Implementation of Telehealth Clinical Nurse Leader Interventions to Reduce Rehospitalizations in Rural Home Health Patients

Briana White

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Implementation of Telehealth Clinical Nurse Leader Interventions

to Reduce Rehospitalizations in Rural Home Health Patients

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Abstract

Reimbursement for home-based care is moving towards a value-based purchasing (VBP) model. This change brings a renewed sense of urgency to focus efforts in care delivery to sustain positive outcomes such as reducing rehospitalizations. The Clinical Nurse Leader role has been instrumental in hospital settings in improving patient outcomes, and evidence points toward the potential success of implementation of this role in the rural microsystem setting. This quality improvement project implemented a remote telehealth intervention led by Clinical Nurse Leaders, to decrease rehospitalizations of Medicare patients assessed as at-risk for 30-day rehospitalization. The DMAIC QI model was used to ensure sustained quality improvement. Methodology included a cohort study model with one cohort receiving the intervention of CNL telehealth calls following admission to Home Health over an 8-week time frame. The measure of this QI project included the comparison of the rate of rehospitalization between the cohorts. Analysis includes rehospitalization rate analysis, as well as qualitative themes derived from interventions taken by the CNLs during the intervention cohort. Results showed a slight increase in rate of rehospitalization for 30-days, yet a drastic decrease of rehospitalization rates in the intervention cohort for 60-day rehospitalizations. CNL interventions included themes of patient and caregiver education, care coordination and connecting to social work/community resources. A cost savings for the 60-day prevention of rehospitalizations for the intervention cohort was calculated at $187,900. Long term prevention of hospitalizations has large cost savings impact for health systems, CMS, but most importantly on the quality of life of patients, and the CNL role through telehealth is prepared to address this need.

Keywords: Clinical Nurse Leader, Telehealth, Rural, Home Health, Rehospitalization
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Implementation of Telehealth Clinical Nurse Leader Interventions

to Reduce Rehospitalizations in Rural Home Health Patients

Home Health is a covered Medicare benefit that consists of skilled care by professionals such as registered nurses, physical therapists, occupational therapists, speech language therapists and other interdisciplinary team members (CMS.gov, 2021). Over 5 million people received Home Health services in over 7 million episodes of care in 2019 alone (CMS.gov, 2019). Home Health typically lasts 30-60 days as a rehabilitative service which serves to promote patient and caregiver independence in care and prevent adverse outcomes such as rehospitalizations following a hospital stay or decline in condition (CMS, 2021).

For hospitals and healthcare systems quality care is often linked to performance measures. Value based care is replacing volume-based care, where Centers for Medicare and Medicaid (CMS) and health reforms “are not exactly asking healthcare facilities to do more with less; but more so demanding those facilities to vow to treat patients with effective, efficient, and high-quality care” (Nelson & Potter, 2020, p.2285). Home Health is the next frontier for value-based care where CMS is focusing on “using incentives to improve care, tying payment to value through new payment models, and changing how care is given through better teamwork, better coordination across health settings, more attention to population health, and putting the power of healthcare information to work” (CMS.gov, 2021, para 4). In January 2020, the Home Health industry began to transform care through a Patient Driven Grouping Model (PDGM). PDGM is a value-based program through CMS, built on 432 case-mix groups and five main levers: admission source, timing, clinical grouping, functional impairment level and comorbidity adjustment (Pierotti, 2019). These 432 groups generate different bundled patients, and estimated number of visits needed for the episode. The agency receives a bundled payment yet is penalized
with a “low utilization payment adjustment” (LUPA) if the number of minimum visits for the patient is not met (Pierotti, 2019). Then, instead of receiving the full bundled payment, the agency receives a much lower payment that reverts to per visit allocation (Pierotti, 2019). Although there is financial penalty for low visit utilization, PDGM has shifted to incorporate more patient data to demonstrate the complexity of patients, directly impacting reimbursement. One of the assessment data points that is collected with Home Health admission is an individual’s risk for hospitalizations. In PDGM risk of hospitalization is used for validating and compensating for nursing care for at risk patients, often with chronic care conditions (Potilove, 2019). In this way PDGM values complex nursing care, moving Home Health as a first step of many towards value-based care, and value-based payment.

While strides towards quality of care have been significant, there are barriers to overcome to achieve optimal care and outcomes. The nursing staffing shortage has plagued the nation for years yet has been exacerbated by the recent COVID19 pandemic. Nursing shortages are especially prevalent in the Home Health setting. As the demand for home-based care increases, and the “aging in place” concept takes hold, there will be a need for “4.5 million workers” in home care by 2030 (Donlan, 2021, para 6). For Home Health providers in rural areas, the situation is even more daunting. In addition to the lack of staffing nationally, longer drive times or “windshield times” limit the ability for clinicians to see the same volume of patients during the day than more urban locations do. Additionally, rural patients are “likely to experience poor health status, obesity, diabetes, and limitations in activity when compared with urban residents” (Rogers and Darden, 2019, p.55). Finally, a cultural norm in the rural population of self-reliance and hesitation to seek medical care contributes to further challenges in meeting the needs of a vulnerable population (Rogers and Darden, 2019).
CMS’s quality goals include to “make care safer by reducing harm where care is delivered, improve support for a culture of safety, reduce inappropriate and unnecessary care, prevent or minimize harm in all settings, help patients and their families be involved as partners in care, promote effective communication and collaboration of care, promote effective prevention and treatment of chronic disease, work with communities to help people live healthily, and to make care affordable” (CMS.gov, 2021, para 5). These goals are synergistic to the role of the Clinical Nurse Leader. The Clinical Nurse Leader (CNL) is “a master’s educated nurse, prepared for practice across the continuum of care within any healthcare setting” (AACN, 2021, para 1). The CNL role focuses on “care coordination, outcomes measurement, transitions of care, interprofessional communication and team leadership, risk assessment, implementation of best practices based on evidence, and quality improvement” (AACN, 2021, para 2).

Introducing the CNL role to the Home Health setting within the Visiting Nurse and Hospice for Vermont and New Hampshire is a first in the nation innovative approach for care coordination and cross-setting collaboration with a focus on microsystem quality. As the CNL role is a new role to the Home Health setting, the evidence is lacking in this area. Therefore, the opportunity presents to conduct a quality improvement pilot project targeted on the interventions of the CNL role focused on measures impacting a rural Home Health population.

**Problem Description**

One of the core functions of Home Health is to prevent rehospitalizations. There are various barriers to achieving this outcome measure. The current shortage of nurses is delaying discharges from hospitals to Home Health agencies (Gleckman, 2022). In rural areas additional challenges include poverty, lack of access to care, and patients being more likely to experience poor health (Rogers & Darden, 2014). These factors contribute to increased complexity and
increased risk for rehospitalization. Finally, a looming change in Home Health includes value-based payment restructuring, which will place an emphasis on quality of care and making the metric of preventing rehospitalizations now a fiscal impetus for agencies (Griffin, 2016). The priorities in Home Health will become better health outcomes with lower costs, and the current barriers to achieving those require a new approach and skillset from Home Health agencies. There is a need to provide coordinated care by highly skilled and educated healthcare clinicians through various care delivery models such as remote options like telehealth.

Currently, at the Visiting Nurse and Hospice for Vermont and New Hampshire (VNH), the unplanned rehospitalization rates are 16.1%, compared to the state of Vermont 14.6% and National of 15.4% (Medicare.gov, 2021). Unplanned rehospitalizations impact the quality of care for patients and also add costs to the healthcare system. Spending on unplanned hospital readmissions is estimated to be $17-$25 billion dollars annually, which equates to approximately 16-22% of Medicare spending on inpatient services (David & Kim, 2017). Additionally, rehospitalization amongst Medicare patients is “common, costly and often preventable” (Centers for Medicare & Medicaid Services, 2021, p. 2). While readmissions are costly, Home Health services are relatively low in cost. On the eve of potential fiscal reductions for unplanned hospitalizations, inaction is not an option, and creative care delivery models are needed without excess resource deployment.

Available Knowledge

The Clinical Nurse Leader Role

As hospitals continue to explore methods to achieve the quadruple aim in healthcare: improving the individual patient experience, improving population health, decreasing costs, and improving the experience of providing care, the Clinical Nurse Leader (CNL) role has been
implemented to address these aims on a microsystem level (Sikka et al., 2015). While there is varying evidence in the literature speaking to outcomes of the role, “the evidence base is weak but demonstrates the feasibility and capacity of CNL-integrated care delivery to improve patient care quality and safety” (Bender et al., 2019, p.316). However, Bender et al., demonstrated with implementation of the clinical nurse leader role into a health microsystem improved “quality and outcome score consistency” (2019, p. 319). Given the challenges facing rural healthcare, the CNL role is poised to integrate into this area of practice. In a rural setting, “CNLs can decrease patients' need for travel to a distant clinic or hospital, reduce the distress of travel, and decrease associated medical costs while enhancing the clinical services provided ” (Rogers & Darden, 2014, p.54). Additionally, CNLs can monitor hospital admissions, referrals to Home Health, quality metrics such as falls, provide patient education inclusive of health literacy considerations, augment knowledge and skill sets which in this rural setting can be largely variable (Rogers & Darden, 2014). The CNL role brings a graduate prepared nurse to the point of care, where they can provide patient centered care, coach team members, bring in evidence-based practice, and deploy quality improvement techniques (Rankin, 2015). Furthermore, “the CNL has the ability to use advanced clinical assessment to evaluate each patient within the cohort, while evaluating quality of care and patient safety metrics for the entire cohort and comparing current care practices to the best evidence available (Stachowiak & Bugel, 2013 as cited by Rankin, 2015). This role advances nursing practice beyond the care of one patient, it enhances the care of entire cohorts. The CNL skillset elevates other nurses in their individual practice by bringing evidence into that practice on a systematic level, along with a focus on continuous quality improvement elevating the clinical nurse as a change agent through the work of the CNL.
One area in the healthcare system that CNLs excel is transitions of care through discharge planning, communication, and navigation or coordination of the health system. During transitions of care, gaps can occur leading to poor outcomes such as “medication errors, discontinuity in care plans, and patient dissatisfaction with care” (Coffey et al., 2017, p. 455). Furthermore, Coffey at al., demands that as patients move across care settings, intensive care coordination across many settings and many disciplines is dependent on personal and environmental factors (2017). Clinical Nurse Leaders are educated to navigate the transitions between complex care settings, and partner with those who are likely caregivers in the home. Evidence supports the importance of caregiver partnership in care during transitions (Coffey at al., 2017). In a systematic review, transitional care interventions involving care givers “had significant positive effects reducing all-cause readmissions, mortality, and heart failure related hospitalizations” (Coffey et. al, 2017, p. 454). The healthcare system is complex, and targeted interventions during transitions in care are vital to the success of individual and population health. Additionally, a second systematic review looking at outcomes with the involvement of a caregiver with discharge planning “showed significantly shorter time to readmission, shorter rehospitalization, and lower costs of post discharge care” (Rodakowski et al., 2017, p.1748). This evidence speaks to the role of coordination of the CNL in partnering with caregivers in providing patient education and facilitating community support through this transitional post-acute episode in care for the Home Health setting.

Readmission and Home Health

The evidence is less robust in the arena of Home Health services to prevent rehospitalizations, even though rehabilitation and stabilization are key functions of Home Health. One study demonstrates how a single handoff in care from one Home Health clinician to another
can “increase the likelihood of a 30-day hospital readmission by 16%”, and further concludes that “one in four hospitalizations during Home Health care would be avoided if handoffs were eliminated” (David & Kim, 2017, p.26). As described above, staffing shortages and longer drive times limit the ability to meet patient demand; these factors also contribute to inconsistency in care providers resulting in an increase in patient hand-offs. The CNL role can piece together disparate information and ensure coordinated communication to mitigate the risks involved with inevitable handoffs in care.

A retrospective study examined the association between mobility, self-care, cognition, caregiver support, and 30-day potentially preventable readmissions for patients with dementia (Knox et al., 2019). This is of particular importance, as this study specifically focused on potentially preventable readmissions, which will soon be a quality metric included in value-based purchasing payment in the Home Health industry. Knox et. al., found that “decreased independence in mobility and self-care tasks, unmet caregiver needs, and impaired cognitive processing at admission to Home Health are associated with risk of 30-day PPR [potentially preventable readmission] during Home Health for individuals with dementia” (2019, p.1009). Additionally, the study found that of those variables, deficits in mobility and self-care tasks had the greatest impact on risk for potentially preventable readmissions (Knox et al., 2019). A strength of Home Health is that it is interdisciplinary, and with this available knowledge, the CNL can remotely support and collaborate with the patient’s provider to include other disciplines on the team such as physical and occupational therapy to target these interventions in goal planning and outcome measurement.

*Readmission and Rural*
The population living in rural areas is at higher risk for hospital readmissions and emergency department visits which is complicated by rural staffing challenges of recruitment and retention, lower volume of patients spread across a larger geography creating longer drive times, higher care needs, and traditionally fewer visits compared with urban patients (Mroz et al., 2018). A study by Mroz et al., explored quality outcomes for Medicare fee for service care in rural Home Health recipients with high-risk diagnoses for hospital readmissions such as heart failure, acute myocardial infarction, chronic obstructive pulmonary disease, and pneumonia (2018). The results of this study were that this population with high-risk conditions that required “more nursing visits, visits from more disciplines and visits soon after discharge were less likely to experience positive outcomes” (Mroz et al., 2018, p. 151). Thus, although many would believe more visits equate to better outcomes, this study showed that perhaps visits alone do not contribute to better outcomes, and that potentially different interventions are needed to achieve those outcomes (Mroz et al., 2018). Although helpful to understand compounding factors, this solidifies the understanding that patients are being discharged to Home Health with complex conditions, and that identifying complex patients with high care needs can indicate a target population of focus for interventions for prevention.

Complex patients in rural health are known to have poor health outcomes compared to urban patients, and additionally from a cultural norm tend to be hesitant to reach out for assistance (Rogers and Darden, 2019). These complexities compound poor medication reconciliation and management for a rural population that is far from healthcare services, with less touch points to a medical provider. In a study by Basnet et al., they found there was a significant association between the number of medications ordered for a patient and the 30-day rehospitalization rate, but interestingly found no significant association between
rehospitalizations and medications using the BEERS criteria (2019). The BEERS criteria explicitly list Potentially Inappropriate Medications (PIMs) that are typically best avoided by older adults in most circumstances or under specific situations, such as in certain diseases or conditions” and is helpful in flagging for needed changes to patient medications (By the 2019 American Geriatrics Society Beers Criteria, 2019, p.674). Caughey et al., looked at medication related to potentially preventable hospitalizations in a pilot study and found that suboptimal medication management was a key factor, with the most common elements including “exposure to medications associated with falls, underuse of angiotensin-converting enzyme inhibitor/angiotensin-2 receptor blocker medications for cardiovascular disease and low rates of hemoglobin A1c and renal monitoring in patients with diabetes” (2019, p. 133). In support of a telephone-based intervention to post-acute care patients, the Rural PILL program used a clinical pharmacist to call patients a week after discharge from a Veterans Administration hospital (Rebello et al., 2016). The results showed that patients were discharged on an average of 16 medications with 4.4 medication changes needed, 61% had clerical errors in the discharge medication list, and potential clinical concerns were identified in over 75% (Rebello et al., 2016). Furthermore, patients who received a post discharge telephone call focused on medication were 70% less likely to have an acute care visit at 30 days post discharge, however there was no significance in rates of hospital readmission or mortality (Rebello et al., 2016). Although not showing a significance in rates of hospital readmission, the reduction in acute care utilization and proactive attention to potentially clinical concerning medication errors speaks to the value in a telephone-based intervention post discharge.

Finally, patient centered care as a core nursing value must take into consideration a patient’s perspective. Sentell et al., conducted a qualitative study and found that potentially
preventable hospitalizations are largely linked to a lack of patient perspective, “especially across diverse racial/ethnic groups” (2016, p.2). The study results indicated social determinants for rehospitalization included “six, non-exclusive, underlying factors: extreme social vulnerability (e.g., homeless, poverty, no social support, reported by 54% of respondents); health system interaction issues (e.g., poor communication with providers, 44%); limited health-related knowledge (42%); behavioral health issues (e.g., substance abuse, mental illness, 36%); denial of illness (27%); and practical problems (e.g., too busy, 6%)” (Sentell et al., 2016, p.1). These findings cement the necessity for care to be patient centered with a focus on the inclusion of the patient’s perspective of the problem of potentially preventable hospital readmissions, as well as consideration and planning for social determinants of health.

Further evidence of the intersectionality of medical complexity with social determinants of health was demonstrated by Bennett & Probst who found that the dual eligible population of Medicare and Medicaid beneficiaries indicative of lower-income, had a higher rate of 30-day rehospitalization than Medicare beneficiaries alone (2015). Interestingly, “rural dually eligible beneficiaries had lower readmission rates than other beneficiaries, and they had a protective effect of physician follow-up care” (Bennett & Probst, 2015, p. 188). When follow up care is targeted for this dual eligible rural population, it serves as a protective factor for prevention of 30-day rehospitalizations. Inclusion of interventions for social determinants of health, in addition to consideration of intersectionality of variables compounding risk serves as a foundation for this quality improvement project.

**Telehealth**

Literature supporting the outcomes from telehealth is largely mixed, with many interventions being truly multivariate such as telehealth and medication reconciliation, or
telehealth for symptoms management that are often labeled all under the same umbrella of telehealth which limits the conclusivity of the intervention itself. However, the general finding is that telehealth is beneficial, again limited by the specific study intervention, design, and population. In one study by Kranker et al., patients discharged from a hospital were assigned a nurse care coordinator for 30 days where they would review the patient's status, assess transitional needs, and utilize weekly phone calls starting soon after discharge from the hospital to align with treatment plans (2018). While there was no statistically significant difference between the control and intervention group in “30-day unplanned readmission rate, number of inpatient admissions, or number of emergency department visits, this may be due to modest statistical power to detect effects” (Kranker et al., 2018, p.256). However, there was a reduction in Medicare spending in the intervention group by 30.8% equating to “$1333 per beneficiary per month” (Kranker et al., 2018, p.256). Reduction in costs of care certainly lean in favor of the quadruple aim.

In a randomized trial by Piette et al., patients with chronic care conditions identified a care giver or care partner where the intervention group would receive weekly assessment and behavioral change calls, and the care partner would receive structured feedback (2020). Additionally, serious clinical problems were sent to the patient’s outpatient clinics for additional follow up (Piette et al., 2020). Although the caregiver support intervention did not improve 30-day readmissions, the patients with a pulmonary diagnosis did show a statistically significant improvement in 30-day readmissions (Piette et al., 2020). This study emphasizes the importance of caregiver support in reaching quality goals for community-based patients, the potential need to stratify intervention groups based on diagnosis for a telehealth initiative (Piette et al., 2020). In recognizing that patients with pulmonary diagnoses showed statistically significant improvement
in 30-day readmissions, but other diagnoses did not, needs to be explored further. It is important to take into consideration that although chronic disease management is often lumped together, there may be consideration of interventions specific to individual diagnoses (Piette et al., 2020).

Finally, Rogers and Darden discuss the opportunity for the CNL role to bring telehealth and technology-based support to rural clinical Microsystems (2014). However, it is important to understand that smart phones or computers “may not be as useful in rural areas due to network limitations or personal concerns such as privacy, inability to afford service, and even technophobia” (Rogers & Darden, 2014, p.55). Regardless of the barriers, many rural patients have a telephone, which enables education and continuous follow up, and as Rogers and Darden state, the use of additional devices partnered with a visiting nurse service can help to focus on “personal care skills, education on risk reduction, health promotion and disease management” (2014, p.55). The Clinical Nurse Leader in the rural Home Health setting can augment physical visits through telehealth to provide clinical education, collaboration across the continuum of care and more.

**Clinical Nurse Leader Role Providing Telehealth Interventions to Reduce Readmissions**

Literature was utilized in multiple facets yet pulled together to provide depth of the concept. However, there are limited available articles specifically about the Clinical Nurse Leader role in the delivery of telehealth for at risk patients for rehospitalization. Leger investigated the Clinical Nurse Leader role in and ambulatory setting providing telehealth interventions focused on disease specific education and self-management skills, in addition to resource identification for at risk patients (2021). Following the 9-month intervention, 37 patients received the intervention, 90% of patients were deemed by the CNL to understand the education provided through teach back, and none of the patients reported an emergency room
visit or urgent unplanned clinic visit (Leger, 2021). Another article utilized Clinical Nurse Leaders from the inpatient setting to make telehealth calls within 24 to 72 hours of discharge to at risk patients utilizing the Transitional Care Post Discharge Assessment tool (Miller & Schaper, 2015). Miller and Schaper found that the readmission rate within 7 days of discharge was significantly lower (p< .05), and the rate within 30 days trended lower (p=0.53) with the CNL intervention versus those that were not contacted (2015). The barriers encountered led to the lack of CNL time to engage in the telehealth calls and then follow up with other interdisciplinary team members post discharge from the inpatient setting (Miller & Schaper, 2015). This limitation sets up as a strength for Clinical Nurse Leaders in the Home Health setting, where they have the time and resources to assist with the follow up care needed to enhance this intervention and ultimately hospitalization prevention.

**Home Health Value Based Purchasing**

As hospitals have continued to shift from fee for service to value based care, the Home Health care setting is on that same path. The Home Health Value Based Purchasing (HHVBP) model “provides financial incentives to Home Health agencies for quality improvement based on their performance relative to other agencies in their state” (CMS, 2021, p.1). The program intends to improve quality of care, coordination of care and ultimately efficiency in care for patients receiving the Medicare benefit for Home Health services (CMS, 2021). In 2016, nine states took part in a pilot with payment incentives in the first years of +/-3% with the intention of an eventual risk of +/- 5% (CMS, 2021). The findings included a total Medicare spending decline in these nine states “during and after Home Health episodes of care” which resulted in a $604.8 million dollar reduction from 2016-2019 (CMS, 2021, p.2). Interestingly there was “no effect on
Medicare spending for Home Healthcare”, yet the reduction was driven by reductions in
inpatient hospitalization spending and reduction in skilled nursing facility services but was
“offset by an increase in outpatient ED and observation stay spending” (CMS, 2021, p.2). In the
fourth year of the HHVBP model showed gains in quality of care such as an 8% higher score for
total performance vs. non HHVBP states, a decrease in unplanned hospitalizations, ED visits
leading to inpatient admission, and continued improvement in functional status (CMS, 2021).
Finally, the results from the initial participating states demonstrated no reduction of access to
Home Health services or change in use of Home Health services (CMS, 2021). When focusing
on quality of care, clearly beneficial outcomes follow. The promise of this model is undeniable,
and with CMS proving that improved quality of care and large Medicare savings is possible, a
proactive focus on these quality measures such as rehospitalizations is not only prudent but a call
to action for the Home Health setting.

**Rational**

**Transitional Care Model**

The rationale for this project is based on the Transitional Care Model (TCM). The TCM is
widely studied and provides a solid foundation on which to mirror care delivery. The basis of the
transitional care model (Figure 1) is to “establish and maintain trusting relationships with older
adults and their family caregivers throughout acute care episodes; engage them in designing and
implementing plans of care; assess and manage their symptoms and risks; prepare them for self-
management; promote communication and collaboration with all team members; and assure
coordination of health and community-based services” (Naylor et al., 2018, p.28).
For the purpose of this project, adaptations to the design of the model were made to include changing roles within the care delivery system to achieve outcomes. Specifically, while the Transitional Care Model uses the APRN, for this project the Clinical Nurse Leader is employed to facilitate delivery of the components of care. This is a first in the nation care delivery model in terms of mobilization of the Clinical Nurse Leader Role, built on the foundation of the Transitional Care Model. “In multiple NIH funded randomized controlled trials and comparative effectiveness studies, the TCM has consistently been demonstrated to enhance older adults' care experiences and improve their health and quality of life while decreasing use of costly health care services” (Naylor et al., 2018, p. 28). The TCM model aligns well with the core competencies of the CNL (Table 1) and sets the foundation for adaptation of the CNL role to support older adults at home through telehealth interventions.
Table 1

**TCM and CNL Competency with Activities Comparison**

<table>
<thead>
<tr>
<th>TCM Model</th>
<th>TCM Definition (Hirschman et. al., 2015)</th>
<th>CNL Core Competency</th>
<th>CNL Application for QI Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>Targets adults transitioning from hospital to home who are at high risk for poor outcomes.</td>
<td>Implementation of Best Practices Based on Evidence</td>
<td>Targets adults in Home Health with risk for hospitalization score 4 or higher based on admission assessment</td>
</tr>
<tr>
<td>Staffing</td>
<td>Uses APRNs who assume primary responsibility for care management throughout episodes of acute illness.</td>
<td>N/A</td>
<td>Clinical Nurse Leaders (non-APRNs, adaptation of the TCM model)</td>
</tr>
<tr>
<td>Maintaining Relationships</td>
<td>Establishes and maintains a trusting relationship with the patient and family caregivers involved in the patients’ care.</td>
<td>Interprofessional Communications and Team Leadership</td>
<td>Ongoing care discussions and longitudinal partnership with patients and families to foster relational health optimization</td>
</tr>
<tr>
<td>Engaging Patients and Caregivers</td>
<td>Engages older adults in design and implementation of the plan of care aligned with their preferences, values, and goals.</td>
<td>Care Coordination</td>
<td>Medication review, and optimization; Health Care Planning in partnership with patient and caregivers</td>
</tr>
<tr>
<td>Assessing/Managing Risks and Symptoms</td>
<td>Identifies and addresses the patient’s priority risk factors and symptoms.</td>
<td>Risk Assessment; Outcomes Management</td>
<td>Phone interventions based on “at risk categories” for examples, falls would have the CNL talking about risk mitigation</td>
</tr>
<tr>
<td>Educating/Promoting Self-Management</td>
<td>Prepares older adults and family caregivers to identify and respond quickly to worsening symptoms.</td>
<td>Outcomes Management</td>
<td>Zone tool education for escalation of care as appropriate.</td>
</tr>
<tr>
<td>Collaborating</td>
<td>Promotes consensus on plan of care between older adults and members of the care team.</td>
<td>Care Coordination; Transitions in Care</td>
<td>Communicating across care teams both in home health, PCPs, Specialists and Community Resources for care optimization</td>
</tr>
<tr>
<td>Promoting Continuity</td>
<td>Prevents breakdowns in care from hospital to home by having same clinician involved across these sites.</td>
<td>Transitions in Care</td>
<td>CNL oversight of patient journey following admission to Home Health—case check in weekly during implementation.</td>
</tr>
<tr>
<td>Fostering Collaboration</td>
<td>Promotes communication and connections between healthcare and community-based practitioners.</td>
<td>Quality Improvement; Care Coordination</td>
<td>Develop a person-centered care plan to achieve goals; knowledge of and connection to community supports and connections.</td>
</tr>
</tbody>
</table>
**DMAIC**

The quality improvement model used for this project, Define, Measure, Analyze, Improve and Control (DMAIC) stems from lean six sigma, a methodology aimed at measuring statistical control of processes and reducing variation to achieve reliable systems and defect-free outcomes (ASQ, 2021). Through define, measure, analyze, improve, and control, this quality improvement methodology utilizes data to change and control processes (ASQ, 2021). The steps are as follows (Figure 2):

**Figure 2**

**DMAIC Model for Project**

**Define**
- Voice of the Customer
- Project Charter
- Fishbone diagram for hospitalizations
- Demographics of pre-intervention cohort

**Measure**
- 30 Day Rehospitalization Rate
- 60 Day Rehospitalization Rate

**Analyze**
- PDSA Cycles
- CNL Interventions
- Cohort comparison

**Improve**
- 2 Week PDSA Cycle Decisions
- Define at Risk Patients for CNL Telehealth Interventions

**Control**
- Standard process for identification of at risk patients
- Standard process for interventions for at risk patients

**Define.** In the define phase a project charter (Appendix A) and voice of the customer tool (Appendix B) was utilized to further define the scope of the project and elements to consider.
from end users. Additionally, a cohort of patients who were rehospitalized were studied to help inform the CNL telehealth interventions. One of the major findings in this phase was that ten out of the nineteen patients in the hospitalization group were rehospitalized within two weeks of being discharged from the hospital (Appendix C). Characteristics of the risk for hospitalization for this cohort was assessed using the OASIS tool. The OASIS tool is the standardized patient assessment for identification of patients at risk for hospitalization. A reasonable hypothesis would be that patients who had rehospitalizations, would have scored high on the “risk for hospitalized” OASIS element. Only eight of the nineteen patients scored four or higher indicating risk when used as inclusion criteria. However, through chart reviews, many patients on this list would potentially qualify for a hospice referral: 42% (Appendix D). Oncology diagnosis was the highest rehospitalized category, even surpassing cardiac (Appendix E). CMS recognizes a clinician’s score of 3 or greater identifies the patient as “at risk”, this would have resulted in a projected sample size of N=83. Based on current CNL resources for the pilot project, the scope of the project was narrowed by setting inclusion criteria at a score of 4 or above resulting in a projected sample size of 47. In summary, the define phase led to the project design inclusive of interventions targeted within the first two weeks of admission to home health, and the inclusion criteria was changed to an at risk for hospitalization score of 4.

**Measure Phase.** During the measure phase, the 30-day rehospitalization rate and the 60-day rehospitalization rate were calculated.

**Analyze.** In the analyze phase, 2-week PDSA cycles were evaluated for project team decisions. Additionally, CNL interventions were evaluated to understand patterns and how the CNL actions were relating back to the transitional care model and contributing to outcomes.
**Improve.** The improve phase incorporated all the action steps from the PDSA cycles, and further narrowed the definition for at risk patients for hospitalizations, who would benefit from CNL interventions.

**Control.** The control phase is ongoing and working to incorporate CNL telehealth interventions into daily work for targeted individuals. The control phase will also include agency planning on trending rehospitalization data, as the following year will commence Home Health Value Based Purchasing, thus fortifying the necessity of this continued work.

**Specific Aims**

The specific aim of this project was to implement remote telehealth interventions led by Clinical Nurse Leaders, to decrease potentially preventable rehospitalizations of Medicare patients who are assessed as at-risk for 30-day and 60-day rehospitalizations.

**Methods**

**VNH Context**

The Visiting Nurse and Hospice for Vermont and New Hampshire (VNH) is a non-profit home-based care agency that serves 140 towns surrounding the Connecticut River (VNH, n.d.). VNH employs multidisciplinary clinicians including nursing, physical therapists, occupational therapists, Home Health aides and more (VNH, n.d.). The average daily census for Home Health is approximately 500 patients, with patients needing assistance from orthopedic surgery to chronic disease management, to acute skilled care such as IV antibiotic administration at home. Insurances for services include mostly Medicare patients, also Medicaid, VA, Commercial Insurance, and private pay. VNH is a member of Dartmouth Hitchcock Health, the only Home Health agency within the system. The mission of VNH is centered around “a focus on excellence and a spirit of innovation, from improving systems of care to improving individual lives” (VNH,
n.d., para 4). An innovative community-based agency connected to the resources of a larger health system, serves as the setting for this new care delivery model.

**Interventions**

The TCM was used as the foundation for the intervention to build a standardized telehealth program for at-risk for rehospitalization rural health patients with Medicare insurance being admitted to Home Health following an acute care hospitalization. At risk for hospitalization was defined as a score of four or greater on the OASIS for the criteria M1033 which scores for risks of hospitalization. The Clinical Nurse Leader team utilized the tools and results of the planning phases of the project to create a telehealth intervention targeting specific root causes of hospitalizations from the data, as well as voice of the customers. Elements from the transitional care model such as establishing a trusting relationship, engaging patients and caregivers, assessing/ managing risks, and symptoms, educating/ promoting self-management, collaborating, promoting continuity, and fostering coordination were included as part of their interventions (Coffey et al., 2017).

The interventions designed and delivered through telehealth focused on correlation to the specific risk factors for hospitalization selected from the patient’s admission to Home Health such as: history of falls, unintentional weight loss, multiple hospitalizations, multiple emergency department visits, decline in mental, emotional, or behavioral status, reported or observed history of difficulty of complying with any medical instructions, currently taking 5 or more medications, currently reports exhaustion, other risk not listed. The standardized telehealth template matched these categories and utilized evidence-based mitigation strategies targeted to the determined risk factors. There is sufficient evidence suggesting CNLs can help to identify and mitigate risk through, health management education; support the caregivers as patients transition to home,
bridge the gap in handoffs in care, provide medication reconciliation and education, and connect patients who experience intersectionality with social determinants of health to other interdisciplinary team members such as social work (Rogers & Darden, 2014; Coffey et al., 2017; David & Kim, 2017; Rebello et al., 2016; Bennett & Probst, 2016).

The planned intervention was for each CNL will make one telehealth visit per patient meeting inclusion criteria during the first 1-2 weeks post admission to Home Health services and document the results of their visit in the EHR, as well as a data collection sheet. The standardized telehealth call template included a brief introduction, medication review, a review of patient specific conditions, and risk factors from the Oasis item M1033 (Appendix F). Inclusion criteria included Medicare patient, hospital referral, ACH score 4 or greater. Exclusion criteria included non-Medicare patient, Community or SNF referral, ACH score below 4.

**Study of the Interventions**

The study of the interventions used a cohort design. The first cohort is retrospective, and received no intervention, the second cohort received the telehealth intervention, a third cohort were patients who qualified but did not receive CNL interventions due to time constraints of the CNLs during the 8-week intervention phase. Data collected from cohort one (Pre-Intervention) on the rate of patients that were at high risk for hospitalization (4 or greater) and their characteristics will be compared with the cohort two (post intervention cohort) and cohort 3 (No-Intervention). Cohort 1 and cohort 3 both received no CNL intervention and help to provide comparison in understanding if the outcomes studied were due to the intervention. This current project was not structured to study the intervention with enough power to calculate statistical significance. Data related to the interventions collected by the CNL team and documented
through using an excel data collection tool, were analyzed for themes as a measure of clinical significance.

**Measures**

The measure utilized in this quality improvement project include the rate of patients who were rehospitalized within the at-risk population from cohorts within an 8-week period. Rates of rehospitalization are a defined and validated measure through CMS reported in Home Health Compare contributing to quality star ratings for Home Health agencies. The rate of rehospitalization for 30-days and 60-days between cohort groups is the main measure of this project.

Fidelity to the intervention was assured through every other week check in meetings for PDSA cycles, with chart audits of patients included in the intervention. Additionally, a debrief with the CNL team completing the intervention identified any additional changes needed for the PDSA cycle. Rehospitalization rates were validated through chart review, indicating inpatient events through the Oasis data set.

**Analysis**

Quantitative methods included comparing cohort 1 and cohort 3 vs. cohort 2 (intervention) rates of rehospitalization 30- day and 60-day rates within the defined population by 8-week periods of time as defined by CMS. Additionally, descriptive statistics for the cohorts compared to determine differences, such as diagnosis, and age.

Qualitative methods included reflexive and iterative processes including interviews with CNLs to solicit real time feedback on the telehealth intervention and the patient and caregiver population's receptiveness to guide rapid cycle improvement where necessary. These interviews completed biweekly during PDSA check-ins were conducted by the project director. Fieldnotes
from these interviews were analyzed using thematic analysis. Following these debriefing sessions, the project director used member check-ins to verify the themes, interpretations, and any proposed modifications to the intervention consistent with the DMAIC process. All data, field notes and transcripts will be maintained to ensure credibility of the theme and will be maintained in a password protected drive.

**Ethical Considerations**

Verbal consent was obtained during each telehealth call as part of this intervention, and this was explained as allowable to be revoked at any time. Confirmation of privacy during the phone call was also reiterated during the intervention. Departmental review through Dartmouth Hitchcock Health was sought and obtained prior to the intervention (Appendix G). UNH Nursing Departmental review deemed the project was quality improvement and did not need IRB approval. (Appendix H). Patient data was kept secure through secure drives only accessible to the VNH quality team. There were no conflicts of interests declared within the CNLs, project director or project team.

**Results**

**PDSA Cycles**

The CNL team, the Project Director, and Project Advisory team met every two weeks during the intervention to complete rapid cycle PDSAs. (Figure 12). The first PDSA identified that the case communication note was too lengthy to share data, and maxed out the characters allowed within that note, thus the note was shortened to focus on the main areas of problem identification and resolution. Next, the Home Health clinicians at times would be visiting patients the same day as the CNL telehealth intervention, the group decided to ask the CNLs to space out their calls when clinicians were not visiting as to not confuse the patient with multiple
touch points over one day and to also spread the assessment of the patient condition within the resources available. Additionally, the team recognized many patients had a medication list often exceeding ten medications. Therefore, we asked the CNL team to focus their review on the top three medications, determined by the CNL to include high risk medications, those relating to their primary diagnosis, or those medications needing follow up and monitoring such as Coumadin with INR, also allowing for the patient and caregiver with that identification as well. Finally, it was found the CNLs had varied amount of prep time, time to make phone call, and then post phone call documentation. The team then provided guidelines to aim for 20 minutes of chart prep, 20 minutes of a phone call, and 20 minutes for post phone call documentation.

For the second PDSA, the CNLs verbalized they did not have enough time to provide telehealth interventions for all patients who met criteria of Medicare and an Oasis hospitalization risk score of 4 or above, in combination with their other daily roles within the Home Health agency. Therefore, the project team asked the CNLs to provide telehealth interventions for the first three patients in the week for the remaining weeks who met criteria and to document on patients who did not receive the intervention that it was related to time constraints. One unintended finding of this project was that the CNL team found that they would provide recommendations and/or insights for the clinical team that would be seeing the patient in the home but that clinical team did not often read or follow those recommendations. Timing of team meetings, and lack of clinician adherence to reading case communication notes, with one factor being lack of time to do so related to lack of staffing. Although this was an important finding, it was out of the scope of the current project but communicated to the operations team.

The third and final PDSA also emphasized that for the CNLs to receive the patients that are meeting inclusion criteria, they would need to wait on third party software that would input
this at-risk score once the clinician completed admission documentation. Unfortunately, some patients would have a delay in eligibility for CNL interventions due to staff delays in documentation, and some patients were rehospitalized before the CNL could call the patient. Again, staff delay in documentation led to early identification of at-risk patients for rehospitalization and although an important finding, was outside the scope of this project, but communicated with the operations team. Last, the CNLs were questioning adding an exclusion criterion of patients who reside in assisted living (AL) facilities, or who otherwise have been identified as not benefitting from a CNL telehealth call. In this third and final PDSA cycle, the CNLs began to have enhanced clinical judgement on which patients would benefit from the telehealth intervention, and the project team asked them to capture their thoughts on how they understand quickly that a patient may not benefit. For example, in one CNL intuition field note it was (Appendix I) documented that a patient who was being admitted for osteomyelitis, with multiple providers recommending below knee amputation, but despite patient education on risks/benefits, the patient refused that treatment option, while verbalizing sufficient resources to help with the current and ongoing infection. In addition, we added the final exclusion criteria of patients residing in AL facilities.

Figure 3

PDSA Cycles

<table>
<thead>
<tr>
<th>PDSA 1</th>
<th>PDSA 2</th>
<th>PDSA 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Shortened case communication note</td>
<td>• Work overload with calls and CNLs</td>
<td>• Timeliness of documentation (delays) &amp; pts in hospital already</td>
</tr>
<tr>
<td>• Calls spaced out from clinician visits</td>
<td>• First 3 patients to meet criteria</td>
<td>• Exclusions – ALFs/ pts who won’t benefit from call</td>
</tr>
<tr>
<td>• Medication rec – focusing on top 3 – asking their input</td>
<td>• Time lapse in communication with team</td>
<td>• CNLs to capture “intuition” on who to call or not</td>
</tr>
<tr>
<td>• Timeliness of preparation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Demographics

Inclusion/ Exclusion Results

Cohort 1 (Pre-Intervention) 30 Day Rehospitalization N= 37, with two patients excluded because they were admitted to hospice within 2 days of Home Health admission. Additionally for cohort 1 (pre-intervention) for 60-day rehospitalization N=33 with an additional 2 patients within that time transferred to hospice. Cohort 2 (Intervention) 30-day rehospitalization N= 20, with no exclusions, and for the 60-day rehospitalization rate N=20 with also no exclusions. Cohort 3 (No-Intervention) 30 Day rehospitalization N= 34, with 4 patient exclusions for being in AL facilities, and one patient excluded for a death at home prior to intervention. Additionally, for cohort 3 for the 60-day rehospitalization rate N=31 with 2 patients excluded as they transferred to hospice during this time, and one patient excluded as they were still in the hospital from the first 30-day period.

Demographic Comparison

Demographic data were compiled for all three cohorts for sex, age, acute care hospitalization risk score, and PDGM diagnosis group (figure 4). The majority of patients were over 70 years old, had ACH scores 4 or 5, and the highest prevalent diagnoses were wounds and medical management, teaching & assessment (MMTA) for Cardiac/Circulatory disease.
Figure 4

Demographics of Cohorts

<table>
<thead>
<tr>
<th>Sample Characteristic</th>
<th>Cohort 1</th>
<th>Cohort 2</th>
<th>Cohort 3</th>
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<tbody>
<tr>
<td>Gender</td>
<td>18</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>51%</td>
<td>45%</td>
<td>65%</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>49%</td>
<td>55%</td>
<td>35%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 39</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>40–49</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>50–59</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>60–69</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>70–79</td>
<td>15</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>80–89</td>
<td>9</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>≥ 90</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ACH Score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>21</td>
<td>8</td>
<td>24</td>
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<tr>
<td>5</td>
<td>6</td>
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<td>6</td>
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<tr>
<td>7</td>
<td>2</td>
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<td>2</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDGM Clinical Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Musculoskeletal Rehabilitation</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Neuro/Stroke Rehabilitation</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wounds</td>
<td>15</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Complex Nursing Interventions</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Behavioral Health Care</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Medication Management,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching &amp; Assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMTA - Surgical Aftercare</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>MMTA - Cardiac/Circulatory</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>MMTA - Endocrine</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>MMTA - GI/GU</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MMTA - Infectious Disease/Neuro</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>MMTA - Respiratory</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>MMTA - Other</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

CNL Interventions

CNL Interventions were collected by the CNL team in the patient data excel spreadsheet.

The major themes included 1) Patient and Caregiver Education, 2) Care Coordination and 3) Connecting to Social Work and Community Resources (Appendix J). It is important to note that
over 50% of patients in the intervention group needed the intervention of connection to social work and/or community resources. The following includes examples of CNL telehealth interventions:

**Theme 1: Patient and Caregiver Education**

Patient 1 was provided Chronic Heart Failure (CHF) education and anticoagulation education. Through conversation it was realized that the patient and spouse did not recognize the terms heart failure or CHF. The patient’s spouse stated, “You’ve told me more in two sentences than I’ve ever hear form a doctor.” This patient also had not started their blood thinner in accordance with provider discussions, and the CNL was able to educate on that piece.

**Theme 2: Care Coordination**

Patient 16 was provided coordination to schedule a PCP telehealth appointment. The spouse of the patient brought them home early from rehab because they did not feel he was getting the care he needed. Through the CNL telehealth call it was recognized that the patient had not been seen by their PCP in months. The CNL coordinated with the PCP office and suggested a telehealth call, as the patient was physically unable to get to an appointment in the office. The CNL was also able to collaborate with coumadin and INR follow ups that had not been established yet.

**Theme 3: Connecting to Social Work/Community Resources**

Patient 17 was provided follow ups on home oxygen, attention to the inability to afford anticoagulation therapy, medication review, wound care concerns, and education tools. The CNL was able to coordinate with the PCP for follow ups on home oxygen that the patient was told he was getting but had not arrived. There were issues with inability to afford anticoagulation therapy, and opportunities for medication review. The patient expressed concern for his non
healing wounds and caring for them, so the CNL was able to coordinate with his PCP for him to be seen in wound care clinic. Education on wound management and anticoagulation therapy was discussed and recommendations were discussed with the case managers to bring education tools to the next visit to reinforce the education.

Patient 7 was provided diabetes education, caregiver support, and a MSW consult. One of the most impactful telehealth calls for one of the CNLs involved a patient and their spouse. While the CNL did provide some basic diabetes education, they spent a majority of the call practicing active listening and acknowledging the difficulty the patient and family had navigating all of the different doctors and specialists they had seen. The CNL could hear the worry in their voices and praised them for everything they were doing to impact the patient’s health. At the end of the call, the spouse thanked the CNL and said, “In this sea of uncertainty, it’s great to know we are all on the same team, and you understand what we are going through and are willing to help us.”

Table 2

*CNL Intervention Themes*

<table>
<thead>
<tr>
<th>Patient and Caregiver Education</th>
<th>Care Coordination</th>
<th>Connecting to social work/community resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication education</td>
<td>Care team guidance for patient needs</td>
<td>Equipment assistance</td>
</tr>
<tr>
<td>Zone tool education</td>
<td>Care plan recommendations for PCP</td>
<td></td>
</tr>
<tr>
<td>Self-management education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptom education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinforcing Provider Instructions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rehospitalization Rates**

The final rehospitalization results are depicted in figure 13. The 30-day rehospitalization rates included cohort 1 pre-hospitalization: (4/35) 11%, cohort 2 intervention: (3/20) 15%, cohort
3 no intervention: (2/34) 6%. The 60-day rehospitalization rates included cohort 1 pre-hospitalization: (7/33) 21%, cohort 2 intervention: (1/20) 5%, cohort 3 no intervention: (5/31) 16%.

Table 3

Rehospitalization Rates

<table>
<thead>
<tr>
<th></th>
<th>Cohort 1 Pre-Intervention N=35</th>
<th>Cohort 2 Intervention N=20</th>
<th>Cohort 3 No Intervention N=31</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-Day Rehospitalization Rate</td>
<td>11%</td>
<td>15%</td>
<td>6%</td>
</tr>
<tr>
<td>60-Day Rehospitalization Rate</td>
<td>21%</td>
<td>5%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Discussion

Summary

The results show that although the 30-day hospitalization rate for the intervention group (cohort 2) was higher than the pre-intervention (cohort 1) and no-intervention (cohort 3), the 60-day rehospitalization rate of the intervention group (cohort 2) was impacted by the clinical nurse leader telehealth interventions. It is important also to point out that the rehospitalization reasons for the pre-intervention (cohort 1) and no-invention (cohort 3) were mostly exacerbations of chronic conditions such as COPD and heart failure. While the intervention group had hospitalizations less related to underlying chronic conditions and related more to acute conditions such as hyponatremia, and GI bleed.

Although statistical significance was not achieved in this project, the clinical significance achieved the aim of the project which was to explore CNL telehealth interventions on impacting rehospitalizations for rural Home Health patients. Additionally, this project helps to strengthen
the components of the transitional care model delivered by clinical nurse leaders in home health. This project is unique in that it used the first in the nation model of care with the TCM as the foundation, and the Clinical Nurse Leader role in the Home Health setting to champion care coordination through telehealth for rural home care patients.

**Interpretation**

Although causation cannot be concluded from this quality improvement project, the CNL telehealth interventions seem to have impacted the patient outcome of rehospitalization. Many of the interventions surrounded patient and family education, care coordination and connecting to social work and community resources, each of which have protective factors for this population. There are no other quality improvement studies published that looked at the role of the Clinical Nurse Leader role utilizing telehealth interventions in Home Health patients. This is a first in the nation model of care, yet this quality improvement project on the basis of comparison of CNL telehealth interventions for at risk patients showed similar results to research looking at CNLs in ambulatory and inpatient settings (Leger, 2012; Miller & Schaper, 2015).

The impact of this project on the system hinges on the trajectory of health care shifting towards value-based care. The Clinical Nurse Leader role is not reimbursed through CMS, yet this project solidifies the role in keeping patients at home and out of the hospital. Additionally, individual patients were impacted, many voicing gratitude during the intervention to be able to finally understand their condition and how to manage it.

**Cost-Benefit Analysis**

Chronic conditions account for 77.1% of potentially preventable adult hospital stays in the US, contributing to $27.3 billion dollars in costs (McDermott & Jiang, 2020). Additionally, in 2017 “adult inpatient stays with an expected payor of Medicare accounted for two-thirds of
potentially preventable stays and related costs” (McDermott & Jiang, 2020). As VNH’s Medicare population averages 70% of patients served, a targeted intervention on this population is promising for the optimal outcome of preventing rehospitalizations. In heart failure alone, aggregate costs for potentially preventable hospitalizations are $11.2 billion dollars (McDermott & Jiang, 2020). The mean cost for an individual stay is $10,100 (McDermott & Jiang, 2020) compared to the low cost of $200 per skilled nursing visit for a Home Health patient; the cost savings to the health system is remarkable. Although telehealth is not reimbursed currently by CMS, the standard in-person $200 skilled nursing visit fee was utilized for illustrative purposes. Using the CNL in this role, yields a cost/benefit ratio which suggests the cost to the agency is offset by the savings from preventable hospitalizations.

Given there were a total of 19 patients in the intervention group (cohort 2) not rehospitalized for the 60-day rate, following a total of 20 telehealth visits, the cost savings to the system is approximately $187,900 (Table 4).

**Table 4**  
*Cost Benefit Analysis*

<table>
<thead>
<tr>
<th>Cost / Savings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled Nursing Visit Cost ($200/ telehealth visit)</td>
<td></td>
</tr>
<tr>
<td>$200 (x 20 visits)</td>
<td>$4,000</td>
</tr>
<tr>
<td>Potential Savings for Preventing Rehospitalization ($10,100/patient)</td>
<td></td>
</tr>
<tr>
<td>$10,100 (x 19 patients)</td>
<td>$191,900</td>
</tr>
<tr>
<td><strong>Total Cost Savings</strong></td>
<td><strong>$187,900</strong></td>
</tr>
</tbody>
</table>

Additionally, with the value-based payment model anticipated in the next Home Health Payment Rule for 2023, VNH could receive up to a 5% penalty for poor performance. With VNH home health’s revenue averaging $14 million dollars per year, a 5% penalty could lead to
$700,000 in reduced payment or reward. This is a significant amount considering VH and other
not-for-profit home care agencies often use the margins from Home Health to offset losses from
underfunded/unfunded programs within that same agency such as Maternal Child Health that are
vital to the community. With successful investment in prevention strategies deployed from the
CNL in Home Health, the cost savings are significant.

Limitations

While the results of the project are limited by the lack of statistically significant results,
clinical significance was clearly described and exemplified. The setting was based in a rural
Home Health environment so generalizability to urban populations is limited. An additional
limitation was the time allotted to the Clinical Nurse Leader to complete interventions. There
were more patients that qualified for the intervention than the Clinical Nurse Leader could
accommodate. Time limitation was mitigated by capping the patient load to 3 patients per CNL
per week, in addition an exclusion of patients residing in assisted living facilities was added.
Inherent in the project design, the at-risk criteria was through Oasis data and was reliant on
clinician accuracy. The Clinical Nurse Leaders found there were times criteria was missing that
would add to the acute care hospitalization risk score. Finally, areas arose with this project that
were outside the scope including delay in clinician documentation, as well as a need for
improved clinician communication. While not within scope, the project team did share these
findings with the operations team.

Conclusions

Innovation in the face of value-based care in the US healthcare system calls for the skills,
knowledge and expertise of nurses educated in quality improvement, system of care, and care
coordination. The Clinical Nurse Leader exemplifies the essential qualities needed to lead
systems of care. Healthcare providers can no longer set discharge plans in motion for vulnerable patients and assume they will make the journey. Instead of assumptions, strategic prevention of rehospitalizations through coordination of care and quality improvement methodology is needed. This project leveraged the Clinical Nurse Leader skills through telehealth to prevent rehospitalizations. Prevention of rehospitalizations were demonstrated for 60-day rehospitalization rates through the CNL telehealth interventions.

Long term prevention of rehospitalizations has implications for large cost savings impacting health systems, CMS, but more importantly on the quality of life of patients. The model of care and interventions introduced in this project are scalable to other Home Health agencies, and hospital systems, and with the prospect of expansion, a larger scale impact could be studied, adapted, and actualized. The results of this project have been disseminated at the CNL Summit 2022, an important group of stakeholders with this knowledge at hand to help continue to expand the role of the CNL to Home Health. Additionally, the results of this project will be submitted to the Journal of Nursing Care Quality to publish, as evidence in this area was lacking. Future dissemination plans include sharing the project with National Home Health organizations, especially with Value Based Care coming to Home Health in 2023, catalyzing the need for rehospitalization prevention and the skillset of the CNL to lead in this space. Further research on the impact of the CNL on home-based care is warranted, and necessary to move the needle on value-based care in the community.
References


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Appendix A

Fishbone Diagram

Implementing the CNL Role for the Facilitation of Telehealth

- Screening
  - Vital Signs
    - Lack of compliance
  - Communication
    - Changes not communicated
- Lack of continuity
  - Lack of accountability
- Order
  - Medication
    - Not ordered
  - Documentation
  - Med Reconciliation
    - Not reviewed
- Right Place
  - Remote
    - Equipment
    - Not available
- Right Time
  - Time
    - Not consistent
- Right Person
  - Staff
    - Lack of training
  - Patient
    - Not involved
- Right Technology
  - Telehealth
  - Not available
  - Not standardized

- Staffing
  - Turnover
  - Staff shortages
  - Company
    - Limited resources

- Access to Tech/Equipment
  - Not working
  - Missing supplies

- Medication Needs
  - Not discontinued
  - Incorrect dosage

- Home Health Patients are Rehospitalized

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## Appendix B

Voice of The Customer Plan

<table>
<thead>
<tr>
<th>Customer group</th>
<th>Target number of responses</th>
<th>Collection method</th>
<th>Timeframe for collection</th>
<th>Responsible for collection</th>
<th>Possible Questions</th>
<th>Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNL</td>
<td>2</td>
<td>Fishbone Diagram - Webex</td>
<td>Due 9/15</td>
<td>Briana</td>
<td>Why are patient rehospitalized? What makes a patient at risk to be hospitalized?</td>
<td>Analysis of Fishbone diagram for incorporation into telehealth tool intervention for meeting 10/4</td>
</tr>
<tr>
<td>RN</td>
<td>6</td>
<td>Email survey questions</td>
<td>Due 9/22</td>
<td>Jenna/Sarah</td>
<td>What are factors that bring patients back to the hospital? What have we done to prevent rehospitalization that works?</td>
<td>Analysis of RN feedback for incorporation into telehealth tool intervention for meeting 10/4</td>
</tr>
<tr>
<td>PT</td>
<td>4</td>
<td>Email survey questions</td>
<td>Due 9/22</td>
<td>Jenna/Sarah</td>
<td>What are factors that bring patients back to the hospital? What have we done to prevent rehospitalization that works?</td>
<td>Analysis of PT feedback for incorporation into telehealth tool intervention for meeting 10/4</td>
</tr>
</tbody>
</table>
Appendix C

Define – Days Until Rehospitalization
Appendix D

Define Data - Hospice Referral

Potential Hospice Referral

- Hospice: 42%
- No: 58%
Appendix E

Count of Diagnosis for Rehospitalized Patients
Appendix F

CNL Telehealth Guide

Introduction
Hi this is XXXX a Clinical nurse leader with VNH. We are doing telephone follow up with patients with a focus on keeping you at home and out of the hospital. This phone call should take about XXXX minutes. Is now an ok time to talk? Do you have a caregiver or support person you want to include in this conversation? Are you in a location where we can talk privately about your health? You are able to end the call at any time, our goal is to gather some more information to share with the clinical team to help keep you out of the hospital. Can you tell me about your goals for your care at home?

Medication Review
Did your clinician go over your medications with you at your first visit?
Regardless of answer, for priority medications: (2-3 meds highest priority for pt condition)
• Why are you taking them?
• How are you taking them?
• How do you organize your medications?
• Do you have a plan for obtaining refills?
• Are you able to afford your medications?

Summarize any recommendations/any steps
Communicate plan for necessary follow-up with team

Patient-Specific Conditions
Patient’s highest priority conditions are:_____________________
What is your understanding of your ___high risk diagnoses___?
Besides taking medications, what things do you do to manage your health at home?
• Checking blood sugar
• Checking BP
• Weighing self
Have you received the ______ zone tool yet?
Zone tools exist for: Asthma, blood thinner, COPD, Depression, Diabetes, Heart Failure, High blood Pressure, Joint Replacement, Pain Management, Respiratory, UTI, Wound Management
• Review condition-specific risk factors/when to escalate care
  ○ Use Elsevier/Triage book to inform conversation

M1033 Risk Factors
2 or more falls or any fall with injury in the past 12 months
• Could you please tell me about your previous fall(s)?
• How does your health impact your daily activities?
• Are there any self-care activities you feel you could use more help with?
• What do you think puts you at risk to fall?
• Has anyone talked about home safety or fall prevention with you?
• Review areas of concern based on falls risk tool
  Offer immediate recommendations as indicated
  Consider recommending consults to PT/OT/SN/HHA as appropriate

*Unintentional weight loss of 10+ pounds in past 12 months*
Conditions that put patient at risk for weight loss: _______________
  • Do you have any trouble affording or getting enough food at home?
  • Can you tell me about your eating habits? How is your appetite?

*2 or more hospitalizations in past 6 months*
• It looks like you’ve been admitted to the hospital several times recently.
  o If admission info is available, review risks based on info during prep.
  o If admission info is NOT available, ask: “What did you need to go to the hospital for in the past 6 months?”
• Can you tell me what helps to keep you home?
  Offer immediate recommendations as indicated
  Review appropriate escalation of care/resources based on concern

*2 or more ED visits in past 6 months*
• It looks like you’ve been to the Emergency Room several times recently.
  o If ED info is available, review risks based on info during prep.
  o If admission info is NOT available, ask: “What were the reasons you went to the Emergency Room over the past 6 months?”
• Can you tell me what helps to keep you out of the Emergency Room?
  Offer immediate recommendations as indicated
  Review appropriate escalation of care/resources based on concern

*Decline in mental, emotional, or behavioral status in past 3 months*
• Do you have any help to manage your health at home? Who helps you, and how do they help you?
  o How often/during what times is caregiver available to help?
  o Is caregiver able to help with __pt-specific needs__?
  o What training/education can we help caregiver with?
  o What concerns or questions does caregiver have?
• Do you receive any community supports? Meals on Wheels, community case manager, etc
• How does your health impact your daily activities?
• How does your mood impact your daily activities?
• Consider recommending SW consult

*Reported or observed history of difficulty complying with any medical instructions*
• Do you have any help to manage your health at home? Who helps you, and how do they help you?
  ◦ How often/during what times is caregiver available to help?
  ◦ Is caregiver able to help with __pt-specific needs__?
  ◦ What training/education can we help caregiver with?
  ◦ What concerns or questions does caregiver have?
• Do you receive any community supports? Meals on Wheels, community case manager, etc
• How do you learn best? Do you have any learning challenges or disabilities?
  Consider recommending SW consult

_Taking 5 or more medications- no additional questions- med rec above_

_Currently reports exhaustion_
• How many hours of sleep are you getting each night?
• How many times/night to you wake up? Do you know why you’re waking up?
• Do you feel well rested in the morning?
• Are you having any trouble breathing?
• How much activity do you get during the day?

_Other risks noted (no comment box on OASIS)_

_Closing_
• Are you planning to get a flu shot? Do you have a plan of where/how to get it?
• Do you have any questions or concerns we haven’t talked about yet?
• Summarize plan and action steps related to phone call with patient
  ◦ We will share this information with your clinical team for follow up in your chart and when we come together to talk about providing you the best care.
• Review who to reach out to with questions or concerns
  ◦ VNH (1 888 300 8853) vs PCP vs EMS
October 12, 2021

Briana L. White MSN, RN, CPN, CCRN-K, CNL
Manager, Clinical Quality and Care Management
Visiting Nurse and Hospice for VT and NH
Dartmouth-Hitchcock Health

Dear Briana,

Thank you for the opportunity to review your plans for your study on the implementation of the Clinical Nurse Leader Role for Facilitation of Telehealth to Reduce Rehospitalizations in Rural Home Health Patients. The intent and design of the study, an examination of potentially preventable rehospitalizations of Medicare patients assessed as at-risk for 30-day rehospitalization, are described in your words as a “pilot quality improvement project” aimed at implementation of “a remote telehealth intervention led by Clinical Nurse Leaders.” Your study seeks to transfer information that is known (and cited in the literature) into a possible change in clinical practice that will improve health outcomes for the population under study. It is not a systematic investigation to develop generalizable knowledge. You also indicate the use of the DMAIC model, a quality improvement framework that ensures sustained quality improvement.

From my perspective, this is not a research study, and thus, a typical pathway for proposed research approval is not indicated. I would be happy to discuss this in more detail if that would be helpful as you move forward with the study. Just as a reminder, this note represents my perspective only, and any related discussion would be an effort to provide a helpful perspective for further planning. In addition, this note does not serve as a formal departmental/scientific review or as a definitive determination concerning participant risk.

Thank you for reaching out. I wish you all the best as you move forward with your doctoral work.

Sincerely,

Debra Pilling Hastings, Ph.D., RN, NPD-BC
Director, Continuing Nursing Education
Accredited Provider Program Director
Dartmouth-Hitchcock

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Appendix H

UNH Nursing Departmental Review

October 26, 2021

Dear Briana,

The UNH Department of Nursing Quality Review committee has reviewed your DNP proposal titled: Implementation of CNL Role for Facilitation of Telehealth to Reduce Potentially Preventable Hospitalizations. Based on the SQUIRE 2.0 guidelines for determination of quality improvement and research activities, the proposal meets the standards for a quality improvement project. The Quality Review committee determined that this project does not constitute research, and therefore does not need review by the UNH Institutional Review Board for the Protection of Human Subjects, and there are no potential conflicts of interest (financial, professional, or institutional). You may implement your project as proposed. If you make any changes to your project, please notify the committee.

Best Wishes!

Dr. Cathleen C. Colleran DNP, RN
DNP Program Director
Graduate Program Coordinator
Clinical Associate Professor
Dept. of Nursing
University of New Hampshire
Cathleen.Colleran@unh.edu
603-862-1286
Appendix I

CNL Intuition

**CNL “Intuition”**
- **CNL 1**
  - We know patients who are sick and likely to be rehospitalized—maybe none of my intervention will make a difference (i.e., osteomyelitis patient not agreeable to BKA recommendations)
  - Sick patient, that is well supported in the home, some are well supported, and may be rehospitalized due to the nature of their disease progression and there is little that I can do about that.
- **CNL 2**
  - I feel like I can learn a lot by reading the admission note and that alerts me to high needs.
  - I think patients with CHF or newly or uncontrolled diabetes are important to call.
  - I had one patient on my list who was a complex referral. After doing a chart review I wasn’t sure what else I was going to be able to contribute, as he had multiple people checking in on him and multiple equipment and resources. This was a patient that I knew was going to be hospitalized because of the nature and progression of his disease/illness and there wasn’t anything I could do to prevent that. Palliative care was already having those goals of care conversations with him and we had a hospice informational set up for him.
  - There were a few patients on the list that clinicians approached me about before I had called because they were complex. I think moving forward it will be important to have more communication up front with the clinicians about patients they identify as needed more supports. It will also be important to figure out a way to reach these patients earlier in their admission.
## Appendix J

### CNL Intervention Themes

<table>
<thead>
<tr>
<th>Intervention Summary</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education to start apixaban in accordance with provider instructions. Communication with RN CM re: next visit schedule and CHF education need.</td>
<td>Medication education</td>
</tr>
<tr>
<td></td>
<td>Reinforcing Provider Instructions</td>
</tr>
<tr>
<td>Follow up on MSW consult, clinicians: updated med list, UTI &amp; COPD zone tools, ortho hypo</td>
<td>Connecting to social work/community resources</td>
</tr>
<tr>
<td></td>
<td>Medication education</td>
</tr>
<tr>
<td></td>
<td>Zone tool education</td>
</tr>
<tr>
<td></td>
<td>Symptom education</td>
</tr>
<tr>
<td>Recommend DM, Resp, UTI zone tools. Recommend CHF education.</td>
<td>Zone tool education</td>
</tr>
<tr>
<td></td>
<td>Care team guidance for patient needs</td>
</tr>
<tr>
<td>Recommend Med review. Recommend HTN &amp; wound management zone tools. Recommend Flu vaccine follow up.</td>
<td>Connecting to social work/community resources</td>
</tr>
<tr>
<td></td>
<td>Medication education</td>
</tr>
<tr>
<td></td>
<td>Zone tool education</td>
</tr>
<tr>
<td>Follow up on MSW consult, Education on taking full dose of lactulose, Education on skin and incontinence care</td>
<td>Connecting to social work/community resources</td>
</tr>
<tr>
<td></td>
<td>Medication education</td>
</tr>
<tr>
<td></td>
<td>Self-management education</td>
</tr>
<tr>
<td>communication with clinician on Diabetic nutrition education, MSW consult</td>
<td>Connecting to social work/community resources</td>
</tr>
<tr>
<td></td>
<td>Care team guidance for patient needs</td>
</tr>
<tr>
<td>Follow up with SW re: applications for more help in home. Spoke with RT from vent vendor, plan for RT to reinforce vent line hygiene, RN to reinforce/check in on trach care practices.</td>
<td>Connecting to social work/community resources</td>
</tr>
<tr>
<td></td>
<td>Equipment assistance</td>
</tr>
<tr>
<td></td>
<td>Care team guidance for patient needs</td>
</tr>
<tr>
<td>Education on smoking cessation, clinician recs: update medlist, Follow up MSW consult and transportation to MD appt.</td>
<td>Self-management education</td>
</tr>
<tr>
<td></td>
<td>Care team guidance for patient needs</td>
</tr>
<tr>
<td></td>
<td>Connecting to social work/community resources</td>
</tr>
<tr>
<td>Message to team noting pt ready for, accepting of visits- ROC visit only visit made so far</td>
<td>Care team guidance for patient needs</td>
</tr>
</tbody>
</table>
| Recommended CHF and UTI zone tools to team, Clarified for patient that pt. was having foley removed in the clinic not at home. Discussion about community resources | Care team guidance for patient needs  
Zone tool education  
Connecting to social work/community resources |
|---|---|
| Called PCP requesting MSWa order for med assistance. Alerted clinicians to concerns re: insomnia, opportunity to provide zone tools. | Connecting to social work/community resources  
Care team guidance for patient needs  
Zone tool education |
| CNL called PCP for MSW order, reach out to Swa for updates on in-home and community resources, call pulmonologist for info about 1st choice inhaler. OT to bring CHF zone tool. | Care team guidance for patient needs  
Connecting to social work/community resources  
Care plan recommendations for PCP |
| Recommended med review/update med list, MSW to follow up on LTC application | Medication education  
Connecting to social work/community resources |
| Patient expressing multiple concerns, memory deficit noted, communicated needs around pantoprazole, constipation, flu shot, & RD referral to PCP’s office in prep for 12/2 appt. Encouraged use of PRNs as indicated. F/U with team about potential HHA, MSW, SN needs. | Medication education  
Symptom education  
Self-management education  
Care plan recommendations for PCP  
Care team guidance for patient needs  
Connecting to social work/community resources |
| Plan of care discussion with CM. Called PCP to coordinate PCP evaluation, relay concerns for: capacity, med management, LTC needs. Connect with MSW. Planning for complex care meeting. | Care plan recommendations for PCP  
Connecting to social work/community resources |
| Called PCP to follow up on home oxygen and inability to afford lovenox. Note to clinician recommending blood thinner & wound management zone tools; identified need for Med review. | Care plan recommendations for PCP  
Care team guidance for patient needs  
Zone tool education |
| Pt with good understanding of condition, no overt opportunities identified | None |
Recommend clinician follow up with patient with goals of care after palliative care visit on 12/6 and medication review.

<table>
<thead>
<tr>
<th>Care team guidance for patient needs</th>
<th>Medication Education</th>
</tr>
</thead>
</table>

Pt. and CG with good understanding of condition. Reinforced they call Community surgical for any additional education needs on portable O2 tanks.

<table>
<thead>
<tr>
<th>Self-management Education</th>
</tr>
</thead>
</table>

Recc to SN: hydroxyzine education, Resp zone tool, dysphagia soft diet ed., consider if PT is appropriate

<table>
<thead>
<tr>
<th>Care team guidance for patient needs</th>
<th>Zone tool education</th>
<th>Self-management education</th>
</tr>
</thead>
</table>

**Themes**

<table>
<thead>
<tr>
<th>Patient and Caregiver Education</th>
<th>Care Coordination</th>
<th>Connecting to social work/community resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication education</td>
<td>Care team guidance for patient needs</td>
<td>Equipment assistance</td>
</tr>
<tr>
<td>Zone tool education</td>
<td>Care plan recommendations for PCP</td>
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</tr>
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<td>Reinforcing Provider Instructions</td>
<td></td>
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</tbody>
</table>