chart prior to the call. This was written on the back of the post-discharge phone call script.

***Procedure***

The project was implemented for six weeks. During the first week, the project manager educated staff about the project, their role in the successful implementation of the project, and the RED toolkit. This education session was conducted online via Facebook Live on the unit facebook page. Nurses, charge nurses and nurse educators were educated on how to use the pre-discharge contact sheet and the post-discharge telephone script. This information was also included in the daily huddle for a week prior to the project implementation. Upon discharge, patients were asked to fill in a pre-discharge contact sheet with the name, address, preferred phone number/time for contact, and need for interpreter services during the follow-up phone calls. If they preferred the caregivers or family members to be contacted, the information for the family members' were listed on the contact sheet. The discharging staff nurse handed the pre-discharge contact sheet to the patients prior to their dismissal.

The post-discharge telephone follow-up calls were conducted for a total of five weeks. A first follow-up phone call was made to the patients and caregiver by either the charge nurses or the nurse educator of the floor within two to three days of their discharge on both weekends and weekdays. The project manager completed the phone

calls when charge nurses or nurse educator were caring for patients. The caller reviewed the patients' After Visit Summary (AVS) for the recent hospitalization prior to making the phone calls. A voice message was left at the preferred contact on each attempt, if permitted, to return the call if unable to reach to the patient. The caller made three attempts to call the patient.

Assistance was provided to the patients over the telephone if they had any questions that can be addressed over the telephone. If not, the patients were provided with additional resources for possible help. Patients usually had an already arranged follow-up with a PCP prior to discharge. However, patients might not have the follow-up appointment scheduled if they discharged over the weekend. In such cases, patients were encouraged to schedule a follow up with a PCP if not already. If patients reported not doing well during the weekend, they were recommended to make a trip to the hospital.

The follow-up phone calls were documented on the facility's electronic charting system. The documentation included call attempts, patient's health status, problems with medications if any identified, follow-up appointment status, patient's post-discharge actions, and follow-up actions taken by the caller as listed in the RED toolkit (Boston University Medical Center, 2014). The caller noted the total time required to prepare and make the phone call on the telephone call script.

***Ethical Consideration***

The South Dakota State University Institutional Review Board (IRB) determined that the project did not meet the federal definition of human subjects research and did not need IRB approval (Appendix A). The facility did not have a Nursing Research Council. As per the facility protocol, the project was submitted to the chief nursing officer for

review of whether the project meets the exempt status. The project was approved by the facility's unit manager (Appendix B).

The completed questionnaires were stored in a locked cabinet immediately after completion which was only accessible to the project manager. The locked cabinet is located in the staff lounge on the fifth floor of the hospital. The patients' names along with other personal information were de-identified immediately after completing the post-discharge telephone call and prior to storing the documents. The patients' names were replaced by the last two numbers of their hospital room number and the date of their discharge for the de-identification purpose.

## Results

The data on discharges and 30-day readmissions for July 2019, 2020 and 2021 were obtained from the hospital records with assistance from the informatics department. The patients who met the exclusion criteria were removed and the remaining data was entered into Statistical Packages for the Social Sciences (SPSS) software. Chi-square test and logistic regression model were used to evaluate if there was a reduction in 30- day readmission rates post-intervention and the differences in readmission rate based on age, gender, and diagnoses. The 30-day readmission rate for patients included in the project was calculated for July, 2019 and July, 2020 due to the COVID pandemic that occurred in 2020 which skewed facility admission numbers. This number was compared to the 30-day readmission rate calculated for July, 2021.

### *Demographics*

Out of 113 patients, 52 (46.1%) patients were females and 61 (53.98 %) patients were males. The number of readmissions were greater for males (three, 4.91%) compared

to females (one, 1.92%) in July, 2021. Data categorization based on gender was not available for 2019 and 2020. Among the 113 patients, 96 (84.95%) patients were able to complete post-discharge telephone follow-up. The telephone follow-up calls were unable to be completed on 17 (15.04 %) patients due to no response on third attempts, wrong phone number provided, patients' refusal, or impaired hearing.

The number of patients between 18-65 years of age was 56 (49.55%) and above 65 years of age was 57 (50.44%) in 2021. The age wise distribution of population for all three years along with their readmission rates is listed in Appendix H. The number of patients readmitted between 18-65 years was four (two percent) and the number of patients admitted above 65 years of age was eight (3.95%).

Comparison was made between the patients with admitting diagnosis of stroke/Transient Ischemic Attacks (TIA), MI, electrolyte imbalances /dehydration, chest pain/discomfort, and acute respiratory distress (ARD). Patients with diagnoses of pneumonia, COPD, UTI, COVID-19, sepsis and others were not included in the comparison since the frequency table showed a very few patients with these diagnoses (Appendix I). Out of 78 patients, 37 patients (47.4%) had an admitting diagnoses of dehydration/electrolyte imbalances followed by 18 patients (23%) with chest pain/discomfort, ten patients (12.8%) with stroke/ TIA, nine patients (11.5%) with MI, and four patients (5.12%) with ARD.

***Statistical Testing Results***

The 30-day readmission rate was calculated for July 2019, 2020 and 2021 using the total number of discharges and the total number of readmitted patients for the respective month and are found to be at 3.1%, 2.29%, and 3.54% respectively. On further

testing using logistic regression analysis, there was no statistically significant difference noted in the 30-day readmission rate from July, 2019 to July, 2020 to July, 2021 (Appendix J). The chi square test did not show statistically significant reduction in 30-day readmission rate between patients who received post-discharge telephone follow-up calls and the patients who did not receive follow-up calls ($p$ 0.915) (Appendix K). No significant differences were noted in the 30-day readmission between males and females ($p$ 0.589), patients between 18-65 years of age and above 65 years of age ($p$ 0.259) (Appendix L). There were no differences in the 30-day readmission rates among patients with admitting diagnoses of electrolyte imbalances/dehydration, chest pain/discomfort, stroke/TIA, MI and ARD (Appendix M).

Data analysis was completed separately including patients that did not receive post-discharge telephone follow-up call on three attempts. The number of patients that were readmitted and had not received post discharge follow-up telephone calls was seven (70%), which is greater than the number of patients (three) that were readmitted and had received post-discharge follow-up telephone calls (30%) in July, 2021. The mean time spent to review chart prior to making phone calls was 6.86 minutes per patient.

***Clinical Outcomes***

The project did not show a significant reduction in readmission rate post-intervention. This is most likely due to lack of quality data from the past years to compare. The calculated readmission rate for July, 2019 and 2020 were significantly low per the given data. The number of patients that were discharged to home was almost three times greater (74.6%) compared to the number of patients discharged to home with home health services (25.4%). There was a significant difference in the 30-day readmission rate

for patients discharged to home (1.98%) versus home on home health services (5.82%). This finding was statistically significant on both chi-square test ($p$ 0.047) and logistic regression analysis ($p$ 0.046). There was no significant association between the 30-day readmission rate and the length of the hospital stay ($p$ 0.639).

**Discussion**

The findings of the projects contradicts the findings from other studies where post-discharge telephone follow-up call showed significant reduction in 30-day readmission rates among adult patients with various diagnoses regardless of gender (Briscoe et al., 2018; Mols et al., 2019). However, these findings are similar to the findings from Danielsen et al. (2020) and Jayakody et al. (2018) which did not show any reduction in 30-day readmission rates among patients with aortic valve replacement and Aboriginal people with chronic problems (Danielsen et al., 2020).

As depicted in Danielsen et al. (2020) and Jayakody et al. (2018), even if the post-hospital discharge telephone follow-up call did not reduce readmission rates, it is likely to have positive health outcomes.The implementation of the project was a great learning experience for the project manager as well as the key stakeholders and the organization. The post-discharge telephone follow-up was a good reminder to the patients of their follow-up appointments, medication regimen, self-monitoring questions and to answer any questions they have. Participants of the project might have bnefitted from the knowledge and resources provided during the post-discharge telephone calls.

There were several barriers to the successful implementation of the project. The project manager had to be at the site of implementation every day to make sure the pre-discharge contact lists were filled in by every patient. Answering return calls were

challenging as the project manager would leave the facility after certain time. The charge nurses and nurse educators had to answer the return calls which impacted their productivity with patients. The use of interpreter services for telephone calls was time consuming. Majority of the phone calls were made within two to three days of discharge. However, patients who did not respond on first attempt and needed three calls were out of the three days range. All first phone call attempts were made within two to three days.

The project did not include impaired hearing and patients leaving AMA on the exclusion criteria initially. However, it was impossible to make a communication on three attempts with patients with impaired hearing. Patients leaving AMA did not get the discharge instructions and medication prescriptions. Therefore, these patients were excluded from the project. Completing post-discharge telephone follow-up calls among homeless patients was challenging as these patients did not have enough resources to carry out self-care as instructed.

**Implications for Practice**

The post-discharge follow-up telephone calls provide an opportunity for the health care providers to impact patients' abilities to self-care at home post-discharge. This is likely to promote positive health outcomes for the patients, health care providers and organizations. Post-discharge telephone calls may be beneficial to rural patients with limited access to health care by addressing some of their questions over the telephone, which may save their trip to health care facilities several miles away. Post-discharge telephone calls promote the safe patient transition from hospital to home and with a better understanding of the disease process, self-management, monitoring, and follow-ups.

The project did not require a huge financial investment. Therefore, financial sustainability should not be a concern. Time constraint was a huge factor in completing the follow-up calls by charge nurses and educators when they had to take patients. The majority of the post-discharge telephone follow-up calls were completed by the project manager. It is recommended to plan ahead of time on who will actually make the follow-up calls. Having a float nurse or admitting/discharge nurses help with completing the follow-up calls could be an option for better time management and increased sutainability. The project was conducted in a small unit of the hospital and among patients with limited diagnoses due to academic limitations and requirements. Similar future projects for a longer time duration and on a larger scale are recommended for better evaluation of impact and to increase generalizability. The findings of the project could have been largely impacted due to lack of adequate baseline data to compare. Thus, it is recommended to ensure quality baseline data prior to starting the project.

**Conclusion**

There is a huge financial burden for healthcare facilities associated with the increase in 30-day readmission rates as they may be penalized financially. Therefore, it is important to implement post-discharge interventions to reduce the 30-day readmission rates. Post-discharge follow-up telephone call was one of the economical and effective strategies listed to reduce the 30-day readmission rates among patients with different diagnoses and across various age groups. It is unclear from this project whether the post-discharge telephone follow-up calls reduces 30-day readmission rates, indicating a need for future studies of similar kind with larger sample and longer time duration.

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# Appendix A

## University IRB Approval

Dianne Nagy <support@inforeadyreview.com>
Wed 5/12/2021 1:54 PM
To: Kadariya, Sabina - SDSU Student
Cc: Kadariya, Sabina - SDSU Student

Hello Sabina Kadariya,

I reviewed your application to the IRB (Impact of Post-Hospital Discharge Follow-up Phone Calls on 30-day Readmission Rates) and question the need for IRB approval. If your study will use existing knowledge to improve health care outcomes within a local health care institution or setting, it does not meet the federal definition of human subjects research and does not fall under the Federal policy, or under the purview of the SDSU Human Subjects Committee.

However, if your study will test a new, modified, or previously untested intervention for which there is insufficient evidence to determine whether it is safe and/or effective, this is research involving humans, and it is subject to IRB review and approval.

If you determine that IRB approval is required, please upload your consent form and resubmit your application:

Best,

Dianne Nagy

Research Integrity and Compliance Officer

View Application

## Appendix B

## Facility Approval

**DNP Project Site Agreement**

Date: 04/16/21

This letter is in support of Sabina Kadariya DNP Project (Impact of Post-Hospital Discharge Follow-up Phone Calls on 30-day Readmission Rates) at 5A Telemetry floor at Unity point Hospital, Sioux City. Sabina Kadariya, RN has my permission to implement post-discharge telephone follow-up calls on 5A/telemetry floor for her DNP project.

We look forward to the results of the project.

Joni DeKok

(Signature of Manager)

(Typed Name of Manager or Director)

Joni De Kok

Approved by Graduate Faculty 5.10.19; Updated 5.18.20

# Appendix C

## John Hopkins Nursing Evidence-Based Practice Model

### Evidence Level and Grading Table

| Evidence Levels | Quality Ratings |
|---|---|
| **Level I**<br>Experimental study, randomized controlled trial (RCT)<br>Explanatory mixed method design that includes only a level I quaNtitative study<br>Systematic review of RCTs, with or without meta-analysis | **QuaNtitative Studies**<br>**A High quality**: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence.<br>**B Good quality**: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.<br>**C Low quality or major flaws**: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn. |
| **Level II**<br>Quasi-experimental study<br>Explanatory mixed method design that includes only a level II quaNtitative study<br>Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis | **QuaLitative Studies**<br>No commonly agreed-on principles exist for judging the quality of qualitative studies. It is a subjective process based on the extent to which study data contributes to synthesis and how much information is known about the researchers' efforts to meet the appraisal criteria.<br>*For meta-synthesis, there is preliminary agreement that quality assessments of individual studies should be made before synthesis to screen out poor-quality studies[1].*<br>**A/B High/Good quality** is used for single studies and meta-syntheses[2].<br>The report discusses efforts to enhance or evaluate the quality of the data and the overall inquiry in sufficient detail; and it describes the specific techniques used to enhance the quality of the inquiry. Evidence of some or all of the following is found in the report:<br>• Transparency: Describes how information was documented to justify decisions, how data were reviewed by others, and how themes and categories were formulated.<br>• Diligence: Reads and rereads data to check interpretations; seeks opportunity to find multiple sources to corroborate evidence.<br>• Verification: The process of checking, confirming, and ensuring methodologic coherence.<br>• Self-reflection and scrutiny: Being continuously aware of how a researcher's experiences, background, or prejudices might shape and bias analysis and interpretations.<br>• Participant-driven inquiry: Participants shape the scope and breadth of questions; analysis and interpretation give voice to those who participated.<br>• Insightful interpretation: Data and knowledge are linked in meaningful ways to relevant literature.<br>**C Low quality** studies contribute little to the overall review of findings and have few, if any, of the features listed for high/good quality. |
| **Level III**<br>Nonexperimental study<br>Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only, with or without meta-analysis<br>Exploratory, convergent, or multiphasic mixed methods studies<br>Explanatory mixed method design that includes only a level III quaNtitative study<br>QuaLitative study Meta-synthesis | |

| Evidence Levels | Quality Ratings |
|---|---|
| **Level IV**<br>Opinion of respected authorities and/or nationally recognized expert committees or consensus panels based on scientific evidence<br>Includes:<br>• Clinical practice guidelines<br>• Consensus panels/position statements | **A** **High quality:** Material officially sponsored by a professional, public, or private organization or a government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise clearly evident; developed or revised within the past five years<br>**B** **Good quality:** Material officially sponsored by a professional, public, or private organization or a government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise clearly evident; developed or revised within the past five years<br>**C** **Low quality or major flaws:** Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the past five years |
| **Level V**<br>Based on experiential and nonresearch evidence<br>Includes:<br>• Integrative reviews<br>• Literature reviews<br>• Quality improvement, program, or financial evaluation<br>• Case reports<br>• Opinion of nationally recognized expert(s) based on experiential evidence | **Organizational Experience (quality improvement, program or financial evaluation)**<br>**A** **High quality**: Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial, or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence<br>**B** **Good quality**: Clear aims and objectives; consistent results in a single setting; formal quality improvement, financial, or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence<br>**C** **Low quality or major flaws**: Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial, or program evaluation methods; recommendations cannot be made<br>**Integrative Review, Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference**<br>**A** **High quality**: Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field<br>**B** **Good quality**: Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions<br>**C** **Low quality or major flaws**: Expertise is not discernable or is dubious; conclusions cannot be drawn |

## Appendix D

## Permission to Use

## John Hopkins Nursing Evidence Based Practice Model and Tools

Thank you for your submission. We are happy to give you permission to use the JHNEBP model and tools in adherence of our legal terms noted below:

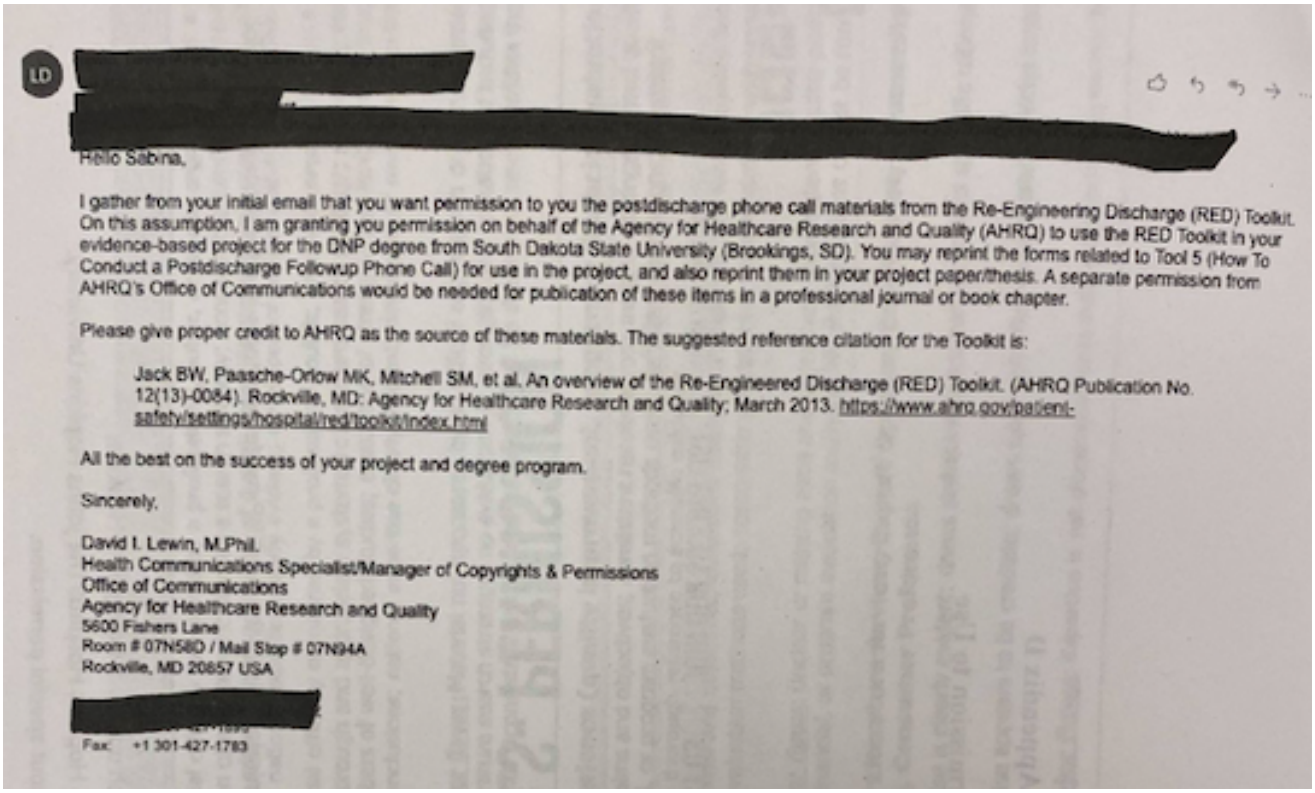
---

- You may not modify the model or the tools without written approval from Johns Hopkins.
- All reference to source forms should include "©The Johns Hopkins Hospital/The Johns Hopkins University."
- The tools may not be used for commercial purposes without special permission.

If interested in commercial use or discussing changes to the tool, please email ijhn@jhmi.edu.

## Appendix E

## Permission to Use



LD [redacted]

Hello Sabina,

I gather from your initial email that you want permission to you the postdischarge phone call materials from the Re-Engineering Discharge (RED) Toolkit. On this assumption, I am granting you permission on behalf of the Agency for Healthcare Research and Quality (AHRQ) to use the RED Toolkit in your evidence-based project for the DNP degree from South Dakota State University (Brookings, SD). You may reprint the forms related to Tool 5 (How To Conduct a Postdischarge Followup Phone Call) for use in the project, and also reprint them in your project paper/thesis. A separate permission from AHRQ's Office of Communications would be needed for publication of these items in a professional journal or book chapter.

Please give proper credit to AHRQ as the source of these materials. The suggested reference citation for the Toolkit is:

> Jack BW, Paasche-Orlow MK, Mitchell SM, et al. An overview of the Re-Engineered Discharge (RED) Toolkit. (AHRQ Publication No. 12(13)-0084). Rockville, MD: Agency for Healthcare Research and Quality; March 2013. https://www.ahrq.gov/patient-safety/settings/hospital/red/toolkit/index.html

All the best on the success of your project and degree program.

Sincerely,

David I. Lewin, M.Phil.
Health Communications Specialist/Manager of Copyrights & Permissions
Office of Communications
Agency for Healthcare Research and Quality
5600 Fishers Lane
Room # 07N58D / Mail Stop # 07N94A
Rockville, MD 20857 USA

[redacted]
Fax: +1 301-427-1783

## Appendix F

## Contact Sheet From RED Toolkit

**Patient Name:**

OK to send letter (Y / N)

**Address**
Street Apt #

City, State ZIP Code _____

Email address

**Preferred spoken language:**

**Interpreter needed?** (Y/N) _____

**Preferred phone number: __ home __ cell phone __ work**

**Home Phone:** ( ) OK to leave message? (Y/N)

Best time to call:

**Cell Phone:** ( ) OK to leave message? (Y/N)

Best time to call:

**Work Phone:** ( ) OK to leave message? (Y/N)

Best time to call:

## Appendix G

## Modified Script From Oneida Healthcare, Oneida, NY

***TRANSITION SERVICES "After Hospital Care Plan"***

Patient name: _____ Acct #: _____

Date: _____

110. Hello, my name is from Oneida Healthcare. I am hoping to talk to you about your medical issues, to see how you are doing, and if there is anything I can do to help you. Do you mind if I ask you a few questions so I can see if there is anything I can help you with? Is this a good time to talk? It will probably take about 15 minutes or so.

111. Before you left the hospital, I spoke to you about your main problem during your hospital stay. This is also called your "primary discharge diagnosis." Can you tell me the main reason you were in the hospital?

112. Do you have any questions for me about your diagnosis? Is there anything I can better explain for you?

113. Since you left the hospital, do you feel your main problem, , has improved, worsened, or not changed?

114. Have any new medical problems come up since you left the hospital?

115. Can you bring your new or changed medications to the phone, please?

116. I'm going to ask you a few questions about your new or changed medications to see if there is anything I can help you with. We will go through your new or changed medications one by one.

117. What is the name of this medication? The name of it should be on the label. 118.

119.

120.

121.

122.

123. What is the strength of the medication? It should say a number and a unit, such as mg, mcg, etc.

1.

124.

125.

126.

127.

128. How do you take this medication? How often do you take it? And at what time(s) during the day?

1.

129.

130.

131.

132.

133. Do you know the reason/purpose you are taking this medication?

1.

134.

135.

136.

137.

138. Do you have more medications to review?

139. Have you been using the medication calendar that was given to you on discharge?

140. Do you use a pill box?

141. What questions do you have today regarding your new or changed medications and/or medication calendar (if using)?

142. Now, I'm going to make sure you and I have the same information about your appointments and tests that are coming up. You were given appointments with your doctor(s) and for lab tests when you left the hospital. Can you please tell me what appointments you have scheduled?

143. What is your appointment for?

144. Are you going to be able to make it to your appointment?

145. Are you weighing yourself on a daily basis? ○ Yes ○ No (If applicable)

*If no, why not?*

*If yes, what was your weight today?*

*Are you aware that your physician needs to be notified if you gain more than 3 pounds in a day or 5 pounds in a week?*

146. Are you using your oxygen as prescribed? ○ Yes ○ No (If applicable)

*If no, why not?*

147. Are you using nebulizer as prescribed? ○ Yes ○ No (If applicable)

*If no, why not?*

148. Before we hang up, I want to make sure that if a medical problem arises, you know what to do. If you're having an emergency, for example, chest pain, trouble breathing, to name a few, you need to call 911 to get an ambulance so you can see a doctor right away. However, if you are having a nonemergent medical problem and want to be seen by your doctor before your next scheduled appointment, you can call your doctor's office directly and ask for an earlier appointment. Does that make sense to you? Do you have any questions about it?

## Appendix H

**Table 1**

*Age-wise Distribution of Population for the Year 2019, 2020 and 2021*

| **Year** | **Number of patients** | **≤ 65 years** | **>65 years** | **Readmission for ≤65** | **Readmission for >65** |
|---|---|---|---|---|---|
| 2019 | 161 (39.75%) | 80 (49.68%) | 81 (50.31%) | 1 (1.25%) | 4 (4.93%) |
| 2020 | 131 (32.34%) | 64 (48.85%) | 67 (51.14%) | 1 (1.56%) | 2 (2.98%) |
| 2021 | 113 (27.90%) | 56 (49.55%) | 57 (50.44%) | 2 (3.57%) | 2 (3.50%) |
| total | 405 (100%) | 200 (49.38%) | 205 (50.61%) | 4 (2%) | 8 (3.9%) |

## Appendix I

**Table 2**

*Frequency Distribution Table for Admitting Diagnoses*

**AdmitDiagnosis**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | . | 75 | 18.5 | 18.5 | 18.5 |
| | 0 | 1 | .2 | .2 | 18.8 |
| | 1 | 4 | 1.0 | 1.0 | 19.8 |
| | 10 | 216 | 53.3 | 53.3 | 73.1 |
| | 11 | 4 | 1.0 | 1.0 | 74.1 |
| | 2 | 8 | 2.0 | 2.0 | 76.0 |
| | 3 | 10 | 2.5 | 2.5 | 78.5 |
| | 4 | 9 | 2.2 | 2.2 | 80.7 |
| | 5 | 8 | 2.0 | 2.0 | 82.7 |
| | 6 | 7 | 1.7 | 1.7 | 84.4 |
| | 7 | 8 | 2.0 | 2.0 | 86.4 |
| | 8 | 37 | 9.1 | 9.1 | 95.6 |
| | 9 | 18 | 4.4 | 4.4 | 100.0 |
| | Total | 405 | 100.0 | 100.0 | |

Indicators:
1. Pneumonia
2. COPD
3. Stroke/TIA
4. Mi
5. UTI/Pyelonephritis/Cystitis
6. COVID-19
7. Sepsis
8. Electrolyte imbalances/Dehydration
9. Chest pain/ Discomfort
10. Others
11. ARD

## Appendix J

**Table 3**

*Logistic Regression Analysis Output*

**Variables in the Equation**

| | | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|---|
| Step 1[a] | AgeGrp | .542 | .631 | .738 | 1 | .390 | 1.719 |
| | LoS | -.056 | .120 | .220 | 1 | .639 | .945 |
| | disdisposition | 1.259 | .632 | 3.968 | 1 | .046 | 3.523 |
| | fuphonecall | -.746 | 1.209 | .380 | 1 | .537 | .474 |
| | Year | | | 1.164 | 2 | .559 | |
| | Year(1) | -.593 | 1.148 | .267 | 1 | .606 | .553 |
| | Year(2) | -1.196 | 1.212 | .974 | 1 | .324 | .302 |
| | Constant | -4.579 | 1.409 | 10.555 | 1 | .001 | .010 |

a. Variable(s) entered on step 1: AgeGrp, LoS, disdisposition, fuphonecall, Year.

## Appendix K

**Table 4**

*Chi square Test For Follow-up Phone Calls and 30-day Readmission Rate*

**Crosstab**

Count

| | | Read30day | | |
|---|---|---|---|---|
| | | 0 | 1 | Total |
| fuphonecall | 0 | 300 | 9 | 309 |
| | 1 | 93 | 3 | 96 |
| Total | | 393 | 12 | 405 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | .011[a] | 1 | .915 | | |
| Continuity Correction[b] | .000 | 1 | 1.000 | | |
| Likelihood Ratio | .011 | 1 | .915 | | |
| Fisher's Exact Test | | | | 1.000 | .571 |
| Linear-by-Linear Association | .011 | 1 | .915 | | |
| N of Valid Cases | 405 | | | | |

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.84.

b. Computed only for a 2x2 table

## Appendix L

**Table 5**

*Chi square Test For Age, Gender and 30-day Readmission Rate*

**Crosstab**

Count

| | | Read30day | | |
|---|---|---|---|---|
| | | 0 | 1 | Total |
| AgeGrp | Age <= 65 | 196 | 4 | 200 |
| | Age > 65 | 197 | 8 | 205 |
| Total | | 393 | 12 | 405 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 1.274[a] | 1 | .259 | | |
| Continuity Correction[b] | .699 | 1 | .403 | | |
| Likelihood Ratio | 1.300 | 1 | .254 | | |
| Fisher's Exact Test | | | | .381 | .202 |
| Linear-by-Linear Association | 1.271 | 1 | .260 | | |
| N of Valid Cases | 405 | | | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.93.

b. Computed only for a 2x2 table

**Gender * Read30day**

**Crosstab**

Count

| | | Read30day | | |
|---|---|---|---|---|
| | | 0 | 1 | Total |
| Gender | . | 284 | 8 | 292 |
| | 0 | 58 | 3 | 61 |
| | 1 | 51 | 1 | 52 |
| Total | | 393 | 12 | 405 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 1.057[a] | 2 | .589 |
| Likelihood Ratio | .954 | 2 | .621 |
| N of Valid Cases | 405 | | |

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.54.

## Appendix M

**Table 6**

*Chi square Test For Admitting Diagnoses and 30-day Readmission Rate*

Count

| | | Read30day | | |
|---|---|---|---|---|
| | | 0 | 1 | Total |
| AdmitDiagnosis | 11 | 4 | 0 | 4 |
| | 3 | 10 | 0 | 10 |
| | 4 | 9 | 0 | 9 |
| | 8 | 36 | 1 | 37 |
| | 9 | 18 | 0 | 18 |
| Total | | 77 | 1 | 78 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 1.122[a] | 4 | .891 |
| Likelihood Ratio | 1.506 | 4 | .826 |
| N of Valid Cases | 78 | | |

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .05.