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UNIVERSITY OF CALIFORNIA

Los Angeles

Communication and Message Framing Effects  
on Pneumonia Readmission Reduction

A dissertation submitted in partial satisfaction of the requirements  
for the degree Doctor of Philosophy in  
Nursing

by

Angela P. Halpin

**University of California, Los Angeles**

**2015**



# **ABSTRACT OF DISSERTATION**

Communication and Message Framing Effects  
on Pneumonia Readmission Reduction

by

Angela P. Halpin

Doctor of Philosophy in Nursing

University of California, Los Angeles, 2015

Professor Felicia Hodge, Chair

## **Background**

As the eighth leading cause of death in the United States, pneumonia (PN) is relevant to the health of the elderly and the young. Accountability for readmission is part of the Affordable Care Act's Hospital Readmissions Reduction Program (RRP), which levies penalty costs for readmissions. RRP's influence patients with pneumonia, accounting for over 1.1M discharges and comprising 18.5% of all readmissions. Since pneumonia is one of the targets of the RRP, this research proposed that purposeful communication using framing effects can motivate patients to make decisions with providers for care post discharge and can prevent readmissions. Communication strategies (CS), such as framing effects, are known to facilitate decision-making about health care choices. Framing effects as a method of reducing readmission have not been tested in the condition of pneumonia and the process of making decisions for care post discharge.

## **Specific Aims:**

1. To compare the communication strategies (intervention) of framing effects (positive or negative messages) on the readmission outcome at 30 days post discharge.

2. To assess the extent pneumonia readmissions decrease at 30 days post discharge when communication strategies (CS) include the patient or family in decisions about transitions.
3. To determine the impact of agreement between patients and HCPs on recommendations for post hospital care.
4. To examine the potential confounding effects on the relationship between framing effects and readmission rates of age, pneumonia severity index (PSI), and the number of diagnoses.

### **Design and Data Analysis**

This was a double-blind randomized control trial (RCT) with parallel assignment of pneumonia patients to one of three arms. The independent variable (IV) was the communication strategy (framing effects), and the dependent variable (DV) is the readmission. The sample randomized each group ( $N = 156$ ); three participants were excluded: Intervention A: positive framing,  $n = 44$ , Intervention B: negative framing,  $n = 65$ , and control group,  $n = 44$ .

**Conclusion:** Findings suggest that framed messages aid in the reduction of pneumonia readmission rates in hospitals. The decision-making strategy incorporates education and understanding of risk by the patient, so the healthcare team can encourage and improve readmission outcomes.

**The dissertation of Angela P. Halpin is approved.**

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## **Dedication**

This dissertation manuscript is dedicated to my beloved son, Joshua Hodosh, and in memory of my parents, John G. Halpin and Grace Halpin.

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## **ACKNOWLEDGMENTS**

Acknowledgement goes to the participating enrollees, leadership and nursing staff at the site hospitals, dedicated research assistants, and my honorable committee members.



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## **CHAPTER ONE**

### **OVERVIEW**

#### **Introduction**

Nursing and medical scholars have added a communication strategy known as message framing to the transition phenomena, and this framing can be a significant factor in determining the outcomes of care (Goldberg, Koontz, Rogers, & Brickett, 2012; Kahneman, 2011; Brooten et al., 1988). Inadequate or poor management of the transition from hospital to home results in a greater incidence of readmissions to the hospital and increased hospital costs (Goldberg et al., 2012; Naylor et al., 2011; Naylor et al., 1999). Other adverse effects for hospitals include loss of government funds, and most important of all, the cost to the health of the patient and subsequent impact on family, friends, and other caregivers (Centers for Medicare and Medicaid, CMS, 2011a). Politicians and policy makers understand the critical role transition from hospital to home exerts upon patients and significant others, and demand that readmissions be avoided (Joynt, Orav, & Jha, 2011a; CMS, 2011ab; Braes et al., 2009). Those who oppose transitional care models (TCM) from hospital to home as costly utilization of resources argue that TCMS, as they currently exist, do not significantly reduce readmission rates (Epstein, Jha, & Orav, 2011).

The Health Research and Educational Trust (HRET, 2010) suggests that multiple strategies noted as “foundational actions” in hospital interventions can prevent readmission. One such strategy is supporting mutual decisions (p. 2). Mutual decision-making between patients/families and primary providers includes establishing communication with “patients, families, primary providers” and “interdisciplinary teams” (HRET, 2010, p. 2, 6). However, missing from the actions is a consideration of how framing effects impact decision-making (Kahneman, 2011; McCormack, Dewing, & McCance, 2011; HRET, 2010).

Message framing has been used in health care over the past 30 years (Edwards & Elwyn, 2001; Rybash & Roodin, 1989). Framing effects (AKA framed messages) are defined in prospect theory as behavioral approaches to decision-making under risk (Kahneman, 2011; Salovey & Wegener, 2009). According to Kahneman (2011), framing helps motivate the decisions based on the positive or negative connotations of the framed message communicated. The main application in health care has been in decisions regarding the risk of surgery procedures, vaccination choices, and health promotion. Literature indicates that decisions involving mutual and shared decision-making result in favorable outcomes for patients (Edwards & Elwyn, 2001; Rybash & Roodin, 1989).

In addition to mutual decision-making, another strategy recommended to reduce readmission is patient-centered communication (PCC) (HRET, 2010). PCC is an interactive approach used in nursing care as a process of engagement with the patient, who is the center of all health care delivery (McCormack et al., 2011; McCormack & McCance, 2006). A patient is a person, either well or ill, who seeks services from a professional health team (Meleis, 2012b). Nurses facilitate communication with patients taking into account the patients' point of view, beliefs; and understanding of the health-illness context. Within the framework of PCC the differential outcome of a negative or positive frame will inform us on how to structure our messages.

The intention of this research is to provide a model for communication within the interdisciplinary team, of which the patient and family are members. Communication by health care providers (HCPs) using framing effects is a method to motivate patients to change behaviors, choices, and agreements (HCPs) (Kahneman, 2011; Moxey, O'Connell, McGettigan, & Henry, 2003). This research posits that deliberate implementation of team communication strategies (framing effects) with patients as members in the interdisciplinary team (IT) will lower the rates of readmission. Just as PCC involves patients, this nursing

research seeks to use mutual decision-making by engaging patients and studying framing effects. The proposed research question is “Does pneumonia readmission decrease at 30 days post discharge when a communication strategy (CS) using framing effects includes the patient or family in decisions about transitions?”

### **Statement and Significance of the Problem**

Pneumonia (PN) readmissions have become a concern as rates are reported at 18.5% of all U.S. admissions in 2012 and are targeted as part of national measures that will penalize hospitals with high rates of readmission (CMS, 2011a). Through evidence introduced by social psychology, we hypothesize that the behaviors regarding health decisions are influenced by the utility of suggested actions (Salovey & Wegener, 2009). Since patients often have an imprecise assessment of the risk of the illness, the framed messages provide clarity and new information to help individuals in decision-making (Young & Oppenheimer, 2009, p. 433). Therefore, patients may be able to determine the best approach for post-hospital care based on their interpreted meanings of shared information about an illness (Groopman & Hartzband, 2011; Health Research & Educational Trust (HRET) 2010; Schumacher & Meleis, 1994). Central to reducing readmission rates is patient involvement because patients can interpret framed messages and filter out others, which allows them to agree or disagree with recommendations by providers, but this must be tested (Kahneman, 2011).

The framed message reference points are influenced by a patient’s past history, knowledge of the illness, and communications with HCPs about the event’s severity (Aujesky & Fine, 2008; Tversky & Kahneman, 1981). Mortality or readmission from pneumonia is a risk often left unspoken to patients. As a result, there is uncertainty around the risk of illness for both providers and patients (Mishra, Gregson, & Lalumiere, 2012; Winter & Parker, 2007). One method of measuring this complex illness readmission outcome is to examine

perceptions of risk in terms of patients' agreement with recommendations using prospect theory's framed messages. Perceptions of risk are influenced by comorbidities and sociocultural factors, and are a result of the meanings attributed to the individual's choices around conditions presented in negative or positive messages (Winter & Parker, 2007). Nursing therapeutic interventions are needed to provide adequate communication with patients and families to reduce negative outcomes (Meleis, 2012ab). Knowing what message frame is beneficial becomes a nursing approach to apply in order to achieve successful outcomes.

Patients do not always understand the extent of their illness in relation to clinical findings (Youman, Lee, Schonberg, Widera, & Smith, 2012; Goldberg et al., 2012). Therefore, sharing information on the severity of the illness using indices and the outcomes expected may be constructive in framed messages (Arnold et al., 2010; Fine et al., 1997). As costs for hospital stays have continued to escalate, the readmission reduction program (RRP) mandates additional efforts to decrease length of stay by increasing patient understanding of illnesses (CMS, 2011ab). Quantitative studies on early stages of hospitalization are less robust compared to post-hospital interventions (Nosbusch, Weiss, & Bobay, 2010; Naylor & Bowles, 2005). Yet, it is known that interdisciplinary team (IT) communications impact decisions for post-hospital care, and require collaboration to improve the patient's understanding of options (Marciarille, 2011). The patient's preference, meaning, and acceptance of the transition that affects his/her agreement to recommendations at the time of discharge are examined in this research (Meleis, 2012ab). The study aims are feasible as proposed and support examining new knowledge on effective communication strategies using framing effects with patients admitted with PN.

## **Pneumonia Importance**

Respiratory disease is a major public health problem and remains the third leading causes of death worldwide (Courtais et al., 2012, p. 215). Specifically, community acquired pneumonia affects over six million patients annually, with a cost to the United States of 8.4-10 billion dollars (Jones et al., 2011, p.156). In recent years, the need to innovate has intensified as reports conclude that national health care expenses are increasing each year and currently stand at 16% of the gross national budget according to Medicare and Medicaid Services (CMS, 2011b).

Evidence-based practice results from multiple studies provide standards about pneumonia and its severity (Aujesky & Fine, 2008). On the other hand, the degree of illness and the recovery that follows the acute illness are often misunderstood (Langer, 2008). It is known that certain interventions in post-hospital care can influence the outcome of healing, yet the degree of the illness must be recognized. Therefore, the American Thoracic Society (ATS) provides algorithms such as the pneumonia severity index (PSI) score assessment, which guides physicians' decisions on level of care (Nair & Niederman, 2011; Wewers et al., 1998). The PSI is a useful tool to determine a patient's risk for recovery and mortality within 30 days of admission. However, the literature does not address communication of PN severity to patients but rather only the tool's use by HCPs (Aujesky & Fine, 2008). Communication of the pneumonia severity can counterbalance decisions made by patients if shared within the communication strategy of framed messaging.

## **Patient and Provider Communication**

Communication during transition from hospital to home is a dimension of the transition event. Thus, communication within the "person-environment interactions" is important in investigating pneumonia readmission (CMS, 2011a; Chick & Meleis, 1986, p. 239). The movement across transitions is a "nursing concern" because of its impact on

humans and human sciences (Meleis, 2012ab; Meleis & Trangenstien, 1994; Chick & Meleis, 1986, p. 237). Accordingly, in an effort to ease these patient transitions, HCPs who engage patients with pneumonia ought to communicate using all available resources. Exchanging information on the pneumonia's severity along with a framed message is a method that better facilitates patient understanding and agreement on post-hospital choices (Kahnemen, 2011; Aujesky & Fine, 2008; Edwards & Elwyn, 2001).

One strategy to improve communication is implementation of interdisciplinary communication (IC). This is a recent mandate from The Joint Commission, which has provided sample tools for communication and documentation on discharge planning (Gandara, Ungar, Lee, Chan-Macrae, O'Malley, & Schnipper, 2010). IC is defined as communication that occurs between providers as part of the health team. Patients are often not part of the team (Lown & Manning, 2010). Studies on IC strategies are proven effective when readily adopted, as long as providers use structure in discharge planning (HRET, 2010; Jha, Orav, & Epstein, 2009; Edwards & Elwyn, 2001). This type of communication is enhanced when patients are involved in shared decision-making within interdisciplinary communications using models like patient-centered care during their illness (Legare et al., 2011; McCormack & McCance, 2011). The communications require providers to understand available methods that are effective to use within the engagement. It is known that informing patients using framed messages is one such method. Therefore, the way communication is framed by HCPs is substantiated and influences a patient's behavior, decisions on choices, and outcomes (Edwards & Elwyn, 2001; Rybash & Roodin, 1989).

### **Decision-Making**

Having patients participate in decision-making (DM) by including them as part of the team can make a difference in reducing chances of readmission. A patient-centered strategy using communication may impact health outcomes, but must be tested for utility and



effectiveness with patients who have pneumonia. Framed communications based on reference points of loss or gain are known to affect behavior because information is provided for patients to consider (Kahneman, 2011; Trupp, Cowin, Ahijevych, & Nygren, 2011; Moxey et al., 2003; Rybash & Roodin, 1989). After a systematic review of literature, Edwards and Elwyn (2001) identified that communication has an effect on “treatment choices” when framed as a probability of risk. These techniques are nevertheless influenced by factors, or “effect modifiers,” which are the “treatment choice and the individualized estimate of risk” (Edwards & Elwyn, 2001, p. i10).

The initiation of multiple studies challenges researchers to seek better communication methods in informing patients of the degree of their illness (Marciarille, 2011; Bowles, Foust, & Naylor, 2003). Scripts like those found in prospect theory may be helpful if used with information on illness severity (Edwards & Elwyn, 2001). The transition home can prevent readmission if the patient’s preferences and the perceived value of recommendations to their health are meaningfully included in post-hospital choices (Sox & Goodman, 2012; Salovey & Wegner, 2009).

Clinical innovations are necessary to make well-informed decisions about what information patients ought to know at discharge (Shepperd, Parkes, McClaran & Phillips, 2008). If patients are provided recommendations, mutual agreement and meaning can be merged with an understanding of the transition’s impact on the patient’s situation, and thus decrease readmission outcomes, but this must be studied (Trupp et al., 2011; Voss et al., 2011; Zoffman, Harder, & Kirkevold 2008; Moxey et al., 2003).

### **Summary**

Moving forward into the 21st century, research intends to enhance transition success and reduce readmission by improving communication strategies (CS) that increase collaboration with the patient as a member of the IT (CMS, 2011ab;2012b). This study’s

context is focused on decisions at the time of transition for patients diagnosed with pneumonia. Various communication strategies can be used in the description of a patient's risk by framing specific health symptoms that influence the patient's decision-making; however there is a gap in testing framing effects on patients with pneumonia (Moxey et al., 2003; Edwards & Elwyn, 2001).

The patient and his/her family must be part of the decision-making using active participation to form a value and preference that impacts outcomes (Kahenman, 2011; HRET, 2010; Vecchiarino, Bohannon, Ferullo, & Malijanian, 2004). The economics of studying framing effects using positive or negative messages at the transition time suggest efficiencies for the future. New knowledge on communication strategies (framing effects) can express itself in nursing, when nurses examine characteristics through pioneering CS in discharge planning to effect readmission reduction.

Communication that accomplishes patient-centered decisions and evaluates meaning associated with the transition can provide evidence in supporting new CS in practice settings as "must haves" (Olsen, Saunders, & McGinnis, 2011; Zoffman et al., 2008). Health behaviors affect transition outcomes, which may lead to readmission (Meleis, 2012ab). Using communication to frame positive and negative messages with patient participation on choices based on indices (e.g. PSI, activities of daily living scores) can help patients' understanding of the depth of the pneumonia illness and the risk for readmission (Zoffman et al., 2008; Vecchiarino et al., 2004). If patients are provided recommendations, then mutual agreement and meaning can be merged with an understanding of the transition's impact on the patient's situation and decrease readmission outcomes; but this must be studied (Trupp et al., 2011; Voss et al., 2011; Zoffman et al., 2008; Moxey et al., 2003).

This chapter provided an overview of the research with a statement about its significance. Chapter two will review the theoretical and conceptual framework, and chapter

three will give a review of the literature. Chapter four presents the study design and methods. Finally, chapters five and six will provide the study findings and discussion of the effects of communication strategies (framing effects) on readmission.

## CHAPTER TWO

### THEORETICAL AND CONCEPTUAL FRAMEWORK

#### Transition Phenomenon

In nursing, innovations in transition research resulted from an interest in discharge care in the 1980s. Insightful nurses explored the discharge process outcomes and what occurred after a patient is transitioned from the hospital to home (Shepperd et al., 2008; Brooten et al., 1986). The nursing domain purported a concern with the life process, the trajectory during transition on specific age groups, and the unique experiences of differing patient populations (Naylor et al., 2011; Naylor et al., 1999; Brooten et al., 1988). Much of the research on transition models focuses on factors precipitating readmissions (Moxey et al., 2003; Brooten et al., 1988; Brooten et al., 1986). The intent of the research in the 1980s and 1990s was to contain costs and make a difference in the perceptions of the transition experience for the patient (Brooten et al., 1988).

According to Chick and Meleis (1986), transition is a process that affects people in the passages that occur in their lives. Many concepts and characteristics are infused within transition. Transitions can either be agreeable or dissatisfying in nature and people's responses to and perceptions of changes may vary (Chick & Meleis, 1986, p.242). Anticipation of the transition itself is a cause of disruption. Every transition has multiple phases with no period of stagnation until stability is reached. A person's response to a transition is based on his/her perceptions, which are in turn dependent upon the person's role changes, self-concept, or other reactions to the event (Meleis & Trangenstein, 1994; Chick & Meleis, 1986). Although transitions include universal properties and conditions, each transition is unique. Schumacher and Meleis (1994) described the several transition types as "developmental, situational, health-illness, [or] organizational" (p.125). Their universal

properties have common elements that may be divided into “stages or phases” (p.121). The change phases are demonstrated in “roles, relationships, [and] patterns of behavior” (Schumacher & Meleis, 1994, p.121).

Each person makes meaning out of the conditions and subjective experience of a transition. Schumacher and Meleis (1994) explained that these meanings might be anticipated as “positive or negative” responses to the transition (p.122). Integrated into these conditions are expectations, levels of knowledge, skills, the environment, planning, and emotional well-being (Schumacher & Meleis, 1994). These conditions include a multitude of features, emotions, and interactions.

Hospitalization is an example of a transition event, specifically a patient’s movement from home to hospital. Following the hospital, an individual may return home, which then becomes a second transition. This transition’s characteristics include “process, disconnectedness, perceptions (meaning assigned to the transition), awareness, and patterns of response” (Chick & Meleis, 1986, p. 240). The transition occurs within the context of the individual’s current life perceptions and situation.

These transition characteristics and context (dimensions) affect the person’s level of well-being and are a nursing concern. Nursing offers an opportunity to evaluate for effective interventions to assist patients in the transition process (Chick & Meleis, 1986). Various factors define the process, helping to provide knowledge of the person’s subjective and objective concerns. Relationships are evident as mediating factors such as the person/family’s subjective responses formulated by the “meaning, expectations, knowledge, [and] level of planning for the environment, along with the implemented nursing therapeutics” (Schumacher & Meleis, 1994, pp. 121-123). In transition domain concepts, health outcomes can result in restoration, maintenance, protection, or promotion (Chick & Meleis, 1986).

Transition reflects movement on the continuum of a person's health-illness experience. The transition experience is best navigated using an interdisciplinary approach that requires perspective from the multiple players in the transition process (Goldberg et al., 2012; HRET, 2010). That is to say, to pragmatically evaluate a transition, it is necessary to decenter one's self and see the experience from the vantage point of the other person.

Chick and Meleis (1986) described the transition concepts as based on sociology, psychology, and nursing domains. These concepts were: (a) physical structure and pathology of a human, (b) psychology and mental capacities, and (c) spirituality as the theology or beliefs that act to support one's health seeking. Groups of individuals may fare better in transitions compared to others based on these factors. For example, some transition challenges were noted in elders who have cognitive impairments, widows and widowers, the homeless, and/or those with limited financial resources (Schumacher & Meleis, 1994).

### **Transition Theory**

Initially, Chick and Meleis (1986) evaluated characteristics of the phenomenon of transitions, defined as categories in order to frame the transition in terms of time span, process, and perceptions. Chick and Meleis (1986) outlined characteristics such as “perceptions, events, patterns of response, and dimensions of transitions,” each of which was grouped with subsets to establish context (Chick & Meleis, 1986, p. 240). The theory became a way to profile a patient's ability to move through the human experiences that arise during the transition event (Meleis, 2012ab). The model's characteristics become descriptors to assist patients' and nurses' understandings of the extent of a transition. Meleis (2012b) systematically creates a tapestry for illustrating the meaning of transitions within the human experience illustrated by the timing, scope, or duration of the experiences (Chick & Meleis, 1986; Meleis, 2012b).

The model extrapolates much from other nursing theorists' concepts establishing congruence for nurses as a way to conceptualize the term "transition" into practice (Meleis & Trangenstein, 1994; Chick & Meleis, 1986). Depending on the transition event, a response is based on the dimension of health-illness within the patient's life (Meleis, 2012ab; Chick & Meleis, 1986). The theory of transition is central to the study of effects of communication on the perceptions of patients, readmission rates, the meaning of the hospital stay, and choices for post-hospital care.

Early renditions of transition theory occurred systematically with evaluation of its dimensions, concepts, and characteristics. Each dimension was defined in phases of the transition experience, namely with an "entry, passage, and exit" categorized within the dimension listed (Chick & Meleis, 1986, p. 242). A patient can have a "single transition or multiple transitions" (Chick & Meleis, 1986, p. 243). Readmission is a multiple transition, representing more than one admission within 30 days (CMS, 2012a; CMS, 2011b; Chick & Meleis, 1986).

An illustration is the readmission of a pneumonia (PN) patient who has a secondary diagnosis of stage one breast cancer. According to CMS (2012b), PN readmissions comprise 18.5% of all admissions. For example, following a lumpectomy and limited treatment, the experience of rehospitalisation with PN affects the patient's continuum of health. The phases experienced by the patients are in sequences of variable durations, with different lengths of effects, degrees, or magnitude on the patient's life situation due to the multiple admissions (Meleis, 2012ab; Chick & Meleis, 1986).

The nurse who uses transition theory has a clear understanding of the dimensions and types of biological, physiological, and psychological conditions that are possible based on patients' responses observed (Meleis, 2012ab; Chick & Meleis, 1986). The nurse can then select appropriate therapeutics to guide the patient in the adjustment to the transition within a

health-illness context (Chick & Meleis, 1986). Understanding what the event means to the patient can make a difference in the experience and recovery post-hospital. When faced with an illness, a patient moves either from illness to health, to further declining of health, or to death. Once informed as a member of the interdisciplinary team during shared communication, the patient is able to process information and respond based on the dimension of the event. For example, patients can know if it is a “temporary or permanent condition, a pleasant or unpleasant experience,” then adjust their lives around this contextual information (Chick & Meleis, 1986, pp. 242-243).

Nursing therapeutics was an initial interest of Meleis because it cues the nurse to evaluate the patient’s interpretation of the event (Meleis, 2012ab). This part of the nursing process offers a frame for the nurse to interact effectively with the patient. To describe relationships to other domain concepts, Chick and Meleis (1986) address the movement toward health outcomes, such as maintenance or promotion (p. 246). Health promotion is supported by motivating patients during the therapeutic relationship to change behaviors using decisions to maintain health. The framing message concepts from prospect theory can be integrated into the nursing communication and thus affect the health outcomes.

### **Prospect Theory**

Prospect Theory (PT) framing effects data has been collected over three decades in various settings for health treatment adherence (Moxey et al., 2003). Kahneman (2011) defines PT as descriptive, and is “analysis of decisions under risk” (p. 271). PT explicates how individuals make decisions based on preference and intuition rather than using rationality. Decisions result from a psychologically neutral status quo and reference points (Kahneman, 2011, p. 281; Tversky & Kahneman, 1991; Trupp et al., 2011). According to Trupp et al. (2011) and Tversky and Kahneman (1981), PT indicates decisions are “highly malleable and may shift due to changes in health status or by the way choices are presented”



(p. 39). Subjective values and psychologically driven responses are based on the person's interpretation, thus affecting perceptions and outcomes. In research, the change is perceived as a loss or gain or a positive or negative effect (Tversky & Kahneman, 1981). Tversky and Kahneman (1981) define "a decision problem" "by the acts or options which one must choose, the possible consequences of these acts, and the contingencies or conditional probabilities that relate outcomes to the act" (p. 453). "As a result, any change in the status quo has a highly personalized meaning" (Trupp et al., 2011, p. 39). PT predicts that preferences for choices with uncertain or risky outcomes are affected by how information is presented (Trupp et al., 2011; Tversky & Kahneman, 1981). The maxim "losses loom greater than gains" is the essence of PT and how decisions are reached (Kahneman, 2011; Trupp et al., 2011, p. 39; Tversky & Kahneman, 1981).

### **Usefulness**

The benefits of integrating transition theory with framing effects for the study of CSs are useful in understanding the relationships between members of the interdisciplinary team and with the patient, and on readmission outcomes. The theory's foundations include a gamut of studies, comprising discharge planning, IC, readmissions within subgroup populations, and social psychology (Kahneman, 2011; Moxey et al., 2003; Naylor et al., 1999; Brooten et al., 1986). Scientific inquiry into meanings of transitions for PN patients based on CS can add to nursing knowledge. Transition theory and PT concepts will be merged in the proposed study of CS with patients as members to evaluate meanings, understanding of choices, references, and preferences. The design will account and control for factors of framing effects on CS to examine reduction in readmission.

In addition to the control, both positive and negative frames will be measured in these research groups using clinical indices (Youman et al., 2012; Trupp et al., 2011; Moxey et al., 2003; Edwards & Elwyn, 2001). Theoretically, adoption of PT's framing effects with

transition theory concepts can strengthen information on what motivates patients to agree with recommendations that reduce readmission. Adding decision-making and agreement within the transition theory is valuable to the outcome measures of readmission within the proposed study model (Figure 1).

### **Conceptual Framework**

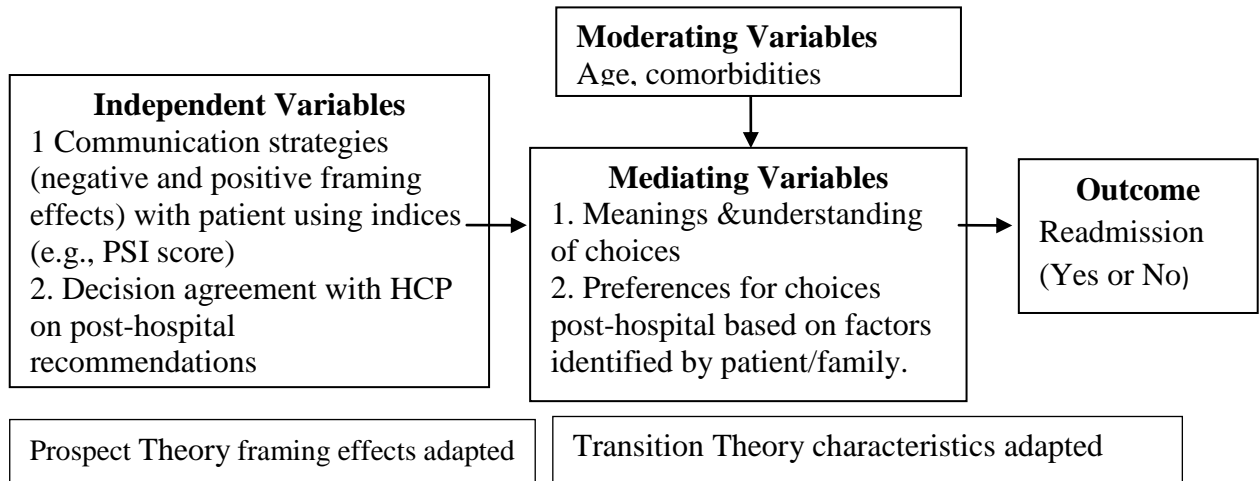
This study proposes that explicit inclusion of patients in “meaningful participation” as part of the interdisciplinary team while using communication strategies as framing effects (independent variables) will reduce readmissions (dependent variable or outcome) and thus control hospitalized costs (Epstein & Gramling, 2013; Moxey et al., 2003; Tversky & Kahneman, 1981). The construction of the framework integrates transition, prospect, and communication theories (Meleis, 2012a; Kahneman, 2011; Shannon & Weaver, 1949). Patients included in communication who receive information on the severity of their pneumonia illness can reach decisions with providers on choices for care that will prevent their risk for readmissions, which is known to be important to Medicare recipients (Marciarille, 2011, p. 68). Communication feedback was initially studied by Schramm in 1948. The nursing and social science theories on communications have been based on his work throughout the years (Schramm, 1948). The design includes mediating variables of preferences, meanings, and understanding of transitions, which are unique to individual patients (Meleis, 2012b; Groopman & Hartzband, 2011). How information is framed influences decisions in communication, and places a utility or value on transition choices.

Studies show significant findings supporting the concepts and morphology of the middle-range theory of transitions based on Meleis (2012ab). Because it is a middle-range theory, new criteria in prevention of readmission can be added to link relationships to possible concepts (Meleis, 2012b, p 412). These new criteria are the communication strategies’ (CS) use of indices such as the pneumonia severity index (PSI), framing effects,

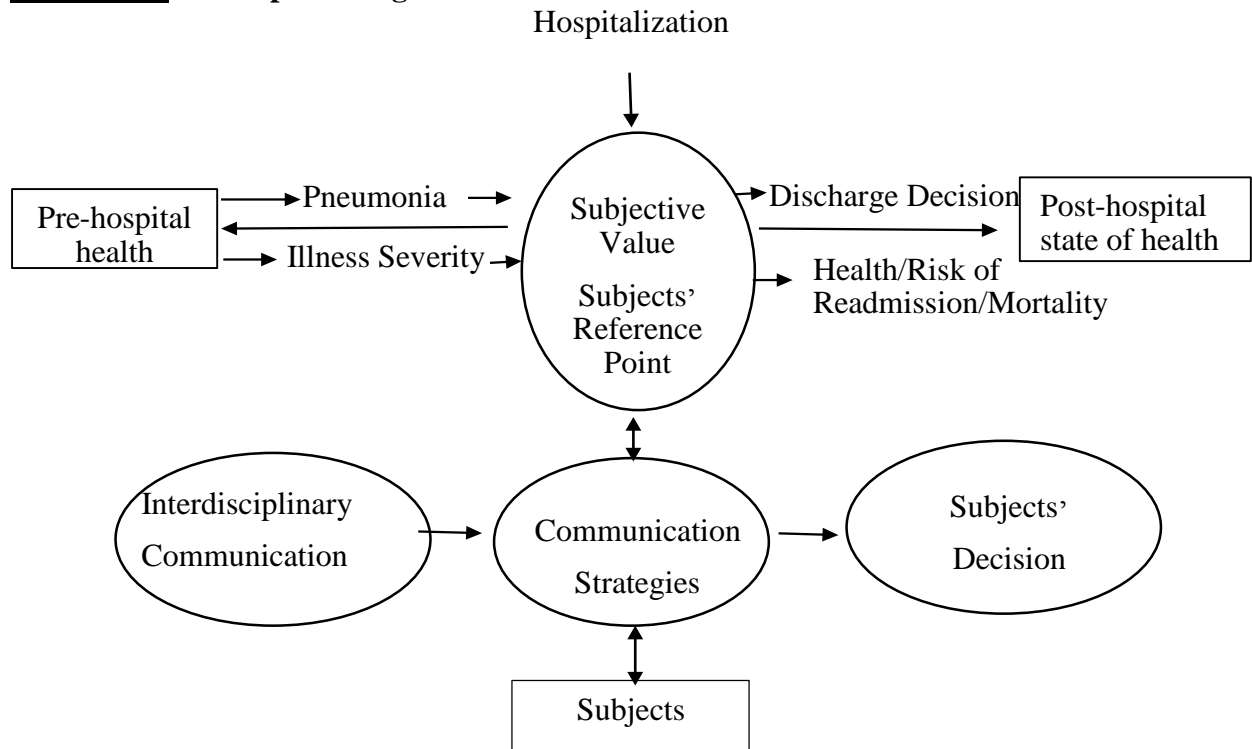
and inclusion of the patient as a member of the interdisciplinary team (IT) (Courtney et al., 2012; Naylor et al., 1999; Naylor et al., 1994; Brooten et al., 1988; Brooten et al., 1986).

**FIGURE 1: Conceptual Model**

A Communication Strategy with Pneumonia Patients using Framing Effects on Decisions to Reduce Readmission Rates.



**FIGURE 2: Conceptualizing the Transition Problem**



## **Concepts of Nursing**

The transition concept is foundational within the proposed nursing study (Chick & Meleis, 1986). Health, nursing therapeutics, and nursing patients are the main concepts. Each of these concepts is synergetic and includes ideas used in the transitional conditions; for example, how a patient perceives the meaning of the pneumonia event. Indicators that measure healthy transitions, such as mastery of behaviors, sentiments, cues, and symbols, are associated with the result of new roles and identities faced by the patient with pneumonia due to the transition event. Transition is a “multiple concept embracing elements of process, time span, and perceptions” (Chick & Meleis, 1986, p. 239), each of which affects the transitions on a patient’s response to the pneumonia illness, and impacts his or her life situation due to the hospitalization.

In the domain of nursing concepts, the nursing patient is defined by Meleis (2012a) as a “patient and a consumer of care” who has needs and interacts with the environment to adapt, but due to illness is vulnerable and thus may be at risk for disequilibrium (pp. 98, 99). The nurse evaluates the human experience and meaning of the transition event in relation to the patient’s responses. The freedom of patients to perceive their unique situation is crucial to the nursing process (Chick & Meleis, 1986). To effectively present the scope of the illness, the nurse must communicate the event in terms of the patient’s basic human needs and vulnerabilities.

The concept of health within the context of a pneumonia event includes a patient’s transition from hospital to home. Understanding the severity of the event and the meanings attributed will influence the patient’s transitional decision as well as other IT members. The challenges are to make decisions about the post-hospital interventions that can influence outcomes such as readmission or mortality. These multiple concepts are applied in this study

because the effects of transitions on a patient's response to the pneumonia illness are important in determining the impact on his/her life situation.

As Chick and Meleis (1986) explained, the patient would be in contact with a nurse, and therefore the transition was part of the domain of nursing (p.238). The discharge process presents an opportunity for nurses to interact effectively with the patient. When a pneumonia event results in hospitalization, the event contains transitional condition characteristics that infuse meanings and level of knowledge within the patient's interaction with the environment (Meleis, 2012a).

From the nursing perspective, discharge transitions are a significant aspect of nursing care because patients require assistance through the health-illness experience. Together with nursing, concepts from social psychology and economic prospect theory's framing effects, nursing can assist in communication about the pneumonia event by eliciting what the transition means to the patient (Meleis, 2012a; Kahneman, 2011; Schwartz, Goldberg, & Hazen, 2008; Chick & Meleis, 1986).

### **Concepts of Social Psychology**

Prospect theory concepts include a subjective value function of gains or losses. When weighing their choices, patients use a status quo or a reference point to make a decision (Trepel, Fox, & Poldrack, 2005). The concepts in this study are applied in the pneumonia illness event when measuring framing effects to determine readmission outcomes. Framing effects, when communicated with the pneumonia severity index (PSI) as the reference point, provide patients with a better understanding of the risk/benefits of their illness and potential for readmission. The decision is based on the value of the prospect risk to the patient's current health status using a reference point, and their preferences after exchange of information with HCPs about consequences of gains or losses (Epstein & Gramling, 2013; Kahneman, 2011; Levin, Schneider, & Gaeth, 1998; Tversky & Kahneman, 1981).

Motivating loss aversion can be restated as advantages versus disadvantages in relation to reference points. Reference points usually correspond to a person's decision, making current positions influenced by norms, expectations, and social comparisons (Tversky & Kahneman, 1991, p. 1046). As reference points shift, decisions are influenced based on reference-dependent choices. Valuation is determined on two options in the reference dependent model which assumes losses have greater impact on preferences than gains and advantages. The two properties are asymmetrical with a S-shaped value function, concave above the reference point (gain/risk averse) and convexity for loss averse that is steeper, as the convex (loss) is below the reference point (risk seeking/losses) (Trepel, Fox & Poldrack, 2005; Tversky & Kahneman, 1991).

Several authors have summarized PT's theory and its background. Edwards and Elwyn (2001) summarized PT studies on clinical risk communication, which demonstrates a basis for application of framed messages that are fair and balanced in health care settings. Reit et al. (2014), summarized studies on risk framing hypotheses and argued that although studies often indicated risk seeking framed messages (negative) were more persuasive than risk averse messages (positive), researchers have not reached a consensus based on study results. What is substantiated is that individual's perceived vulnerability related to the message received effects on outcomes (Reit et al., 2014, p. 944). However, the summarized studies' findings mentions central to decisions' influence is based on a result from subjects' perceived risk. Examining how negative or positive message affect or influence outcomes can be valuable in health outcomes and practice but future message framing studies are recommended (Reit et al., 2014). Explanations on vulnerabilities of the decision makers is needed to strengthen study results.

Abellan-Perpinan, Bleichrodt, and Pinto-Prades (2009) examined external validity of prospect theory and found that consistency with choices and rankings improve with prospect

theory's use when aligned with person's preferences compared to expected utility theory. The conclusion, although, indicates PT leads to better decisions under risk, it may not translate to decision context, other than risk (Abellan-Perpinan, Bleichrodt, & Pinto-Prades, 2009, p. 1046). The concepts for the HRS RCT, measures the differences of framed messages (negative and positive) on the outcome of readmission. Health decisions for those sick with pneumonia are based on conditions under risk. The messages were designed to motivate decisions that prevent readmission with positive framed messages that indicate beneficial consequences versus detrimental consequences and study measured effects on readmission.

Therefore this RCT examined the risk-framing hypotheses outcome on readmission after patients listen to a framed health message. Agreement or non-agreement occurs between the provider and the patient's alternative decision choices for post-hospital services. This agreement becomes a concept to consider in the readmission rate (outcome). Choices are multiple at the time of discharge and include patient decisions such as: (a) going to follow-up physician appointments; (b) returning home alone; (c) accepting either home services, home with home health agencies, home with family support only, or outpatient care (e.g., physical therapy); and (d) transitioning to a skilled nursing facility (SNF). HCPs are responsible for moving the patient through the transition from admission to home. The study's conceptual model uses framing effects to reduce rates of readmission.

Study concepts within the framework were: (a) readmission (dependent variable); (b) communication strategies' framing effects (independent variable); (c) meanings of illness as understood by the patient (mediating variable); (d) decision-making (DM) by interdisciplinary team with the patient on discharge choices (independent variable); (e) preferences, meanings, and understanding of choices by the patient (mediating variable) (Mishra, et al., 2012); and (f) transition (moderating variable based on theory).

## CHAPTER THREE

### REVIEW OF THE LITERATURE

#### Introduction

Pneumonia is a principle condition being targeted under the Affordable Care Act's (ACA) readmission reduction program (RRP) (CMS, 2011a). In this study, pneumonia is the main variable and diagnosis of the population under review. A literature search was initiated from ProQuest, CINAHL, clinical trials, and PubMed using MeSH terms. Articles were searched via the content's hierarchy of meta-analysis and Cochrane reports. The filtered terms applied were: transition phenomena, readmission, pneumonia, discharge planning, prospect theory (PT), communication, patient-centered care, interdisciplinary, and multidisciplinary teams. All lists were scanned for pertinent articles that identified and addressed the nature of transition from hospital to home. The aims were to glean information on the quality of published literature, to assess the effectiveness of methods, and to evaluate the status of patient participation in decisions upon discharge.

The PubMed search on PT was then refined to "framing effects in social psychology, decision-making in health" with results of 17 references. PT yielded 2,446 results in PsychINFO searches, yet together with readmission, zero references were reported. Overall, the search assessed for measures used in interdisciplinary team decisions, the importance in avoiding readmission, and assumed clinical studies would demonstrate methods to improve this intended outcome.

Mechanisms to improve communications and engagement within hospital transitions are necessary moving forward (Marciarille, 2011; McCormack & McCance, 2006). Although there are many methods available related to reducing readmission, this review of the literature substantiates the transition phenomenon and transition theory development as foundational to



reduction of readmissions (Williams, 2013; Sox & Goodman, 2012; HRET, 2010). Patient participation as members of the interdisciplinary team is supported as a new intervention. Further, prospect theory's framing effects are presented as a communication strategy (CS) (Edwards & Elwyn, 2001). A suggested significant method of avoiding readmissions for the pneumonia population is established within the following context of Chick and Meleis' (1986) transition theory and prospect theory's framed message (Tversky & Kahneman, 1991). Prospect theory evaluates a value function based on three characteristics. The three characteristics are: a) reference dependence (values of gains and losses relative to reference points, b) loss aversion with the function steeper in the negative message than in the positive message (domains), and c) diminishing sensitivities as the margin of gains or losses decrease with size (Tversky & Khaneman, 1991, p. 1039).

Timing of the mediating factors of interventions/therapeutics becomes an element that can be tested in practice (Chick & Meleis, 1986). For example, if the PN results in a patient's readmission, then what may be lacking is the patient's knowledge and understanding of his or her decision choices on the outcome. The use of framed messages using positive or negative message content as the research intervention were studied to measure potential effects on readmission outcomes when patients participated with the providers in choices at the time of discharge. Health promotion is key in the nursing process and a characteristic of the therapeutic exchange between the nurses and patient. "Promotive, preventive, and interventive" nursing therapeutics are all part of the transition model (Meleis, 2012b, p. 47). Empirical testing of the CS exchange using framed messages (when patients are members of the IT) can provide a measurable intervention to determine if there is an impact on readmission.

The characteristic of perceptions becomes a therapeutic target for the nurse to support the patient from the very beginning of the event (Chick & Meleis, 1986). When the nurse

and other providers explain prognostics and recommendations with the patient, meanings of the event are determined (Aujesky & Fine, 2008; Chick & Meleis, 1986).

When participating as part of the interdisciplinary team, a patient finds meaning in the exchange of communication. The “explanatory power” that comes from knowledge, as long as it works, has meaning (Magee, 2001 p. 187). When a communication makes no difference, then it has no significance and the result is that it has no meaning (Magee, 2001). The CS exchanges (framing effects) facilitate understanding and support agreement on choices with the patient for post-hospital care. Decisions made together with agreement within the context of the health-illness events are suggested to evaluate effects on the readmission with PN patients (CMS, 2011a; Marciarille, 2011; Orchard, 2010). Prospect theory’s (PT) use of framing effects merged with concepts from transition theory in CS with patient engagement is proposed as advantageous to outcomes (Moxey et al., 2003).

### **Patient-Centered Care Communication**

The Institute of Medicine (IOM) stresses that good communication improves patient outcomes and lowers readmission (Goldberg et al., 2012). Initial actions include establishing communications with “patients, families, primary providers” (Health Research & Educational Trust [HRET], 2010, p. 2) and “interdisciplinary teams” (p. 6). What is missing is adding the patient to the team and using framing effects for decision-making (Kahneman, 2011; HRET, 2010). According to studies (Trupp et al., 2011; Moxey et al., 2003; Tversky & Kahneman, 1981), synopses of framing effects research are seen as useful in communication with patients and affect decision outcomes, as is allowing nurses as well as physicians to adjust recommendations to fit the desires of patients gleaned from interactive discussions (Schimpff, 2012, p. 68).

Patient-centered care is defined as a program designed to include patients and families in health care decisions, creating two-way communication as a standard expectation in health

care delivery (Boev, 2013). Developed over the past twenty years as a result of collaborative models, its intentions are to improve care outcomes. However, without structure, patient-centered care is often meaningless. Integration into procedures and practices within the organization takes initiative and research to determine best methods. Studies have ensued to investigate contributions to care and identify patients' perceptions or preference for use in the health care arena (Swenson et al., 2004). In Swenson's qualitative study ( $N = 250$ ), measurements on approaches favored patient-centered communication over biomedical communication in younger age groups, use of complementary alternative therapy, and when physicians were rated as interested in them (patient characteristics) in determining the outcome; for example, regression statistics results indicate  $p < 0.001$  for this group. Younger patients responded positively to use of patient-centered styles, even with videotaped approaches. The subgroup of older patients, however, responded best to encounters with less formality. Use of framing effects methods is less formal in facilitating and motivating patient decisions (Kahnman, 2011; Trupp et al., 2011).

According to Alvarez and Coiera (2006), communication requires attention, as several studies support the importance of good communication in prevention of errors. When patients with pneumonia transition to a new care environment from home to hospital, they rely on the health care team's ability to relay care management recommendations. Yet patients often indicate that they are talked "at" rather than "with" in discussing follow-up care management (Lown & Manning, 2010). A focus on clear verbal exchanges about a patient's pneumonia illness can help increase understanding and aid in reaching agreement on services required post hospital. The exchange of information becomes important because if there is a baseline understanding of the scope of the illness situation, then decisions can be made together on post-hospital service choices (Gandara et al., 2010; Alvarez & Coiera, 2006).

Voss et al. (2011) further studied communication using Coleman's Care Transition Intervention (CTI) in a prospective quasi-experiment ( $N = 257$ ). The study used both nurses and social workers to evaluate coaching methods at discharge. Odds-ratio compared effectiveness between groups based on cardiac conditions, mostly congestive heart failure and chronic obstructive pulmonary diseases, and found coaching interventions followed up at hospital discharge reduced readmission by 30% compared to the usual care models.

Communication has been found to strengthen outcomes when messages are framed within the context of a situation (Kahneman, 2011; Trupp et al., 2011). Lack of communication between HCPs and patients is a result of poor exchanges of messages that lack meaning. Meanings are defined as the perceptions of an individual based on the situation and its impact on that individual's life, which then in turn "influences the outcomes" (Zoffman et al., 2008; Chick & Meleis, 1986, p. 241). Over the past three decades PT has demonstrated effectiveness in patient's health care decisions for surgeries and health promotion but has yet to be tested in pneumonia patients or for post-hospitalization choices (Rennke et al., 2013; Edwards & Elwyn, 2001).

Today, gaps continue in communication practices and application of patient-centered care. Stacey et al. (2011), in a literature review on decision aids' value in patient interactions, found only four studies addressed this topic. These few studies supported improved communication within clinical exchanges between providers and patients. Decision aids were found to enhance the interactions and agreements between patients and providers. There is a dearth of studies on the application of decision aids and benefits of structured communication at the time of discharge. Use of framing effects through scripts that state risk is proposed in this research to augment the encounters between nursing providers and patients.

## Prospect Theory's Framing Effects

### Decision-Making: Framing Effects

Prospect Theory is a design of choices under risk, where there is a choice between prospects or gambles (Kahneman & Tversky, 1979). A value function is defined as deviations from a reference point. The theory describes this study's CS (framed messages) helps set reference points based on the information shared with the patient, which is then viewed as a loss or gain (Kahneman, 2011, Moxey et al., 2003). Further, Tversky and Kahneman (1991) explain PT in two options as choices x and y that differ in value dimensions in decision choices based on reference points. The more a patient perceives that inaction will result in a loss, the more likely that agreement with the proposed recommendation action is achieved (Kahneman, 2011). Whereas, if the patient does not follow the recommendations (i.e., agree and find meaning in it), then the patient will view the situation as a gain and is more likely to disagree and not follow the proposed recommendations. Thus, the premise is that in situations that are perceived risky, actions or decisions are motivated more often than in gains (Trupp, 2011; Kahneman & Tversky, 1979).

Other researchers have applied PT., for example, Edwards and Elwyn (2001) found in a synthesis of literature that framing effects/messages was effective in health promotion, treatment choices, and informed decisions for surgeries. Schwartz, Goldberg, and Hazen's (2008) presented graphical descriptions of PT in a qualitative study, starting with the status quo from which patients made decision on prostate treatment. The study provided directional findings of reference points on judgements. Examples discussed found for those individuals with poor health, procedures perceived as an incremental loss were selected because these individuals perceived the procedures as "less" bad, also known as risk seeking. While Trupp et al. (2011) demonstrated in a small study that negative framing was effective for adherence in sleep device use ( $p < 0.015$ ), thus changing behavior. The population in Trupp's study

were patients ranged in age 21-77 years with known comorbidities and various reference points.

In CS, framing effects, and PT can be used as a part of the transition event communications to influence prevention of readmission. In an early study, Rybash and Roodin (1989) ( $N = 301$ ) found that framing messages impacted decisions for medical treatments. Most interesting was the effect of age: younger adults were risk averse (positive framed messages) while older adults, greater than 70 years of age, were risk seeking (negative framed message). The study supported Tversky and Kahneman's early research, concluding that decisions were influenced prior to the decision (1981). In Rybash and Roodin's (1989) study, participants had instructions qualifying the degrees of illness and the need to convince others, and there was significance found ( $p < .0001$ ) with the main effect on the treatment decision.

Risk appraisal tools amongst providers in studies varied and their use for interdisciplinary decisions was evident in only two studies reviewed (Voss et al., 2011; Parry, Min, Chugh, Chalmers, & Coleman, 2009). Adjunctive services that contribute to decisions such as nutrition and activity were noted in a few studies that influenced post-discharge services choices (Naylor et al., 2011; Courtney et al., 2012). Transitions, CS, and clinical decision-making with patients as members of the IT are not as well studied in nursing compared to medical social psychology studies (Naylor et al., 2011; Moxey et al., 2003; Edwards & Elwyn, 2001).

The propensity of social psychologists' studies using PT have found that patients are motivated to change behaviors, choices, and agreements if framing effects were used by HCPs and therefore were applicable to nursing science research (Kahneman, 2011; Moxey et al., 2003). A literature review by Moxey et al. (2003) evaluated social psychology random controlled trials (RCT) and non-RCT studies from 1990-2000 on decision-making in health

care. Results on framing effects demonstrated that both negative and positive frames have impact on health decisions such as cancer treatment choices, vaccination choice, and life expectancy (Moxey et al., 2003; Edwards & Elwyn, 2001). Use of framing effects within healthcare communication is seen as a plausible technique and can be used with patients for better outcomes (Moxey et al., 2003; Edwards & Elwyn, 2001).

### **Preferences**

Preferences, or the choices that people make are often discussed in relationship to prospect theory and stated preference (SP) methods (Fujii & Garling, 2003). Preferences focus on choices that are determined by the person's request to state a desire within the context of a situation (Fujii & Garling, 2003; Chick & Meleis, 1986). Preferences were cited as an important component in communication by community representatives and health teams to increase effective patient engagement (Olsen, et al., 2011). Winter and Parker (2007) discussed the patient's preferences in health care as related to his/her state of health. When personal health was considered, if a patient was very ill today, he/she reacted differently to prospect theory's premise of "distant prospects" (Winter & Parker, 2007, p.1695). In other words, if an individual's chance of becoming sick seemed remote, he/she was less likely to see a need and to choose a risk aversion choice. Conversely, he/she was more likely to prefer risk-seeking choices when ill or already compromised by multiple health conditions (Tversky & Kahneman, 1981).

Moreover, life-sustaining health care preferences increase with illness. In Winter and Parker's (2007) study ( $N = 304$ ), the value factor of prospect theory was interplayed in the findings' S curves midpoint, or value point placed on wellness, referred to as a reference point. Preferences were chosen in part, by the patient's perceived belief of survivability. This is an aspect of concern to hospital organizations because if a patient desires more care in the hospital rather than outpatient, cost is increased. If his/her choices conflict with the HCPs

acceptance of recommendations, the patient may then be readmitted. In the proposed research, the researchers will use framing effects (within a scripted message and indices) to motivate agreement among patients and prevent readmission in a blinded RCT.

### **Discharge Planning**

Nurse specialists' consults with providers about discharge plans as part of a transitional care model (TCM) lack a standardized structure of communication exchange, and are unclear or go unmentioned in studies (Voss, et al., 2011; Shepperd et al., 2010; Shepperd, Parkes, McClaran, & Phillips, 2008; Naylor et al., 1994). Shepperd et al. (2010) accessed 62 articles measuring the effects of discharge planning on outcomes of mortality, LOS, and readmissions using "fixed-effects models for dichotomous outcomes of mortality, unscheduled readmission and discharge destinations with 95% confidence intervals [CI] for all estimates" (p. 6). The analysis ranked high in models, which indicated levels of evidence. Groups within studies were heterogeneous. Findings on discharge planning coordination varied and patient participation in communication was implicated for further study.

Surveys of the literature revealed fewer RCTs than qualitative studies, and few focused on communication with the patient. Even research reviews on discharge planning by Shepperd et al. (2008) found fewer RCTs than expected and none addressed communication with the patient. Only Cheung, Milliss, Thanakrishanan, Anderson, and Tan (2009), in a feasibility study, reviewed questionnaires from multi-disciplinary team meetings (MDTM) held in an Australian hospital, and the outcome measures found significance in the value of MDTMs in the intensive care unit (ICU). Evidence of power analysis for significance of effect size was only mentioned in a few individual studies reviewed (Cheung et al., 2009). However, patients were rarely discharged to home from these units.

It is important to note that there are gaps within discharge planning communication procedures that occurred in the comprehensive assessment process during admission



(Nosbusch et al., 2010; Shepperd et al., 2010). Often the team was in disagreement about nurses' roles and not everyone was in agreement that nurses should be doing discharge planning. Yet most HCPs agreed that more time for communication with patients was valuable (Nosbusch et al., 2010). Some lacunae existed in uniformity of CS, although teams' inclusion of patients was seen as necessary for improved outcomes to reduce readmission (Marciarille, 2011; HERT, 2010).

Larger studies addressed effect size, but not all articles available met aforementioned criteria for analysis (Shepperd et al., 2010). There was a dearth of IC team strategies and a lack of standardized structure in discharge planning, with little use of indices on mental health, functional status, or survivability-mortality measures to determine uniform recommendations for choices post hospital (Braes et al., 2009; Aujesky & Fine, 2008; Fewster-Thuente & Velsor-Friedrich, 2008). Noteworthy are Legare et al. (2011), who provided a description of communication models for patients' involvement in decisions to improve outcomes.

Moreover, data-based studies identified the need for IC exploration in discharge planning and readmission (Nosbusch et al., 2010; Shepperd et al., 2010; Shepperd et al., 2008). Nosbusch et al. (2010) reviewed 38 articles from 1991-2008 on discharge planning and the perceptions of bedside nurses. The systematic reviews noted that what was lacking on discharge was a focus on communication. Most articles focused on discharge planning with a mix of qualitative and quantitative study designs (Nosbusch et al., 2010; Shepperd et al., 2010; Shepperd et al., 2008).

### **Transition**

Research in the area of transitions has evolved over time progressing to transitional care models (TCM) that now exist to benefit outcomes for both patients and organizations (Naylor et al., 2011; Naylor, 1999). The fields of psychology, sociology, and government studies

each have maintained an interest in transitions. Utilization and cost have motivated these disciplines to evaluate transition models that focus on effective programs preventing readmissions at 30 days, 90 days, or 6 months post-hospital services (Naylor et al., 2011; Naylor et al., 1999; Brooten et al., 1988). The effects of transitions on the elderly were introduced in a RCT by Naylor et al. (1999) ( $n = 363$ ), and with ( $n = 125$ ) caregivers over a 24-week period. Results suggested, as did Brooten's earlier study (1986), that readmission between groups at two weeks was lower for the intervention groups versus the control groups that received no intervention and the standard of care. Relative risk of readmission was  $p < .0001$  for readmission when followed by APNs/specialized nurses. Control groups were "more likely to be readmitted at least once," with patients in the intervention group having fewer days of hospitalization at 24 weeks ( $p < 0.001$ ) (p. 617). These findings promoted further development of the TCM by generalizing methods across populations to decrease readmission (Naylor et al., 1999; Naylor et al., 1994; Brooten et al., 1988).

Rennke et al. (2013) performed a systematic literature review on transitional care strategies. The research evaluated effects of interventions categorized as pre-discharge, bridging, and post-discharge care during transition to home that reduced readmission (RR). Of the 47 controlled studies reviewed, there were various methods initiated by hospitals to reduce adverse events, increase safety, and RR. Of note was a scarcity of transitional programs focused on medical conditions like pneumonia outcomes. Although there were multiple approaches being applied, there was no single best solution. The review samples represented research in both the United States (about half) and internationally. Twenty-eight were RCTs and 19 were controlled trials. Each was found to be of moderate quality in methodology. Importantly, the interventions most commonly cited included patient engagement ( $n = 37$ ), mostly around preventative education. None mentioned framing

effects or patient-centered care. Conclusive remarks point to opportunities to further examine protocols for improved effective readmission reduction programs.

### **Readmission**

Accountability for readmission is part of the Affordable Care Act's (ACA) Hospital Readmissions Reduction Program (RRP), which penalizes hospitals for readmissions (CMS, 2011ab). PN patients are affected by RRP, accounting for over 1.1M discharges and comprising 18.5% of all readmissions (Hall, DeFrances, Williams, Golosinsky, & Schwartzman, 2010). Health policymakers are challenging nursing and HCPs to approach new methods to preventing readmission using communication and engagement (Goldberg et al., 2012; CMS, 2011ab). These findings reinforce that the decision-making process for pneumonia discharges ought to be examined.

Patient care services for hospitalized patients begin upon hospital admission and last through discharge planning as cited by U.S. Public Health discharge planning rules (2004). The initial assessment and recommendations made by the health care team upon admission and throughout the hospital stay determine the subsequent course of events, known as transition. Smooth and seamless transitions enhance the continuum of care at discharge, which is required to prevent readmission (Meleis, 2012ab; Zoffman et al., 2008). Since decisions by HCPs influence the efficacy of a patient's post-hospital care, communication with the patient benefits an understanding of illness and improves consensus in planning post-hospital care (Goldberg et al., 2012; Marciarille, 2011). Collaborative decision-making with patients and team members affects transitions and readmission outcomes because each party influences transition choices (St. Pierre, Hofinger, Bureschaper, & Simon, 2011; Bowles et al., 2003).

Advantages of systematic reviews and meta-analyses are the identification of common themes for drawing conclusions on what works during the discharge transitions (Nosbusch et

al., 2010; Shepperd et al., 2010; Shepperd et al., 2008). These studies identified poor communication, verbal or written, impeding the discharge (Nosbusch et al., 2010). One of three types of communication delineated was between nurses and patients. Findings by Nosbusch et al. (2010) indicated that patients were not part of IC, and nurses did not take an active role in IC or discharge plans (p. 768). One interesting finding was that nurses' quality of communication was significant as a predictor of patients' readiness for discharge (Nosbusch et al., 2010). RCTs that controlled for unknown variances have advanced knowledge on readmission reduction and have validated the value of research on transition from hospital to home (Naylor et al., 2011). Unfortunately, it has been difficult to report whether any single intervention can prevent readmission (Naylor et al., 2011; HRET, 2010; Shepperd et al., 2010; Shepperd et al., 2008).

Communication continues to be mentioned as important in avoiding readmission for Medicare recipients (Marciarelli, 2011, p.68). Joynt et al. (2011) demonstrated the value of collaboration between doctors and nurse practitioners (NP) during transitions post hospital when home visits are implemented. The studies by Brooten et al. (1986 & 1994), along with Naylor et al. (1994 & 1999), initiated the development of today's TCM influencing policy and Medicare now includes TCM language in national documents (Naylor et al., 2011; Marciarille, 2011). Today, hospital strategies confidently utilize advance-practice nurses (APNs) and registered nurses during discharge to enhance care through the hospital stays and post hospital to prevent readmission (Naylor et al., 2011; HRET, 2010). What continues to be lacking are collaborative studies at bedside on effective CS using framing effects, and how these effects may influence readmission (Kahneman, 2011; HRET, 2010; Shepperd et al., 2008).

## **Clinical Implications**

This study will help provide information on the usefulness of framing effects by minimizing gaps in our knowledge of the factors involved in patient communication at the time of discharge and its role in decision-making. When assessing the improved patient understanding of pneumonia readmission risk, this study will add valuable knowledge in the area of better patient care to improve quality of life. Contributions may extend to implementation of organization policies with expectations for standardizing communication methods, or producing new types of decision aids, which may realize prospective costs saving by reduction in pneumonia readmissions.

Improved communication standards are needed for better health outcomes and management of health care costs (Sox & Goodman, 2012). If informed during transition, understanding the severity of a pneumonia illness can have meaning to patients. Studying prospect theory's application through communication of pneumonia severity at patient discharge may increase the patient's understanding and quality of care. Typically, patients with comorbid conditions are familiar with managing their illnesses, yet knowledge of the illness or risks of outcomes vary (Legare et al., 2011; Edwards & Elwyn, 2001). Measuring response to communications framed with severity messages are primary variables of this study design in data collection and evaluating readmission outcome.

While caring for patients, nurses can confidently use evidence-based practice alternatives that inform patients of illness severity in framed messages because empirical data supports decision tools and communication standards (Salovey & Wagener, 2009). Improving information exchanges among the interdisciplinary team (IT) with patients as members is a method of increasing value in the transitional care model (Jones et al., 2011; Lown & Manning, 2010). Decreasing pneumonia readmission is a part of the discharge planning program's goals (CMS, 2011a; HRET, 2010; U.S. Public Health, 2004). However,

studies suggest that the process of making discharge decisions needs to be examined carefully (Shepperd et al., 2010; Edwards & Elwyn, 2001).

Decisions by HCPs influence the efficacy of patients' post-hospital care. The meaning, preferences, and involvement of patients during transitions affect wellness (Parry et al., 2009; Chick & Meleis, 1986). A study on CS and decisions prepared together with patients may increase agreement on choices, and decrease readmission because patients will "understand how to get their needs met" without needing to return to the hospital (Schmipff, 2012; Parry et al., 2009, p. 87).

### **Summary**

In conclusion, the analysis of these studies' findings used varied designs: qualitative, quantitative, and meta-analysis to address research outcomes, statistics, strengths, and weaknesses. There are many approaches to reduce readmissions with varying degrees of success (Williams, 2013). The intentions of communication strategies are noted as a means to contribute to health policy by transforming communication standards within hospitals to include framing effects. Engaging patients as stakeholders in decisions using evidence claims to influence outcomes and meet the Institute of Medicine's (IOM) 2020 goals (Stacey et al., 2011; Olsen, et al., 2011). Policymakers are challenging HCPs to consider new methods of reducing readmissions using communication, decision aids, and engagement (Goldberg et al., 2012; CMS, 2011a). When HCPs and nurses frame messages related to the transition concerns, readmission rates may improve via agreements on care choices. This research tested CS and demonstrated the effectiveness of framing effects on the readmission reduction outcome.

**FIGURE 3: Framing Effects Consequences on Readmission**

(Adapted from *Levin et al., 1998*)

*Behavior Agreement*

Positive Frame  
[Approach]

<u>Consequence A</u> Obtain Gain (no readmission)
<u>Consequence B</u> Lives saved

Negative Frame  
[Avoid]

<u>Consequence C</u> Loss Aversion (no readmission)
<u>Consequence D</u> Lives lost (readmission)

## **CHAPTER FOUR**

### **METHOD**

#### **Purpose of the Study**

The purpose of the study was to measure the effects of a specific communication strategy, framing effects, on hospital readmission rates for pneumonia patients. Framing effects are positive and negative messages that are known to motivate decisions in health situations (Winter & Parker, 2007; Edwards & Elwyn, 2001). Framing effects have not been tested in patients with pneumonia and this study hypothesizes that framing effects will reduce the outcome of hospital readmission.

#### **Research Questions**

(RQ 1) Do framing effects (either positive or negative) affect the readmission outcome at 30 days post hospital discharge? Framing is the main condition (independent variable) of the experiment and the primary outcome (dependent variable) is readmission within 30 days of discharge.

(RQ 2) To what extent do pneumonia readmissions decrease at 30 days post hospital discharge when communication strategies (CS) include the patient or family in decisions about discharge transitions?

(RQ 3) Do patients with patient-provider transition agreements that include post hospital services differ by intervention arms compared to those who do not have agreements?

(RQ 4) What is the effect on readmission (change in odds ratio) of potential confounders, age, number of diagnoses, and pneumonia severity index (PSI)?

#### **Specific Aims and Hypothesis**

The aims of this study were to determine if framing effects impact decision behaviors of patients with the diagnosis of pneumonia.



1. To compare the communication strategies (intervention) of framing effects (positive or negative messages) on the readmission outcome at 30 days post discharge.

Hypothesis (H<sub>1</sub>): The readmission rate (dependent variable /outcome) among patients in the negative framing intervention (framing groups /independent variable) will be significantly different than the rate among patients in positive framing intervention at 30 days post discharge. Null Hypothesis: There is no difference between positive and negative framing effects on readmission rates at 30 days.

2. To assess the extent pneumonia readmissions decrease at 30 days post discharge when communication strategies (CS) include the patient and family in decisions about transitions. Hypothesis (H<sub>2</sub>): The readmission rates among patients who are in the intervention groups (positive and negative framed messages) will be significantly different than the rates among patients in the control group at 30 days post discharge (Fisher exact test). Null Hypothesis: There is no difference between intervention and control groups on readmission rates at 30 days.

3. To determine the impact of intervention arms on patient agreement with the decided hospital provider recommendations (HCP). Hypothesis (H<sub>3</sub>): Patients by intervention arms [framed messages] who have agreement (dependent variable) have a difference compared to patients with no agreement on HCPs recommendations (Fisher's exact test). Null hypothesis: There is no difference in agreement of patients with HCP recommendations by intervention arms.

4. To examine the potential confounding effects on the relationship between framing effects and readmission rates by age, pneumonia severity index, and the number of diagnoses. (H<sub>4</sub>) The age, number of diagnoses, and the PSI score will have an effect on readmission rates at 30 days in intervention groups. Null Hypothesis: There is no effect of age, number of diagnoses and PSI on readmission rates at 30 days (Logistic regression and odds ratio).

## Experimental Design

The design of this study was a double-blind randomized control trial (RCT) with parallel assignment of patients ( $N = 156$ ) with pneumonia (PN) into one of three arms. Intervention Arms “A,” or “B,” and Control Arm “C.” The intervention splits into three arms, two arms use a communication strategy: Arm A-positive framing message and Arm B-negative framing message. The third arm was the control group. The intervention provided patients with a message regarding the risk for readmission in relation to the severity of the PN illness. The “C” group listened to a neutral audio CD message. All arms received usual care for PN with explanations of recommendations based on standard discharge planning practices (CMS, 2010). The readmission rates (outcome) were compared between the randomly assigned arms/groups (intervention) at 30 days post-discharge by review of medical records (MRs). The researcher continued examining for biases and assumptions, while taking care not to interfere with the integrity of the study design. The study protocol was approved by the UCLA Human Subjects Protection Committee at each site where data collection occurred.

1. Intervention Arms (A & B): Audio-taped communication received on CD had either Arm A-intervention positive framed message or Arm B-intervention negative framed message.
2. Arm C: Control Group (standard care): Audio-taped communication received on CD had information on a neutral non-related topic.

The study proposed causality between the communication strategies (framing effects) and the outcome of readmission (dependent variable). Randomization of positive and negative framing scenarios were the conditions that allowed for the comparison of the post-study effects on readmission outcomes. Patients who received information in this format were able to consider the information and agree or disagree with the recommendations based on the communication and exchange with the providers (Goldberg, Koontz, Rogers, &

Brickell, 2012; Edwards & Elwyn, 2001). The RCT design was chosen since each intervention group performance was compared to the dependent variable. According to Polit and Beck (2011), blinded designs and protocol steps are attentive to potential bias by protecting outcome variation via random allocation of interventions. Blinding reduced biasing of perception because the treatment assignment was not known to certain individuals. Fain (2013) discussed in parallel double-blind studies, both the research team and patients are unaware of the intervention type. Because the study used blinded randomization of the intervention groups, the results offer new information for application in health care settings and supported internal validity.

### **Description of Conditions**

This experimental study used the following conditions: (a) loss aversion or a negative frame effect (participants agree with the discharge options based on loss aversion), (b) gain or a positive effect (participants agree with the discharge options based on a gain expected), and (c) control condition (standard of care).

### **Criteria (Inclusion and Exclusion)**

Patient criteria for inclusion were: (a) pneumonia diagnosis on admission, (b) ability to understand and speak English since the intervention is in English, (c)  $\geq 55$  years of age since mortality is increased with age according to Fung and Monteagudo-Chun (2010), (d) willingness to sign a consent, (e) able to hear voices or music using head phones, (f) alert and oriented, and (g) MMSE  $\geq 26$ . Exclusion criteria were patients with: (a) self-report of diagnosis of dementia or are known to be on a dementia medication, (b) unable to speak or read English, (c) a score of 25 the MMSE, (d) without a PN diagnosis, (e) having known hearing loss without corrective devices, and (f) PN patients with a history of being admitted in the last 60 days prior (Naylor & Bowles, 2005).

## **Operational Definitions**

The operational definitions were as follows:

1. Readmission was the outcome or dependent variable and was a measure of 30 days from the date of discharge for a patient who had a diagnosis of pneumonia and now is readmitted for any reason back to the hospital from their home or a community facility. According to the University Health System Consortium (UHC), measures for all-cause readmission rates are for adults (non-obstetric), returning to hospitals within 30 days of discharge from the prior (index) admission (UHC, 2014). Numerator: total number of readmissions (all causes) within 30 days.

Denominator: Total number of discharges (eligible for readmission). Exclusions: readmits for dialysis, chemotherapy, mental health diseases, or death on admission (UHC, 2014).

2. Communication strategies (CS) were the independent variables. The intervention (framing effects-positive or negative) were proposed to change the degree of patient/family behavior and decision-making related to post-hospital choices for services/care.

3. Framing effects (communication strategies as a framed message) were the intervention and were presented on a CD, and randomly assigned to one of the three Arms (positive vs. negative vs. control) (Kahneman, 2011; Salovey & Wegener, 2009; Tversky & Kahneman, 1991).

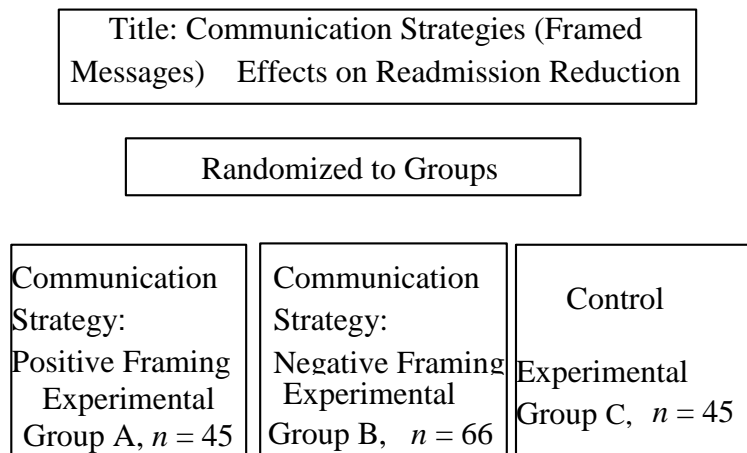
4. Agreement (independent variable) was defined as both the participant and the provider agreeing (Case Management Agreement [CMA/discharge RN]) on the choices for post-hospital care at the time of discharge.

5. Participants were the persons that enrolled in the study and listened to the CD (intervention) and agreed or disagreed with the discharge plan.

6. Meanings and understanding (mediating variable) were defined as patients' assigned meaning to the transition based on their past experiences, knowledge about the transition, the reference point, and influences (Meleis, 2012a; Kahneman, 2011).
7. Preferences (mediating variables) were patient's individual partialities for services post-hospital (Winter & Parker, 2007; Winter, Lawton, & Ruckdeschel, 2003; Tversky & Kahneman, 1981).
8. Pneumonia was the diagnosed condition and reason for a patient's admission to the hospital for treatment and care within this study. Pneumonia was defined as an acute respiratory infection and the illness diagnosis of the subjects enrolled in the study.
9. Reference points were representative of the subjects' point of reference concerning their present status of health on their continuum and perceived vulnerabilities (Winter, Lawton, & Ruckdeschel, 2003; Tversky & Kahneman, 1991).
10. Pneumonia severity index (PSI) was a tool used to determine severity of illness (Aujesky & Fine, 2008; Fine et al., 1997).
11. Discharge instructions were part of the standard individualized plan of care based on hospital policy, provided to each patient at the time of discharge by the registered nurse. Patients participated in the plan and agreed or disagreed with the plan at the time of discharge and signed/verbally agreed with the explained post-hospital recommendations.
12. 60 day: A measure used to screen out potential enrollees in order to assure patients had not had a hospital encounter within 60 days of enrollment.
13. Screening: The process of inquiry that ensured the exclusion criteria was upheld, patients with PN were not enrolled twice.
14. Readmissions payment is defined as a decrease in hospital payment based on PN readmits by hospital rates of readmission and is based on operating DRG payment differences by HL1/HL2 and HRS readmissions rates (CMS, 2015).

**FIGURE 4:**

**STUDY DESIGN**



**Variables**

1. The independent variables were: (a) communication strategies (CS) with positive or negative framing effects/messages (nominal); and (b) subjects discharge choices, which were ordinal (high or low).
2. The primary dependent variable was readmission at 30 days post hospital discharge (the outcome) and was nominal (yes or no). A secondary dependent variable was agreement (outcome) and was nominal (yes or no).
3. Moderating variables were age (continuous), gender (nominal), and ethnicity (categorical).
4. Mediating variables were subjects' preferences, meanings attributed to the illness, and subjects' understanding of recommendations (categorical).
5. Potential confounding variables were the extent of patient understanding of the pneumonia severity, the number of patient comorbidities, ages of patients, length of stay, the hospitals policies, or the dynamic environments of the hospital settings (nominal/continuous). The groups of patients had multiple covariates: age, gender, and ethnicity (moderating variables), which were measured as demographics. HCPs and IT members considered age

and gender as part of the pneumonia severity index (PSI) when making decisions for post-hospital recommendations. All participants received standard procedures unique to specific hospital policies (e.g., follow up appointments made by hospital staff prior to discharge).

### **Settings**

Two hospitals with established relationships with the UCLA School of Nursing (SON) agreed to participate. The hospitals were licensed tertiary hospitals with 266-350 beds, one in Orange County (OC), and the other in Los Angeles County (L.A.), California. The L.A. hospital serves 40,000 patients annually (2012), approximately 880 of which are PN patients. The OC hospital serves 64,670 patients annually (2012); of which 1,214 are PN patients (Quality Improvement Organizations, 2013; University of California, Irvine (UCI) internal reports, 2013) (Appendix I).

After the study was approved by the UCLA SON and the UCLA institutional review board (IRB), a final letter of agreement was obtained from both hospitals' nursing leaders permitting the recruitment of participants and allowing access to the hospitals for reviews. The initial exchange explained the study's title, purpose, and requirements. The two hospitals are in the same health system, yet vary in location by county, with both admitting PN patients directly from physician's services (clinics/offices) or from their respective emergency departments (ED). All procedures, approvals, and time frames were provided to hospital stakeholders prior to the study's implementation. Approximately five staff members employed by the hospitals and/or research assistants (RA) from the UCLA or UCI schools of nursing were selected to assist the PI. Each was trained to assist the researcher in recruitment of patients from the ED or medical units.

### **Recruitment**

Recruitment flyers were posted in the hospital approved areas and on medical units to recruit adults aged  $\geq 55$  with a PN diagnosis at admission for the study. Prospective

participants were referred to the study in three ways: (a) participants were told about the study by hospital staff and agreed to have hospital staff tell the researchers to approach them, (b) participants learned about the study through the posted flyers, and/or (c) participants were approached by the researcher by an approval of waiver of consent that allowed the PI to review a hospital list of patients with the PN diagnosis used for the purpose of recruitment. Prior to approaching the patients on the PN list, the PI asked the RNs or hospital staff if the patient may be approached. If the RNs or hospital staff said it was “OK” to ask the patients if they might be interested, then the PI approached the patient and asked if they were interested in participating in a nursing study. At any time during any of these approaches if the patients said they were not interested they were thanked for their time and not approached again by the PI.

Recruitment was intended to occur in the ED or on the medical unit within 48 hours of a patient’s admission when researchers were told by staff that the patients may be eligible, were interested in the study, and/or researchers were directly contacted by interested patients or their families. The PI then met with the interested patients to explain the study following the protocol. Prior to consent, the PI screened potential participants for eligibility, and if the subject expressed interest in participating, a *Study Information Sheet* was reviewed and the PI obtained oral consent for the study (waiver of signed consent). A mental status screen was completed using an approved IRB script and if the patient met eligibility the PI obtained a HIPAA authorization to review the medical records (subjects signs the HIPAA form) prior to administration of interventions. The risk and benefits of participating were reviewed and all questions answered. All documents were de-identified using codes and maintained in a confidential, locked room.

### **Eligibility Screening**

Screening was provided in a private manner, which included HIPAA protections and



privacy. After patients' expressed interest, the eligibility screening occurred using a script per protocol. The process was designed to lessen any burden on patients or families who would not meet the criteria. Eligibility included obtaining the participant's oral permission to screen, with review of inclusion and exclusion criteria. If the patients met eligibility based on inclusion criteria, and agreed to participate, the Mini Mental State Exam (MMSE) was used to complete a final screen. Patients provided oral consents to participate in screening; an explanation included use of an eligibility script to provide consistency in the screening process and completion of the MMSE.

## **Subjects**

### **Population Description**

The eligible target population included patients with pneumonia (PN). PN is an infectious disease, the eighth leading cause of death in America and a problem internationally (Musher & Thorner, 2014; Fung & Monteagudo-Chun, 2010; Rello, 2008; Mandell et al., 2007). Among the elderly (age  $\geq 65$  years), PN is determined to be a risk factor for mortality (Fung & Monteagudo-Chun, 2010). According to Fung and Monteagudo-Chun (2010), factors that increase risk for pneumonia are the decrease of oral secretion clearance, aspiration risk, and bacteria in gastric systems. Secondary are independent factors that increase PN risk categorized as smoking, alcohol use, nutritional status, environmental exposures, and comorbidities. Measures such as these are helpful in establishing risk for readmissions.

Pneumonia (PN) infections are caused by bacterial, viral, and fungal organisms. The infection is often superimposed over an existing infection affecting alveolar cells, with alterations in breathing patterns as the organisms cause disease in the lobes of the lungs (Baral, Batra, Zermans, Downey, & Jeyaseeian, 2014). As a result, sepsis, a systemic infection, often occurs secondary to the pneumonia organism (Langley et al., 2014; Angus &

van der Poll, 2013). Approximately 2% of all hospital admissions in the United States result in sepsis and half of all sepsis cases are due to pneumonia (Angus & van der Poll, 2013). Results of the illness and readmissions compromise the individual by increasing risk for mortality. In the United States, bacterial pneumonia is the most common type with annual deaths reported at 50,000 (Fung & Monteagudo-Chu, 2010).

Therefore, the accessible population is pneumonia participants admitted to emergency departments (ED) or directly from physician's offices or community clinics. PN admission rates are highest during the influenza season, with an underlying incidence rate of 12% throughout the year (Lessinger, Kulkarni, Zemans, Downey, & Jeyaseeian, 2014). Patients were invited to be in the study, once identified from the ED or medical units within 48 hours of admission and with the primary diagnosis of pneumonia (Fung & Monteagudo-Chun, 2010; Mandell et al., 2007). Finally, PN is an identified risk for the elderly and is costly to patients' health, hospitals, and the Medicare payers and therefore a rationale for subject selection for the study (CMS, 2011ab; Fung & Monteagudo-Chun, 2010; Fry, Shay, Holman, Curns, & Anderson, 2005).

### **Intervention**

#### **Sample Plan**

After institutional review board (IRB) approval and completion of the baseline interview, and also after screening guidelines were applied, eligible patients were enrolled by oral consent (waiver of signed consent) and after signing a HIPAA authorization. Participants were randomized into one of the three arms (intervention or control). The control arm received a generic standard communication in the same compact disc (CD) format as the intervention arms (A & B). The random sample assignment occurred in the ED or on medical units where adult PN diagnosed patients are admitted to acute care. The PI used a computerized program of a block of numbers to assign subjects (participants) into one

of the three arms (Random.org, 2013). The representative PN subjects were homogenous in age, and evenly split by gender. If randomization works, the groups should have been homogeneous in all factors in terms of severity of illness. Differences at sites may impact generalizability. PN subjects are accessible throughout the year in all emergency departments nationally, with most admissions occurring during the influenza season from October through March (Fung & Monteagudo-Chun, 2010; Centers for Disease Control and Prevention [CDC], 2012).

### **Description of the Intervention**

A CD was the planned medium to present an audio of the framing effects message (communication strategy). This method was used to communicate a positive or negative message to the patients about the severity of their pneumonia risk for readmission. The CD script information was based on the PSI indices and risk attributed for readmission (Aujesky & Fine, 2008). Audio CD intervention mediums have been used previously in prospect theory studies (Trupp et al., 2011; Hack, Pickles, Bultz, Ruether, & Degner, 2007; Edwards & Elwyn, 2001). The intervention used an audio CD to communicate both the framed messages and the standard generic message to patients with pneumonia. The literature shows that audiotapes benefit patients in consultations (Hack et al., 2007; Edwards & Elwyn, 2001). The messages were conveyed verbally by an audio recording and were tailored to represent the positive or the negative message over a 60-second period. For example, the positive message states, “As you know you have been diagnosed with pneumonia, a respiratory infection. It takes time and a careful program of treatment to recover from pneumonia. If you follow the recommendations agreed upon with the health team, your registered nurses, and physicians, you will: (a) have more energy, (b) be able to breathe better, (c) be able to complete daily activities, (d) have a better appetite, (e) feel less fatigue, and (f) prolong your life” (Appendix G).

Each arm received a copy of the consent (waiver of signed consent), HIPAA authorization form (participants sign), a CD, headset, and a copy of the American Thoracic Society (ATS) educational hand out on pneumonia disease (ATS, 2013). Hospitals are dynamic health care environments where subjects receive various communications. Multiple disciplines routinely communicate findings using information from indices as recorded in the medical record (MR). These findings are to be reviewed prospectively by the researcher during data collection (medical record abstraction) and include information on activity of daily living (ADL), laboratory findings, clinical disciplines findings, recommendations, and disposition at discharge (Wiener, Hanley, Clark, & VanNostrand, 1990; Edwards, 1990).

## **Procedures**

### **Blinded Randomization**

Patients were allocated to intervention arm A or intervention arm B (framing effects), or arm C control (neutral content) groups by a schematic of computerized numbers. The CDs were randomized to intervention A, intervention B, or control C groups using the same procedure (random.org, 2013). The allocation schedule was computer generated by the PI, who was not involved in the administration of the study interventions. Allocation was concealed in advance by the nature of a minimization procedure. Labels were placed on all materials in prearranged packets available for use within study procedures by a schematic of computerized numbers, minimizing differences.

The study was therefore a double-blind RCT design, with parallel assignment of pneumonia patients allocated to receive control (neither message intervention), or intervention A, or intervention B. A delegated PI and RA, to whom the allocation is concealed, followed the study protocols during enrollment or when administering the interventions. The participants listened to the CD message and the RA administering the

interventions followed the study protocols and did not know which intervention has been assigned.

### **Demographics**

The research associate or PI reviewed the medical record for demographic information by completing a medical record abstraction form (Appendix F). A baseline self-report questionnaire (Appendix H) asked questions on education and employment. Information obtained from the questions on education and employment assisted the PI in analysis of confounding variables that may have impacted outcomes. These were completed after the consent process (waiver of signed consent) and signature of HIPAA authorization. All information was coded and maintained in a secure and confidential manner. The interactions with the subject or family member were approximately 10-15 minutes. All research data were stripped of participant identifiers after analysis at the end of the study.

### **Patient Intervention**

Following the randomization procedure, each subject in the intervention arms (A & B) and in the control arm (C) received an audio CD recorded message and listened to the CD content that was no longer than 60 seconds. The CD was presented after consent procedures were completed and the total time with the subjects was expected to be no greater than 10-15 minutes. Both CDs and each subject were randomly assigned with PIs and RAs blinded to the content.

The PI: 1. Explained and instructed participants in study protocols using a neutral manner to sustain a non-biased approach.

2. Followed recruitment, eligibility screening, consents and HIPAA protocols aiming to enroll subjects within 48 hours of admission.

3. Aimed to administer the intervention prior to discharge when the patient was feeling better.

4. Sent a mailed survey to the enrolled subjects at one month following hospital discharge per IRB approval.

The RA: 1. Administered the intervention by having the subjects listen to the CD using headphones in his/her presence a minimum of one time. Afterwards, the subject was able to listen to the CD as many times as he/she wished.

2. Reviewed and explained the intervention only once to the subjects and administered the intervention using headphones.

3. Provided each subject with the CD, headphones, and an educational handout approved by the ATS (2013) on the pneumonia illness (Appendix J).

Other communications that transpired between patients and HCP occurred per usual standards of care within the organizations. Medical record (MR) entries included in study abstractions are based on study protocols. Each unique discipline follows its standard requirements for care of a patient with pneumonia based on medical orders as set forth by procedures within the organizations. Expected interactions and MR entries include: (a) the RN's completion of organization's discharge instructions (DI) with the patient/family at the time of discharge and as part of usual discharge practice; (b) RN's or case manager's review of physical and/or occupational therapist measures of activity of daily living (ADL), Functional Status (FIM), and instrumental ADL (IADL) following usual care; and (c) other disciplines' communication with the patient and team per their usual care. These notes were reviewed in data collection. Nutritionist notes and lab values provided albumin levels, body mass index (BMI), dietary and caloric requirements as included in standard discharge notes. Additionally, speech therapist (S.T.) notes provided information on communication limits, swallowing test results if applicable; ancillary staff reported additional observations as appropriate, which may include respiratory care providers (RCP), or others; and patients' subjective assessment and objective findings were considered.

Advanced directives documentation was reviewed by the PI prior to encounters with patients. Patients were provided information on their clinical results by each discipline, and discharge planning specifics such as family and social support, transportation, and financial limits (U.S. Public Health, 2004; Weiner et al., 1990). Each IT member was assumed to follow the standards of measurements approved by his/her disciplines. ADL and IADL measures were designed in 1969 and have been tested in 1990 for reliability (Edwards, 1990).

In conclusion, subjects received recommendations both verbally and by receipt of the discharge plan as per policy of the hospital. Data from the exchanges was collected before and after chart reviews of discharge disposition and entered as decisions for post-hospital care. Both the "I" and "C" groups had decisions as yes agree or no disagree.

### **Data Collection**

Collection of data began after consent (waiver of signed consent) and HIPAA authorization was signed, and at 30 days post-discharge. At intervals of one month the PI reviewed medical records to assess if participants were readmitted at 30 days. Patient information was collected for intervention and control groups, and data included age, gender, ethnicity, insurance status, smoking/non-smoking, marital status, shortness of breath (SOB) and living arrangements (alone or lives with others). Specific MR PSI data used to obtain the PSI score included: (a) age, gender, and nursing home resident status; (b) comorbid conditions of (i) renal disease, (ii) liver disease, (iii) heart failure (HF), (iv) cerebral vascular disease, and (v) neoplastic; (c) physical exam at time of admission noting (i) altered mental status, (ii) systolic blood pressure < 90, (iii) temperature < 35 or > 40 centigrade, (iv) respiratory rate > 30, and (v) heart rate  $\geq$  125; and (d) laboratory findings of (i) PH < 7.35, (ii) PO<sub>2</sub> < 60 or saturation < 90, (iii) NA < 130, (iv) HCT < 30, (v) glucose > 250, (vi) BUN > 30, and (vii) pleural effusion (Fine et al., 1997; Fine et al., 1993). The PSI calculation is part of the medical record abstraction form which records findings from MR.

Actual interaction data from both the intervention and control groups was documented on confidential medical record data abstraction worksheets maintained in a confidential locked room. Medical record review including laboratory, radiology, and expert health reviews was collected. The randomized communication strategy (positive or negative framing effect) assigned to intervention and control groups, was entered as codes on the data collection sheet. The PI was available to answer intervention and control group's questions about HCP post-hospital recommendations.

At 30 days post admission, a follow-up survey was sent to the patients to evaluate by self-report information on the status of their follow up with a physician, health satisfaction, breathlessness, if they had received home health if ordered, and to inquire on the symptom of shortness of breath. The self-reported descriptive data was collected to assess the subjects' post-hospital follow-up care.

### **Intervention Groups**

The PI, with assistance from the RAs, completed a medical record abstraction worksheet, which notes provider recommendations after consent and after patients have listened to the CD. HCP members were the physicians, case managers, and RNs assigned to the patient and were familiar with the study's purpose. The worksheet (data abstraction) completion occurred after participants' received the audio recording interventions.

The worksheet form is a method used in conjunction with the randomly assigned audio CDs during administration of A, B or C arms, to record the date and time of the one-on-one exchanges between the RA and the patient. The CD content is blinded to the patient, PI and RA. Forms were collected by the PI or a delegate RA and submitted to the PI for record-keeping and data collection purposes, following all confidential and privacy protocols.

### **Control Group**

The control "C" group (Arm C) listened to an audio CD after consent. Because the



study is blinded, the control group followed the same procedures as the intervention groups (Arm A and Arm B).

### **Patients as IT Member Procedures**

Both the intervention A, B, and control groups were admitted to multiple medical or intensive care units typically used for the care of patients diagnosed with PN. Patients may be admitted from the ED and transferred to an intensive care unit, sub-ICU prior to admission to the medical units. Discharge usually occurs from medical units. The interdisciplinary final recommendation was entered in the medical record as recorded by the physicians, discharge planners/case managers, or registered nurses. The researcher recorded the decisions-recommendations conveyed on the data collection sheet. Medical records were accessed electronically using sign-on and passwords per the hospital policies to access discharge instruction content.

### **Instruments**

#### **Medical Record Abstraction Form**

Patient characteristics were gender (both males and females), age ( $\geq 55$  yrs.), employment, social support, smokers, living situation, education levels, and insurance (Ware & Sherbourne, 1992). Other variables measured were the hospital departments accounted for in the admission, PSI variables, readmission rates at 30 days, and mortality. Patient comorbidities, pneumonia diagnostic test-laboratory and radiology findings were collected as part the PSI measures. Functional status, length of stay, and PSI scores were collected using questions from standard valid and reliable tools available and documentation by specialists (Arnold et al., 2010; Aujesky & Fine, 2008). Analysis of all factors were reported using statistical comparisons of means analysis of variance (ANOVA) and Fisher's exact test.

## **Mini Mental State Exam (MMSE)**

Cognitive impairment is important to consider when enrolling individuals as subjects into studies. Patients diagnosed with pneumonia are at higher risk for temporary cognitive changes due to the severity of the disease. Mentation is affected when oxygen saturation is altered via hypoxemia from a respiratory infection (Aujesky & Fine, 2008). Subjects were unable to consent to participate in this study if they had altered mental status secondary to dementia from cognitive changes affecting their judgment.

The mini mental state exam (MMSE) was used in screening for eligibility. MMSE was developed in 1975 and is a tool often used to screen study subjects for dementia (Nasreddine et al., 2005; Folstein, M., Folstein, S. & McHugh, 1975). The MMSE tool had 5 questions and 11 criteria to calculate mental challenges with a potential highest score of 30. A score of 30-29 indicates the person is cognitively normal, 28-26 indicates the person has borderline cognition and a score of 25 or lower indicates there is a memory issue (Folstein et al., 1975). In the study, all subjects were screened for cognitive dysfunction prior to enrollment. Subjects were eligible with a MMSE score of 26 or above. If scores were lower than 26 the prospective subjects were excluded from participation. Educational materials were then shared and each patient was thanked for allowing the researcher to screen (Appendix J).

The selection of the MMSE was a result of comparison to the MOCA scale, and although less sensitive than the MOCA instrument, the MMSE was accepted. The MMSE's purpose was to screen potential subjects for dementia and had been used successfully in transition research (Naylor et al., 1999; Folstein et al., 1975)

The MMSE measures executive functions, memory, conceptual thinking, and language (Naylor & Bowles, 2005). The MMSE's previous use in elderly transition research made it a good tool for this study (Naylor & Bowles, 2005). If eligible participants fail the

MMSE due to cognitive impairment, they are referred to the attending physician for follow up care (Appendix E).

### **CD Scripts** (Appendix G)

Scripts were the conditions recorded on the CDs and used in the study intervention to test CS (framing effects: positive/negative messages - Arm A and Arm B) or Arm C (neutral message) on the outcome of readmission. Decisions made by patients with pneumonia during the transition event of hospitalization were affected by mediating, moderating factors, and the interventions. The decisions were influenced by the subject's perception of the pneumonia illness consequence, either as a gain or a loss, based on the reference points of the individual (Kahneman, 2011; Schwartz, et al., 2008; Tversky & Kahneman, 1981).

### **Pneumonia Severity Index (PSI)**

The PSI was applied in the study as a decision tool that used the inter-relationship of prognostic variables and comorbidities in a predictive rule. Severity and mortality are the two main concepts of the PSI prediction rule instrument (Fine et al., 1997). Severity is described as the likelihood of mortality within 30 days post admission to an acute care hospital (Arnold et al., 2010; Fine et al., 1997). Mortality is defined as death within 30 days of being diagnosed with PN (Fine et al., 1993). The patient that presents with PN symptoms becomes central to the determination of risk. The attributes were the prognostic variables, each of which has a value that must be calculated to identify interrelationships. This process involves interaction between the weighted variables as impetus for prediction of severity and the risk of mortality from community acquired pneumonia (CAP).

CAP is diagnosed based on inclusion of clinical assessment factors and the judgement of physicians. The variables defining the diagnosis become the classification criteria within the instrument for the prediction. Specific assessment factors are: (a) a “new

pulmonary infiltrate (within 24 hours of admission); and (b) an association with at least one of the following factors: a new or increased cough, an abnormal temperature ( $< 35.8^{\circ}\text{C}$  or  $> 37.8^{\circ}\text{C}$ ), abnormal leukocyte counts (leucocytosis, leukopenia, or the absence of immature neutrophils),” or other physical findings like increased respiratory rates of  $\geq 30$  per minute (Arnold et al., 2010, p.1737; Fine et al., 1997). Severity outcomes are usually demonstrated when symptoms for these factors are positive. These criterion-referenced measures were explicit in the practice domains of both nursing and medicine.

Fine et al. (1997) ranked 20 predictor variables using a step approach method to mirror the physician’s decision-making when diagnosing PN (p. 244). The PSI is one instrument that was developed to address inconsistencies in judgment about the degree of illness in pneumonia (PN) patients, in order to predict severity and risk of mortality by summation (Fine et al., 1993). The PSI prediction tool uses 20 variables as items of severity for PN. A clinical predictive rule is defined as a decision-making tool for clinicians that include three or more variables from the history, physical examination, or simple diagnostic test that provide the probability of a suggestive diagnostic, therapeutic action (Wasson, Sox, Neff, & Goldman, 1985). The PSI is a valid interactive tool approved by the American Thoracic Society (ATS) to determine the risk of mortality and outcomes (Aujesky & Fine, 2008) (Appendix F). The content was included in the medical abstraction form. The PSI potentiates control of confounding variables related to the timing of the enrollment which was designed to occur within 48 hours from admission.

### **Compact Disc (CD)**

The CDs were the medium for communicating framing effects to patients in intervention (positive or negative message) and control groups, and each is randomly assigned to the patients. Administration of the CD audio interventions occurred when subjects were feeling better prior to discharge. HCPs, PI, RA, and team members did not

know which message was given. Each discipline's care was not interrupted or affected by the study. Each shared their recommendations with the patient/family ("I" or "C" groups) as per usual standards of care. This prevented a burden from being placed on the staff or patient, since the normal care continued regardless of their participation in the study. Message scripts were prepared and reviewed by sponsors and consultants to establish messages as positive or negative or neutral in order to measure for risk of readmission.

### **Discharge Instructions**

The discharge instructions (DI) are the signed/printed copy hospital form that is provided to the patients/families at the time of discharge based on hospital policy. The DI confirms communication of recommendations by the HCPs with the patients and was given to both the "I" and "C" groups and its content was available in electronic medical records (EMR). The DI ensures that each subject is made aware of the care after hospital through participation in the post-hospital plan and receives the findings and recommendations of the individual team specialist. In addition to usual EMR information, the degree of agreement about decisions about post-hospital follow up is conveyed between HCPs and the patient/family. The DI indicates the final ratings of agreement about decisions that may impact readmission. The minimum entries must include decisions by the physician, bedside registered nurse, and the patient/family member. The DI is presented to the patient/family by the registered nurses per hospital protocol. The researcher reviewed the DI during the data collection process, which used the study medical record abstraction form to determine whether follow-up survey returns indicated agreement by patients to go to the physician appointments arranged and to take advantage of any services ordered.

### **Follow-Up Survey**

A quantitative survey questionnaire was sent to the participants at 30 days post discharge. Descriptive questions were asked related to the subject's perceptions of

breathlessness, feelings of satisfaction with their health and if they had seen a physician at follow up appointment(s). This data about the behavior of (a) going to a physician follow-up visit, (b) experiencing symptoms of shortness of breath, and (c) determining how satisfied they were with their health was helpful in the predictions of readmission. For example, the first question asks “Are you doing better? Or are you worsening since leaving the hospital?” The questions asked for a binary or nominal response of “yes” and “no” referring to their perceptions, followed by questions taken from the health assessment questionnaire (HAQ) derived from Stanford University, which is valid and reliable and assesses satisfaction about their health (Bruce & Fries, 2003). The second question asks “How satisfied are you with your HEALTH NOW?” The last question inquires about the services they have received, if any, at home post-hospital.

According to Bruce and Fries (2003), the HAQ self-administered questionnaire has content validity and has been used several times since 1980 in chronic illness to assess dimensions of disease-specific illness and measure outcomes in populations. Initially, the instrument was specifically applied to rheumatology outcomes but has been used “across disciplines as an instrument” (Bruce & Fries, 2003, p. 2). The follow-up discharge survey will provide insight into how well the pneumonia condition is resolved at the time of the survey.

The Borg scale modified, as part of MRC, breathlessness is one of the measures asked in the follow-up survey (Stenton, 2008). Since it is designed to measure patients with breathlessness on exertion, it provides information on how well subjects are performing activities post-hospital (Stenton, 2008). The scale has been tested repeatedly and found to be a reliable and valid tool. Originally, the scale was developed using HR measures with activity to rate breathlessness severity. Patients rate their breathlessness on a 0-4 scale in the modified version, using perceptions of shortness of breath (SOB), known as the dyspnea

symptom (Stenton, 2008; Mahler, 1990).

### **Summary**

The study proposed that framing effects (interventions) impact readmission outcomes. This research is important for practice because bedside registered nurses process and review the discharge plan with patients at the time of discharge transitions using nursing therapeutics within the health-illness event (Meleis, 2012a). The health-illness, the situation event of hospital admission, and the discharge experience, as perceived by patients, impact patients' decision-making and choices on care post-hospital. Reinforcing what providers have documented using CS, answering questions, providing knowledge on pneumonia severity and supporting patient decision choices for post-hospital care may reduce readmissions. Pneumonia readmission results in higher mortality, and is significant to both patients and hospitals (CMS, 2011a; File & Marrie, 2010). Since study findings are significant, nurses can adopt framing effects as a tool to influence readmission reduction.

### **Strength**

Strength of the design is the randomization of independent variables (framing effects). Framing effects have previously shown to be effective in both health promotion and prevention (Moxey et al., 2003). Positive and negative framing are an attribute condition and patients receiving the intervention are expected to receive more communications and have decreased readmissions. The facilities that are participating in the study at this time do not use framing effects in communication, which strengthens the intended findings. This design contributes to new knowledge on techniques to improve communication with patients at discharge (CMS, 2012b). Finally, the framing effects are scheduled to be presented randomly and RAs and providers are blinded to the assignments.

## **Weakness**

Although framing effects have been found to be effective in communication they have not been tested for benefits in readmission outcomes. Some studies have used RCT in parallel framing effects models but not consistently (Moxey et al., 2003). Confounding variables of age, ethnicity, and comorbidity effects are known to impact readmission rates and may deter efforts to isolate the impact on readmission reductions. However, randomization procedures as part of the study's design allowed for this variance, along with the control group, which acts as a proxy for the ideal "counterfactual" observation of the standard of care (Polit & Beck, 2011, p. 249). Even though providers are trained in the study protocol and use of the PSI in communication, each interaction was not be observed for full compliance. The many communications between providers and patients occurred in a dynamic environment, thus presenting a weakness to the study design.

## **Limitations**

The study was conducted at two university medical centers in the same health system in southern California. Because of location, the accessible samples may have some differences. The unique PN populations served may not be heterogeneous, with variations in socio-economic status, ethnicity, comorbidity risk, and the fact that only two U.S. hospitals are represented. This study enrolled patients who were without dementia and hospital tabulations included dementia patients that are readmitted, therefore, this difference might influence savings when using framed messages. Laboratory and comorbidity data was missing from some of the chart reviews, histories, and physical documents filed on the first admission. However, the PSI used in the framing effect communication analyses in subgroups match specific criterion or are similar. Finally, biases by providers or RAs may have influenced the outcomes. There are multiple ways the interdisciplinary team communicates with patients and these may not be sensitive to patient needs as per request.



## **Validity**

Validity is the accuracy with which the study measures what it addresses in the hypotheses. Randomization of the framing effects is known to be effective in maintaining internal validity. Construct validity was evident to the extent the framing effect variables presented on the CDs accurately reflect the model concepts. Screening was performed consistently by the PI and the intervention was delivered consistently by the trained RA. The use of the approved framed message on a CD allowed for consistent message delivery. The RAs were trained in the delivery and presentation of the CD, and are trained not to discuss any differences in order to prevent influencing subjects. Statistical findings evaluated for errors, noting corrections, and different statistical nonparametric results. Ethics were maintained with strict confidentiality, privacy practices, and rights of patients. Patients that were too sick to participate were not approached. All data was de-identified and kept in locked secure areas.

## **Human Subjects**

This study received an IRB (waiver of signed consent) for informed consent. Patients with pneumonia, if interested in the study received an information study sheet. Receiving the information allowed them to decide to participate, when they felt better. No medical records were reviewed until patients signed a HIPAA authorization form during the enrollment procedure. All data collection was maintained as confidential upholding HIPAA privacy rules. No change in this practice transpired over the study. Collection and analysis maintained further privacy as per procedures already in place at both UCLA and UCI health systems. No patient identifiers were used in summaries, presentations, or analysis.

Data was collected during individual interviews and through electronic medical record reviews using a MR abstraction form that was IRB approved. Only after patient's expressed interest in participating in the study and had received and signed the HIPAA authorization

was information obtained. Additionally, in order to secure information the RNs were instructed to refrain from using the participants'/subjects' names when discussing the interactions with the other personnel. All electronic and paper data as well as electronic copies and paper copies were assigned codes and maintained using password-protected computer access and locked in file cabinets, respectively. All discussions with the sponsors and co-sponsor were done using subject's codes. All interactions with patients were conducted in the patient's rooms or in a private office. All information pertaining to the research study participants will be destroyed seven years after the study completion as per IRB and California guidelines.

Data management for the analysis phase was conducted by the PI, faculty sponsor, and statistician. Tasks included the development/adaptation of the data collection instruments (excel and SPSS formats), protocol manuals and data input instructions, monitoring and controls (data cleaning, input, verification of data and runs, storage and security). The data was collected in the following formats: (1) data entry forms that are coded with subject identifier, (2) self-report demographic forms, (3) medical record abstraction forms, (4) the follow-up survey forms, and (5) excel or SPSS formats. The data forms and follow-up surveys will be destroyed upon completion of the study. Personal identifiers (participants' names, addresses, etc.) are not be linked to any data, as identifiers were coded for data analysis. Only the PI had access to the data.

This study reports on readmission predictors and suggests framing effects messages as an aid in the reduction of pneumonia readmission rates in hospital settings. The decision-making strategy incorporates education and understanding of risk by the patient, so the healthcare team can encourage and improve readmission outcomes.

## CHAPTER FIVE

### DATA ANALYSIS

#### **Introduction**

A double-blind RCT design, with parallel assignment of pneumonia patients ( $N = 156$ ) allocated to receive either one of two framed message interventions, or a controlled message was employed. Pneumonia is a serious disease, defined as an infection of the lungs with incidence highest amongst geriatrics and a mandated readmission measure (CMS, 2011a; Nair & Niederman, 2011). Pneumonia patients have other comorbidities that compromise an individual's decision-making and compound the overall risk for mortality (Tate et al., 2014; Nair & Niederman, 2011). Among these are recurrent pneumonia and readmissions (Hewner, 2014; File & Marrie, 2010; Fry et al., 2005). Accordingly, this chapter's perspective provides the results of the study with an analysis of the RCT use of messages to reduce readmission among this population.

Data analyses are estimates of the conditions and the subjects in relationship to both readmitted dependent variable (DV) and not readmitted groups. The independent variable (IV) of health messages found statistically significant evidence with the use of framed messages in hypothesis three (H3). There was both clinical and statistical significance when comparing study readmission rates to hospital readmission to framed messages (DV30).

#### **Statistical Analysis**

Experimental data was analyzed using IBM SPSS 22.0 and SAS software (SAS, 2014; Armonk, 2012; Buchner, 2013). Statistical methods included general descriptive ANOVA, chi-square, Fisher's Exact and logistic regression models. Continuous variables were analyzed using

summary statistics of means, standard deviation, median, minimum, maximum ranges, and analysis of variance tests (ANOVA) for hypothesis testing. Hypotheses testing were performed using Fisher Exact Test or the Chi-square test. In addition, for binary data, analysis of association was performed using odds-ratios. Categorical variables were evaluated with frequency and percent. Analysis includes baseline characteristics, comorbidities and surveys. Subset analysis includes results that address hypotheses with explanations.

The RCT allocation consisted of baseline descriptive statistics characterizing both enrolled subjects' admitting and discharge diagnoses, age, sex, ethnicity, socioeconomic factors, comorbidities as chronic health conditions, and the pneumonia severity index (PSI). The continuous variables were age, height, weight, and length of stay (LOS). All other remaining variables were categorical.

### **Sample Size Calculations**

For hypotheses 1-3, a Fisher's exact/chi-square test was performed. Using G\*Power with an alpha = .05, power = 0.8, a two-tailed test with an expected effect size being between small (.1) and medium (.3), this produced a necessary total sample size between 132-1178 (132 is the sample size needed for a medium effect size and 1178 for a small effect size).

### **Screening and Enrollment**

As the flow diagram describes, 766 patients were screened, with 156 eligible and enrolled, and three were excluded, resulting in allocation  $N = 153$  (Appendix A). Highest screened-out patients were those found to have cognitive impairment at a rate of 26.5%. Three subjects were excluded during the initial hospital stay after intervention. There was one death unrelated to the study and its occurrence was reported to IRB. PSI class ranks ranged from 1-5 with the largest group (40%) in rank 4 (Table 6.). The study populations had high acuity of illness and comorbidities (Table 8). Admitting diagnoses were: types of pneumonia, rule out

(r/o) pneumonia, or sepsis with pneumonia (Appendix P).  $N=156$  or 20.21% of 766 patients screened were enrolled. Twenty-three participants that were enrolled with PN were subsequently readmitted at 30 days post hospital.

### **Baseline Characteristics**

Data were collected from two university hospitals (HL1 and HL2) within a 13-month period. Enrollees' admissions were from November 2013 through December 2014. None had been hospitalized in the previous 60 days per protocol. Of the 156 participants enrolled, three subjects were excluded. Of those three patients, one died during the hospital stay, one was unable to complete the intervention due to a hard-of-hearing condition, and a third participant was enrolled and then found to have diagnosis of dementia during medical record review, resulting in  $N = 153$ .

Patients were admitted with a diagnosis of pneumonia in 92% of the cases; all patients were discharged with the diagnosis of pneumonia. There were no statistical differences in the distribution of the Medical Doctor's (MD) diagnosis of pneumonia across study arms ( $p = 0.835$ ). Patients who were admitted with a diagnosis of pneumonia in 92% of the cases with MD diagnosis of pneumonia at 90% (138/153). Eighty-three percent (83%) (127/153) of patients were discharged with a diagnosis including pneumonia (excluding influenza with or without pneumonia).

Fifteen percent (23/153) of patients enrolled with pneumonia were subsequently readmitted by the 30-day post-discharge time point. Thirteen percent (20/153) of the patients enrolled with pneumonia according to the diagnosis by the MD were readmitted, and 12% (18/153) of the patients who were discharged in this sample were readmitted. There are no statistically significant differences in readmission by diagnosis, either at admission or discharge.

The study characteristics are balanced in distribution, therefore are not confounding, and do not have an effect on the outcome. All participants were between 55 and 99 years of age, with a mean age of 72.5. There were no differences in age across treatment arms. Gender groups had no difference in distribution overall and within intervention groups. Most participants were Caucasian (81%) with the second most frequent ethnicity being African American (9%). Percentage of those married ranged from 35-50% across all arms. Of all the participants, 16-32% were single with 65% living with someone, 52% were retired, and 27% were employed full or part time.

**Table 1: Subject Enrollment Disposition**

Characteristic	Positive <i>n</i> (%)	Negative <i>n</i> (%)	Control <i>n</i> (%)	All Subjects <i>N</i> (%)
Enrolled	44 (29)	65 (42)	44 (28)	156
<u>Excluded</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>3</u>

Diagnoses included ICD-9-codes 038.9, 486 through 495 and included community-acquired pneumonia (CAP), aspiration pneumonia (AspPN), atypical pneumonia, sepsis with pneumonia, and other pneumonia or rule out pneumonia. We examined the aims for statistical and clinical significance using national, state, and local reports on readmission rates.

### **Results**

The study period was one year from November 2013 through December 2014. Hospital 1 (HL1) admitted PN patients with 23.2 % readmitted (internal reports). HL2 admitted PN patients with 19.1 % readmits. The state of California overall readmit rate is 17.4% (Quality Improvement Report, 2013).

**Table 2: Baseline Characteristics**

Characteristic	Positive ( <i>n</i> = 44)	Negative ( <i>n</i> = 65)	Control ( <i>n</i> = 44)	All Subjects ( <i>N</i> = 153)	<i>p</i> -value [1]
Age					
<i>n</i>	44	65	44	153	
mean (sd)	72.5 (10.84)	73.6 (12.6)	71.0 (11.6)	72.5 (11.8)	0.511
median	71.5	73.0	68.5	72.0	
range	55 - 99	54 - 96	55 - 94	54 - 99	
Gender <i>n</i> (%)					
Male	24 (55)	35 (54)	20 (45)	79 (52)	0.622
Female	20 (45)	30 (46)	24 (55)	74 (48)	
Ethnicity [2] <i>n</i> (%)					
African-American	6 (14)	2 (3)	6 (14)	14 (9)	0.293
Caucasian	34 (77)	56 (88)	33 (75)	123 (81)	
Asian	2 (5)	3 (5)	5 (11)	10 (7)	
Hispanic	1 (2)	2 (3)	0	3 (2)	
Other	1 (2)	1 (2)	0	2 (1)	
Not reported	0	1	0	1	
Marital Status <i>n</i> (%)					
Single	7 (16)	21(32)	11 (25)	39 (25)	0.376
Married	22 (50)	23 (35)	20 (45)	65 (42)	
Divorced/Separated	9 (20)	8 (12)	5 (11)	22 (14)	
Widowed	6 (14)	13 (20)	8 (18)	27 (18)	
Live with Someone <i>n</i> (%)					
Yes	29 (66)	39 (60)	32 (73)	100 (65)	0.390
No	15 (34)	26 (40)	12 (27)	53 (35)	
Employment Status <i>n</i> (%)					
Full/Part Time Outside Home	11 (25)	14(22)	16 (36)	41 (27)	0.158
Unemployed by Choice	2 (5)	1 (2)	0	3 (2)	
Sick leave/Disability	2 (5)	3 (5)	6 (14)	11 (7)	
Homemaker	1 (2)	1 (2)	0	2 (1)	
Retired due to HF	3 (7)	5 (8)	2 (5)	10 (7)	
Retired-other	23 (52)	39 (60)	17 (39)	79 (52)	
Other	2 (5)	2 (3)	3 (7)	7 (5)	

[1] *P*-value for age based on the ANOVA; *p*-value for gender, ethnicity (Caucasian vs. non-Caucasian), and employment status (full/part time vs. All Retired vs. all others) are based on Pearson Chi-square.

[2] No subject reported as American Indian/Alaskan Native, Native Hawaiian/Other Pacific Islander, or Mixed.

**Table 3: Comparison Readmission Rates (DV30)**

Source	Readmittance Rate	95% CI for Rate[1]	<i>p</i> -value[2]
HRS	15.0% (23/153)	(9.8 - 21.7)	0.440
HL1	23.2% (36/155)	(16.8 - 30.7)	0.056
HL2	19.0% (17/89)	(11.5 - 28.8)	0.672
California 2013 Annual Report	17.4%	NA	

[1] Confidence interval is based on Clopper-Pearson (exact method).

[2] *P*-value based on a one sample normal approximation test of the University Hospital readmittance rate compared to the California 2013 Annual Report readmittance rate (a test of the null hypothesis that the readmittance rate is equal to 17.4%).

Note: Table 14 binomial exact test findings significant for HRS to HL1 & HL2

### **Primary Variables**

**Hypothesis 1:** Readmittance rates for the interventions groups are 20.5% in the positive message group and 13.9% in the negative message group. This is not a statistically significant difference, hence, there is insufficient evidence from this study to reject the null hypothesis of no difference between the message groups in readmittance rates by the 30-day post-discharge time point ( $p = 0.434$ ). Bivariate findings indicated of those readmitted, 47.1% were in the positive group compared to 52.9% in the negative group. There was no statistically significant association between a positive or negative message and readmission at 30 days (chi-square test  $p = .643$ ).

**Hypothesis 2:** Readmittance rate for the intervention group including both messages is 16.5% compared with 11.4% in the control group. This is not a statistically significant difference, hence, there is insufficient evidence from this study to reject the null hypothesis of no difference



between the intervention group and the control group in readmittance rates by the 30-day post-discharge time point ( $p = 0.618$ ).

**(Hypotheses #1 & #2)**

**Table 4: Readmittance Rate Paired Comparisons (DV30)**

Characteristic			<i>p</i> -value[1]
	Positive Message	Negative Message	
Readmittance Rate	20.5% (9/44)	13.9% (9/65)	0.434
	Any Message	No Message (Control)	
Readmittance Rate	16.5% (18/109)	11.4% (5/44)	0.618

[1] *P*-value based on Fisher’s Exact Test.

Negative messages had less readmittance than positive messages, while no message had the lowest. This may mean there is no real significance, or there is some confounding variable that is masking a real difference.

**Hypothesis 3:** The rate of Case Management Agreement (CMA) by study arm is displayed in Table 9. Agreement between the case manager and the patient regarding the transition plan is 80% to 85% in the two intervention arms and 50% in the control arm. A Fisher Exact Test of the study results show that there is a statistically significant difference in the proportion of agreement by intervention groups at  $p = 0.017$  for the test of independence in the distribution of agreement rate among the study arms. Hence, there is sufficient evidence to reject the null hypothesis of no difference in the agreement rate among the study arms.

**Table 5: CMA by Study Arm (Hypothesis #3)**

Characteristic	Positive ( <i>n</i> =44)	Negative ( <i>n</i> = 65)	Control ( <i>n</i> =44)	All Subjects ( <i>N</i> = 153)	<i>p</i> value[1]
CMA					
Yes	35 (80)	55 (85)	26 (60)	116 (76)	0.017
No	9 (20)	10 (15)	17 (40)	36 (24)	
<u>NA</u>	1	0	0	0	

[1] *P*-value based on Fisher’s Exact Test.

Findings indicate there is agreement with the CM/RN and the participants, whether a positive or negative message is provided showing significance. However, there is less agreement and no significance in the control arm where there is a neutral message provided.

**Hypothesis 4:** The analysis strategy for the assessment of influencing variables on readmission started with a practical selection of variables suggested by study design, the literature and careful thought; these included all study arms, age, comorbidities, and PSIC. Variables were examined using Fisher Exact Test for categorical variables and odds ratios (ORs) for binary variables. Of these variables, age group and comorbidities had associations with readmission that were either statistically significant at  $p \leq 0.05$  or had marginally significant findings  $p \leq 0.100$ . These findings are displayed below. There is sufficient evidence to reject the null hypothesis of no difference by age, and comorbidities.

**Table 6: Readmittance by Study Arm (DV30)**

Characteristic	Positive ( <i>n</i> = 44)	Negative ( <i>n</i> = 65)	Control ( <i>n</i> = 44)	All Subjects ( <i>N</i> = 153)	<i>p</i> -value[1]
Readmit <i>n</i> (%)					
Yes	9 (20)	9 (14)	5 (11)	23 (15)	0.506
No	35 (80)	56 (86)	39 (89)	130 (85)	

[1] *P*-value based on Fisher’s Exact Test.

Patients were readmitted in slightly increasing rates from the control arm, the negative message arm, to the positive message arm. These findings are not, however, statistically significant.

**Table 7: Age by Readmittance (DV30)**

Characteristic	Readmittance % ( <i>n</i> = 23)	All Subjects ( <i>N</i> = 153)	<i>p</i> -value[1]
Age <i>n</i> (%)			
55-64	7 (30)	52 (34)	0.001
65-74	0	36 (24)	
75 or >	16 (70)	65 (42)	

Most readmitted patients were in the oldest age group: 70% in the 75+ years age group and 30% in the 55-64 years age group and were found to be significant ( $p < 0.001$ ) by Fisher's Exact Test.

**Table 8: Comorbidities by Readmittance (DVR30)**

Characteristic	Readmittance % ( $n = 23$ )	All Subjects ( $N = 153$ )	OR 95% CI [1]	$p$ -value[1]
Comorbidities $n$ (%)				
CHF	8 (35)	33 (22)	2.2 (0.86 – 5.87)	0.096
CAD	7 (30)	26 (17)	2.6 (0.93 – 7.04)	0.064
HTN	18 (78)	95 (62)	2.5 (0.87 – 7.09)	0.084
3 or more	19 (83)	95 (62)	3.4 (1.09 – 10.48)	0.028

[1] Odds ratio (OR) and 95% confidence interval (CI).

Key predictor variables identified among the comorbidities were CHF, CAD, and HTN, with ORs between 2.2 and 2.6 indicating patients were at least twice as likely to be readmitted having had the comorbidity, and that patients with three or more of any comorbidities at admission were 3.4 times more likely to be readmitted by 30 days post-discharge per odds ratio.

A logistic regression including the age, multiple diagnoses (number of diagnoses not individually), chest x-ray with pleural effusion (CXPE), and PSIC indicated that only CAD and an intercept was moderately significant in predicting readmission rates ( $p = 0.053$ ). This finding was similar using a Spearman correlation coefficient (0.47) and found one variable, CAD, likely to have a linear association with readmission at 30 days.

**Table 9: Pneumonia Severity Class (PSIC) by Readmittance (DV30)**

Characteristic	Readmits ( $n = 23$ )	All Subjects ( $N = 153$ )	$p$ -value[1]
PISC $n$ (%)			
1.<51	0	1 (1)	0.406
2.51-70	2 (9)	14 (9)	
3.71-90	3 (13)	40 (26)	
4.91-130	13 (57)	61 (40)	
5. >130	5 (22)	37 (24)	

[1] *P*-value based on Fisher Exact Test of the independence of readmittance and PSIC.

There is no significance for PSIC on readmittance. Most participants were in PISC 3-5. Highest PISC was group 4 (91-130) at 40% and PISC 5 is known to be the sickest group based on the literature (File & Marie, 2010).

### Secondary Variables

There were 15% (23/153) of patients enrolled with pneumonia that were subsequently readmitted by the 30-day post-discharge time point. Thirteen percent (20/153) of the patients that enrolled with pneumonia according to the diagnosis by MD were readmitted, and 12% (18/153) of the patients who were discharged in this sample were readmitted. There are no statistically significant differences in readmission by diagnosis, either at admission or discharge, which is expected, as baseline diagnosis is pneumonia.

**Table 10: Gender and Marital Status by Readmittance (DV30)**

Characteristic	Readmits ( <i>n</i> = 23)	All Subjects ( <i>N</i> = 153)	<i>p</i> -value[1]
Gender <i>n</i> (%)			
Male	10 (43)	74 (48)	0.656
Female	13 (57)	79 (52)	
Marital Status <i>n</i> (%)			
Single	3 (13)	39 (25)	0.034
Married	9 (39)	65 (42)	
Divorced/Separated	8 (35)	22 (14)	
Widowed	3 (13)	27 (18)	
Significant Other	0	0	

[1] *P*-value is based on Fisher Exact Test of independence between readmittance and characteristic.

There is an association between marital status and readmittance ( $p = 0.034$ ). A greater percentage of those in either the married or divorced/separated groups were readmitted than those in the categories of single or widowed. There is no statistically significant association

between gender and readmittance. Further analysis might tease out gender and marital status interaction.

**Table 11: Association of Gender and Marital Status**

Characteristic ( <i>N</i> = 153)	Male	Female	<i>p</i> -value[1]
Marital Status <i>n</i> (%)			
Single	25 (16)	14 (9)	< 0.0001
Married	43 (28)	22 (14)	
Divorced/Separated	7 (5)	15 (10)	
Widowed	4 (3)	23 (15)	
Significant Other	0	0	

[1] *P*-value is based on Fisher Exact Test of independence between variables.

There is a statistically significance difference in the distribution of marital status between males and females. Approximately 88% (43/70) compared to 30% (22/74) makes to female were married. This does not address the relationship to readmittance.

**Table 12: Discharge Disposition by Readmittance**

Characteristic	Readmits ( <i>n</i> = 23)	All Subjects ( <i>N</i> = 153)	<i>p</i> -value[1]
Discharge Disposition <i>n</i> (%)			
Home	10 (43)	72 (47)	0.211
Home Health	3 (13)	39 (25)	
Home w/Assistive Devices	1 (4)	6 (4)	
Nursing Home	7 (30)	26 (17)	
Other	1 (4)	5 (3)	
Expired	1 (4)	2 (1)	
Home w/Hospice	0	3 (2)	

Most patients who were readmitted were discharged to home (43%) or to a nursing home (30%). On review of readmits at 30 days, one participant expired at the time of readmit per medical record review. Actual LOS and reason for the participant’s death on readmit was not assessed further due to the study design and IRB approved protocols.

## Surveys

Surveys were sent 30 days after discharge (Appendix D). Altogether, 48% (74/153) of the surveys sent were returned, and 14% (10/74) of the participants who returned surveys were readmitted. Eighty-six percent were very or somewhat satisfied with their health. Seventy-three percent of the survey responders reported 0-1 on the Borg scale (Appendix C). The number of patients who reported going to appointments was 99% (71/72) and those agreeing to home health services were 67% (34/51). The entire survey dataset ( $n = 67$ ) found “Breathlessness and Satisfaction” to be associated  $p = 0.002$ . Survey questions (Q4 & Q5) ( $n = 64$ ) breathing problems & breathlessness were significant ( $p < 0.0001$ ) as to be expected (Appendix D).

**Table 13: Breathlessness and Health Satisfaction (Total Returns)**

Q3 & Q5 Breathlessness & Satisfaction	(0)	(1)	(2)	(3)	(4)	<i>p</i> -value[2]
Very satisfied	0	10 (15)	0	0	0	< 0.002
Somewhat satisfied	10 (15)	18 (27)	7 (10)	3 (4)	1 (2)	
Neither satisfied or dissatisfied	0	1 (2)	0	2 (3)	1 (2)	
Somewhat dissatisfied	0	1 (2)	1 (2)	0	0	
Very dissatisfied	0	0	1 (2)	1 (2)	1 (2)	

[1] Percentage is based on 67, the number of patients answering both questions.

[2] *P*-value is based on Fisher Exact Test of independence between the two variables.

Note: A Pearson Correlation coefficient = 0.543 ( $p < 0.001$ ), although not strong, is statistically significantly different from zero for correlating breathlessness and health satisfaction.

These analyses suggest, for all survey responders, an association between breathlessness problems and satisfaction with health, and may also be true for readmits, although the sample size was insufficient for statistical significance. Overall, survey returns were high, with timely responses. According to the literature, survey returns are often impacted by incentives, or when

responses were unconditional (Edwards et al., 2002; Armstrong & Overton, 1977). Our research used no incentives and overall returns were high, with timely responses. However, the surveys were sent with stamped self-addressed envelopes to make it easier for returns. This technique may have made it easier to return, minimizing discrimination by health status or other culture, or other economic status. It is supposed that subjects not responding may have failed to return surveys for multiple reasons: (a) not at the address, (b) too sick, (c) not willing to return, and/or (d) other unknown reasons.

### **Assumptions**

In all the analyses used, random sampling and independence of the observations from each other is assumed. Test of assumption of equal variances in DV for the two groups assumes homogeneity. The parametric test, analysis of variance (ANOVA), assumes normality of the observed variable and homogeneity of variances among the groups for two groups (DV) and three groups (study arms). Testing assumes the pneumonia readmission rate of 24.8% reported by HL1 and 19.1% HL2 is correct, null hypotheses assumptions are based on these response rates. In examination of the assumptions, each variable was looked at one by one. The non-parametric methods include the Fisher Exact test, the Pearson chi-square test and the odds ratio, its confidence interval, and test of significance. None of the non-parametric tests rely on the normality assumption by using the 'exact' distributions. The Fisher test assumes fixed marginal distributions, and the chi-square test assumes sufficiently large observed and expected cell sizes. Assumptions for the odds ratio, its test, and CI follow the same basic assumptions as the Fisher.

### **Clinical Significance**

A test of proportions indicates that the readmission rate for Halpin Readmission Study (HRS) is significantly lower than the reported rates from both HL1 and HL 2 ( $p$  values for both

are  $p < 0.001$ ). HRS, in a comparison using a one-sample binomial test of the comparison hospital rate, assumes this value is fixed with no variability. Findings indicate that there may be some beneficial effect with the use of framed messages, yet a much larger sample size would be needed to detect such a beneficial effect.

**Table 14: Economic Binomial Statistics Readmission Rates**

HRS	15.0	
HL1	23.2	$p < .001$
HL2	19.01	$p < .001$

This population has no variability using an economic statistic binomial exact test.

**Cost Savings**

An analysis of daily total cost of a pneumonia patient, using university health cost guidelines, provides average daily direct cost for a ventilator/high flow and non-ventilator patient hospital day. Total cost is defined as direct and indirect cost. Direct costs consist of fixed labor, supplies, and benefits. Indirect costs are fixed non-revenue expenses and include facility, supplies, and utilities. HRS enrollments had pneumonia diagnoses of: pneumonia, pneumonia and sepsis, rule out of pneumonia and/or symptoms of pneumonia. Therefore, if hospitals add the framed message to their strategies, it is assumed that a cost savings would be gained because of possible reduced readmission.

**Table 15: Calculation of Loss per Patient Readmitted by Type of Hospital Day**

Type of Hospital Day (Ventilator or non-Ventilator)	Average Length of Stay (LOS)	Average Daily Cost [1]	Average Cost per Patient	Loss [2] per Patient Readmitted
Cost non-ventilator day	3.6	\$3,188	\$11,476.8	\$344.30
Cost of ICU/w high flow/ventilator	8.5	\$4,178	\$35,513.0	\$1,065.40



[1] [Cost figures average by UHC data per patient].

[2] Based on 3% PN readmission adjustment factor and represents the reduction due to readmit penalty according to CMS, 2015.

Note: These rates are assumed without CMS final aggregates.

**Table 16: Application of Messaging**

			Savings per 100 Patients Admitted	
Type of Hospital Day (Ventilator or non-Ventilator)	Hospital Reference	Readmit Rate Difference due to Messaging[1]	# of Patients Not Readmitted	Savings
Cost non-ventilator day	HL1	6.7%	7	\$2,410.10
	HL2	2.6%	3	\$1,032.90
	California 2013 Annual Report	0.9%	1	\$344.30
Cost of ICU/w high flow/ventilator	HL1	6.7%	7	\$7,457.80

[1] HSR differences from HL1, HL2 and California rates [Table 8].

### Conclusions

This study has internal validity since it follows a double-blinded RCT design that maintains the independent variable of framed messages. The study controlled for extraneous factors that observed effects. Analysis confirmed that those patients readmitted had comorbidities and predictor scores of severity. Significance was found in variables of age and comorbidities, and confirm that patients 75 years of age or older with three or more comorbidities are more likely to be readmitted at DV30. Results suggest that the participants who received interventions, either positive or negative, had similar results and lower readmission rates compared to the control arms. A larger sample that would detect a smaller effect is suggested for further confirmation of the interventions' broader scale.

## **CHAPTER SIX**

### **DISCUSSION**

#### **Introduction**

Effective communication is a valuable tool that can improve the exchanges between patients and health care providers. Both the content of the message and how it is framed can be useful in preventing readmissions. To our knowledge, this is the first study using framed messages as an intervention to reduce readmission of pneumonia patients. Patients must make many decisions related to care choices and follow-up actions they undertake following a stay in a hospital. Communication about their illness and its care during the transition process from illness to wellness can make a difference. It is known that communication that involves patients/families in decision-making can improve outcomes (Naylor 2011; HRET, 2010; Edwards, 1990).

In trying to reduce readmission, hospitals use multifactorial approaches such as transition options, decisions, conditions of illness, and others (Metersky, Waters, Nsa, & Bratzler, 2012). Our study attempts to be an additional method to reduce readmissions. This study's RCT maintained scientific rigor, as RCTs reduce subjective variances. This design method strengthens the credibility and interpretations of its results.

One important factor in determining readmission is the patient's condition of illness. Factors contributing to the patient's condition can be comorbidities, types of organisms, age, and the level of participation of the patient permitted in decision-making regarding his or her discharge. Discharge processes are implemented by RNs, CMs, and other providers in order to

assist patients in understanding their choices post hospital. These processes can prevent readmission and improve healthy responses to illness.

The effects of readmission include intervening factors related to: (a) the condition, known as disease; (b) treatment (the care or actions taken to heal or alleviate symptoms); (c) transition choices for post-hospital care; and (d) risks that impact the readmission at 30 days from discharge. Deliberate communication that takes into account patients' reference points about their health and preferences can lead to positive agreement on choices for transitions or behavior changes post hospital (Verma et al., 2014; Edwards & Elwyn, 2001). Discharge responsibilities fall into the realm of effective collaboration between the interdisciplinary team and patients/families.

This study implies: (1) interdisciplinary teams determine the management of care prior to sharing their recommendations with patients/families, (2) that communication using framed messages may reduce readmission, and (3) the scope of illness triggers different options, which includes the management of the psychosocial, physiological, and spiritual foundation of the individuals being treated (Verma et al., 2014; Meleis, 2012 ab; Kahneman, 2011; Naylor et al., 2011; Brooten et al, 1988). The structure of the roles of hospital staff may influence the timing of communication exchanges with patients and families. Below, the present RCT is discussed in terms of pneumonia, transition, therapeutic interventions, challenges, communication, laws, and hypotheses generating findings suggesting further investigation.

### **Discussion of Study Findings**

#### **Pneumonia**

Pneumonia is prevalent in hospital admissions, and its treatment is costly. In this study, its reoccurrence and readmission was affected by how ill the participants were at the time of

recruitment. A recent study found comorbidities are predictors of mortality and readmission, and this study's findings concur with previous works related to pneumonia severity (Metersky, 2013; Fine, 1999). The study used the pneumonia severity index (PSI) to evaluate severity of illness as a credible predictor of readmission (Aujesky & Fine, 2008). The PSI index severity ranges from 1-5, with 5 presenting the highest risk of mortality. This study ranked variations within our sample participants, with the PSI used by some providers to evaluate the need for inpatient hospitalization. The majority of participants enrolled were rated class 4, similar to the usual ranking by physicians for hospital inpatient admission and care based on literature (Fine et al., 1993). The few in our sample who had the lowest PSI scores (1-3 rankings) had other comorbidities, or prognostics, and were admitted by providers because they presented with atypical pneumonia, for example, aspergillus or mycobacterium pneumonia, and thus met criteria for enrollment into the study (Musher & Thorner, 2014). All patients (100%) had other comorbidities, confirming subjects each had some risk specific to the geriatric and pneumonia condition (Table 12). The findings were aligned with known correlations between pneumonia readmissions and heart diseases (CMS, 2011ab). This, proposed with the RCT design, may equalize the differences demonstrated by participants under age 65 who were disabled with secondary diagnoses such as renal disease, or liver disease. Some subjects were still working. These comorbidities are common in severity measures within the pneumonia severity index (PSI) (Metersky et al., 2012; Fine & Marie, 1998). The severity of the illness is a consideration during planning for follow-up care and transition.

### **Transition**

Transition practices were comparable at both settings where data were collected. National reports of readmission rates for pneumonia are consistent across national teaching

hospitals and comparable to this study's findings (CMS, 2013; CMS, 2011a). The CMS report evaluates readmission of patients with pneumonia using risk stratification rates obtained by Medicare claims. Both HL1 and HL2 administered several new transition practices using a systematic, thoughtful process at the time of discharge. These practices included telephone calls post hospital, follow-up appointments arranged at the time of discharge, and provider partnerships formed within the patients' communities. It is known that poorly coordinated transitions increase the number of readmissions even with multiple types of interventions (Hewner, 2014; Naylor, 2012; Naylor & Sochalski, 2010; Naylor, 2004). The participants all had diagnoses of pneumonia, with similar incidences of age, comorbidities, and readmission rates (Metersky et al., 2012). Consideration of at-risk geriatrics is part of the latest ACA mandates, as it is known that comorbidities increase with age and affect readmission risk (Formiga et al., 2012).

Understanding factors that contribute to pneumonia patients' readmission, or the reinfection consequences, is important when making discharge recommendation decisions. Therefore, this study's focus was on improving provider/patient exchanges. Prior to or outside of this study, exchanges observed were varied, with multiple interactions between and among disciplines. The pneumonia illness is a condition and creates risks that must be considered by patients when making decisions at the time of transition from the hospital to home.

At the time of discharge of the patients in our study, all communication exchanges were delegated to registered nurses (RNs) and/or case managers (CMs). RNs and CMs each had targeted responsibilities related to discharge based on the hospital procedures, or their roles as assigned by their licenses, or state and federal expectations (Groopman & Hartzband, 2011; CMS, 2010; Hall et al., 2010; Dy, 2007). For example, the RN provides reinforcement of

clinical algorithm information on medications, diet restrictions, direct care, and transition locations; identifying who will assist in the physical transitions, and the timing of when the hospital to home or community transitions would occur (Uhrenfeldt et al., 2013; CMS, 2010).

CMs arrange for the placement and/or services to be received, and assist in appointment scheduling. CMs and discharge planners handle “one on one” open discussions about the options for post-hospital care with patients and family members. Deliberations based on finding of the study and on literature suggest CMs/RNs consider comorbidities, age, complexity of the chronic illnesses, patient reference points, and preferences during therapeutic communications at the time of discharge (Verma, Razal, & Detsky, 2014; Trupp et al., 2011). Elders with chronic illness are hospitalized more often and result in one fifth of all readmissions (Hewner, 2014).

For this study, the findings of the disposition at time of discharge indicate that patients with the highest readmission rates had gone home without services; 43% (10/23) returned to the hospital from home, and 30% (7/23) were readmitted from nursing homes. These findings are notable for suggesting methods to reduce readmission. For example, the interdisciplinary team can seek agreement for services at the time of discharge, even if the patient is going to his/her own home. A suggestion for patients going to the nursing homes would be for hospitals to explore establishing partnerships as a way of reducing readmission. Such a partnership could include sharing resources such as advance practice nurses or medical residents to manage care and arranging for them to complete ongoing assessments of outcomes at the sites (Naylor et al., 1999). As well, CMs and RNs need to be more proactive in their reviews by identifying needs expressed subjectively by the patients and clinical objective findings available to impact RR.

Partnering with nursing homes, or use of advance practice nurses within hospitals are already known to prevent readmissions by implementation of extensive discharge planning

programs. The programs documented in the literature use follow-up surveillance tactics and are recommended based on the findings of this study, as practice considerations for hospital's readmission reduction strategies (Nosbush et al., 2010; Naylor et al., 1999; Naylor et al., 1994).

Older adult patients are hardly a homogenous group, with wide ranges of mental, personality, physiological, reference points, and language variances. Each has a different social experience, based on the extent of the patient's relationship with family or friends. Many geriatrics have minimal to no sources of social support, impacting health outcomes and transition (Cacioppo & Cacioppo, 2013). In this study, readmittance was highest among the marital group. It is surmised that elders with the support of a spouse may be readmitted because the support persons recognize symptoms as urgent and make decisions to take their spouse to providers for care.

Moreover, according to McHenry et al., (2012), cultural norms differ amongst the elderly, influencing responses and receptiveness to communication on transition suggestions. Therefore, it is important to consider the characteristics of each patient with pneumonia when determining transitions from hospital to home.

### **Challenges**

In the current study, a definitive diagnosis of cognitive impairment (CI) ranked as the highest screen-out reason for non-eligibility, and eliminated enrollment (26.47%). Additionally, during screening, the PI noted identification of CI using MMSE. Staff RNs were informed of MMSE scores and/or enrollment by the PI. During screening for enrollment, it was observed that some patients were documented as cognitively aware, alert, and oriented times four (Ax4: person, place, time and situation). Yet, when the PI screened these patients, they were unable to pass the MMSE (Folstein et al., 1975).

This observation suggests that further nursing studies examine altered mental status assessments and use of tools to measure Ax4 in practice. Literature has recently addressed such need for clarification in order to improve consistent practice in mentation measurement (Tate et al., 2014). In addition to factors such as degree of the illness, age, or other reference points, sound mentation measurement tools must be used, or the patient may fail to internalize the framed message. Recent secondary analysis by Tate et al., (2014) explored  $N = 3,069$  patients hospitalized with pneumonia, and found that the pneumonia increased their risk for dementia. The findings showed that 17% of patients with pneumonia develop dementia. Although many studies have been done using framed messages (IV), none, prior to this study, have been explored using subjects with pneumonia. Also, decision-making choices that affect behavior outcomes using the communication strategies are limited with dementia.

Another challenge is the way infections of the lungs compromise the oxygen and carbon dioxide exchange, followed by symptoms of confusion and irritability (Tate et al., 2014). These patients may have a degree of infection so severe that it limits their ability to participate in a study. The challenge is to screen out those with this level of severity. To minimize differences, HRS used a screening criteria defining exclusions, such as dementia, or “too sick” to participate. It is important to note that hospital readmissions include all types of pneumonia patients.

This study contributes another aspect to consider within transition theory established by Chuck and Meleis (1986). In order to use communication strategies, the patient must be cognitively alert and able to receive messages. As Meleis (2012a) mentions in transition theory, use of therapeutic interventions is a concept within transitions. When patients are cognitively impaired, family members who are caretakers become recipients of the communication strategies. According to Janssens (2005), older persons with pneumonia are 30% correlated with



comorbidities and cognitive impairment (p. 226). Just as in transition theory, purposeful communication with patients/families, known as framed messages, are considered therapeutic interventions.

### **Therapeutic Interventions**

Nurses, in collaboration with medical and ancillary teams, are responsible for understanding pneumonia management as part of the routine practice of communicating with patients and families regarding the patient's illness, treatment, and recovery (CMS, 2011a). As evidenced by transition theories, illness-to-health continuums require therapeutic intervention in the form of communication (Meleis, 2012a). This study found in H3 that while targeting the risk of sustained illness and/or readmission, nurses must explain risks to the patients and families in order to reach agreement. Nurses who consider both the patients'/families' preferences and their reference points will reduce the chance of readmission because decisions for mutual agreement regarding post hospital care have occurred.

Framing effects (framed messages) in this study were composed of decisions under risk as the intervention, with the messages framed in terms of influential consequences: beneficial or gain-framed messages, or detrimental or loss-framed messages (Reit et al., 2014; Tversky & Kahneman, 1991; Kahneman & Tversky, 1979) (Appendix G). Patients are vulnerable due to the disease of pneumonia and had different reference points. This study's results by percentages indicated that negative messages had less readmission at 13.9% compared to positive messages at 20.5%. These findings are surmised to be due to multiple factors. For example, the intervention in this study was singular as the RCT provided one message, which was allocated randomly and heard only by the patient. Perhaps additional doses of the message might benefit the expected readmission reduction goal. For example, perhaps providing the intervention

(framed messages) repeatedly or singularly to a selected family member may influence patient choices and broaden the possible scope of the expected goal to reduce the readmission. Thus, studies that increase the dosage of messages might be tested to evaluate the number of repeated messages that may make the difference in the outcome of readmission (Banerjee & Greene, 2012). Once the patient is home, the primary family member who is engaged in his/her care could impact the readmission rate, but this would require additional studies that include family participation.

Hospitals are dynamic environments, and patients receive multiple messages. HRS results, found clinical significance suggesting framed messages compared to the study hospitals made a difference in decision-making by patients (Table 14). Together with other hospital staff, RNs and CMs can promote social support for those diagnosed with pneumonia who may not have family; RNs and CMs can then enhance viable transitions that prevent readmissions. Notwithstanding all the efforts of hospital programs, the disease, even with treatments, can result in patients succumbing to the illness. Thus the use of structured, deliberate messages in communication is a therapeutic intervention by which practitioners can reduce readmission rates (Meleis, 2012a; Naylor et al., 2011; Naylor et al., 1999).

### **Communication**

It is important to note that, during this study, HPR rates of readmission were lower at both HL1 and HL2 with use of the communication strategy of framed messages. Communication by nurses at the time of discharge is changing due to the impetus of the ACA and its emphasis on pneumonia-related readmissions (CMS, 2011a; CMS, 2010). Changing the nature of nurses' discharge practices to include communication strategies as a therapeutic intervention is the main intent of this study. The findings suggest the framed-message method

may increase engagement between nurses and patients about their illness at the time of discharge, which can in turn enhance or lead to decisions made by patients about their follow-up care post hospital. In this study, both positive and negative messages have similar results. Maintaining consistent communication is key, though there are many valid frailty models that frame a researcher's perception of subjects prior to understanding individuals' situations. The phenotype models emphasize a set of signs and symptoms as variables in frailty (Clegg, Young, Iliffe, Rickert, & Rockwood, 2013). Nurses must consider frailty and comorbidities, as this study confirms that a condition involving three or more comorbidities has significance for readmission.

Communication using framed messages that takes into account patient reference points about health and preferences can provide positive agreement on choices for transition or behavior changes (Epstein & Gramling, 2013; Levin et al., 1998). Nosbusch, Weiss, and Bobay (2010), in an integrated review of 27 studies, found that nurse-patient communication at the time of discharge either impedes or facilitates the transition planning process. Discharge responsibility falls into the realm of effective collaboration with the interdisciplinary team and patients/families (Bowles et al., 2003).

Consequently, curriculum inclusion in nursing studies is recommended. Curricula around deliberate framed messages are unique and may accentuate the advocacy roles of CMs and RNs, if taught within therapeutic interventions and communication models. Each of these providers impacts the readmission outcomes as part of his/her role at the time of discharge (Hall et al., 2010). The current multifactorial approaches during transition can be effective by the addition of a communication strategy, with such framed messages contributing to reduction in readmissions.

## **Laws**

The proposed rules to reduce readmission rates are important measures of quality of care according to Centers of Medicare and Medicaid (CMS, 2015; CMS, 2012b). These rules are a result of decades of studies by pathfinders such as Brooten et al. (1986) and Chick and Meleis (1986) on the transition phenomenon. Patterns of responses and transition practices, the principle features that impact reoccurrence of hospitalizations, have resulted in nurse scholars' participation in designing solutions to the problems of readmissions (Naylor et al., 2012; Schumacher & Meleis, 1994; Chuck & Meleis, 1986). Lawmakers have taken note of these researchers' programs, potential cost saving, and efficacy; when establishing current CMS's ACA reduction processes. The latest U.S. ACA legislation purports that readmission increases mortality, morbidity, and health care costs (CMS, 2012b). Cost savings become an important factor to all parties including nurses within health care, since readmission adjustment factor penalties are now at 3% for hospital readmissions of the PN diagnostic related groups (DRGs) used in billing (CMS, 2015) (Table 19).

Therefore, this study's research findings suggest that communication strategies by the use of framed messages be added to CM/RN procedures in order to assist with potential for cost savings and reduction in readmissions. Communication is noted as an important effort in readmission reduction, as readmission is a burden on Medicare recipients (Marciarelle, 2011; HRET, 2010). Promoting nursing education and training on framed messages effectiveness at every discipline level may benefit hospitals by preventing cost expenditure due to readmitted patients. Since, results suggest that enhancing transitions practices by the addition of framed messages will reduce pneumonia readmissions. Adding framed messages to curricula within

schools of nursing integrates social science theory with nursing theories and benefits practices, therapeutic methods, as well as, fostering reducing pneumonia readmissions.

### **Inferences**

The inferences in this RCT results are generalizable to older patients without dementia and at larger urban hospitals, as protocols were followed and the study can be replicated. In H3 the variable agreement, and H4 age and comorbidities were significant. Within the context of the sample of elderly patients with pneumonia, those who received framed messages did better compared to control groups that receive a non-framed message. Other variables and comorbidities may affect decision-making based on multiple factors such a marital status, support, and breathlessness. It is assumed in analyses that decision makers (patients) have definitive reference points of illnesses (Tversky & Kahneman, 1991). Therefore, this study's findings suggest PN readmission reduction must specifically consider comorbidities such as CAD, HF and HTN's for those patients admitted with pneumonia. Using the knowledge of these contributory factors become a valuable tool for all nurses and other providers when considering risks for readmission. Communication is key in reaching agreements with patients and families on decisions regarding post-hospital care choices. The findings suggest consistent communication that includes framed messages will help in reducing readmissions.

### **Relative Importance of Respiratory Education on Recidivism**

Nurses need education on topics related to patients with pneumonia, such as techniques to improve breathing efficiently, activity modification, and management of breathlessness (Yates, 2014). Per Yates (2014), improving lung health includes techniques such as consideration of pacing, conservation of energy, slowing down, and resting. Although Yates' studied quality of life in older adults undergoing lung cancer care, others mention COPD, asthma, cardiac, and

muscular-skeletal conditions as having an impact on breathing (Donesky, Nguyen, Paul, & Carrieri-Kohlman, 2014; Stenton, 2008; Mahler, 1990). HRS study analyses suggest, for all survey responders, an association between problems with breathlessness and satisfaction with health. This may also be true for readmits, since a Pearson Correlation coefficient = 0.543 ( $p < 0.001$ ), although not strong, is statistically significantly different from zero. The sample size was sufficient for statistical significance in self-report. All patients indicated no problems breathing since they returned home, however, 97% (34/35) of those who answered “no breathing problems” checked one of the two first categories under breathlessness (Appendix D). The categories used the Borg scale since it is valid and reliable (Mahler, 1990).

Breathing techniques recorded in the literature are beneficial for breathing outcomes, because supervised exercises improve symptoms of breathlessness (Donesky et al., 2014; Stenton, 2008; Mahler, 1990). Improvement of symptoms alleviates respiratory distress and provides needed oxygen, which reduces recidivism. Therefore, multiple-level solutions are necessary to achieve readmission reduction in pneumonia patients. Guiding nurses to better management by use of framed messages can lead the way to reduced readmissions. Using framed messages can be an asset to adjunct practices. For example, the discharge includes teaching patients to manage their dyspnea by applying breathing techniques (Yates, 2011). The effectiveness of such teaching is an addition to discharge planning. Medication alone without the assistance of a careful wellness plan is not enough; the addition of framed messages by nursing staff with symptom management models may reduce readmissions.

### **Implications**

Current attempts to reduce pneumonia readmissions use multifactorial approaches, but what is missing is the use of framed messages in acute settings (ACS). Communication

messaging during the hospital stay is an augmentation of the current initiatives, and can enhance existing transition programs. For instance, an intervention such as ACS transition partnerships with providers, provider-supported follow-up visits at skilled nursing facilities, hospital telephonic-initiated outpatient appointments, and telephone calls, all can help to reduce readmissions. Pneumonia patients themselves can participate in their treatment plan if they understand the disease's severity, and if they receive appropriate breathlessness technique education coupled with structured communication. Kept simple and direct, messages can influence patients' behaviors following hospitalization. This study proposes adding prospect theory's framed messages and communication strategies to nursing curricula.

Over the past thirty years, framed messages have been found to be effective in surgical consenting, vaccinations, exercise, smoking cessation, and in the use of medical apparatuses (Trupp et al., 2011; Toll et al, 2007; Jones, Sinclair, & Courneya, 2003; Edwards & Elwyn, 2001). This study shows framed messages as a possibility for use in acute-care settings for medical patients with pneumonia. Framed messages may also be able to transcend to other populations that are cognitively intact. Thus, consideration of the benefit of using communication strategies such as framed messages can be adjunct to hospital policy practices. Health care policy has suggested that communication is important to the multifactorial approaches to reduce readmission, and this study adds framed messages as a valid approach to the existing body of knowledge (Marciarelle, 2011; HRET, 2010).

### **Limitations**

The interpretation of these results was limited because of sample size, exclusion of dementia participants with PN, and because prospect theory application in acute-care settings is lacking, even though the study was randomized and masked balance of groups was not part of

the randomization. This sample only represented  $N = 153$  participants in a RCT within two similar hospitals. Framed messages have been tested, for example, in surgical consents, human immunodeficiency virus (HIV), and vaccinations studies. Prior to this study, however, medical pneumonia patients have not been studied using this technique (Levin et al., 1998). Additionally, replication of the study is recommended to ensure findings are similar within various hospital settings. Both hospitals used in this study met the criteria for recruitment of patients 55 years or older, providing homogeneity, yet more research using framed messaging in these groups is required. The infectious nature of pneumonia is known to affect mental acuity, therefore repeating framed messages closer to discharge when patients are stable may reduce readmissions (Angus & van der Poll, 2013). This study should be repeated with a larger sample to better represent significance. It would appear that gender response to framed messages may need further study. In addition, we suggest further study is needed regarding ethnicity, culture, and how various groups hear or respond to a framed message.

### **Suggestions for Future Research**

Prospect theory's decision under risk (framed messages) requires further research in acute care settings (ACS) and with medical/surgical patients of various age groups (Kahneman, 2011; Kahneman & Tversky, 1979). Therapeutic communication that clearly influences decision behaviors of patients/families using framed messages at the time of discharge is recommended (Meleis, 2012ab; Abellan-Perpinan, Bleichardt, and Prades, 2009). When framed messages are utilized at the time of transition in ACS, readmission reduction rates are influenced. This study's findings indicated negative messages were more effective in the study's older age groups because reference points and comorbidities were higher. As indicated in the literature, this group has



more reference points with advanced age and because of their health profile (Abellan-Perpinan, Bleichardt, and Prades, 2009; Kim, Goldstein, Hasher, & Zacks, 2005).

In relation to readmission, when patients hear structured messages, some patients' natural response is to turn away or to not acknowledge the framed message. This may be considered to be an "ostrich effect" or a purposeful ignoring of the message information due to fear or disbelief of the message (Panidi, 2014). Secondly, dosage effects may increase the motivation of patients' favorable readmission outcomes and response to a framed message, but this too must be tested with this population (Banerjee & Greene, 2012). Banerjee and Greene studied younger populations' substance abuse not acute care patients and used various types of messages different from this RCT.

Examine vulnerabilities and clearly defining them is important in future studies. Because perceived vulnerability by subjects may influence the outcomes expected by using framed message. Reit et al., (2014) mention that several factors can influence effects of framed messages. For example avoidance system's used by recipients of the messages deter effectiveness of outcomes. Also, perceived vulnerabilities of subjects must be considered in study design and analysis (Reit et al., 2014). Mixed methods with qualitative research that include the patient's feedback on the framed messages may provide further insights on messaging by age group and disease reference points.

Finally, larger studies with small effects are needed to validate this study's findings. Only then can administrators understand the financial penalties or financial gains of PN readmissions. Every day that a PN patient is not readmitted is a considerable cost savings to the hospital. This suggests that, although future empirical studies are recommended with larger samples, the use of framed messages can further verify this study's findings of statistical

significance. Since this study was a double-blinded, randomized control trial (RCT) that assigned random allocation to groups, outcome estimates are credible. Since this study was a two directional study, perhaps a one sided directional study within ACS settings is needed to identify prospects related to conditions of risk, choices, and rationality of choices considering age and reference points within various hospital populations (Salovey & Wegener, 2002).

Comparative research in other populations may contribute to the body of knowledge for applications in ACS, since both H1 and H2 were not significant or validated thus recommending further study. Studies could possibly provide specific guidelines to select positive or negative message types, since we know that reference points differ by message recipients (Schwartz et al., 2008; Edwards & Elwyn, 2001). For example, when there are a number of reference points, negative messages are usually more effective. With fewer reference points related to illness, the positive message is usually more effective (Mishra et al., 2012). In addition, emotions may play a part in discharge decisions (Nosbusch, Weiss, & Bobay, 2010; Noone, 2002; Tversky & Kahneman, 1981).

Certain cultures and races may have higher incidences of illnesses, however, this study had a higher proportion of Caucasian and African American patients. Both men and women had fewer differences (Woz et al., 2012; Joynt, Orav, & Jha, 2011b). Even though we know previous consent and vaccination studies using framed messages had positive results, having other cultures and groups represented in future studies is necessary in an acute-care setting (Mischar, Gregson, & Lalumiere, 2003; Edward & Elwyn, 2001).

Research that includes hospital's leadership participation is of interest, as leadership goals are often centered on cost savings. Since this study suggests that the use of framed

messages has resulted in potential cost saving, the researcher believes educating leadership on framed messages is important in effectively saving hospitals' money.

Together with other hospital staff, RNs identify the perceptions and concerns of patients/families at the time of discharge (Noone, 2002). Even after identifying concerns and perceptions, RNs must encourage social support to promote viable transitions that reduce readmissions. Notwithstanding all the efforts of hospital programs, this study found those with pneumonia, even with interventions, depending on the severity of the illness, may be readmitted. But using framed message should reduce readmission.

In summary, hospital leadership and nurses, in collaboration with medical and ancillary teams, can benefit from participation in framed-message studies. The focus of reducing readmission is the responsibility of all members of the interdisciplinary team. Understanding pneumonia management as part of their routine practice is assumed, as is communication with patients and families regarding the patients' illness, treatments, and recovery plan (Nosbusch et al., 2010).

This study's investigation lays a foundation for acute-care hospital application of deliberate communication phrases that use framed messages as a way to provide better outcomes. Providers are encouraged to consider the scientific evidence of making decisions with patients by using prospect theory's framed messages for decision-making (Verma et al., 2014; Trupp et al., 2011; Edwards & Elwyn, 2001). However, associated studies are needed to further clarify which type of framed messages are more successful in different disease processes and age groups within the acute care settings. Finally, nursing curricula that adds prospect's theory framed messages, pneumonia care measures, and respiratory dyspnea management may also help to reduce readmissions.

## Conclusion

This study suggests that using framed messages as purposeful communication may reduce the rates of PN readmissions. Further studies with larger samples sizes are recommended. It can be inferred that when consistent communication strategies use short phrases as framed messages, and then use such messages as therapeutic interventions, readmission rates for PN can be reduced. Communication between patients/families, RNs, and CMs should be used to arrive at decisions that meet the patients' best interest; this agreement is a determinant that can reduce readmissions. The effectiveness of the agreement is based on the actions taken by the patients after hearing the framed messages.

This study used framed messages while promoting patients/families preferences on choices at the time of discharge confirming existing knowledge (Goldberg et al., 2012; Gandara et al., 2010; Edwards & Elwyn, 2001; Naylor et al., 1999). Findings are relevant and confirm the findings from other studies that communication with patients/families is a crucial integral factor of the responsibilities of the discharge planners, CMs, and RNs (Stacey et al., 2011; Swenson et al., 2004; Bowles, Foust, & Naylor, 2003). The study justifies considerations to educate RNs and CMs on the use of framed messages in practice. The confirmed findings of H3 significance by arm on agreement at discharge ( $p < 0.001$ ) suggest the need for education of nurses on the importance of reaching agreement at the time of discharge. Addition of framed messages to the curricula of staff within hospitals can be a resource to enhance readmission reduction.

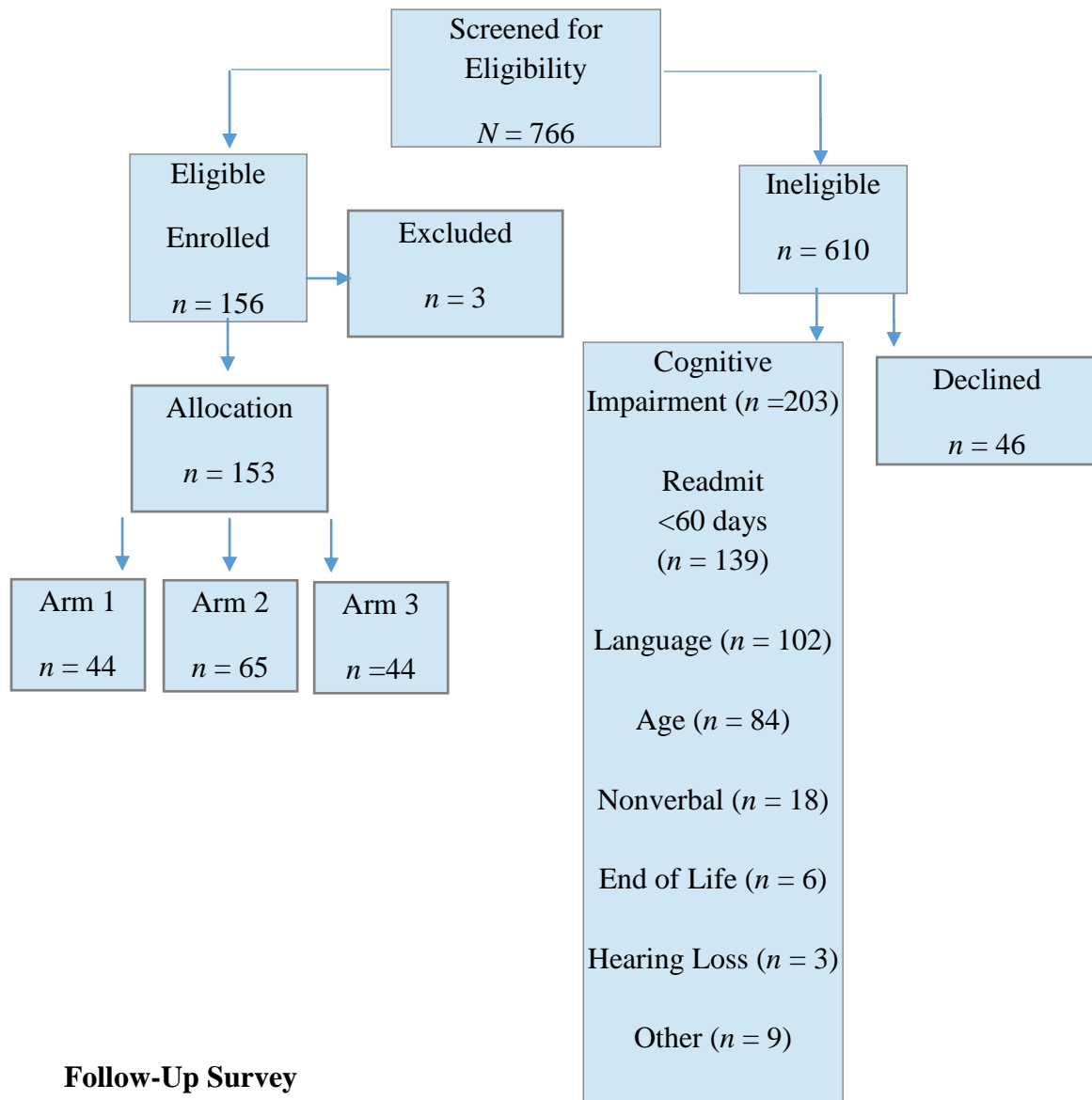
Educators are encouraged to teach RNs and CMs prospect theory's use of framed messages as an adjunct to current methods that motivate decisions for post hospital care. This study's findings are promising regarding improving the patients' involvement in decisions about care alternatives, which in turn may improve patients' final outcomes and reduce the risk of

readmission. RNs and CMs can be pivotal to preventing readmission through using communication strategies known as framed messages to reach agreement with patients/families to follow recommendations (Goldberg et al., 2012; Gandara et al., 2010; Edwards & Elwyn, 2001; Naylor et al., 1999).

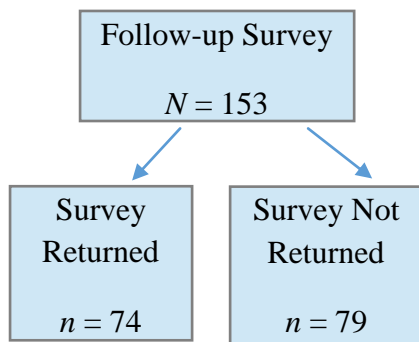
Finally, worldwide pneumonia continues to be a prevalent concern among providers in many countries (Angus & van der Poll, 2013). Hospital readmission for pneumonia continues to be penalized in the United States (CMS, 2011ab). This study found, as previous researchers Halm and Teirstein (2002) noted, that 30-50% of pneumonia patients are at a high risk for mortality due to their comorbidities. Nursing leadership must understand that, within multifactorial transitions, communication strategies may play a part in readmission reduction (Verma et al., 2014; Sox & Goodman, 2012). All decisions during transitions are based on needs or conditions, and decisions during PN illness are but one example (Mishra et al., 2012; Meleis, 2012ab). Nursing research that actively involves older adults using framed messages, allows older adults to make better decisions at discharge. Readmission reduction results in optimal patient health and significant hospital cost savings.

**APPENDIX A**

**Study Enrollment**



**Follow-Up Survey**



**Legend:**

- A) Excluded potential may/may not have received the intervention, died, or were found to be ineligible after EMR review.
- B) Ineligible potential participants did not meet all of the IRB-approved criteria for study participation.
- C) Eligible potential participants met all of the IRB-approved criteria for study participation at the time of enrollment.

**APPENDIX B:**

**Ranking of Screened Participants**

**Screened Participants (Single Exclusion Criterion Per Participant Screened Out)**

Category		#	%	Code
<b>Enrolled</b>		<b>156</b>	<b>20.21%</b>	
<b>Excluded</b>		<b>3</b>	<b>0.26%</b>	
<b>Declined</b>	RN declined (e.g., patient judged to be too sick by RN or PI)	13	1.69%	RN
	Patient declined (before enrollment)	26	3.39%	Pt
	Not Recorded	7	0.91%	Ot
<b>Total in Declined Category</b>		<b>46</b>	<b>6.00%</b>	
<b>Cognitive Impairment</b>	Dementia	93	12.13%	Dm
	Delirium	5	0.65%	DI
	Alzheimer's	10	1.30%	Al
	Memory Loss	4	0.52%	ML
	Other cognitive deficit (e.g. confusion)	91	11.86%	Ot
<b>Total in Cognitive Impairment Category</b>		<b>203</b>	<b>26.47%</b>	
<b>Age &lt;55</b>		<b>84</b>	<b>10.95%</b>	
<b>Readmit &lt;60 days</b>		<b>139</b>	<b>18.12%</b>	
<b>Unable to or does not speak</b>	Nonverbal	2	0.26%	NV
	Ventilator	7	0.91%	V
	Tracheostomy	7	0.91%	T
	Other impediments to speech	2	0.26%	Ot
<b>Total in Speech-Impaired Category</b>		<b>18</b>	<b>2.35%</b>	
<b>Language</b>	Spanish	56	7.30%	Sp
	Russian	3	0.39%	Ru
	Persian/Farsi	17	2.22%	PF
	Korean	5	0.65%	Kr
	Chinese	5	0.65%	Ch
	Other languages not listed here	16	2.09%	Ot
<b>Total in Language Category</b>		<b>102</b>	<b>13.30%</b>	
<b>End of Life</b>		<b>6</b>	<b>0.78%</b>	
<b>Hearing Loss</b>		<b>3</b>	<b>0.39%</b>	
<b>Other</b>		<b>9</b>	<b>1.17%</b>	
<b>Total # screened*</b>		<b>766</b>		

Each patient is counted in only one category, even if they screen out more 1 category

**Ranking of screened participants not meeting eligibility by category**

1	Cognitive impairment
2	Readmit <60 days
3	Language
4	Age <55
5	Declined
6	Unable to or does not speak
7	End of Life
8	Hearing Loss
9	Blindness
10	Other

## APPENDIX C

### Follow-Up Survey Responses

Survey Question (Q)	Survey Response	Survey Responders n (%)	Readmitted by Response n (%) [1]
<hr/>			
Returned Surveys ( <i>N</i> = 153)		74 (48)	10 (14)
Q 1) Are you doing better? ( <i>n</i> = 73)	Yes	69 (95)	8 (12)
	No [2]	4 (5)	2 (50)
Q 2) Did you go to your physician appointment? ( <i>n</i> = 72)	Yes	71 (99)	9 (13)
	No	1 (1)	0
Q 3) How satisfied are you with your health right now?	Very satisfied (1)	20 (27)	3 (15)
	Somewhat satisfied (2)	43 (59)	5 (12)
	Neither satisfied or dissatisfied (3)	4 (5)	0
	Somewhat dissatisfied (4)	2 (3)	0
	Very dissatisfied (5)	4 (5)	2 (50)
Q 4) How well are you breathing now since you returned home? ( <i>n</i> = 70)	No problems	37(53)	3 (8)
	Some problems	33 (47)	7 (21)
Q 5) Describe breathlessness ( <i>n</i> = 67)*Borg	I only get breathless with strenuous exercise.(0)	19 (28)	1 (5)
	I get short of breath when hurrying on level ground or walking up a slight hill.(1)	30 (45)	2 (7)
	On level ground, I walk slower than people of the same age	9 (13)	2 (22)



	because of breathlessness, or have to stop for breath when walking at my own pace.(2)		
	I stop for breath after walking about 100 yards or after a few minutes on level ground.(3)	6 (9)	1 (17)
	I am too breathless to leave the house or I am breathless when dressing.(4)	3 (4)	1 (33)
Q 6) Did you receive the home health care after discharge that was ordered? ( <i>n</i> = 74)	Yes	34 (46)	5 (15)
	No	17 (23)	2 (12)
	Not applicable	23 (31)	3 (13)

---

[1] Percentages are based on the number in the response category.

[2] Only the first half of the question is summarized due to inconsistency in the answers of the second half.

\*breathlessness – collapsed (0-1 vs. 2-4) since 97% of those who answered no breathing problems checked one of the two first categories under breathlessness (**Borg scale**).

**APPENDIX D**

**Code:** \_\_\_\_\_

**Pneumonia Readmission Reduction  
Follow Up Survey**

**Instructions:** Below are a few questions about your recent experience with pneumonia. Do not put your name on this survey. We have a research code to protect your privacy. Read each question and check the box that applies. If unable to answer, just leave blank. Once complete, mail this form back in the self-addressed envelope provided. Thank you!

1. Are you doing better?  NO 0       YES 1
- OR*    are you worsening since leaving the hospital?  NO 0       YES 1
2. Did you go to your physician appointment?  NO 0       YES 1
- a.      Date of appointment: \_\_\_\_\_
3. How satisfied are you with your health RIGHT NOW: (check one)
- Very satisfied 1
  - Somewhat satisfied 2
  - Neither satisfied or dissatisfied 3
  - Somewhat dissatisfied 4
  - Very Dissatisfied 5
4. How well are you breathing now since you returned home?
- No Problems 0       Some problems 1
5. Please check the box that applies to you (one box only)

<b>Grad e</b>	<b>Description of Breathlessness (Borg Scale-Mahler,1990)</b>
<input type="checkbox"/> 0	I only get breathless with strenuous exercise.
<input type="checkbox"/> 1	I get short of breath when hurrying on level ground or walking up a slight hill.
<input type="checkbox"/> 2	On level ground, I walk slower than people of the same age because of breathlessness, or have to stop for breath when walking at my own pace.
<input type="checkbox"/> 3	I stop for breath after walking about 100 yards or after a few minutes on level ground.
<input type="checkbox"/> 4	I am too breathless to leave the house or I am breathless when dressing.

6. Did you receive the home health care after discharge that was ordered?
- NO 0     YES 1     Not Applicable 3

## **APPENDIX E**



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### **Appendix A**

#### **MMSE Sample Items**

##### Orientation to Time

"What is the date?"

##### Registration

"Listen carefully. I am going to say three words. You say them back after I stop.

Ready? Here they are...

APPLE (pause), PENNY (pause), TABLE (pause). Now repeat those words back to me." [Repeat up to 5 times, but score only the first trial.]

##### Naming

"What is this?" [Point to a pencil or pen.]

##### Reading

"Please read this and do what it says."

[Show examinee the words on the stimulus form.]

CLOSE YOUR EYES

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**Medical Record Data Abstraction Form**

<p><b><u>Information collected from the Medical Record</u></b></p> <p><b>Birth Date:</b>          Birth date Month _____ Day _____          Year _____ (MM/DD/YYYY)          Age: _____ years old</p> <p><b>Height _____ cm</b>  <b>Weight _____ kg</b></p> <p><b>Primary Language</b>  <b>English</b> <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p><b>Dementia Diagnosis</b>  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p><b>On Dementia Medications</b>  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p><b>Ethnic Origin:</b>  <input type="checkbox"/> Black or African-American 1              (not Hispanic or Latino)  <input type="checkbox"/> White or Caucasian 2              (not Hispanic or Latino)  <input type="checkbox"/> Asian 3  <input type="checkbox"/> Hispanic or Latino 4  <input type="checkbox"/> American Indian or Alaskan Native 5  <input type="checkbox"/> Native Hawaiian or other Pacific 6  <input type="checkbox"/> Mixed 7          Other 8 (please specify _____)</p> <p><b>Marital status?</b>  <input type="checkbox"/> Single 0 <input type="checkbox"/> Widowed 3  <input type="checkbox"/> Married 1 <input type="checkbox"/> Significant Other 4  <input type="checkbox"/> Divorced/Seperated 2</p>	<p><b>Smoking history:</b>          Current smoker (smoking within one month of encounter)?  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p>Recent (stopped between one month and one year before this encounter)  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p>Former (stopped more than one year before this encounter)  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p>Never Smoked  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p><b>Drink alcohol</b>  <input type="checkbox"/> No 0 <input type="checkbox"/> Yes 1</p> <p><b>On average, use of alcoholic beverages (beer, wine, or liquor) use?</b>  <input type="checkbox"/> Never 0  <input type="checkbox"/> 1 or fewer alcoholic drinks per week 1  <input type="checkbox"/> 2-7 alcoholic drinks per week 2  <input type="checkbox"/> 7 or more alcoholic drinks per week 3  <input type="checkbox"/> 5 or more drinks on one occasion 4</p> <p><b>Subject's Health insurance (mark all that apply)?</b>  <input type="checkbox"/> <u>Government insurance</u> (that is, Medicare, Medicaid; including all state or federal Medicaid-type programs; VA health plans, military medical plan) 1  <input type="checkbox"/> <u>Commercial insurance</u> (that is, fee-for-service and PPO carriers) 2  <input type="checkbox"/> <u>Prepaid health plans</u> (usually called an HMO) where you, your employer or someone else pays the same amount per month, no matter how many doctor visits or hospital stays you have. 3  <input type="checkbox"/> <u>Do not have</u> health insurance. 4</p>
--	---

**Pneumonia Severity Index (PSI)**

An interactive tool for the Pneumonia Severity Index from the Assessment of the Variation and Outcomes of Pneumonia: Pneumonia Patient Outcomes Research Team Final Report. AHRQ Publication No. 97-N009.

\*Age : \_1 \*Sex : \_2

Nursing Home Resident

**Comorbid Diseases :**

Renal Disease  Liver Disease

CHF

Cerebrovascular Disease  Neoplasia

**Physical Exam:**

Altered Mental Status  SBP < 90

Temp < 35 or >= 40  RR >= 30

HR >= 125

**Labs :**

PH < 7.35  PO2 < 60 or Sat < 90

NA < 130  HCT < 30  Glucose > 250  BUN > 30  Pleural Effusion

\* Items marked with an asterisk are required *Current as of December 2003*

**Internet Citation:** *Pneumonia Severity Index Calculator*. December 2003.

Agency for Healthcare Research and Quality. Rockville, MD.

<http://pda.ahrq.gov/psicalc.asp>

**Pneumonia Severity Index Results**

Class :      Score :      Mortality :  
Pneumonia Severity Index

Risk	Class	Score	Mortality
Low	I	< 51	0.1%
Low	II	51 - 70	0.6%
Low	III	71 - 90	0.9%
Medium	IV	90 - 130	9.5%
High	V	> 130	26.7%

Hospitalization is recommended for class IV and V. Class III should be based on clinical judgment.

**Discharge Instructions****Patients received copy at discharge per MR**

No 0

Yes 1

**Discharge Disposition**

Home 0  Home with Home Health 1

Home with Assistive Devices 2

Nursing Home 3

Other 4  Expired 5

**OTHER DISCIPLINES****DOCUMENTATION****1. Physical Therapy**

No 0  Yes 1

Assistive Device  No 0  Yes 1

**2. Respiratory Care**

No 0

Yes 1

Oxygen Devices for Home

No 0

Yes 1

CPAP Devices for Home

No 0

Yes 1

**3. Speech Therapy Care****Dysphagia**

No 0

Yes 1

**Special Diet**

No 0

Yes 1

**4. Advance Directive**

No 0

Yes 1

**5. Case Management Note indicates Agreement with Patient/Family on Transition Plan**

No 0

Yes 1

## **APPENDIX G**

### **CD SCRIPTS**

#### **Arm A: CD Script Positive Message Framing**

THIS MESSAGE IS IMPORTANT FOR YOU TO LISTEN TO, WE WANT YOU TO HAVE GOOD HEALTH

As you know you have been diagnosed with Pneumonia - a respiratory infection.

It takes time and a careful program of treatment to recover from Pneumonia.

The recommended treatment following your hospital stay was designed by your health team with your input and preferences in mind.

If you follow the recommendations you are likely to:

- Have more energy.
- Breathe better
- Experience less fatigue
- Have a better appetite
- Be able to perform more of your usual activities
- Prolong your life.

You are likely to experience major health benefits if you take your medications and follow up with an appointment with your doctor.

#### **Arm B: CD Script Negative Message Framing**

THIS MESSAGE IS IMPORTANT FOR YOU TO LISTEN TO, WE WANT YOU TO AVOID POOR HEALTH

As you know you have been diagnosed with Pneumonia - a respiratory infection. It takes time and a careful program of treatment to recover from Pneumonia. The recommended treatment following your hospital stay was designed by your health team with your input and preferences in mind.

If you don't follow the recommendations you are likely to:

- Have less energy
- Breathe with more difficulty

- Experience more fatigue
- Have a poorer appetite
- Not be able to perform as many of your usual activities
- Shorten your life.

You are likely to experience major health problems if you do not take your medications or follow up with an appointment with your doctor.

**Arm C: CD Script Control Message**

THIS IS A MESSAGE ABOUT UC SYSTEMS-DID YOU KNOW

UC medical centers had 290,000 emergency room visits last year. The UC centers participate in nurse-run clinics at the Union Rescue Mission in Los Angeles (UCLA), Glide Health Services in San Francisco's Tenderloin district (UCSF) and at El Sol charter school in Santa Ana (UC Irvine). UC San Francisco performed the world's first fetal surgery. And UC medical centers provided \$491 million of charity care in the past year and had 3.9 million outpatient visits in the past year. UC's medical centers provide vital aid to UC's medical and other health professional schools: \$592 million this year in professional services and support of research and educational programs. And the University of California nursing programs enroll approximately 1,500 undergraduate and graduate students. UC medical centers are undertaking 78 projects to expand access of care.

**APPENDIX H**

**Pneumonia Readmission Reduction Baseline Self-Report Questionnaire CODE \_\_\_\_\_**

**Instructions:** *I'd like to ask you a few questions. (RA is to administer after HIPAA is signed and informed consent is obtained)*

**1. Do you currently live with another person?**

- No 0 [if no skip to question #3]       Yes 1

**2. Right now, are you living with:**

- Your spouse 1  
 A long-term partner 2  
 A roommate or roommates 3  
 Family who are related to you 4  
(other than your spouse or partner)

**3. Do you have someone to confide in?**

- No 0                                       Yes 1

**4. How many people can you turn to for help?**

- 1     2     3     4

**5. During the past week (even if it was not a typical week) how much total time did you spend on EXERCISE (including strengthening exercises, walking, swimming, gardening, active housework or other types of aerobic exercise)?**

- None 0  
 Less than 30 minutes per week 1  
 30-60 minutes per week 2  
 1 to 3 hours per week 3  
 More than 3 hours per week 4

**6. How many years of education do you have? \_\_\_\_\_**

The highest level of education you have completed?

- Less than high school graduate 1  
 High school graduate 2  
 Business school 3  
 Some college 4  
 Associate degree 5  
 Bachelor's degree 6  
 Master's degree 7  
 Professional degree 8  
 Doctoral degree 9

**7. Employment Status**

- Employed full or part time outside the home 0  
 Unemployed by choice 1  
 Sick leave or disability 2  
 Homemaker 3  
 Retired due to heart failure 4  
 Retired; not due to heart failure 5  
 Other (please specify) 6



**APPENDIX I**



UCLA Medical Center, Santa Monica

**1250 Sixteenth Street  
Santa Monica, CA 90404  
424.259.6000  
DUNS #:**

November 16, 2012

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To Whom It May Concern:

I am writing to confirm that Angela Halpin is approved to collect data at UCLA Medical Center, Santa Monica for her NRSA grant project. Located in Santa Monica, CA within the 30<sup>th</sup> Congressional District, the Medical Center is part of UCLA Health Systems. It is licensed for 266 inpatient beds and admits --- patients annually, -- of which are pneumonia patients. Recent hospital data reported to Health Quality Alliance shows a 19.1 percent 30-day readmission rate for pneumonia, comparable to the national rate.

Under the lead sponsorship of Dr. Felicia Hodge, Angela Halpin will be compiling data for her project, *Communication and Message Framing Effects on Pneumonia Readmission Reduction*. Ms. Halpin will be identifying and screening patient in the emergency room and enrolling patient admitted to the hospital. She will be collecting data either in Fall 2013 or Winter 2014, pending approval from IRB and the School of Nursing.

Please contact me if you have any questions or concerns.

Regards,

A handwritten signature in cursive script that reads "Edith Matesic".

Edith Matesic, RN, MS, DNP, NEA-BC  
Chief Nursing Officer/Director of Nursing  
UCLA Medical Center, Santa Monica  
[EMatesic@mednet.ucla.edu](mailto:EMatesic@mednet.ucla.edu)

November 29, 2012

Karen A. Grimley, MBA, RN  
Chief Nursing Officer  
University of California Irvine Medical Center  
101 The City Drive  
Orange, CA 92868

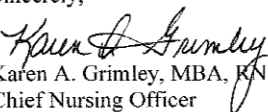
University of California Los Angeles (UCLA)  
405 Hilgard Ave.  
Los Angeles, CA 90094

To the UCLA Institutional Review Board (IRB):

I am familiar with Angela Halpin's research project titled "*Communication and Message Framing Effects on Pneumonia Readmission Reduction*." I understand that UC Irvine patients will be recruited to participate in this study. Prospective participants will be approached by UCI Emergency Department nurses who, in turn, contact Ms. Halpin to meet with patients interested in being part of this study. This study will begin only after approval from UCLA School of Nursing, UCLA IRB and UCI IRB, a final letter of agreement to participate in this study will be signed.

I understand that this research will be carried out following sound ethical principles and that participant involvement in this study is strictly voluntary and provides confidentiality of research data, as described in the protocol.

Sincerely,

  
Karen A. Grimley, MBA, RN  
Chief Nursing Officer

cc: Angela Halpin  
Natasha Fung

## **APPENDIX J**



American Thoracic Society

*We help the world breathe®*

**PULMONARY • CRITICAL CARE • SLEEP**

### **HOW DO I KNOW I HAVE PNEUMONIA?**

Pneumonia may begin like bronchitis, but does not go away with usual treatment. Common signs of pneumonia are more shortness of breath than usual, cough, increase (or sudden decrease) in the amount of sputum, a deep yellow, green or red color to the sputum, coughing blood, fatigue (extreme exhaustion), or fever. A chest x-ray is needed to diagnose pneumonia.

Pneumonia can develop in the lungs from an infection caused by any of several organisms (also called "germs" or "bugs"). These organisms can be a virus, bacteria or fungus. Organisms can grow in the lungs if the person's immune system is too weak to fight off the organism's growth. Our lungs, like our mouth and nose, normally contain organisms, but they are either harmless or are too few in number to be harmful. Harmful organisms are termed pathogenic (they cause infection whether in small or large amounts). People developing pneumonia are either not able to control the growth of these organisms or have inhaled pathogenic organisms that are quick to cause pneumonia.

#### **Is Pneumonia Dangerous**

Pneumonia can be dangerous, especially if the person is already very weak. If pneumonia does occur, it can usually be treated at home with antibiotics. Sometimes your provider has to change the antibiotic if the organism does not go away with the first antibiotic. If you get too weak, or unable to breathe adequately because of the infection in the lungs, you may need to be hospitalized. Occasionally, people with pneumonia need to have their breathing assisted or controlled with a ventilator until the infection is controlled. Some people are too weak to fight the infection, even when a ventilator is used, and die from pneumonia. Pneumonia can be very dangerous if not treated early.

#### **What can I do to treat the pneumonia?**

When antibiotics are prescribed, take them as directed, no more or no less than prescribed (unless they are causing side-effects). That means not only the dosage (for example "one tablet twice a day"), but also for the length of time outlined by your healthcare provider (for example "take for 7 days"). The length of time you are prescribed antibiotics varies with the medication and your provider's evaluation. Therefore, some antibiotics are for 5 days and some for 14 days. The important thing is not to stop taking antibiotics because you "feel better". There is no single antibiotic that is considered the "best" to treat all pneumonias. Your healthcare provider will decide which is best for you based on your history and chest x-ray.

#### **When should I call my healthcare provider about pneumonia?**

You should call your healthcare provider if you suspect that you may have pneumonia. Signs of pneumonia are dark yellow or green sputum production in larger amounts than normal, a feeling of congestion that won't go away, increasing shortness of breath, fever and increasing tiredness. Your provider will determine if you have pneumonia with a chest x-ray and antibiotics will be prescribed if you have. You should call your provider if the sputum does not improve in color or amount after several days of antibiotics. You should also call if your breathlessness worsens or fever does not improve. You can expect to be weak from pneumonia. Weakness, however, that worsens despite treatment should be brought to the attention of your healthcare provider.

<http://www.thoracic.org/clinical/copd-guidelines/for-patients/how-do-i-know-i-have-a-pneumonia.p...> Modified 9/2013

## **APPENDIX K**

### **ABBREVIATIONS**

ACA	Affordable Care Act
ADL	Activities of daily living
AspPn	Aspiration Pneumonia
BMI	Body Mass Index
CAP	Community Acquired Pneumonia
CINAL	Current Analysis of Literature (Search Engine)
CMS	Centers for Medicare and Medicaid
CS	Communication strategies
CXPE	Chest x-ray with pleural effusion
DRG	Diagnostic Related Grouping Codes
DV	Dependent variable
GDP	Gross Domestic Product
H	Hypothesis
HCP	Health Care Providers
HPR	Halpin Pneumonia Reduction
HRET	Health Research and Educational Trust
HRS	Halpin Readmission Study
IADL	Instrumental activities of daily living
IC	Interdisciplinary communication
IT	Interdisciplinary team
IV	Independent variable
MD	Medical Doctor (Physician)
MR	Medical Record
OR	Odds ratio
PN	Pneumonia
PSI	Pneumonia Severity Index
PT	Prospect Theory
Q	Questions
RCT	Random Control Trial
RR	Reduce Readmissions
RRP	Readmission reduction program
TCM	Transitional Care Model
UCI	University of California, Irvine
UCLA	University of California, Los Angeles

## APPENDIX L

### Protocol Training RAs

#### DATA COLLECTION & INTERVENTION

##### Instructions & Overview:

The trained research associates (approved after completion CITI & HIPAA programs) are volunteer registered nurses or student nurses in Baccalaureate Nursing program at the two university schools where enrolment is scheduled. Each are trained by the principal investigator or a delegate on the study protocol. Each research associate (RA) perform the intervention aspect of the study. The PI screens and enrolls all subjects following data collection steps from initiation of study. Specific RAs were assigned days to be available based on their agreed role and schedules. Each agreed to maintain the integrity of the research protocol. The study as three randomized groups; the PI, RAs and patients were blinded to the content of the CD and/group assignments.

- a. The first group of subjects (**Gp I**) were those adult patients who are admitted to the hospital with the medical diagnosis of pneumonia and receive intervention A.
- b. The second group (**Gp II**) were those patients with the diagnosis of pneumonia and receive intervention B.
- c. The third group (**Gp III**) were pneumonia patients in the control group.

General admission procedures per hospital standard care are adhered to and followed.

Subjects' test or required procedures by hospital staff, such as diagnostic or medical/surgical treatments, are not altered due to the experiment. If patients were interested in participating the PI: Followed recruitment, eligibility screening, consent, and HIPAA protocols aiming to enroll subjects within 48 hours of admission or on the day of discharge.

Once enrolled the RA then administered the intervention by having the subjects listen to the CD using headphones in his/her presence a minimum of one time. Afterwards, the patient may listen to the CD as many times as he/she wishes. The steps for intervention are:

- a. Review and explain the intervention only once to the subjects; may assist the patients on use of the intervention headphones.
- b. Each subject received the CD, headphones and an educational handout approved by the American Thoracic Society (ATS) (2013) on the pneumonia illness and received any standard pneumonia education handout from the hospital staff/RA.

Other communication with HCPs occurred per usual standards of care within the organizations. Medical record (MR) abstraction occur post HIPAA authorization and oral consent. These entries included are based on unique discipline requirements as set forth by procedures within the organizations. However, only the data points used in the designated abstraction forms such as demographics, pneumonia severity index are included. Expected interactions and MR entries include (a) the RN's completion of organization's discharge instructions with the patient/family at the time of discharge and as part of usual discharge practice; (b) RN's or case manager's review of physical and/or occupational therapist measures of activity of daily living (ADL), Functional Status (FIM), and instrumental ADL (IADL) following usual care; (c) other disciplines' communication with the patient and team per their usual care. These notes will be reviewed in data collection. Nutritionist notes and lab values may provide albumin levels, body mass index (BMI), dietary and caloric requirements as included in standard discharge notes; (d) speech therapist (S.T.) notes will provide information on communication limits, swallowing test results if applicable; (e) ancillary staff will report additional observations as appropriate, which may include respiratory care providers (RCP), or others; (f) and patients subjective assessment and objective findings. Each IT member follows the standards of measurements approved by their disciplines. ADL and IADL measures were designed in 1969 and have been tested in 1990 for reliability (Edwards, 1990).

## **I. Recruitment**

First step: Recruitment began after UCLA institutional review board (IRB) provided approval and after the two sites (UCLA/UCI) had provided approval from their site IRBs. Once approved individual units and staff identified were provided short 10 minute in-services on the nursing study process. Directions regarding the staff available were obtained by unit leadership, charge nurses and the school of nursing. Postings of study timeline were provided and posted in approved designated places.

Second step: Adult subjects 55 years or > were recruited from medical-surgical units. Recruitment notices were posted based on procedures on the units which explain that a research study is available to patients admitted with a pneumonia diagnosis and list inclusion criteria. Staff physicians, registered nurses and managers were educated on the study at shift changes, short meetings, or at scheduled monthly staff meetings and provided with flyers. The RNs or physicians on the units recommended to the PI patients those patients that verbalized interest and/or met criteria. Once notified the PI asked the assigned registered nurse if it was convenient to approach the adult patient and determine the potential for enrollment or to confirm patients' interest in participating in the study. The PI with IRB permission was able to begin screening after the hospital staff had recommended potential subjects (Figure 5, Appendix L).

## **II. Eligibility**

Once patients have agreed to participate, the PI explains to the patient alone or with the family present the nursing study's goal to reduce pneumonia readmission risk. If the patient continues to express interest in the study and provides oral consent, the PI will ask patients to participate in a screening procedure which entails use of an eligibility script followed by administering the MMSE. After the MMSE, scores are summed; results score of 26 or above meet inclusion criteria. And patients will be asked to confirm the wish to

continue to participate in the study. Whereas, when a score is less than 26, then the subjects are not selected as participants in the study.

Those patients with lower scores are thanked, questions answered and explanations offered. All scores are maintained following confidentiality and HIPAA guidelines. For subject's with an acceptable score, who consent to participate, the study information sheet is given and read to them if needed. If the patient hesitates or conveys they do not want to participate, patients are thanked for their time and the PI notes that the patient declined to participate using a screening worksheet, noting reasons if given. Worksheets have no identifiers and are maintained in secure location with the PI, individual sheets are kept in the lock box within the areas and present with PI at all time while at each site location.

All subjects who receive interventions are assigned at the end of the consent and enrolment process. The PI will answer any questions and follow the randomization procedures.

### **III. Blind Randomization**

Patients are allocated to intervention arm A, intervention arm B, or arm C control groups by a schematic of computerized numbers. The CDs are randomized to intervention A, intervention B, or control C groups using the same procedure. The allocation schedule is computer-generated by the PI not involved in the administration of the study interventions. Allocation is concealed in advance by the nature of a minimization procedure. Labels with codes are placed on all materials in prearranged packets available for use within study procedures.

### **IV. Interventions**

The RA is to administer the interventions to all groups and will not know which group the subject is assigned. Following the procedures, the participants listen to a 60 second CD message, and the RA administering the interventions follow the study procedures and do not know which interventions is assigned. The administration of the intervention the audio CD



message at the subjects bedside should last approximately 5 to 10 minutes which includes reintroducing the RA, assembling the CD player, assisting subjects with use of ear head set, listening to the 60 second CD and providing the subjects/family an education hand out on pneumonia, a document published by the ATS. If the subjects are unable to participate at the time of the intervention visit the RA may ask to come back later that day or the following if the subject is still hospitalized. Anytime the subjects' refuses to participate their wishes are respected and the administration of the intervention is not to occur. The PI is on site at all times during the procedure and available to answer any questions regarding the study.

## **V. Medical Record Abstraction Form**

Collection of data began after oral consent was obtained using the study information sheet (waiver of informed consent) and a HIPAA authorization signed by participants. Subject information was collected from medical records (MRs) for intervention and control arms and included demographic, gender, ethnicity, insurance status, smoking, marital status, and living arrangements (alone or lives with others) patient interactions, medical history (co-morbidities), and disposition at discharge. The MR data abstracted was entered on the approved MR abstraction form by the PI with/without RA assistance. The PSI information to determine the PSI score includes (a) age, gender, and if nursing home resident (b) comorbid conditions of (i) renal disease, (ii) liver disease, (iii) HF, (iv) cerebral vascular disease, and (v) neoplastic; (c) physical exam at time of admission noting (i) altered mental status, (ii) systolic blood pressure < 90, (iii) temperature < 35 or > 40 centigrade, (iv) respiratory rate > 30, and (v) heart rate  $\geq$  125; (d) laboratory findings of (i) PH < 7.35, (ii) PO<sub>2</sub> < 60 or saturation < 90, (iii) NA < 130, (iv) HCT < 30, (v) glucose > 250, (vi) BUN > 30, and (vii) pleural effusion (Fine et al., 1997; Fine et al., 1993). The PSI calculation is assigned and recorded in the MR per hospital policy.

## **VI. Coded data**

Data collections materials such as worksheets and CDs used in interventions are randomly coded prior to the intervention to maintain integrity of the study. The packets include: 1) Study Information Sheet (waived informed consent), and HIPAA authorization form 2) medical record abstraction form which includes the PSI form, 3) baseline self-reported questions, 3) MMSE, 4) headsets, 6) ATS handout 7) intervention and control CDs, and 8) follow up survey (mailed at 30 days post discharge). Each are labeled using the randomized numbers and group assignment, the RA/PI are blinded to the codes and content of CD messages. All codes are de-identified at the end of the study after analysis. Once materials are implemented, study forms and abstracted data is placed in a locked box on the designated units and the PI maintains records at the same time by use of the locked box. Since there will be a minimum of 180 subjects in the study and analysis of the aims follows.

## **VII. Confidential and Privacy**

Following the randomization procedure, each subject in the intervention groups and in the control group received a CD recorded message following privacy and confidential protocols. Each subject is to listen to the audio CD content that is no longer than 60 seconds. The CD was presented after consent and HIPAA authorization procedures were completed. Audio CDs were randomly assigned to the study arms and subjects, both PI and RAs were blinded to the content.

In conclusion, subjects received discharge recommendations both verbally and by receipt of the discharge instructions (DI) as per policy of the hospital. Data from the provider and patient exchanges was collected using the MR abstraction form during chart reviews. Measures include the discharge disposition as entered in the EMR by the provider and signed/ or on documented receipt of DI by patients as per hospital policy. The RA or a delegate enters study data elements on the abstraction form following HIPAA, confidentiality and

privacy rules. The data management procedures were followed.

The researcher (PI or a delegate) records data into a spread sheet that maintains all the data elements, decisions and health care recommendations conveyed on the data collection sheets with a code. MRs both hard copy and EMR are accessed using privacy and confidential procedures, accessed with sign-on passwords per the hospital policies which permit access to subject's data as approved as necessary for the study. Research data collection worksheets are kept in a secure locked box in a designate site areas and retrieved by the PI or a designee weekly and maintained in secure locked area in the PI's office.

## APPENDIX M

UNIVERSITY OF CALIFORNIA LOS ANGELES  
PNEUMONIA READMISSION REDUCTION STUDY  
CONTACTS and NUMBERS

If you have questions later about the research or screening you may call the principal investigator: **Angela P. Halpin MSN, RN, CNS, PhD (c)** at 1-949-282-9795 or **Felicia S. Hodge, Dr.PH. UCLA professor** at (310)-267-2255.

If you have questions about your rights as a research subject or if you wish to voice any problems or concerns you may have about the study to someone other than the researchers, please contact: **UCLA Office of the Human Research Protection Program** at (310) 825-7122.

**APPENDIX N**

IRB# 13-001196

**University of California**  
**Permission to Use Personal Health Information for Research**

Study Title (or IRB Approval Number if study title may breach subject's privacy):

Pneumonia Readmission Reduction Study

Principal Investigator Name:

Angela Halpin, MSN, RN, CNS, PhD(c)

Sponsor/Funding Agency (if funded):

**A. What is the purpose of this form?**

State and federal privacy laws protect the use and release of your health information. Under these laws, the University of California or your health care provider cannot release your health information to the research team unless you give your permission. The research team includes the researchers and people hired by the University or the sponsor to do the research. If you decide to give your permission and to participate in the study, you must sign this form as well as the Consent Form. This form describes the different ways that the researcher, research team and research sponsor may use your health information for the research study. The research team will use and protect your information as described in the attached Consent Form. However, once your health information is released it may not be protected by the privacy laws and might be shared with others. If you have questions, ask a member of the research team.

**B. What Personal Health Information will be released?**

If you give your permission and sign this form, you are allowing: **UCLA** to release the following medical records containing your Personal Health Information. Your Personal Health Information includes health information in your medical records and information that can identify you. For example, Personal Health Information may include your name, address, phone number or social security number.

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Entire Medical Record                                    | <input type="checkbox"/> Laboratory Reports    | <input type="checkbox"/> Emergency Medicine Center Reports |
| <input type="checkbox"/> Outpatient Clinic Records                                | <input type="checkbox"/> Dental Records        | <input type="checkbox"/> Health Care Billing Statements    |
| <input type="checkbox"/> Pathology Reports  | <input type="checkbox"/> Operative Reports     | <input type="checkbox"/> Diagnostic Imaging Reports        |
| <input type="checkbox"/> EKG  | <input type="checkbox"/> Radiology Reports     | <input type="checkbox"/> History & Physical Exams          |
| <input type="checkbox"/> Progress Notes   | <input type="checkbox"/> Radiologic & MR Scans | <input type="checkbox"/> Consultations                     |
|   | <input type="checkbox"/> Discharge Summary     | <input type="checkbox"/> Psychological Tests               |
| <input checked="" type="checkbox"/> Other (describe): Data specifically for study |  |  |

UCLA HIPAA Research Authorization 2009

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**C. Do I have to give my permission for certain specific uses?**

Yes. The following information will only be released if you give your specific permission by putting your initials on the line(s).

I agree to the release of information pertaining to drug and alcohol abuse, diagnosis or treatment.

I agree to the release of HIV/AIDS testing information.

I agree to the release of genetic testing information.

I agree to the release of information pertaining to mental health diagnosis or treatment as follows:

**D. How will my Personal Health Information be used?**

Your Personal Health Information may be released to these people for the following purposes:

1. To the research team for the research described in the attached Consent Form;
2. To others at UC who are required by law to review the research;
3. To others who are required by law to review the quality and safety of the research, including: U.S. government agencies, such as the Food and Drug Administration, the research sponsor or the sponsor's representatives, or government agencies in other countries. These organizations and their representatives may see your Personal Health Information. They may not copy or take it from your medical records unless permitted or required by law.

**E. How will my Personal Health Information be used in a research report?**

If you agree to be in this study, the research team may fill out a research report. (This is sometimes called "a case report".) The research report will **not** include your name, address, or telephone or social security number. The research report may include your date of birth, initials, dates you received medical care, and a tracking code. The research report will also include information the research team collects for the study. The research team and the research sponsor may use the research report and share it with others in the following ways:

1. To perform more research;
2. Share it with researchers in the U.S. or other countries;
3. Place it into research databases;
4. Use it to improve the design of future studies;
5. Use it to publish articles or for presentations to other researchers;
6. Share it with business partners of the sponsor; or
7. File applications with U.S. or foreign government agencies to get approval for new drugs or health care products.

**F. Does my permission expire?**

This permission to release your Personal Health Information expires when the research ends and all required study monitoring is over. Research reports can be used forever.

**G. Can I cancel my permission?**

You can cancel your permission at any time. You can do this in two ways. You can write to the researcher or you can ask someone on the research team to give you a form to fill out to cancel your permission. If you cancel your permission, you may no longer be in the research study. You may want to ask someone on the research team if canceling will affect your medical treatment. If you cancel, information that was already collected and disclosed about you may continue to be used. Also, if the law requires it, the sponsor and government agencies may continue to look at your medical records to review the quality or safety of the study.

**H. Signatures**

**Subject**

If you agree to the use and release of your Personal Health Information, please print your name and sign below. You will be given a signed copy of this form.

\_\_\_\_\_  
Subject's Name (print)--*required*

\_\_\_\_\_  
Subject's Signature

\_\_\_\_\_  
Date

**Parent or Legally Authorized Representative (where IRB approved)**

If you agree to the use and release of the above named subject's Personal Health Information, please print your name and sign below.

\_\_\_\_\_  
Parent or Legally Authorized Representative's Name  
(print)

\_\_\_\_\_  
Relationship to the Subject

\_\_\_\_\_  
Parent or Legally Authorized Representative's Signature

\_\_\_\_\_  
Date

**Witness**

If this form is being read to the subject because s/he cannot read the form, a witness must be present and is required to print his/her name and sign here:

\_\_\_\_\_  
Witness' Name (print)

\_\_\_\_\_  
Witness' Signature

\_\_\_\_\_  
Date

**APPENDIX O****SAMPLE CALCULATIONS**

\*take maximum value to determine sample size needed to power the study.

Hypothesis	Test	Effect Size	Notes	Total sample size	
1, 2	Chi-square test	Small (.1)	Df = 1, two tailed	785	For questions 1-2 a total of $(785/2)*3 = 1178$
1, 2	Chi-square	Medium (.3)	Df = 1, two tailed	88	For questions 1-2 a total of $(88/2)*3 = 132$
1, 2	Chi-square	Compare 15.03% to 23.2%	Df = 1, two tailed	151	For questions 1-2 a total of $(151/2)*3 = 227$
1,2	Fisher's Exact	Small sample	Equal allocation, two tailed	1198	
1,2	Fisher's Exact	Small sample	Compare 23.2% to 15.03%	768	
3	Chi-square	Medium (.3)	Df = 2, two tailed	108	
3	Chi-square	Small (.3) sample	Df = 2, two tailed	964	
4	Logistic regression	Small sample	Compare 23.2% to 15.3%	898	

If we assume H1-H2 can be analyzed using a chi-square with medium effect size, 88 with a total = 132. This study uses a medium effect.

If we assume H3 can be analyzed with Chi-square with a medium effect sample size 108.



## **APPENDIX P**

### **Pneumonia and Index Admission, Discharge by Study Arm**

	Positive	Negative	Control	Subjects	<i>p</i> -value
Index Admission	( <i>n</i> = 44)	( <i>n</i> = 65)	( <i>n</i> = 44)	( <i>N</i> = 153)	[1]
<b>Diagnosis on Admission <i>n</i> (%)</b>					
Pneumonia (PN)	40 (91)	59 (91)	41 (93)	140 (92)	0.936
No pneumonia	4 (9)	6 (9)	3 (7)	13 (9)	
<b>Diagnosis on Admission by MD <i>n</i> (%)</b>					
PN w/o sepsis or other dx	23 (52)	30 (46)	16 (36)	69 (45)	0.835
Pneumonia w/other dx, no sepsis	9 (20)	16 (25)	13 (30)	38 (25)	
PN w/other dx &/or sepsis	8 (18)	12 (18)	11 (25)	31 (20)	
Pneumonia ruled out	4 (9)	7 (11)	2 (5)	13 (9)	
No pneumonia	0	0	2 (5)	2 (1)	
<b>Diagnosis on Discharge <i>n</i> (%)</b>					
Pneumonia	13 (30)	18 (28)	14 (32)	45 (29)	0.868
Treated as pneumonia or had PN w/other dx, no sepsis	22 (50)	32 (49)	22 (50)	76 (50)	
Influenza w/respiratory tx, w/o pneumonia	0	3 (5)	0	3 (2)	
Pneumonia w/sepsis	1 (2)	3 (5)	2 (5)	6 (4)	
No pneumonia, or other dx	8 (18)	9 (14)	6 (14)	23 (15)	

[1] *P*-value is based on Fisher Exact Test of independence between study arms and characteristic. Note: There were two patients diagnosed as ‘no pneumonia’ according to the MD on admission, and thirteen where pneumonia was ruled out however, these patients received treatment for pneumonia.

## **APPENDIX Q**

### **UCLA RESEARCH STUDY PNEUMONIA READMISSION REDUCTION**

Principal Investigator Angela Halpin MSN, RN, PhD (c) UCLA School of Nursing is collaborating with University of California, Irvine Health Care and University of California Medical Center, Santa Monica on a research study.

The purpose of the study is to determine if listening to a health message on an audio compact disc (CD) reduces readmission to the hospital for patients with pneumonia. The study is a randomized control trial with three patient groups and each will listen to a different health message.

Participation is voluntary. Choosing to participate will not affect your relationship with your doctor or the hospital. You will receive all standard care and treatments for the condition of pneumonia if you participate, or if you choose not to participate.

If you participate in this study you will complete a short survey while in the hospital and a second survey mailed to you when you get home. The total time if you choose to participate in this study is about one hour.

In order to participate, you must be:

- Diagnosed with pneumonia on admission
- Free of hospitalization in the last 60 days
- English speaking
- Age 55 years or older
- Able to hear a recorded health message using headphones
- Alert and oriented
- Willing to take a short reasoning screen

If you are interested or you have a family member who is here at the hospital and is interested please let your treating physician or registered nurse know, or you may contact the UCLA principal investigator: Angela at 949-282-9795.

## **APPENDIX R**

### **UNIVERSITY OF CALIFORNIA LOS ANGELES CONSENT STUDY INFORMATION SHEET**

#### *Pneumonia readmission reduction*

Angela P. Halpin MSN, RN, PhD candidate, sponsored by Felicia S. Hodge Dr.PH, from the School of Nursing at the University of California, Los Angeles (UCLA) is conducting a research study and Ruth Mulnard, DNSc., Faculty, University of California, Irvine at UCI. You were selected as a possible participant in this study because you have a diagnosis of community acquired pneumonia or pneumonia which is known to have a risk for readmission to the hospital. Your participation in this research study is voluntary.

#### **Why is this study being done?**

The purpose of the research study is to identify information that will inform clinical practice and hopefully reduce hospital pneumonia readmissions.

#### **What will happen if I take part in this research study?**

There are three patient groups in this research study and each will listen to a different health message on a CD. If you agree to participate, you will be randomized to one of the three groups, and the researcher will ask you to do the following:

- Complete a survey in the hospital that asks questions about your life style (e.g. exercise)
- Sign a HIPAA authorization that allows the reasearches to gather information from your medical record about your pnuemonia, general health, and pneumonia care.
- Listen to a recorded health message on a CD using a head set.
- At 30 days after discharge, complete a mailed survey sent to your home that ask about the status of your health. For example: "Did you go to your physician appoinment?"

#### **How long will I be in the research study?**

Participation will take about one hour of your time. While in the hospital you will meet with the researcher to answer seven questions about demographics, listen to a one minute health message on a compact disc (CD); using a head set and a device that turns on the CD. After you leave the hospital you will receive a short six question survey by mail with a self-addressed return envelope to mail back to the researcher.

#### **Are there any potential risks or discomforts that I can expect from this study?**

There is very little risk known or associated with being in this type of research. You may feel uncomfortable about answering questions about your health or lifestyle. You can choose to skip and not answer any questions that make you feel uncomfortable. You may decide not to participate at any time without any consequence to your benefits or services as a patient and you will receive usual care from the health team during your admission.

#### **Are there any potential benefits if I participate?**

There are no direct benefits to you for participating in this study. Other patients in the future may benefit from the information obtained from this research.

**Will I be paid for participating?**

There is no payment for participating in the research. However, you will receive the CD with to take home you. There is no cost to you for participating in this study.

**Will information about me and my participation be kept confidential?**

All correspondence follows confidential procedures and will protect your private information. Any information that is obtained in connection with this study that can identify you will remain confidential. Confidentiality will be maintained by means of removing your name and using a code for all forms and interactions. All data is safeguarded and maintained in a locked secure area. No one other than the researchers will have access to the secure files.

**What are my rights if I take part in this study?**

- You can choose whether or not you want to be in this study, and you may withdraw your consent and discontinue participation at any time without penalty.
- Whatever decision you make, there will be no penalty to you, and no loss of hospital or health care service benefits to which you are otherwise entitled.
- You may refuse to answer any question(s) in the surveys that you do not want to answer and still remain in the study.

**Who can I contact if I have questions about this study?**

• **The research team:**

If you have any questions, comments or concerns about the research, you can talk to one of the researchers, listed below:

Angela Halpin, MSN, RN, CNS, PhD (c) principal investigator at (949)-282-9795.

Felicia S. Hodge, Dr.PH. UCLA professor at (310)-267-2255.

Ruth Mulnard D.N.Sc, MSN, RN., Faculty, UCI, (949)-824-9795.

• **UCLA Office of the Human Research Protection Program (OHRPP):**

If you have questions about your rights while taking part in this study, or you have concerns or suggestions and you want to talk to someone other than the researchers about the study, please call the OHRPP at (310) 825-7122 or write to:

UCLA Office of the Human Research Protection Program

11000 Kinross Avenue, Suite 211, Box 951694

Los Angeles, CA 90095-1694

UCI Office of the Human Research Protection Program

101 The City Drive

Orange, California

949-834-3831 Thank you.

## APPENDIX S

### UNIVERSITY OF CALIFORNIA LOS ANGELES

#### *Screening Eligibility Script*

Hello, my name is Angela Halpin (or delegate -research associate) and I am a doctoral student researcher at the University of California, Los Angeles (UCLA) (delegate identifies themselves affiliate (UCLA/UCI). I am visiting you today because you have been diagnosed with pneumonia and you have expressed interest in this study or referred by your physician/registered as being interested in the study. This is a study to see if health messages decrease pneumonia readmission rates. Readmission means returning to the hospital within 30 days since your discharge.

Would you like me to continue with the screening? [If no, thank them for their time and do not continue with the screening, if yes, continue]. The screening will take about 10 minutes. I will ask you a about your age, primary language, your hearing, medications and ask you to complete a short reasoning survey. The survey asks you for example about attention, recall, and language. The reason for this screening is to help assure you are eligible to participate. You do not have to answer any questions you do not wish to answer or are uncomfortable answering, and you may stop at any time. Your participation in the screening is voluntary.

Your answers will be confidential. No one will know your answers except for the research team. Would you like to continue with the screening? [If no, thank the person] If yes, continue with the screening:

**A.** Are you 55 or older? 2. Is English your primary language? 3. Are you able to hear a recorded voices or music using headphones? 4. Have you been in the hospital in last 60 days? 5. Are you on any memory, thinking, or dementia medications?) [If question response meets criteria proceed to MMSE, *if not eligible thank participants for their time and explain why*]

**B.** Provide the reasoning screen (MMSE), [administer and score the MMSE following guidelines]

**Orientation to Time:**

What is the year? Season? Month of the year? Day of the week? What is the date?

**Orientation to Place:**

Where are you now? What is the state? What is the county? What is the city? What is the building? What floor of the building (room number/unit).

**Registration:**

Listen carefully. I am going to say three words. You say them back after I stop. Ready? Here they are....APPLE (pause), PENNY (pause), TABLE (pause). Now repeat the words back to me.

**Attention and Calculation**

Now I'd like you to subtract 7 from 100. Then keep subtracting from each answer until I tell you to stop. (If needed administer to keep saying ..Keep going).

Thank you for answering the screening questions. [It appears you meet the screening eligibility based on your score. Indicate whether the person is eligible, or if not eligible explain why.] Do you have any questions about the screening or the research? I am going to give you this paper about the study and contact numbers [provide hand-out of contact numbers]. If you have questions later about the research screening you may call me about the screening or research. If you have questions about your rights as a research subject or if you wish to voice any problems or concerns you may have about the study to someone other

than the researchers, please the UCLA Office of the Human Research Protection Program at (310) 825-7122 which is on the hand-out. Do you want to move forward with the consent? Or do you want me to come back later?  
Thank you again for your willingness to answer questions [if eligible, complete consent the study information sheet and the HIPAA authorization form or arrange a time and place to administer the consent].

Protocol ID:IRB#13-001196 UCLA IRB Approved Approval Date: 7/29/2014 Through: 7/28/2015 Committee: South General IRB

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