

# Avoidable Hospital Admissions for Pneumonia

---

Natasha Kyte, MS4  
Southern Illinois University School of Medicine

## Introduction

- Defining the problem

According to the Centers for Medicare and Medicaid Services the cost of health care in the United States in 2010 was nearly 2.6 trillion dollars [1]. This is up from the 1.37 trillion dollars spent in 2000, within 10 years the cost of health care in the United States nearly doubled [1]. Historically, in the last 50 years the cost of hospital care has consistently contributed the most to the national health expenditure. There are many factors contributing to this high cost of health care, one of which is the avoidable hospital admissions for ambulatory care sensitive conditions. Ambulatory Care Sensitive Conditions (ACSC) are illness that if managed appropriately in an out-patient setting by a primary care provider should not lead to hospitalization or that with early intervention can prevent complications or more severe disease [4]. According to the Agency for Healthcare Research and Quality (AHRQ), ambulatory care-sensitive conditions (ACSC) contribute to increased avoidable hospital admission rates and can be used as prevention quality indicators to measure the efficiency of a health care delivery system [6]. Moreover, ACSCs reflect issues of access to high quality ambulatory care in a system of care.

- How it affects a Federally Qualified Health Center

At AltaMed, one of the largest independent Federally Qualified Health Centers in the country, within the Medical Management department priority is given to improving

the management of Ambulatory-Care Sensitive Conditions (ACSC). In 2011, \$33 million dollars was spent at AltaMed on the utilization of ACSC.

AltaMed was started in 1966 as a nonprofit health clinic to meet the health care needs of a primarily under-served Hispanic population of East Los Angeles and has grown to about 44 clinical sites serving both Los Angeles and Orange County. Over the past few years AltaMed has experienced tremendous growth and is continuing to grow; it is projected to expand over 50-75% within the next 2 years. AltaMed is one of the first FQHCs to be designated as a Patient-Centered Medical Home. It is a government payer in which 65-75% of its patients have Medicaid. As a government payor, AltaMed receives funds from the government to take care of patient with Medicaid and or Medicare. Because of the amount of Medicare and Medicaid patient seen by AltaMed the funds they receive is at a special rate higher than other providers for seeing these patients. As a part of AltaMed's growth it is transitioning towards becoming more of a managed care plan, to better enabling them to deliver care to their patients regardless of changes in the patient's income level. AltaMed is divided into: Los Angeles medical group, Orange County medical group, Children's Hospital Los Angeles and PACE, its Program for All-inclusive Care for the Elderly.

## **Intervention**

Each year pneumonia affects over 6 million Americans [3]. The total annual health care cost to treat these patients is \$8.4 billion [3]. At AltaMed in 2011 there were 226 hospital admissions due to pneumonia, the total annual cost to treat pneumonia for

AltaMed patients in 2011 was a little over \$2 million, this is excluding the cost of treating its patients from Children's Hospital of LA. The question this raises is: How many of these hospital admissions are avoidable? Avoidable meaning the number of hospital admissions for pneumonia that could have been treated in an outpatient setting instead of as an in-patient. For patients with Community Acquired Pneumonia the cost of inpatient care is 25 times that of outpatient care [3]. To determine if the hospital admissions for pneumonia are avoidable one must assess patients for pneumonia severity. Pneumonia severity assessment determines if in-patient versus outpatient management of community-acquired pneumonia is warranted; these risk stratification tools are based on a predictive 30-day mortality outcome if the patient is not treated in an in-patient setting.

The risk stratification tools commonly used include the Pneumonia Severity Index (PSI) and CURB65 score: Confusion, Urea, Respiratory rate, Blood pressure, 65 years & older [2]. These tools do not take into account clinical judgment. The PSI is a clinical prediction rule for the prognosis developed by the AHRQ funded research study in 1997 to help physicians determine the initial site of treatment for patients with pneumonia. It is based on 20 clinical variables that make it complex to calculate. The PSI is used to stratify a patient into one of the 5 different classes that range from low to high risk. The PSI has been widely proven to improve patient care and is a useful research tool but it has been shown to underestimate severity in young people and does not predict need for ICU admission or other complications [2].

The British Thoracic Society derived CURB, which was later modified in 2003 into the CURB65 score, is the other risk stratification tool commonly used in a clinical setting. Like PSI, CURB65 score has been widely validated, underestimates severity in young people and does not predict need for ICU admission or other complications; but unlike PSI it is simple to calculate, it only uses 5 clinical variables [2]. The CURB65 score is used to stratify the patient into one of the 5 different classes that range from low to high risk.

- Description of the project

I devised my quality improvement project after observing that much of the high cost of health care can be attributed to avoidable hospitalizations, with pneumonia contributing one of the most of all ACSC to the high cost of health care within and outside of AltaMed. Thus, for my project I set out to determine how much of pneumonia hospitalizations were avoidable by using and comparing different pneumonia severity assessment tools. I focused on adults diagnosed with pneumonia upon admission to White-Memorial Hospital, one of AltaMed's partnering hospitals that receive the bulk of AltaMed patients. White Memorial Medical Center (WMMC) is 353-bed not-for-profit, faith-based, teaching hospital that serves downtown Los Angeles and nearby communities. From January 2012 through May 2012, there were 96 hospital admissions due to pneumonia about 54 of these hospital admissions were adults and 20 were admitted to WMMC. This made my sample size 20 adults: 5 of which were from the PACE program and 15 were from the LA County medical group.

For this project I calculated both the PSI and CURB65 score for each patient; in addition I determined whether each patient met the Milliman criteria. The Milliman criteria is a evidence-based guideline that has quality measures built in it, is widely accepted in the industry and used by case managers to determine if a patient meets criteria for hospital admission. It takes into account clinical judgment and is made up of both the PSI and CURB65 score. Even though it is not used in clinical practice I used the Milliman criteria as the gold standard and determined it for each of these patients. Unlike PSI and CURB65 score, the Milliman criteria takes into clinical judgment using the following variables: Hypoxia: O<sub>2</sub>sats <90% or pO<sub>2</sub><60 or worsening chronic lung disease, Outpatient management failure, Complications of pneumonia (i.e. Empyema), Appropriate diagnostic testing and treatment unavailable, Hemodynamic instability, PSI class IV/V or CURB-65 score >3, and Immunocompromised [5]. My results showed that according to PSI 60% of the patients, CURB65 score 65% of the patients and Milliman criteria 30% patients were low risk meaning that they could have been treated in an outpatient setting. In conclusion, even using a more conservative measure 30% of the hospital admissions were potentially avoidable hospital admissions for pneumonia because 6 out of 20 of the hospital admissions did not meet the Milliman criteria.

By using the Milliman criteria as the gold standard by which to compare PSI and CURB65 score against I was able to determine that both PSI and CURB65 score were good screening tools. The sensitivity for PSI was 100% and CURB65 score was 86%.

- Relevance

There were some limitations to this quality improvement project. Since this project was retrospectively designed this provided a disadvantage of data availability, as a result missing values were assumed to be normal. The narrow and small sample size of only hospitalized patients in a single center does not account for the variability in the rate of hospitalization for pneumonia between hospitals and among physician-level. The short time period of 5 months of patients admitted during non-peak season provides a disadvantage of limiting the sample size as well. Even taking into account these limitations the results from this project highlights the need for quality improvement in effectively managing the delivery of health care. In order to use this data widely for interpretation of avoidable hospital admissions for pneumonia within the AltaMed patient population this project should be expanded to include other clinical sites and for a wider time period; then more statistical analysis is needed such as validation of the Pneumonia Severity Assessment scores along with Receiver Operator Characteristic curves to assess discriminatory ability and Calibration curves of each tool before the results can be used.

## **Conclusion**

- Impression of experience related to intervention

This research project was a culmination of my entire experience learning and working at AltaMed during the GE-NMF Primary Care Leadership Program. In the

Utilization Department I was able to see some of the factors that contribute to the high cost of health care and how finding better ways to effectively manage the delivery of health care is essential towards lowering the cost of health care and improving the quality of health care.

During my orientation at AltaMed one of the medical directors commented that “Without a margin there is no mission.” At AltaMed their mission is to provide “Quality without exception.” The margin is how much the company saves to deliver health care to its patients. Although AltaMed is a non-profit organization, the incentive to save money is great because it allows for reinvesting money back into the company and growing the company so that it can expand to reach more patients. Thus, lower the health care cost and improving the quality of health care are not mutually exclusive.

When trying to determine where to save the most money it made sense to look at where is the highest cost. In the Utilization Department I learned how most of the cost of delivering health care is attributed to avoidable hospitalizations and how many of these ACSCs are commonly seen by primary care physicians. This led me to wonder where can healthcare professionals most effectively intervene to reduce avoidable hospitalization and control the high cost of delivering health care. Through this project I was able to develop a better understanding of how prevention, PCMH and risk stratification tools can reduce avoidable hospital admission for ACSCs such as pneumonia.

- Feedback

The medical directors and staff responded very well to my presentation and with great enthusiasm about my project. Many of them were very intrigued by the results from my project. Most of them were surprised by how many of the hospitalizations for pneumonia that did not meet the criteria for admission. A lot of discussion was generated on how this information could be further used and built upon to better understand and prevent avoidable hospital admissions in AltaMed. One of the medical directors commented, "I wish all of the medical directors would have been here, they really needed to hear this." Another medical director commented, "This information is very useful."

- Final recommendations

This project highlights the importance of how fully implementing core principles of the PCMH can help decrease avoidable hospital admissions and thereby reducing the cost of health care. By increasing access to care less patients will be inclined to utilize the Emergency Room as their main means of seeking health care treatment and it would provide for better management of chronic care illnesses. In addition it would improve the continuity and coordination of care to further prevent avoidable hospital admissions, reduce length of stay during hospital admissions and decrease morbidity. For example, offering vaccinations and rapid delivery of antibiotics upon initial diagnosis of pneumonia have been shown to decrease the length of hospitalization and morbidity. These are all indicators of the quality of health care delivered. In respect to improving coordination of care this project sheds light on the importance of understanding the different criteria used for admitting patients to the hospital.

## Thanks & Acknowledgements

I would like to express my sincere appreciation to the General Electric-National Medical Fellowships Primary Care Leadership Program for this opportunity and for their support in making this project possible.

I would like to thank the people that I worked with in the Utilization Department at AltaMed Headquarters in Commerce, California for teaching me about utilization management and their help in developing this project, especially Dr. Desmond Lew and Dr. Esquio Casillas. I would like to thank the following people Ulysses Garcia, Esparanza Andrade for their direct assistance with helping me to plan, access and present the information for this project. I would also like to thank the library staff at SIU School of Medicine in Springfield for helping me access the necessary research articles for providing background information for this project. I would also like to thank my mentor at the UCLA School of Medicine, Dr. Michael Rodriguez, for providing critical mentorship, guidance and encouragement throughout the project.

## Bibliography & Works Cited:

1. Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Care Expenditures Data, January 2012.
2. Chalmers JD, Mandal P, Singanayagam A, Akram AR, Choudhury G, Short PM, Hill AT.  
*Severity assessment tools to guide ICU admission in community-acquired pneumonia: systematic review and meta-analysis.* Intensive Care Med. 2011 Sep; 37(9): 1409-20. Epub 2011 Jun 10.
3. Dean NC, Jones JP, Aronsky D, Brown S, Vines CG, Jones BE, Allen T.  
*Hospital admission decision for patients with community-acquired pneumonia: variability among physicians in an emergency department.* Ann Emerg Med. 2012 Jan; 59(1): 35-41. Epub 2011 Sep 9.
4. Lui, CK; Wallace, SP.  
*A Common Denominator: Calculating Hospitalization Rates for Ambulatory Care-Sensitive Conditions in California.* Preventing Chronic Disease Public Health Research, Practice, and Policy. 2011 Sept; 8(5) 1-14.
5. Milliman Care Guidelines Inpatient and Surgical Care 16<sup>th</sup> edition. Pneumonia, Community Acquired.
6. <http://www.ahrq.gov/qual/nhq11/chap7.htm> National Healthcare Quality Report, 2011