



The P.A.C.T Program: Improving Outcomes for the Chronically Critically Ill

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Abstract:

Every year, millions of patients are admitted to intensive care units across the United States. While most patients survive and go on to live normal lives, a small percentage will fall under the category of chronically, critically ill (CCI). Despite surviving their initial ICU stay, these patients remain dependent on medical interventions and around the clock nursing care, undergo lengthy hospitalizations, and have low long term survival rates. Of those who do discharge to home, as many as two thirds are readmitted to the hospital and few ever return to functional independence. In addition to its associated physical hardships, CCI can be an enormous emotional, psychosocial, and financial burden for patients as well as caregivers.

The Post Acute Care Transitions (PACT) Team at Spaulding Hospital for Continuing Medical Care Cambridge (SHC) is dedicated to addressing the unique set of obstacles facing CCI patients and their families. The program will target two often overlooked areas in the care of CCI patients: Advance Care Planning and Transitions in Care. Each patient enrolled in the program will be assigned a Care Transitions Nurse (CTN) who will provide longitudinal case management and palliative care from admission to SHC until home for 30 days. The CTN will provide transition coaching for patients and families while collaborating with post acute care providers to reduce medical errors during transitions and ensure that a patient's goals of care align with his/her plan of care at every step of the continuum.

Patients admitted to the program must be referred to SHC from Brigham and Women's Hospital (BWH) and meet one of the following criteria: Chronic hemodialysis or an 8 night ICU stay with tracheostomy placement and/or prolonged mechanical ventilation. The program is funded by the Massachusetts Health Policy Commission and aims to reduce the length of stay, 30-day readmission rate, and medical expenditure for CCI patients at SHC.

Background

It is estimated that at least 5.6 million adult patients are discharged from the ICU each year in America alone. Of these patients a small percentage will fall under the category of Chronically Critically Ill (CCI) and go on to experience multiple organ dysfunctions and long hospital stays [1-5]. During these lengthy hospitalizations, CCI patients may require multiple life sustaining devices and are at high risk for urinary tract infections, pressure ulcers, pneumonias, and other hospital acquired infections [1, 4, 6, 8-10]. Long term outcomes for this population are poor. Unroe and colleagues followed a cohort of patients receiving prolonged mechanical ventilation (≥ 4 days with tracheostomy placement or ≥ 21 without tracheostomy), finding a 1 year mortality rate of 44% with only 9% of patients alive with no functional dependence [4]. Past studies have produced similar results [7, 11].

In addition to the physical hardships experienced by these patients, CCI comes with emotional, psychosocial, and financial burdens as well. Moreover, these burdens do not fall solely on the patients themselves. Multiple studies have found that caregivers of CCI patients exhibit significant declines in physical and mental health, with as many as a third developing symptoms of some degree of depression [2, 12-13]. Despite being a small percentage of ICU discharges, the CCI population has been found to account for 40-60% of total ICU costs, depending on definition of CCI [14-15]. Due to America's aging population, the demand for critical care is projected to increase. Due to advances in short-term critical care management, however, ICU mortality rates will continue to decrease, leaving more and more patients and families to face the hardships of CCI. To reduce the medical expenditure and improve the quality of life for this population, it is paramount that future research investigates potential methods to both prevent CCI and better manage long term care of remaining CCI patients.

Improving the long term care of CCI patients requires that a patient's plan of care aligns with the patient's goals of care. Patients and families take a variety of information into account when making decisions about treatment preferences, and extending life is not always the ultimate goal. For example, a 2002 study by Fried and colleagues found that most seriously ill adults were more concerned with functional or cognitive impairment than likelihood of death, and would prefer to forego life sustaining treatment if there was a high chance it would yield such impairment [16]. A 2017 report from the Massachusetts Coalition for Serious Illness Care found that only 14% of surveyed patients "want caregivers to do whatever it takes to be kept alive" compared to the 80% that reported not wanting care that reduces their quality of life below a given level [17]. Other studies have shown that intensity of pain, probability of survival, and financial burden on family were all key determinants for whether or not to receive potentially life sustaining care [18-19]. Unfortunately, it is often the case that this information is not given to patients/surrogates, or is not taken into consideration. A 2016 report from the Massachusetts Coalition for Serious Illness Care found that 85% of Massachusetts residents believe physicians should talk with patients about end-of-life care, only 15% reported having these conversations [20]. Of respondents facing serious illness at the time of the study, only 25% reported having these conversations. Other studies have yielded similar results, with 60-90% of patients with serious illness reporting never discussing end-of-life care with clinicians [21-23].

Another important aspect in managing the long term care of CCI patients is improving transitions in care. During transitions, patients may face drastic changes in schedule, an increase in self-care responsibilities, and alterations in medication dosage or schedule [24-26]. Poor communication, planning, and coordination during such transitions have been shown to reduce patient satisfaction and increase the likelihood of adverse events and hospital readmissions [27-30]. It has been reported that nearly one-fifth of patients discharged from a hospital in the United States are readmitted within 30 days, while nearly one-half experience at least one medical error in medication continuity, diagnostic workup, or test follow-up [29, 31-32]. Breakdowns in communication and planning, as well as their negative impact on patient outcomes, have been documented between many levels of care [33-35]. Programs that focus on improving transitions in care have yielded positive results. A 2014 meta-analysis by Verhaegh and colleagues found that transitional care interventions, regardless of intensity, reduced intermediate (31-180 days) and long-term (181-365 day) readmission rates for CCI patients. In addition, the analysis found that higher intensity interventions (such as home visits within 3 days of discharge) were able to effectively reduce short-term readmission rates (0-30 days of discharge) [35].

Methods:

Providing Hospitals

This study will be based out of Spaulding Hospital for Continuing Medical Care, a 180 bed long-term acute care hospital (LTACH) in Cambridge, MA. In the 1980's LTACH's were originally designed to accept medically complex patients from acute hospitals in order to open beds and decreased Medicare spending. Since then, LTACH's have increased drastically in both number and expenditure and accept a large proportion of CCI patients [3-5, 36]. The majority of patients at SHC are referred from the two nearby acute care hospitals, Brigham and Women's Hospital (BWH) and Massachusetts General Hospital (MGH), both of which are nationally renowned teaching hospitals that offer comparable services. Patients that meet the CCI criteria (see below) and are referred from BWH will be enrolled in the program, while those meeting CCI criteria referred from MGH will serve as the control group. In addition, baseline data will be collected from both hospitals prior to program commencement to account for any potential hospital vs. hospital variance.

CCI Criteria

There is currently no consensus definition for CCI, however most definitions involve a combination of ICU stay, tracheostomy placement/mechanical ventilation, and/or multiple organ failure [5]. Combining both commonly used definitions of CCI from CCI literature and qualitative input from clinicians at SHC, the authors determined that patients enrolled in this program must meet at least one of the following 3 criteria:

- ICU Stay >8 nights + tracheostomy placement
- ICU Stay >8 nights + at least 96 hour of consecutive mechanical ventilation
- Receive hemodialysis during SHC admission

PACT Clinicians

In an effort to reduce errors during transitions, increase coordination of care throughout the care continuum, and ensure the plan of care aligns with the patient's goals of care, each patient enrolled in the program will receive longitudinal care-coordination from a Care Transitions Nurse (CTN). The CTN will meet with the patient and/or surrogate within a week of admission to SHC and develop a relationship with the patient and family during their stay. The CTN will also ensure that patients and caregivers are able to make their goals known by providing every patient/surrogate with an opportunity for a serious illness conversation. This guide for this serious illness conversation was developed by a team of palliative care experts at Ariadne Labs, and was designed as "...a framework for clinicians to explore topics that are crucial to gaining a full understanding about what is most important to patients" [37]. A modified version of this conversation guide was recently found to be both efficient and effective, with conversations averaging less than 15 minutes in length and the vast majority of patients describing the conversation as worthwhile and most clinicians reporting that the conversation provided a significant improvement in their understanding of a patient's preferences [38]. In addition, the CTN will provide patients/surrogates with education regarding Advance Care Planning, particularly the Massachusetts Medical Orders for Life Sustaining Treatment (MOLST; the MA equivalent of the POLST) form.

While the patient is at SHC the CTN will collaborate with physicians at SHC to align the plan of care with the patient's goals and desires. Prior to discharge, the CTN will provide transition coaching and communicate with downstream providers to ensure appropriate care will be in place upon discharge. This includes contacting skilled nursing facilities, home health agencies, primary care physicians, as well as respiratory care, dialysis, and infusion providers. Once the patient is discharged the CTN will make regular home visits, provide medication reconciliation, and communicate information with providers as necessary. The CTN will follow patients from admission to SHC until they have been home for 30 consecutive days or expire.

Data Collection and Analysis

The billing codes for all patients admitted to SHC will be screened for CCI criteria upon admission. Patients who meet CCI criteria referred from BWH or MGH will be placed into 1 of 4 groups based on referring hospital and referral date. Patients admitted from BWH during the baseline period (7 months) will be placed in the "BWH Baseline" group, while those referred from MGH during that time will make up the "MGH Baseline Group." Patients admitted during the intervention period (18 months; beginning immediately after baseline period) that meet CCI criteria admitted from BWH will be placed in the "Intervention" group while those from MGH will be in the "Control" group. Only patients enrolled in the "Intervention" group will receive program interventions.

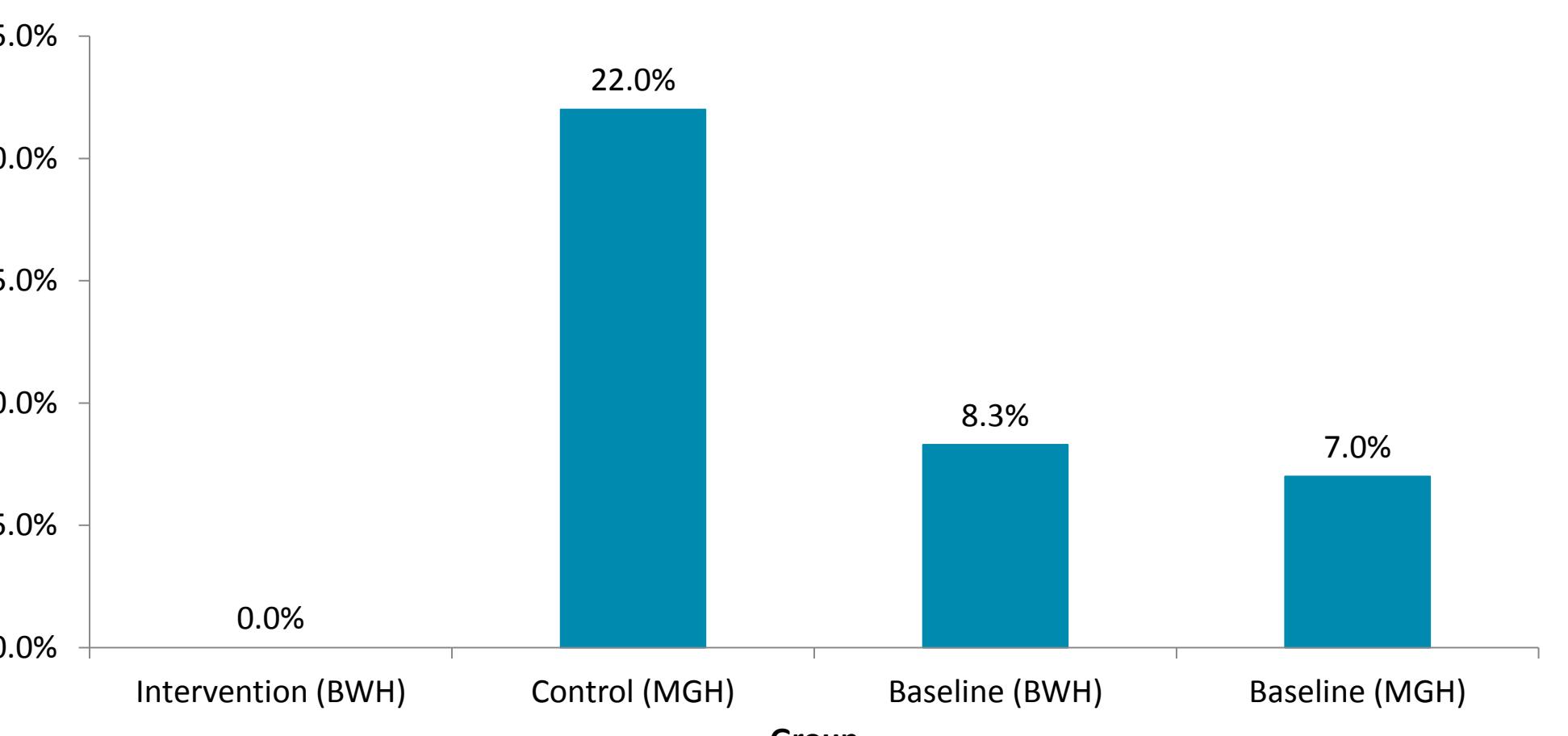
Within a week of admission to SHC, the CTN will meet with patients/surrogates of patients in the "Intervention" group and provide education about the program. Patients/surrogates are informed that all services provided by the program are free of charge and may be declined at any point.

Patient data will be tracked using electronic medical records and telephonic communication. Groups will be compared using average inpatient length of stay (length of stay at SHC combined with intermittent acute visits), percent of patients with a readmission within 30 days of discharge, and percent of patients with a completed MOLST form. For the purposes of this study, discharge is defined as a patient being transferred to a lower level of care (skilled nursing facility, inpatient rehab facility, or home) and readmissions are defined as any admission (planned or unplanned) to an acute care setting after discharge. Average length of stay will be compared across groups using a one-way analysis of variance while readmission percentage will be analyzed using a binary logistic regression.

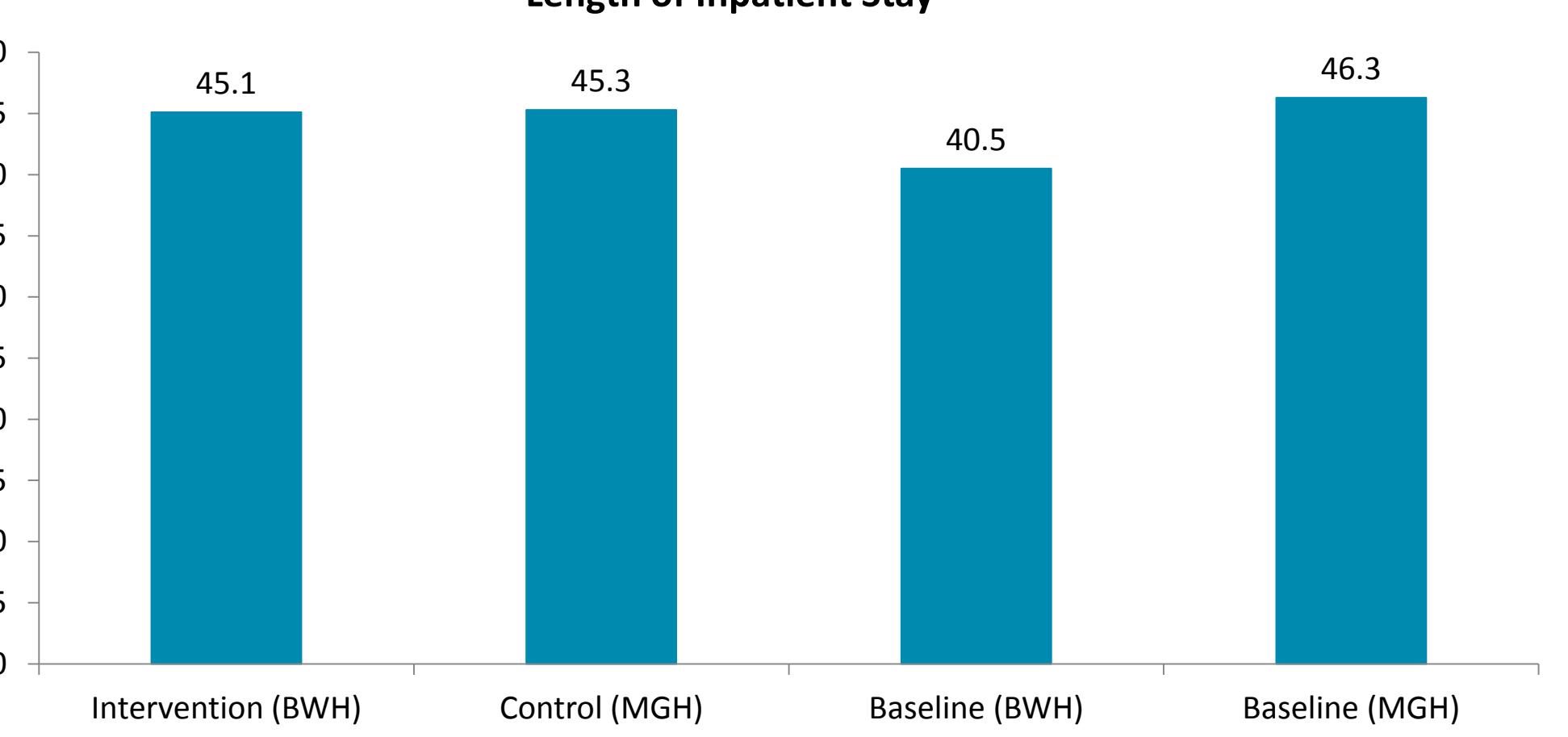
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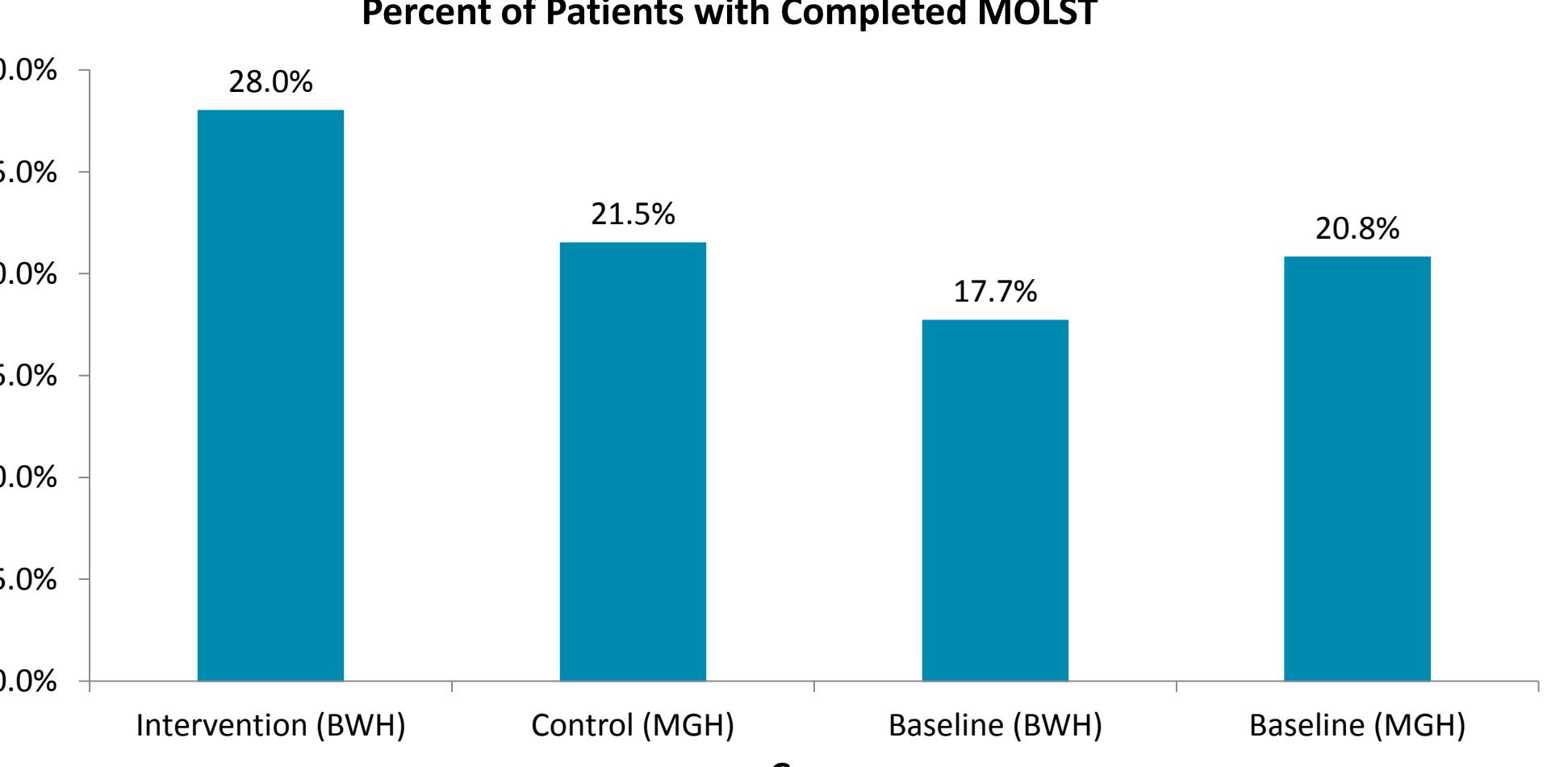
Percent of Patients Readmitted within 30 Days of Discharge



Length of Inpatient Stay



Percent of Patients with Completed MOLST



Discussion:

While no statistical tests have been used to analyze the present data, trends in the data already highlight where the program has been effective and where it needs improvement. The first, and most obvious, trend is the sharp decrease in readmissions. While the magnitude of this decrease exceeded initial expectations, this is the area the PACT clinicians have focused most of their efforts thus far. The PACT clinicians have already averted a number of readmissions by identifying and addressing problems that would have otherwise fallen through the cracks. This includes patients going home with missing medications or equipment, family/caregivers realizing they could not provide the quality of care necessary, transportation failing through, and providers not communicating with each other. In addition, the PACT clinicians have effectively utilized the Partners Mobile Observation Unit (PMOU – a mobile urgent care unit) to proactively address medical issues that may have otherwise led to an emergency room visit.

The data does not suggest that the PACT program is currently having any significant impact on length of stay. Given the medical complexity of many of the patients on the program and the tight medical resources in conjunction with the academic medical centers, there is little opportunity to reduce patient length of stay. The PACT clinicians are, however, focusing on two particular areas that can potentially reduce patient length of stay. The first area involves addressing the MOLST more intently. While the intervention group currently has the highest percentage of patients with a completed MOLST, more than two thirds of patients in this group still do not have one. Educating patients/surrogates about the potential benefits and risks of resuscitation, intubation, and acute transfers can reduce returns to acute care centers, ultimately increasing patient quality of life and decreasing length of stay.

The second area PACT clinicians will focus on is leveraging relationships with skilled nursing facilities involved in the program to place patients quicker. Prior to the program these facilities have hesitated to accept these seriously ill patients because of their intense resource requirements and high risks for readmission post discharge. PACT program patients will all have engaged in serious illness conversations, received transition coaching, and be followed by a CTN who can aid in the discharge planning, advocate for the patient, and ensure appropriate services and safety nets are set up for when the patient is eventually discharged. With these supports in place, partner facilities will ideally accept patients earlier and reduce length of stay at SHC.

References:

1. Cooper, Z, et al. Chronic Critical Illness: A review for Surgeons. *Curr Prob Surg*. 2011; 48(1):12-57
2. Kahn JM, et al. The Epidemiology of Chronic Critical Illness in the United States. *Crit Care Med*. 2015; 43(2):282-287
3. Unroe K, Kahn JM, Carson SS, et al. One-year trajectories of care and resource utilization for recipients of prolonged mechanical ventilation: A cohort study. *Ann Intern Med*. 2010; 153:167-175
4. Kandilov AM, Ingber MJ, Morley M, et al. Chronically Critically Ill Population Payment Recommendations. Research Triangle Park, NC, RTI International. 2014.
5. Kahn JM, Benson NM, Appleby D, Carson SS, Waisvary TJ, Hudson-Jinks T, Gustafson M. Survivors of catastrophic illness: Outcome after direct transfer from intensive care to extended care facilities. *Crit Care Med*. 2000; 28(1):19-25
6. Ahmed MM, de Wit M, Pirone JR, Shorr AF. Growth in adult prolonged acute mechanical ventilation: implications for healthcare delivery. *Crit Care Med*. 2008; 36(5):1451-1456
7. Fried TR, Bradley EH, Towle VR, Allore H. Understanding the treatment preferences of seriously ill patients. *N Engl J Med*. 2002; 346(14):1061-1066
8. Clark M, Flahive J, Person S, Daniel C, Dutwin D. Massachusetts Survey on Advance Care Planning and End-of-Life Care: 2017. Massachusetts Coalition for Serious Illness Care. 2017
9. Murphy DJ, Burrows D, Santilli S. The influence of survival on patients' preferences regarding cardiopulmonary resuscitation. *N Engl J Med*. 1994; 330(8):545-549
10. Kalb TH, Zilberman S. Infection in the Chronically Critically Ill: Unique Risk Profile in a newly Defined Population. *Crit Care Clin*. 2002; 18: 529-552.
11. Douglas SL, Daly BJ, Kelley CG, O'Toole E, Montenegro R. Chronically Critically Ill Patients: Health-Related Quality of Life and Resource Use After a Disease Management Intervention. *Am J Crit Care*. 2016; 16(5):447-457.
12. Douglas SL, Daly BJ, Gordon N, et al. Survival and quality of life: short-term versus long-term ventilator patients. *Crit Care Med*. 2002; 30:2655-2662
13. Douglas SL, Daly BJ, Gordon N, et al. Survival and quality of life: short-term versus long-term ventilator patients: physical and psychological outcomes. *Chest*. 2003; 123:1073-1081
14. Loss SH, Marchese CB, Boniatti MM, Wawzeniak IC, Oliveira RP, Nunes LN, et al. Prediction of chronic critical illness in a general intensive care unit. *Rev Assoc Med Bras*. 2013;59(2):241-247.
15. Zilberman MD, de Wit M, Pirone JR, Shorr AF. Growth in adult prolonged acute mechanical ventilation: implications for healthcare delivery. *Crit Care Med*. 2008; 36(5):1451-1456
16. Fried TR, Bradley EH, Towle VR, Allore H. Understanding the treatment preferences of seriously ill patients. *N Engl J Med*. 2002; 346(14):1061-1066
17. Clark M, Flahive J, Person S, Daniel C, Dutwin D. Massachusetts Survey on Advance Care Planning and End-of-Life Care: 2017. Massachusetts Coalition for Serious Illness Care. 2017
18. Murphy DJ, Burrows D, Santilli S. The influence of survival on patients' preferences regarding cardiopulmonary resuscitation. *N Engl J Med*. 1994; 330(8):545-549
19. Dargatzka A, Belli S, Fischerhoff B, Wisniewski SR, Degenhardt H, Chelluri L. How patients feel about prolonged mechanical ventilation 1 year later. *Crit Care Med*. 2002; 30(7):1439-1445
20. Clark M, Flahive J, Dutwin D, Sherr S. Massachusetts Survey on Advance Care Planning and End-of-Life Care: 2016. Massachusetts Coalition for Serious Illness Care. 2016
21. Leung JM, Udris EM, Uman J, et al. The effect of end-of-life discussions on perceived quality of care and health status among patients with COPD. *Chest*. 2012; 142:128-133.
22. Wright AA, Zhang B, Ray A, et al. Associations between end-of-life discussions, patient mental health, medical care near death, and caregiver bereavement adjustment. *JAMA*. 2008; 300:1665-1673.
23. Davison DJ, Cook DJ, Rocker GM, et al. Decision-making in the ICU: perspectives of patients with chronic kidney disease. *Clin J Am Nephrol*. 2010; 5:195-204
24. Pronovost P, Weast S, Schwartz M, et al. Medication reconciliation: a practical tool to reduce the risk of medication errors. *J Crit Care*. 2003; 18(4):201-205
25. Beers MH, Dahl J, Hasegawa J, Tamai Y. Influence of hospitalization on drug therapy in the elderly. *J Am Geriatr Soc*. 1989; 37:679-683
26. Coleman EA, Smith JD, Frank J, Min SJ, Parry C, Kramer AM. Preparing patients and caregivers to participate in care delivered across settings: The Care Transitions Intervention. *J Am Geriatr Soc*. 2004; 52:1817-1825
27. Bull MJ, Hansen TM, Gross CR. Predictors of elder and family caregiver satisfaction with discharge planning. *J Cardiovasc Nurs*. 2000; 14(3):76-87
28. Clare J, Hofmeyer A. Discharge planning and continuity of care for aged people: indicators of satisfaction and implications for practice. *Aust J Adv Nurs*. 1998; 16(1):1-13.
29. Moore C, Wisniewski J, Williams S, McGinn T. Medical errors related to discontinuity of care from an inpatient to an outpatient setting. *J Gen Intern Med*. 2003; 18:646-651.
30. Coleman EA, Mahoney E, Parry C. Assessing the quality of preparation for posthospital care from the patient's perspective: the care transitions measure. *Med Care*. 2005; 43(10):1014-1022
31. Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med*. 2003; 138(3):161-167
32. Forster AJ, Clark HD, Menard A, Dupuis N, Chernish R, Chandon N, et al. Adverse events among medical patients after discharge from hospital. *CMAJ*. 2004; 170(3):345-349
33. Davis MN, Smith ST, Tyler M. Improving transition and communication between acute care and long-term care: a system for better continuity of care. *Ann of Long-Term Care*. 2005; 13(5):25-32
34. Kripalani S, LeFevre F, Phillips CO, Williams MV, Basaviah P, Baker DW. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *JAMA*. 2007; 297(8):831-841
35. Verhaegh KJ, MacNeil-Vroomen JL, Eslami S, Geerlings SE, de Roos JJ, Buurman BM. Transitional care interventions prevent hospital readmissions for adults with chronic illnesses. *Health Aff*. 2014; 33(9):1531-1539
36. Medicare Payment Advisory Commission. Report to the Congress: Medicare Payment policy. Long Term hospital services: assessing payment adequacy and updating payments. 2006. Available at <a href="http