

Christopher Bowlin
Christopher.bowlin@sclhs.net

Innovation Challenge Semi-Finalists Submission

*Please fill out this submission form and return to Bryanna Miller (bryanna.miller@sclhs.net) by 11:59 MST on **May 25th, 2017**. Submissions received after the deadline will not be considered and will not move forward in the challenge.*

Innovation Venture Lead: Christopher Bowlin
Team Member Names: N/A
Location: Platte Valley Medical Center, Cardiopulmonary
Email: Christopher.bowlin@sclhs.net
Phone Number: 303-498-2190

Plan for what it is difficult while it is easy do what is great while it is small, by failing to prepare, you are preparing to fail. The things we fear most in organizations – fluctuations, disturbances, imbalances – are the primary sources of creativity.

Innovation Venture Title: Solution to Reducing Readmission Rates: Using Technology to Address and Unmet Need, Reducing COPD (Chronic Obstructive Pulmonary Disease) admission and improving quality of life; when hospitalized decreasing their LOS. Reducing COPD Readmission Rates by providing Non-invasive ventilation devices for home use by patients with COPD who frequently spend multiple days in the hospital due to COPD exacerbation. This will not only look at a monitoring method for monitoring the patient at home to intervene earlier to prevent the necessity for admitting the patient as well as an effort to allow patients that are admitted to be discharged earlier and improve quality of life for these patients.

Innovation Intent: Early intervention, days before the patient deteriorates to the point of coming into the Emergency Department, in addition to partnering with a DME (Durable Medical Equipment) Company for prompt NIV (Non-Invasive Ventilation) set up within the hospital to decrease LOS (Length of Stay). In the current process patients have prescriptions that they take at home, patients go to see their physician when they begin to have symptoms. If symptoms progress rapidly and/or the patient decompensated past the point that they are able to manage this at home they are admitted to the hospital. Some facilities have looked at calling the patients and having the patients self-report on their symptoms. This has not proven to be effective and newer technology has shown that patients are actually having physiologic changes prior to them having symptoms that they are able to detect. In this project the patient (if qualified) would be discharged with a NIV device that supports ventilation and sends information via wireless communication back to the Home Care Company. This information is analyzed and if changes are required by the patient's condition, contact would be made to adjust patient regimens prior to the patient continuing to decompensate and requiring hospitalization.

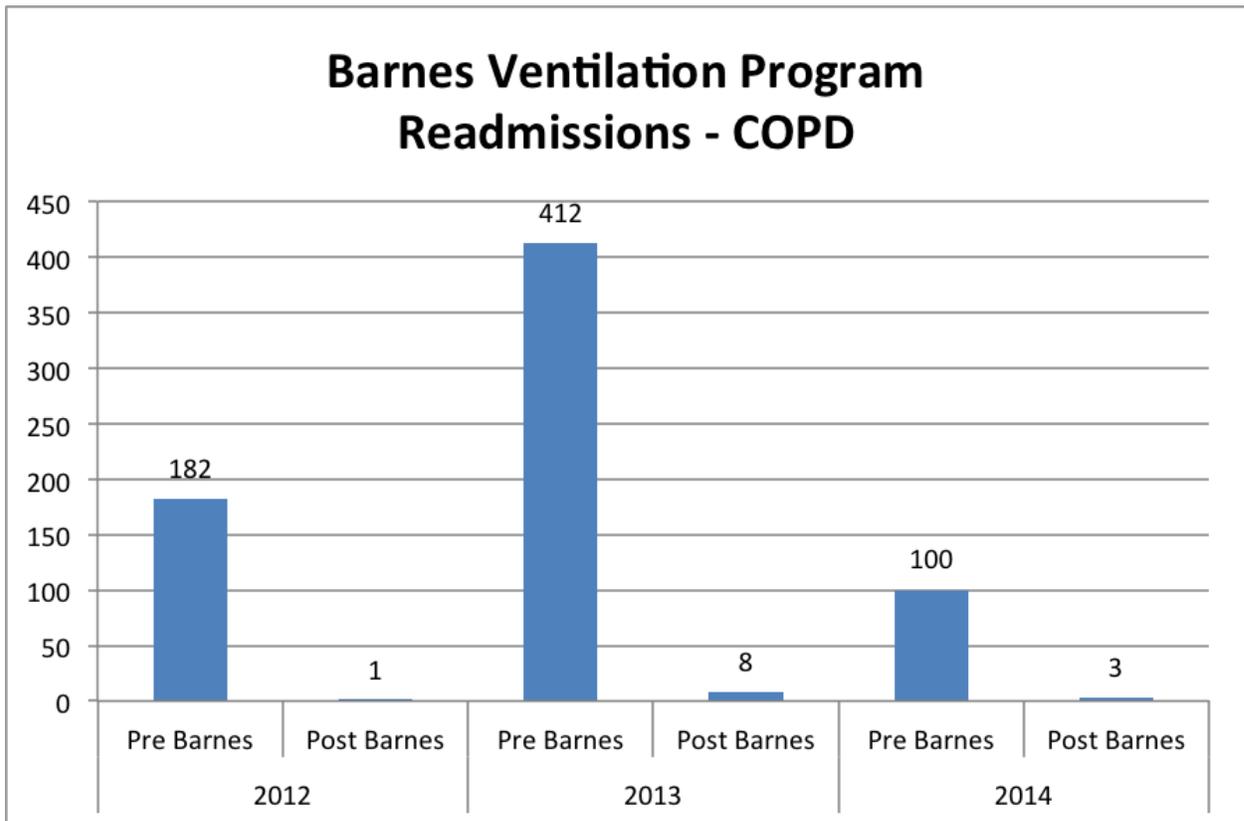
Innovation Shift: The Hospital Readmission Reduction Program (HRRP) was established by the Affordable Care Act to improve care quality and reduce hospital spending by penalizing hospitals for “excessive” readmissions rates for common medical conditions. At present, the Centers for Medicare & Medicaid Services (CMS) calculates hospital risk-adjusted readmission rates for acute myocardial infarction, congestive heart failure, and pneumonia and penalizes hospitals above the national average up to 2% of their total Medicare reimbursement. Recent data demonstrate that hospitals caring for medically complex and socially vulnerable populations are disproportionately penalized under the HRRP. Beginning in 2015, CMS will add chronic obstructive pulmonary disease (COPD) to the list of penalized conditions and will increase the maximum penalty to 3% of total reimbursement for hospitals with excessive readmissions.

How ambitious is this venture? How much will you be able to move the needle on your goal? The disease of COPD is the leading cause of admissions in the United States. I have been working on this idea for 7 years trying to answer the question, “How can I help improve COPD patient’s quality of life, reduce their time in the hospital, and reduce hospital/patient cost?” The needle is currently pointed in the right direction, all it needs is someone to add the thread and start sewing by using technology and early screening processes. Chronic obstructive pulmonary disease (COPD) is the third leading cause of death globally and presents a significant burden to patients, careers and health services worldwide. More than 1.5 million adults are known to be diagnosed with COPD in the United States, and a further 3 million adults are estimated to be living with undiagnosed COPD. Evolving Medicare Requirements are holding the hospital accountable if a patient diagnosed with COPD is readmitted within 30 days the prior hospital visit is responsible for the following visit if it incurs within 30 days. The trend in these guidelines point the needle beyond 30 days to 60 days and even a 90 day penalty. Therefore the hospital needs to take an offensive role to improving these patients quality of life by treating their symptoms prior to coming to the hospital and an earlier discharge by offering technology to help reduce their exacerbations. Often what we do in the Emergency room is no different than what the patient could do for themselves at home, avoiding a visit to the Emergency room by using NIV at home. An addition to, the key is the partnership between the hospital and DME company to provide extend care beyond the hospital setting.

Innovation Shift: What is the primary focus of the change you want to create with your venture? Choose from one of the following three options and provide a short narrative of how your venture fits that option: Business Model: configuring assets, capabilities, and other elements of the value chain to serve our customers and generate revenue differently Platform: Focus on reinventing, recombining, or finding fresh connections across capabilities and offerings to create new value for customers. Platform. It is a business platform for providing out-patient services for the COPD patient that will support them and help them stay healthier and prevent readmissions and facilitate earlier discharges.

Customer Experience: Connects, serves, and engages customers in distinctive ways, influencing their interactions with SCL health and our offerings.

Background: I only know of one system that has addressed this issue. Barnes Hospital in Georgia had a study looking at reducing readmission rates just by using NIV at home. The Barnes Healthcare Services (AL, FL, GA) Non-Invasive Ventilation Management Program is not published yet except on their website below. The Director of their Ventilation Management program presented their successes at a breakfast symposium in Dec. at the American Association for Respiratory Care International Congress. There will be a whitepaper completed on their results which will be distributed as soon as it is available. The images posted below are from their website and show readmissions the 12 months prior to patients being entered in their Ventilation Management program using Trilogy AVAPS-AE (NIV) during sleep, compared with the readmission rate for the same individuals the next year while enrolled in the Ventilation Management program. The first graph shows those with a primary diagnosis of Stage III & IV COPD. The second graph shows the same information for patients of all etiologies enrolled in the Ventilation Management program.



COPD receives less attention among employers compared to other chronic diseases, it is the third leading cause of death in the U.S. and seventy percent of the 24 million individuals with COPD are under age 65. COPD is one of the most burdensome diseases for employers but with half of the 24 million not properly diagnosed, the cost burden may be greater than the data reveals.

Benefits: Identify potential patient experience, health, or financial benefits associated with the solution. Include the benefits to the patients, care givers and providers within and outside our four walls. How can those benefits be measured? Are you already measuring those benefits?

Advancing the Platform for the patient care model. Rarely is anything ever done to address the cause of the COPD exacerbation, or to prepare patients with resources to better manage their exacerbations. This is a failed cycle of care.

In order to effectively and efficiently care for COPD patients, the patient needs must be addressed proactively in the hospital and at home.

Reducing Readmissions among COPD Patients, including extending the quality of life for the patient, with the Use of NIV (Non-Invasive Ventilation) at Home by Partnering with a DME Company to offer < 24 hour set-up times. This results in a shorter LOS (Length of Stay) with quality metrics in which can be measured at home and identified issues can be addressed before the patient comes to the ER or calls 911. The intent is to reduce/minimize COPD's (WOB) Work of Breathing at home with the use of NIV and improve quality of life by eliminating a hospital stay. Benefits with successful ventilation relies on improving gas exchange and reducing the work of breathing while keeping the patient comfortable. Maintaining patient-device synchrony and managing leak is critical to achieving this. Ventilator asynchrony can cause significant discomfort, distress and poor clinical outcomes. One study estimates that 40% of non-invasive ventilation patients experience asynchrony in 10% or more of their breaths'

A good device should help overcome this by:

- **Monitoring and compensating for leak**
- **Accurately sensing the start and end of a patient's inspiratory effort for triggering and cycling**
- **Responding quickly to reach and maintain the set pressure**
- **Offering flexibility of settings to accommodate pathological variations in the patient's respiratory timing/pattern**

Designed to identify changes to a patient's breathing, where sensitivity to leak and patient-ventilator asynchrony is important, by using devices feature the following technologies to help you provide better clinical outcomes; volume ventilation, pressure ventilation and a hybrid between the 2.

Currently:

- **No Program Developed**
- **PVMC Top 15% AE **Penalty** in Colorado (readmission rate is greater than 80% for COPD exacerbation readmissions)**
- **PVMC Top 20% AE **Penalty** in the US**

CMS has posted the FY 2015 IPPS/LTCH PPS final rule. In the FY 2015 IPPS Final Rule, CMS has made refinements to the readmissions measures. CMS is finalizing to include two additional readmissions measures, one is COPD in the calculation of a hospital's readmissions payment adjustment factor. PVMC/SCL Healthcare Services' Ventilation Program

- **Invasive, non-invasive, and pediatric ventilation**
- **Respiratory Care Practitioners (RCPs) ongoing support**

- Provide data reporting from the ventilator
- Monthly progress
- Early Screening
- In-Patient and Out-Patient Support-DME

These services include, but are not limited to, durable medical equipment, therapy, infusion therapy, and nursing care. PVMC/SCL and the DME Company have ongoing communication until the family and patient are home, and the DME Company begins services.

Technology: Describe the technology that will be needed to implement the solution. Identify if the technology already exists or needs to be created. If the technology already exists describe what will be tested that is unique to this solution. Explain how the new technology will enable providers or patients to create or enhance services. Treatments that reduce frequency of COPD-related exacerbations are associated with lower COPD-related medical cost. 40% of COPD costs could be avoided by preventing complications and hospitalizations. The technology and programs already exists therefore we need to mend what DME programs, like ACE are offering and partner with them. For example, if we had a letter of agreement (LOA) with XYZ company to set up all qualified COPD patients with NIV within 12 hours of an order. We would improve patient satisfaction by discharging early, reduce risk of Hospital Acquired Infection, and reduce cost. I have an example of a patient we had at the hospital that had a LOS > 7 days and was admitted just for the set-up of an NIV but was prolonged due to authorization of their insurance. Hypercapnic patients (characterized by increased levels of CO₂ in the blood) are primary candidates for non-invasive ventilation (NIV) as it seeks to improve the patient's CO₂ exchange and support the work of breathing when the patient's own physiology cannot do so effectively. And despite myriad clinical evidence supporting the use of NIV in the hospital for sudden deterioration of chronic hypercapnic respiratory failure due to an exacerbation of COPD, typical treatment after stabilization and discharge often only includes oxygen, medications and inhalers. The role of NIV in the home has yet to be formally adopted, even in light of recent evidence showing improvements in mortality, patient outcomes and a reduced recurrence of acute exacerbations in this patient population.

Funding/Resources:

The turnaround time will be short. The work needed will be a LOA defined with a DME company and our accounts payable to a DME Company. The investment will be the month cost of rental at an estimated \$700 per month. Therefore making the budget less than \$1000 for operations cost. People that would be involved in their care would include, Respiratory Therapy, Case Management, and the DME Company. The process below has been methodically thought out, full circle.

Conclusion: Reducing COPD Re Admission rates and LOS by partnering with a DME company to take candidates that frequently visit the hospital for SOB by enrolling them in a NIV Device. There have been a number of times a NIV device has been ordered but the patient stays for multiple days; costing the hospital THOUSANDS waiting on a NIV device. I propose a LOA with a specific DME company to take all candidates for NIV use within 12 hours to be set up on NIV. This will decrease LOA, Re-Admission rate and increase patient satisfaction because the device

is designed to decrease the patients WOB. In 2012, more than one million COPD patients experienced an acute exacerbation that resulted in hospitalization. At \$11,195 per average admission, the estimated cost to the U.S. healthcare system is more than \$49 billion dollars annually. Furthermore, approximately 22% of these patients are readmitted within 30 days of discharge. Each hospitalization places a tremendous burden on COPD patients and their families. In order to address these costs, Medicare has added COPD to the list of diagnoses targeted for reductions in readmissions with a penalty of 3%. Hospitals, insurance providers, care providers and patients are looking for better solutions for the long-term care of COPD patients. If COPD sufferers are admitted to the hospital due to an acute exacerbation, they are often placed on non-invasive ventilation (NIV.) However, once they are discharged, they continue with their standard therapy of pharmacology and/or oxygen. Oxygen therapy addresses hypoxemia caused by impaired gas exchange in the lung tissue (type1 respiratory failure); however, unlike NIV, it does not address hypercapnia caused by ventilatory failure (type 2 respiratory failure). By adding NIV to your standard care regimen, you may be able to effectively treat both types of respiratory failure in your COPD patients. Research shows that the use of NIV at home:

- Reduces mortality in patients with COPD by 76%⁴
- Reduces admissions and minimizes costs for hospitals⁵
- Reduces recurrence of acute hypercapnic respiratory failure following an initial event by 60.2% in the first 30 days following the event when compared to CPAP (38.5%)
- May lead to an improved quality of life.