ABSTRACT

Background: Healthcare providers have focused on improving patient care transitions to reduce unanticipated readmission costs, improve patient care quality post-discharge and increase patient satisfaction. This is especially true in US since the introduction of the Affordable Care Act. While there are several practices and evidence-based programs discussed in the literature to address care transition post-discharge, the key challenge remains the same – how to structure the care transition program to influence its effectiveness. In this paper, we focus on modeling one particular care transition – moving a patient from a hospital to a skilled nursing facility (SNF) – and discuss how improved capacity building and use of intermediaries such as advanced nurse practitioners have shown promise in reducing patient readmissions.

Methods: The methodology proposed here uses service dominant (SD) logic research to inductively derive a model for service exchanges between the two provider ecosystems. This model is then used to analyze service gaps and look for opportunities to innovate within an SNF and improve its capacity to deliver care. Use of intermediation that expands the service model with the addition of more care providers besides the hospital and SNF is also discussed to reduce patient readmissions.

Results: The study demonstrates that a number of actors have to work collaboratively to make care transition effective in meeting the patient and provider goals. Specifically, when two care facilities, hospital and SNF, are involved in care transition, opportunities exist to improve their internal capacity to address care within and across facilities.

Conclusion: The paper makes two important contributions. It shows the role of SD Logic in identifying opportunities for service innovations in support of care transition, and it shows the role of actors in provider-customer ecosystems to make the transition effective.

Key Words: Patient readmission, Care transition, Service-dominant logic, Service exchanges, Ecosystem, Service innovations

1. INTRODUCTION

Since readmission rates began to be used as an indicator of quality of care as patients are transitioned from hospitals to external care facilities, there has been a growing interest in looking for best practices in care transition for potential exploration and adoption.11 Translational care or care transition refers to the coordination and continuity of healthcare as patients move from one healthcare setting to either another or to home. Healthcare providers have been increasingly focused on improving care transitions worldwide for a number of reasons, including reducing unanticipated readmission and associated costs, improving patient satisfaction, and making access to care convenient and supported, possibly at home by family and community. This also has become a major area of focus for many hospitals in the US since the Affordable Care Act. Care transition became more urgent after the Centers for

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Medicare and Medicaid Services (CMS) instituted penalties in 2012 for unanticipated readmission of patients with certain medical conditions within 30 days, such as myocardial infarction (heart attack), heart failure, and pneumonia, and extended these penalties to external care facilities such as skilled nursing facilities (SNFs) in 2018.

Some of the best practices for care transition include provider interventions,[2] transition care model,[3] and project RED.[4] Other transition strategies include comprehensive discharge planning, complete and timely communication of information, medication reconciliation, patient/care giver education, and open communication between providers.[5] There is also a growing interest in the use of technology-mediated solutions, given the advances in technologies for remote consultation and patients’ use of mobile phones and wireless communication.[6] However, the institutional mechanisms that guide different care provider ecosystems vary, making it difficult to make care transition effective. In other words, each of care facilities – hospitals, external care facilities such as skilled nursing homes, or home care centers that support care at home – have varying capacity to manage patient care and norms and rules that guide their operations. Not understanding the differences in the capacity and culture of these ecosystems leads not only to patient complications and potential readmission of the patient to the hospital, but also influences patient satisfaction.

In general, the period of transition out of a hospital is a vulnerable time for patients, and they rely heavily on communication and coordination among multiple external actors outside the hospital (family members, social workers, primary care physicians, and trusted pharmacists who they frequently interact with, etc.). Several strategies have been discussed in the literature to make care transition patient centric. These include early follow-up for certain population groups,[7] empowering patients through enhanced communication,[8] engaging nurses from regional institutions in support of discharge planning[9] and soliciting the use of specialists/nurse practitioners to act as intermediaries in complex cases.[10] Often, a multi-faceted approach has been shown to be more effective, using technologies when appropriate.[11, 12]

While there are many approaches that, in various contexts, have shown success in care transition, it is important to tailor these approaches to the capacity of patient ecosystem, i.e. the people, knowledge, resources, etc. available to those caring for patients. In this paper, we will discuss prior research on service innovations in healthcare (Section 2) and the role of service-dominant (SD) research[13] to model the service exchanges between actors of two care provider ecosystems to create value (Section 3). We will then use this model to illustrate how a skilled nursing facility has improved its capability to create value (Section 4). An extension of this model to reduce readmissions is discussed in Section 5, and the last section provides some concluding remarks and directions for future research.

2. PRIOR RESEARCH ON SERVICE INNOVATIONS IN HEALTHCARE

Healthcare providers, as service organizations, have focused on providing high quality, cost-effective clinical care services while a patient is in the hospital. Each service provided within a hospital (e.g. delivering prescription drugs, helping a patient visit the bathroom, catering food, etc.) can be viewed as a distinct service exchange between various staff members (e.g. nursing staff, lab staff, catering staff, etc.) and patients. Hospitals have used innovative processes and leveraged advanced technologies to improve the effectiveness of service exchanges between care providers and patients. For example, real-time locator sensors (RTLS) are used to track patient flows and reduce delays within the hospital,[14] optimal scheduling is used to improve efficiency and reduce patient delays in operations rooms,[15] and wearables, smart beds, and structured patient calls are used within patient rooms to track patient conditions for quicker action, a reduction in falls, and improved responsiveness to patient needs.[16] In addition, innovations such as multi-disciplinary rounding are used to track critical events that need immediate follow-up and to engage patients in their care plans.[17]

As healthcare providers prepare to discharge patients, care transition begins with a number of activities that are part of post-discharge care planning.[18] Some of these activities can be done while a patient is still in the hospital, such as communicating with patients and support groups as well as educating them on follow-up activities.[17, 19, 20] However, other activities, such as patient follow-up, medication reconciliation, and use of resources (e.g. time) of family and community/social workers to help patients adhere to treatment protocols, need service exchanges among several clinical and non-clinical actors of the patient ecosystem. Some of these service exchanges may be supported by technologies, such as prescription reminders, remote patient monitoring, and tele-health consultations, etc. Others include the use of community health workers and peers to support patients as a part of preventive care as well as post-discharge care.[21]

When patients are moved to another care facility such as SNF, the care transition strategy appears to be straightforward, as both are clinical care providers. However, the organizational culture that guide decision making and the capacity of each provider (skills, resources, etc.) can be different, thus
influencing the effectiveness of service exchanges within and across these providers of service. Recognizing such provider differences, some healthcare organizations have formed partnership with several SNFs to guide care transition\cite{22} and others have started to use analytics to assess capacity gaps among SNFs (based on readmissions from participating SNFs) to direct focused coordination. Service dominant logic research has emphasized the importance of value creation or cocreation with customers as an important first step in identifying the service exchanges among a number of actors in patient and provider ecosystems, and the internal and external resources needed and available to fulfill the value proposed.\cite{13,23} The next section will rely on this research to model care transition between a hospital and an SNF in order to support a systematic analysis of service gaps and explore opportunities for innovation.

3. Research methodology and a model for service innovation

The case study discussed in this section is based on the interaction between a hospital and an SNF in the Midwest. The SNF, like many care provider hospitals, has two distinct teams managing clinical care and SNF administration. The clinical team includes a medical director, attending physicians, nurse manager, etc., while the administrative team is headed by a certified nursing home administrator, admissions director, director of nursing (DON), clinical nurse liaison, HR and marketing directors, and certified nursing assistants (CENAs). To maintain consistent, high-quality care in a cost-effective manner, the SNF uses specific care pathways or algorithms for patients with different diagnoses in order to provide consistent care and reduce the risk of unplanned hospital discharges (UPHDs). Patients are referred to SNFs by case managers (CMs) in the hospital, and others come from assisted living facilities, home healthcare, etc.

3.1 Research methodology

The interaction between the SNF and the hospital has been studied by the authors since 2013. It began with an analysis of their early introduction of a care related intervention, the use of a nurse practitioner under the direction of a physician, to support care transition of cardiac patients (discussed in depth in the next section) to reduce readmissions. As the SNF improved this intervention, it reflected on its own internal capacity (i.e. skills of its staff and processes used) to handle specialty care patients as well as the processes used to admit and discharge patients to care providers when there are complications. Inductive learning from this case led to identifying several key service exchanges between the hospital and the SNF, and to addressing gaps in service as a part of its capacity building, not only to reduce the readmission of cardiac patients but also address the needs of other patients. Some of the innovations or improvements discussed in this section eventually led the SNF to improve its quality ranking and expand its ability to scale its nursing care operations to service patients receiving care in independent living facilities and those in hospice care.

3.2 Service exchange model

Service exchange model–The SNF nursing staff supports patients with different medical conditions using primarily five service exchanges discussed below and shown in Figure 1.

![SNF Ecosystem interaction with actors in multiple ecosystems](image)

Figure 1. SNF Ecosystem interaction with actors in multiple ecosystems
• ADMIT: Admitting patients from a hospital using consultations with a specialist/surgeon and physician to the nursing staff (NS) of an SNF.
• RETURN: Returning patients back to the provider through an emergency management facility (EMF) by the NS of the SNF if there is an emergency.
• CONSULT: Consulting with specialists (e.g., surgeons from provider or other professional groups), to address the care of complex patients (e.g., cardiac patients).
• ENGAGE: Engaging in interactions with patients and administrative and clinical staff to ensure proper protocols are followed in support of patient care.
• DISCHARGE: Discharging patients to homes or other facilities after transitional care is complete.

When a patient is moved from a hospital to an SNF or vice versa, some of the handoffs include the exchange of patient care related information, and the same is true when an SNF is consulting with a specialist. Also, while a hospital may or may not have full control over a patient who is sent to the SNF, they do use physician recommendations, SNF ratings on quality metrics, or patient preferences (based on regional proximity to family members, etc.). With readmission becoming an important factor for both hospitals and SNFs, their goals are aligned. However, their capacity to handle patients of diverse and complex medical conditions is not necessarily aligned. We will next address how the SNF under study has addressed gaps in each service exchange and, in turn, improved its capacity to scale its operations.

3.3 Analysis of service exchanges and innovations to address gaps

3.3.1 ADMIT: Patient transition from hospital to SNF
The stabilization of a patient within the first 48–72 hours is critical when a patient is transitioning from a hospital to an SNF. Knowledge about medication required during this transitioning phase, along with any follow-up appointments for patients with special needs (e.g., seeing specialists, engaging with rehab, etc.), is particularly important.

One of the process innovations the SNF pursued with a provider system is to get the first dose of medications when a patient is sent to the SNF. This is especially critical for patients admitted to the SNF over the weekend, as there can be delays before its own clinical staff (CS) can review the patient or order prescriptions as recommended or needed. The success of this innovation led to its further expansion with other care providers. In addition, if the SNF to which a hospital may discharge a patient is known, coordinating between the hospital and the SNF during a patient’s discharge planning process can improve its ADMIT process.

3.3.2 RETURN: Patient transition from SNF to hospital
If a patient is to be discharged to a provider using the EMF of a hospital, the nursing staff has to address two questions: where to send the patient and what data is needed to go with the patient. Ideally, the patient should be sent back to the provider system that discharged the patient to the SNF as opposed to any other provider, assuming such a directive will not unduly harm the patient. This is because the provider who sent the patient has all the relevant patient data. If discharged to a new provider, the staff needs to work with the EMF staff of that provider to ensure all relevant patient data is sent with the patient.

Educating the discharge nurse on this information is useful to direct the emergency management vehicle. Also, technology is being explored to help merge data among provider and SNF systems to make the transition a lot more effective, and the SNF is exploring the use of this technology.

3.3.3 CONSULT: Special consults of patients with complex disease conditions
SNFs see patients with different medical conditions and need to consult with specialists/surgeons to address care related to complex patient conditions, especially those that are identified by CMS in the US to reduce unanticipated readmissions. The process here includes noting on the patient’s EMR the contact information of the specialist consult (SC) and tracking the interaction of these consults to ensure continuous improvements are being made in care-related protocols.

The need for process innovation, mostly continuous improvements, came to light as the SNF staff worked with the nurse practitioner used to support cardiac patients. Some example improvements include checking medical devices (e.g., pace makers), monitoring proactively for any unusual symptoms, and contacting SNF clinical staff and/or primary care physicians of the patient before seeking consultation with specialists. Also, since the patient transition to SNF may be influenced by the medical condition the patient, working with hospitals to identify patient risk factors and determine the specialists or intermediaries the SNF may need to consult with during care transition can help when sending the patient back to the hospital if there are complications. This is discussed further in the next section.

3.3.4 ENGAGE: Build staff member capacity to handle patient care transition
Given the high turnover of nursing staff, training of the staff in an SNF is critical. Some of this training is to make staff recognize the diversity of patient diagnoses and noting on the EMR the consultation needed from appropriate specialists. In addition, the staff should use the consult services when appropriate or talk to the clinical staff at the SNF before
sending a patient back to the provider system. For example, an acute pain condition of a patient can be managed within the SNF rather than calling 911 or emergency management staff for discharge.

The process innovation included a weekly rounding of the SNF’s staff to identify reasons for past discharges and develop standardized processes to educate staff on a continuing basis.

3.3.5 DISCHARGE: Discharge of patients from provider as well as SNF

Discharge planning activities of a hospital returning patients home include reconciling medication and communicating with patients and support personnel on follow-up activities. Planning activities are similar when a patient is discharged from an SNF to return home after a certain number of days of intensive care.

While this may be viewed as the responsibility of the primary care physician (PCP) of the patient, the SNF can play an active role in ensuring that the discharge activities are coordinated with the patient’s PCP. Also, if there is an intermediary used to support specialty consults, then this intermediary can be useful in sharing information on follow-up activities once a patient is discharged, as well as keeping family members informed of patient conditions throughout their care in the SNF.

In summary, improving care transition between two care providers, while clinical in focus, needs innovations within the SNF to improve its capacity to handle diverse patient populations. These innovations include process improvements as well the leveraging of technology to share resources such as patient data effectively. The next section will discuss the use of an advance nurse practitioner as an intermediary to address care transition of cardiac patients.

4. CARE TRANSITION STRATEGY OF CARDIAC PATIENTS USING SERVICE INNOVATION

The service innovation discussed here is a physician led and advanced nurse practitioner managed intervention for patients over 65 with a cardiovascular disease. The program started in March 2011, and the care transition strategy between the hospital and the SNF is on-going. Reducing 30-day heart failure readmission rates is a priority for any hospital. Cardiac-related diseases lead to the most readmissions, and they are one of the four conditions CMS has identified for penalty for 30-day readmissions. A review of the heart failure registry shows that several strategies may be needed to prevent readmission, including (1) patient empowerment and inclusion in care transition; (2) bridging the discharge process from the hospital to the place a patient goes to; and/or (3) improving capacities and understanding in administering medications. Also, any new intervention developed to address the risk of readmission must fit seamlessly into the clinical workflow.

![Figure 2. Advanced Nurse Practitioner as an Intermediary](image)

Balaban et al. examined general medicine inpatients over 60 with an admission diagnosis of heart failure and chronic obstructive pulmonary disease. PNs (patient navigators) provided coaching and assistance in navigating the transition from the hospital to home through hospital visits and weekly telephone outreach. Other interventions included dis-
charge preparation, medication management, scheduling of follow-up appointments, communication with primary care providers, and symptom management. Even if the 30-day readmission rates did not significantly improve, a patient navigator intervention among high risk patients decreased readmission among older patients. The case study here uses an intervention similar to patient navigator and multiple actors (the cardiology department, the SNF, and CMS funded the program). The intervention is shown in Figure 2 below, and it is labeled as Advanced Nurse Practitioner (ANP) that works with the provider and SNF systems. The team supporting the intervention includes the cardiologist, cardiology ANP, and SNF members (administrative director, director of nursing, and medical director).

The intervention program used the following steps:

1. All patients with a diagnosis of cardiovascular disease are identified. The LPN (licensed practical nurse) at the SNF assigned to cardiology services generates a patient list (10-15/week), follows up on cardiology orders and ensures their completion, and communicates with the cardiologist or ANP on urgent issues as they arise. LPN coordinates the care transition activities with the hospital.

2. The cardiology ANP evaluates new patients using extensive medical chart review and documentation, orders diagnostic tests, makes medication adjustments, and collaborates closely with the cardiologist.

3. Cardiology services are available during the week for urgent care issues and managed by the same cardiac team at the hospital whenever possible to improve transition of care.

Based on experience over four (4) years, the following areas are identified for success: follow-up plan post-discharge; documentation of previous cardiovascular procedures; correct medication reconciliation; management of protocols regarding medical devices, such as pacemaker/ICD (internal cardiac defibrillator) registry, venous thromboembolism prophylaxis (VTP), atrial fibrillation, coronary stent, peripheral arterial disease/ischemic foot, etc.; and initiation of a cardiovascular preventive medicine program.

Results since 2013 show a noticeable reduction in unplanned patient readmissions (both at the hospital and the elder care facility, as shown in Figure 3), thus enabling the program to be expanded to three other SNFs, with a fourth one planned.

![Figure 3. Readmission Comparisons](image)

Early in the implementation of this program, several challenges were encountered, such as nursing knowledge gaps at the SNF; insufficient documentation, lack of referrals by physicians at the SNF; incorrect medication reconciliations, and lack of protocols on how to manage pacemakers and other devices. The SNF that participated early on and discussed in the previous section has started to recruit people to act as enablers to support interaction with the ANP. Telemedicine as a technology and mobile apps are being explored currently to address some of these challenges for effective intervention in order to facilitate faster communication and consultation, better training of patients through knowledge exchanges, and improved sharing of documentation.

With more SNFs being added to support such ANP-based
intervention, other service innovations that leverage both medical and tele-health technologies are under consideration. These include:

- Monitoring with cardioms - wireless device - Remotely measures the intravascular fluid level with correlation congestive heart failure signs and symptoms;
- Loop recorder - wireless devices - remote evaluation of heart rhythms (atrial fibrillation, bradycardia etc.);
- Pacemaker - vendor has to check; now newer devices have ability to send reports remotely for evaluation of heart rhythm / battery longevity etc;
- Hand-held echo cardiogram – point of sale;
- Skype or other tele-health technologies to support virtual communication and monitoring of the patient condition.

Costs associated with this program are further budgeted with ongoing savings in various areas, such as patient transport and logistics, physician office visits, better education on changing healthcare protocols, etc. Nonetheless, the current cost of consultation support is borne by Medicare as a part of their reimbursement scheme for seniors treated in nursing homes.

5. DISCUSSION & CONCLUSION

The paper illustrates how a tailored patient transition to post-discharge care needs to understand the ecosystem the patients go to and integrate the activities of multiple actors in their ecosystem to ensure that the value-in-context (i.e. care received post-discharge) is consistent with the continuity of care plan developed when a patient is admitted into the hospital. Specifically, this paper discusses how the transition care of patients is addressed when patients are discharged to a skilled nursing facility ecosystem. The role of multiple actors in addressing patient care transition, along with a specific innovation that used an ANP as an intermediary in support of such care transition for cardiac patients, led to several other service innovations within the SNF.

A future direction would be to develop best practices for different service exchanges that link actors within different ecosystems so that these can be tailored to specific patient populations and medical conditions. For example, what are some of the effective approaches used during CONSULT process and frequency of their use. Other future directions to address readmission include expanding the talent pool and technologies available to support professionals entering “transitional care” to support vulnerable populations or populations with chronic or critical care needs. For example, the clever use of health IT applications (e.g. tele-monitoring and social media-based communication) are being used to support coordination among external care delivery professionals, as in Global to Local[27] organization in Seattle, WA. Tele-health programs with wearables, intermediate care provider interventions, and portals may be leveraged to match the multiple clinical needs of patients with varying cardiovascular risk factors and social needs, such as quality of life needs post discharge and reactions to disease like anxiety, depression, or isolation. Ultimately, the goal is to use a mix of clinical and social needs in developing care transition programs. In closing, hospitals as providers of care need to recast readmission and transition of care as value delivered in context by better understanding the patient and/or care delivery ecosystem and broaden the number of actors who can play an active role in sustaining this value.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

REFERENCES


