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# Community Acquired Pneumonia Project

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Community Acquired Pneumonia Project

Submitted in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

at Eastern Kentucky University

By

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### Abstract

There is an increasing number of microorganisms that are becoming resistant to antimicrobial medications. This growing number of resistant organism poses a serious health threat, not only in this nation, but throughout the world. The Center for Disease Control and Prevention (CDC) estimates that there are greater than 2 million people who acquire serious infections that are resistant to one or more antimicrobial agents that were made to treat those organisms (CDC, 2013). Streptococcus pneumonia (*S. pneumoniae or pneumococcus*) is one such organism that has been identified by the CDC (2013) as becoming increasingly resistant to drugs that were once effective in treating this form of pneumonia. Inappropriate use of antimicrobial agents has been identified as a contributing factor in the growing number of resistant organisms.

Antimicrobial Stewardship has been identified by the CDC as a way to decrease the overuse and misuse of antimicrobial therapy. The purpose of the project was to implement a standardized medical criteria and provider query process for the de-escalation of antimicrobial drugs used for hospitalized patients with community acquired pneumonia (CAP).

### Acknowledgements

I am dedicating this to my Mom. As an educator she instilled in me the value of education and the love of learning. She encouraged me and believed in me throughout this journey. Mom reminded me frequently that “Education is something no one can ever take away from you.” Mom, you are my inspiration and my hero... This doctorate is as much yours as it is mine... this one is for us....

To my boys, James and Aaron I love you with all my heart, you are my everything...

To my family and friends, I am so grateful to each of you. You picked me up and dusted me off too many times to count. Your faith in me made me believe in myself and my ability to fulfil my dream. You all are amazing and a tremendous gift in my life...

To the One who shines Light through my life.... I honor You above all...

I would also like to express my gratitude to my Capstone Advisors Dr. Mary Clements and Dr. Mary DeLetter. This has been an amazing journey one filled with challenges and growth. I appreciate each of you for your guidance and support.

Community Acquired Pneumonia Project

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## **Background and significance of proposed project**

### **Problem identification**

The development of super bugs or resistant organisms is a growing concern among the healthcare community worldwide. The health and safety of all individuals is at risk unless the growth of the number of resistant organisms can be halted and new medications developed to combat today's resistant organisms. The inappropriate use of antimicrobial agents is one factor contributing to the growth in resistant organisms. .

In the acute care setting, many providers prescribe antimicrobial agents to prevent infection or prescribe multiple antimicrobial agents without having the sensitivity culture results. Current Community Acquired Pneumonia (CAP) guidelines, released by Infectious Disease Society of America (IDSA) and the American Thoracic Society (ATS), state that once the pathogen has been identified, the antimicrobial therapy should be directed towards that specific pathogen (Mandell et.al, 2007). The guidelines also state that patients should be switched from intravenous to oral therapy when they are improving clinically. Deviations from standard recommended practices in patients with infectious diseases adds to the growing number of resistant organisms and exposes the patients to the serious health risks for example increasing the incidence of *Clostridium difficile* (*C. difficile*) infection (Masterton, 2011). It is apparent that widespread injudicious use of antimicrobial drugs, threatens the health of all individuals because of the growth of multi drug resistant organisms (Moody et al., 2012). Thus, inappropriate use of antimicrobial agents is defined as prescribing practices that fall outside the guidelines recommended by IDSA and ATS.



**Context of the problem**

Streptococcus pneumonia (*S. pneumoniae* or *pneumococcus*) is the leading cause of pneumonia and bacterial meningitis in the United States according to the Center for Disease Control and Prevention CDC (2013). Over 600,000 adults are treated for pneumococcal pneumonia in either the outpatient setting or in the acute care setting. Antimicrobial resistance, defined as an organism being resistant to one or more of the clinically appropriate antimicrobial agents, account for 30% of the severe cases *S. pneumoniae* (CDC, 2013). The CDC (2013) estimates that there are 1,200,000 drug-resistant infections per year. *S. pneumoniae* has been identified by the Center for Disease Control and Prevention (CDC) as an infection for which the treatment requires public health monitoring and prevention activities to prevent the increase in antimicrobial resistance (CDC, 2013).

**Scope of problem**

The health threat from the continued growth of resistant organisms has been identified by multiple health organizations, such as the Alliance for the Prudent Use of Antibiotics, American Society of Health System Pharmacists, the Association for Professionals in Infection Control and Epidemiology, Inc. and the Centers for Disease Control and Prevention. Twenty-five National Health Organizations issued a statement on November 12, 2012 called the “Joint Statement on Antibiotic Resistance from 25 National Healthcare Organizations and the Center for Disease Control and Prevention” (APIC, 2012). The Joint Statement cites that ongoing use of antibiotics will add to the development of antibiotic resistant microbes due to the development of mutations by some of organisms which may result in resistance to antimicrobials. This antimicrobial resistance, has the potential to result in simple infections becoming deadly (APIC, 2012). The CDC (2013) estimates that there are at least 2 million people who acquire serious infections that

are resistant to one or more of the antimicrobial agents designated to treat those organisms. Furthermore, there are 26,000 deaths directly related to these infections and 14,000 people in the United States will die from complications associated with the resistant organisms. In order to keep the current arsenal of effective antimicrobial medications that are available to treat the difficult drug resistant organisms, there must be a balance between prescribing aggressive empirically-based antimicrobial therapy and prescribing less aggressive therapy (Paterson, 2006).

### **Consequences of the problem**

The problem of inappropriate use of antimicrobial agents has become a focus for the CDC. According to the CDC (2013), up to half of these drugs are used unnecessarily and inappropriately. The state of Kentucky ranks among the highest of the states for the number of antimicrobial drugs prescribed (CDC, 2013). The single most important action to slow down the spread of antimicrobial resistant infections is to change the usage patterns of those drugs. The CDC (2013) estimates that nationally, there are at least 2 million illnesses and 23,000 deaths attributed each year to resistant organisms. *S. pneumonia*-resistant infections alone account for 1,200,000 of the resistant infections each year, 19,000 hospitalizations and 7,000 deaths. The cost to human lives is astounding; the estimated excess medical cost each year from drug resistant *S. pneumonia* is \$96 million (CDC, 2013). Changing the prescribing patterns of antimicrobial drugs through de-escalation was found to decrease the length of stay for hospitalized patients (Bosso and Drew, 2011). The research conducted by Bosso and Drew (2011) demonstrated that patients who were converted from intravenous antimicrobial drugs to oral had a 3-day shorter mean length of stay in the hospital.

**Evidence-based intervention**

The CAP Project evidence-based intervention was to implementation of the CAP Review Tool to identify patients who are appropriate for de-escalation of antimicrobial therapy. De-escalation of antimicrobial therapy for this project is defined as changing the route of antimicrobial therapy from intravenous to oral therapy or decreasing the number of intravenous antimicrobial agents.

**Purpose of the project**

The purpose of this project was to implement a standardized criteria and provider query process for the de-escalation of antimicrobial microbial therapy in hospitalized patients with CAP. The objectives of the project were to:

- Decrease the LOS for patients involved in CAP Project.
- Decrease the inappropriate use of antimicrobial therapy for CAP patients.

**Theoretical Framework**

Watson (2006) emphasized that cost-benefit and cost-effectiveness models must include human caring-healing. She stated that nurse leaders have responsibilities to “renew attention to practice that is ethics/values-based and theory guided, alongside evidence and economics” (Watson, 2006, p. 87). Institutions must shift the focus from being dominated by economics, medical science and administrative theory to one that focuses on what is means to be human, vulnerable due to sickness and move to a focus on health and healing. Without this shift in focus, healthcare institutions will move away from what it is to be human. Decisions within the institutions can become centered on economics, which moves the institution away from the value of the human experience for both those who come to their institution for healing and those who

practice within those institutions. Watson's Theory of Human Caring underpins nursing practice and provides the point of reference to guide nursing at all levels. Intentionality and caring becomes the framework for nursing practice, transforming the work place and awakening scientific and ethical practices (Watson, 2002). Watson calls on nursing leadership to keep the patient centric in all decisions and all improvement.

The development of this capstone project, the CAP Project, is grounded in Watson's Theory of Human Caring. It is a collaborative approach between the Antimicrobial Management Team (AMT) and the Care Coordination Department, to care for patients admitted to an acute care hospital with the diagnosis of CAP.

### **Literature Review**

Several investigators have demonstrated the benefits of decreasing the inappropriate use of antimicrobial therapy. This literature review was limited to research from the United States and acute care inpatients. Limiting the selection of articles to the United States was to ensure the national standards of care for patients diagnosed with CAP would be the same standards of care as the patients included in the CAP Project.

Bosso and Drew (2011) conducted a meta-analysis using studies published between 2000 and 2009, to determine the efficacy and safety of switching from intravenous (IV) to oral antimicrobial treatment in patients with moderate to severe CAP. After reviewing six randomized controlled trials, the investigators concluded that converting patients from IV to oral antibiotics had the same effectiveness in measures of treatment success, mortality and CAP recurrence. The investigators also found that those patients who were switched to oral antibiotics had a 3-day shorter mean length of stay in the hospital [mean difference -3.34; 95% CI, -4.42, -2.25]. There was also overall reduction in drug-related adverse events [odds ratio (OR) 0.65;

95% CI, 0.48, 0.89]. Bosso and Drew (2011) found through this meta-analysis, which studied several evidenced based interventions including switching from IV to oral antibiotics, the use of clinical pathways/ guidelines and multifaceted strategies, there were profound positive impacts on patient outcomes. These outcomes included a reduction in 30 day mortality and in-hospital mortality as well as reductions in length of stay and reductions in healthcare costs.

Advic et al. (2012) conducted a prospective observational study. This study was designed to compare the management of patients in a large university-based medical center admitted with CAP in 2008 to those admitted in 2010. A three-component interventional plan for the medical staff was developed around the findings of a 2008 prospective observational study that was conducted at John Hopkins University Hospital. The three-component interventional plan included a knowledge assessment, education and changes to the antimicrobial therapy which included prospective review of therapy by AMT and other pharmacists along with oral feedback and suggestions for change to the provider. The results of this study demonstrated a decrease in median duration of antibiotic therapy days from 10 days to 7 days ( $p < .0001$ ). Avdic and colleagues observed a decreased use of antimicrobial therapy or modification of the antimicrobial medications based on organism susceptibility (67% vs. 19%).

Yu et al. (2014) evaluated the impact of an ASP in a retrospective pre- and post-implementation study. The study was conducted at a multi-facility health care system to evaluate the cost and quality outcomes at the two sites where the ASP was implemented compared to three facilities within the same system not included in the ASP initiative. The authors collected data on the defined daily doses (DDD) on 15 targeted antimicrobial agents that accounted for 70% of all antimicrobials prescribed for hospitalized inpatients. The investigators utilized normalized total cost of the targeted antimicrobial agents per 1000 patient days and the DDD per 1000 patient

days for comparisons between the hospitals to determine the impact of the ASP. A two tailed *t*-test was used for comparison with a *p* value of  $p < 0.05$  for significance. The investigators demonstrated that the aggregated mean cost of the targeted antimicrobials in the study hospitals with the ASP decreased by 17.3% (\$49,131) from the year prior to the initiation of ASP. Overall, the direct acquisition costs savings per hospital with the ASP during the time of the study was \$127,487. In the hospitals without an ASP the direct acquisition costs increased \$100,866 ( $p = 0.02$ ).

Investigators at Saint Joseph Mercy Hospital (SJM), a 535-bed non-university-affiliated community teaching hospital, conducted a retrospective descriptive study to determine the impact of their ASP. Malani et al. (2013) reviewed the medical records of patients who received eight antimicrobial agents that were identified by the ASP and accounted for approximately one third of the hospital's 2008 antimicrobial budget. The investigators reviewed records from the 12 months preceding the initiation ASP. The authors found no significant decrease in likelihood of death 30 days after discharge (OR 0.77; 95% CI, 0.50-1.18,  $p = .11$ ) or in readmissions (OR, 0.95; 95% CI 0.63-1.42,  $p = .87$ ) following initiation of the ASP. The investigators did, however, identify an association with the initiation of the ASP and the likelihood of patients developing CDI, resulting in a decrease in the development of CDI of approximately 50% in period two (OR, 0.42; 95% CI, 0.25-0.82,  $p < .01$ ). The DDD of the targeted antimicrobial agents decreased from 215.7 to 160.8 DDD/1000 patient days (25.4%). In the year following the initiation of the ASP, the savings in the total costs of antimicrobial agents was \$228,911 as the cost decreased from \$1,503,748 to \$1,274,837.

The staff and pharmacy Sanford Medical Center Fargo had tried numerous interventions to decrease the use of antimicrobial agents. The interventions the Sanford Medical Center staff

and pharmacy utilized included education to physicians and the creation care pathway; however, there was no ASP in place (Nowak et al., 2012). Nowak et al. (2012) conducted a quasi-experimental study to compare outcomes data before the implementation of the ASP (January 2003- December 2006) and after the implementation (April 2007-December 2010). Throughout the implementation of the ASP, patient outcome comparisons were made between those patients in whom the ASP recommendations were accepted and those patients in whom the suggestions were rejected. Similar to Malani and colleagues (2013), Nowak (2012) and coworkers did not find significant decreases in the patient length of stay or readmissions following the ASP implementation. In addition, Nowak et al. did not find a significant decrease in mortality. They found that VRE ( $p= 0.018$ ) and *C. difficile* ( $p=0.0004$ ) rates were significantly lower following ASP implementation. Nowak (2012) and colleagues findings suggested a significant reductions in DDD in the pre- and post-implementation of the ASP ( $p = 0.0057$ ). The antimicrobial dollars per patient day decreased 9.7% within the first year of the implementation of the ASP. The year-to-year change in the Antimicrobial Dollars per Patient Day (ADPD) slope pre- and post-implementation differed significantly ( $p = 0.0086$ ). There was a slight increase in the ADPD in 2010 which was attributed to a change in the increased use of linezolid that was experienced. The cost savings that were attributed to the ASP activities ranged from \$24,377 to \$179,088.

The five studies included in this literature review were published in the United States from 2011 to 2014. These studies demonstrated the impact of ASP on antibiotic stewardship on patient outcomes, length of stay and cost of care. Judicious usage of antimicrobial therapy through the interventions of ASP can effectively manage infectious processes in patients while decreasing over use and misuse. A decrease of 3 day mean length of stay was demonstrated when patients were converted from intravenous antibiotics to oral antibiotics [mean difference -

3.34; 95% CI, -4.42, -2.25] and an overall reduction in drug-related adverse events [odds ratio (OR) 0.65; 95% CI, 0.45, 0.89] (Bosso and Drew, 2011). The study conducted by Nowak et al. (2012) findings suggested that antibiotic stewardship activities decrease the cost of care ranging from \$24,377 to \$179,088 and significant reductions in the DDD pre and post implementation of the ASP ( $p = 0.0086$ ).

### **Agency Description**

#### **Setting**

Saint Joseph Hospital is part of KentuckyOne Health, under the parent company Catholic Health Initiatives (CHI). Located in Lexington Kentucky, Saint Joseph Hospital has 488 licensed beds for general medical surgical, telemetry and three intensive care units providing a wide range of medical and surgical services (KentuckyOne Health, 2014). The CAP Project was conducted at Saint Joseph Hospital on the medical units 4A and 2E. Unit 4A is a 38-bed medical unit with emphasis on caring for patients with pneumonia, chronic obstructive pulmonary disease, heart failure and renal failure (Saint Joseph Hospital, 2013). Unit 2E is a 26-bed medical and surgical unit that cares for patients that requiring an intermediate level of nursing care and continuous EKG monitoring. Unit 2E admission criteria included those patients with pneumonia and chronic obstructive pulmonary disease (Saint Joseph Hospital, 2012).

#### **Target population**

The target population for the CAP Project was adult patients 18 years or older that were admitted as inpatients with the diagnosis of CAP. The MS-DRGs that were used to identify the patients were: DRG 193- simple pneumonia and pleurisy with major complication/ comorbidities (MCC), DRG 194- simple pneumonia and pleurisy with complication/ comorbidities (CC) and DRG 195- simple pneumonia without CC/ MCC (CMS, 2014). Donovan (2013) defined CAP as



pneumonia acquired outside the hospital or long-term care facility or occurring within 48 hours of admission to the hospital and does not meet any of the characteristics of hospital acquired pneumonia.

Table 1

*CAP Project Inclusion Criteria*

| Inclusion Criteria           | Description   |
|------------------------------|---|
| Working DRG                  | <ul style="list-style-type: none"> <li>• DRG 193- simple pneumonia pleurisy with major complications and comorbidities</li> <li>• DRG 194- simple pneumonia and pleurisy with complications and comorbidities</li> <li>• DRG 195- simple pneumonia without complications and comorbidities</li> </ul> |
| Community Acquired Pneumonia | <ul style="list-style-type: none"> <li>• Pneumonia acquired outside the hospital or long term care facility</li> </ul> <p style="text-align: center;">or</p> <ul style="list-style-type: none"> <li>• acquired within 48 hours of hospitalization (Donovan, 2013)</li> </ul>                          |
| Patient Status               | <ul style="list-style-type: none"> <li>• Inpatient Status</li> </ul>  |
| Patient Location             | <ul style="list-style-type: none"> <li>• 2 East</li> <li>• 4A</li> </ul>  |
| Age                          | <ul style="list-style-type: none"> <li>• <math>\geq 18</math> years</li> </ul>  |
| Review Timeframe             | <ul style="list-style-type: none"> <li>• <math>\geq 48</math> hours following admission</li> <li>• To be completed Monday through Friday</li> </ul>   |

**Congruence of Capstone**

The mission of CHI is to “nurture the healing ministry of the Church by bringing new life, energy and viability in the 21<sup>st</sup> century” (Catholic Health Initiatives, 2013). Part of fulfilling the mission of CHI includes the development of creative responses to emerging healthcare challenges and the stewardship of resources through general oversight of the whole organization (Catholic Health Initiatives, 2013). The CAP Project is congruent with the CHI mission by utilizing a creative interprofessional approach to improve the health of CHI patients and reduce the health threat posed by the growing number of resistant organisms. Saint Joseph Hospital has an Antimicrobial Management Team (AMT) whose primary goals are to ensure that all aspects

of infection prevention and control are addressed and that the appropriate use of antimicrobial therapy is maintained. The AMT core members include a doctorally-prepared BCPS (Clinical Pharmacy Specialist-ID) pharmacist, the hospital epidemiologist, and the Director of Infection Prevention and Control.

### **Description of Stakeholders**

The AMT at Saint Joseph Hospital began functioning in 2009. The overarching goal of the AMT is to ensure proper usage of antimicrobial agents in order to reduce or prevent antimicrobial resistance, decrease the expenditures on antimicrobials, prevent the spread of multidrug resistant organisms and infectious diseases, and reduce the cost of care in patients with infectious diseases. All patients who come to the hospital with acute infectious disease processes or who have underlying infectious disease processes are served by the AMT. The AMT serves as part of the Infection Prevention and Control Department. The Infection Prevention and Control Department reporting structure falls directly under the Vice President of Medical Affairs and Quality. This reporting structure complements antimicrobial stewardship, since it is a national patient safety initiative and a quality measure (TJC, 2013). A critical aspect of the AMT is formulating provider partnerships. Through interprofessional collaboration, the AMT cares for patients with infectious processes, develops infectious disease protocols, and ensures the appropriate use of antibiotics through monitoring antimicrobial prescribing practices. These efforts enable the facilitation practice changes to decrease the inappropriate use of antimicrobial agents. Improved clinical outcomes result from decreased exposure to the effects of antimicrobial therapy including a reduction in the incidences of *C-difficile*, decreased the cost of care and shorter hospital stay.

## CAP Project Design

### Plan-Do-Study-Act (PDSA) Cycle

The process improvement framework that was used in the CAP Project was the PDSA Cycle (Table 2). The PDSA is a small change, cyclic learning approach that uses a four-step prescribed learning process (Taylor et al., 2014). According to the Institute for Healthcare Improvement (2014), the PDSA Cycle has been successfully used in healthcare facilities throughout various countries to improve outcomes through changing health care processes. PDSA cycle focuses on the development, testing and implementation of quality improvement (Gillam & Siriwardene, 2013).

Table 2

*PDSA*

| Step     | Action   |
|----------|--|
| P- Plan  | <ul style="list-style-type: none"> <li>• Meet with key personal</li> </ul>   |
| D- Do    | <ul style="list-style-type: none"> <li>• Care Coordinators and Social Workers begin utilizing the CAP Review Form</li> <li>• Identified one RN in Care Coordinator Department to complete CAP Review Form</li> <li>• Weekly meetings with Director of Infection Control and Prevention and Project Lead</li> </ul> |
| S- Study | <ul style="list-style-type: none"> <li>• Project Lead conducted three interrater reliability assessments</li> <li>• Review outcome measurements (length of stay)</li> </ul>  |
| A- Act   | <ul style="list-style-type: none"> <li>• Project Lead, interim manager of Care Coordination and Director of Infection Control and Prevention discussed the project outcomes</li> </ul>   |

## Project Methods

### Description of the Evidence-Based Intervention

The Infectious Diseases Society of America and the American Thoracic Society consensus guidelines state that patients should be switched from intravenous to oral

antimicrobial agents when they are clinically stable (Mandell et al., 2007). The AMT outlined specific medical criteria indicating the patient was appropriate for querying the provider for de-escalation as: not requiring mechanical ventilation, treated hypoxemia (as evidence of a O<sub>2</sub> saturation  $\geq 90\%$ ), temperature  $\leq 101^{\circ}\text{F}$  for 48 hours, WBC  $\leq 15\text{K}$ , negative blood cultures, no pleural effusion and not receiving steroids or cytotoxic chemotherapy. The length of stay for pneumonia patients included in the project was be compared to the length of stay for the patients with the same DRGs in the same months the prior year and analyzed.

The Care Coordinators utilized the CAP Review Form (Appendix A) to perform a standardized review and provider query on patients who were admitted with CAP and met the project's inclusion criteria. The CAP Review Form contains the standardized clinical criteria that were developed by the AMT.

The 4A and 2 East Care Coordinators began the CAP Project process by identifying patients admitted with CAP, pneumonia and/ or assigned the working DRGs of 193, 194, or 195. Patients admitted to the project units Saturday through Wednesday were eligible for inclusion in the project. The Care Coordinators used the CAP Review Form to identify the patients who met the medical criteria for de-escalation of antimicrobial therapy. For those patients who met medical criteria for de-escalation, the Care Coordinators were to query the provider for de-escalation of antimicrobial therapy. All of the medical criteria for de-escalation of antimicrobial therapy had to be met in order for the provider to be queried.

## **Procedure**

Institutional Review Board approval was obtained through Eastern Kentucky University (EKU). KentuckyOneHealth deferred to ECU's IRB for this project. Following ECU IRB approval, education of the Care Coordination management and staff involved in the project was

conducted. The education consisted of an overview of the project's objectives, CAP Review Form, patient inclusion criteria, criteria for provider query, timeframe for completion of the form and means of distribution of the completed form to the project lead. The pilot was to be conducted for a four-week time from November to December.

The data gathered for this project included patients' sex, age, number of patients who did not meet medical criteria for de-escalation of antimicrobials, number of patients who met criteria for de-escalation of antimicrobials, whether the provider de-escalated the antimicrobials after notification of patient meeting criteria, and the patients' length of stay. The inclusion criteria consisted of inpatients admitted to the 2 East and 4A Saturday through Wednesday,  $\geq 18$  age, admitting diagnosis of pneumonia (PNA), CAP and/ or the working DRGs 193, 194 or 195, and were hospitalized two days ( $\geq 48$  hours) prior to the time of the Care Coordinator completion of the CAP Review Form. The medical criteria for de-escalation of antimicrobial therapy were listed on this form (Appendix A). If all of the medical criteria were met, the Care Coordinator contacted the patient's providers (physician or unit pharmacist) and queried them for de-escalation of antimicrobial therapy. If the medical criteria were not met or only partially met, then no further action was taken.

Interrater reliability was conducted on three of the CAP Review Forms by the project leader. The project lead independently completed the CAP Review Form on three patients who had been reviewed by the Care Coordinator. There was 100% agreement between the two raters on all seven CAP Review Form Criteria. All completed CAP Review Forms, those of patients who met the criteria for de-escalation and those who did not meet the criteria, were placed in the designated folder in the office of the assigned Care Coordinator. Each week the project leader

met with the Care Coordinator nurse to collect the CAP Review Forms. Data from the CAP Review Forms was retrieved and aggregated by the project lead.

### **Results**

The CAP Project was conducted for four weeks. Due to the low volume of patients meeting the project's inclusion criteria, the project was extended for an additional eight weeks. At the conclusion of the project, a total of 19 patients met the inclusion criteria and had CAP Review Forms completed. The number of patients was lower than the projected 30 patients for the project's timeframe. The number of the project patients was also lower than the project's comparison group of 74, admitted with the DRG's 193, 194, and 195, during the same time frame from the previous year. A meeting with the Director of Infection Prevention and Control was initiated to discuss the low volume of admissions with the diagnosis of CAP. The low volume of patients with CAP was thought to be related to the late onset and mildness of the 2016 influenza epidemic.

### **Sample**

The age of the 19 patients ranged from 43 to 90 with a mean of 70.47. Six of the participants were male (31.6%) and thirteen were female (68.4%).

### **Project Results**

Three patients (15.8%) met medical criteria for query for de-escalation of antimicrobials, however, no provider was queried. The reasons for failure to initiate the query process were cited as de-escalation by the provider before the initiation of the query process, delay in the query process resulted in the patient being discharged before the provider query and failure to handoff the completed CAP Review Form to the Care Coordinator for the initiation of the query process.

Sixteen patients (84.2%) did not meet the criteria for de-escalation. The reasons noted for patients not meeting the criteria for de-escalation included 6- steroids, 3- pleural effusion, 4- patients steroids + pleural effusions, 1- chemotherapy, 1- elevated WBCs and no blood cultures and 1- no blood cultures.

### **Discussion**

The CAP project began on 2E and 4A in mid-November. Shortly after the project began, the Care Coordinators expressed difficulty identifying patients and completing the CAP Review Form due to limited resources. The decision was made by the project leader to designate one person to identify patients who met the CAP inclusion criteria and complete the CAP Review Form. This provided for consistency in identifying patients and in the completion of the CAP Review Form. The process for querying the provider remained with each individual Care Coordinator.

The completed CAP Review Form for patients who met the criteria for de-escalation was given to the unit-based Care Coordinator to query the provider regarding de-escalation. Three of the nineteen patients met medical criteria for query by the Care Coordinator however, none of the providers were queried. Failure to query the provider before the patient was discharged and failure to handoff the CAP Review Form to the Care Coordinator represented a fragmented handoff process. The third patient was de-escalated by the provider was before the Care Coordinator could ask for de-escalation. Having a designated person to identify patients and complete the CAP Review Form streamlined the process of identification and completion of the CAP Review Form. The need to handoff the CAP Review Form to the Care Coordinator for query of the provider broke the continuity of the process and interrupted the seamless transition to the query process.

### **Limitations**

The limitations of this project were the low number of the participants and the failure of the Care Coordinator to initiate the query process. The project was extended to 12 weeks and increased the number of eligible patients in the pilot period from eight to nineteen. The CAP process was successful in identifying three patients meeting the medical criteria for the initiation of provider query process for de-escalation of antimicrobials. The inability to initiate the CAP project query process due to lack of or incomplete handoff was the cause of failure for this project.

### **Implications**

The use of standardized medical criteria as an indicator for patients' readiness for de-escalation of antimicrobials has the potential to decrease the use of antimicrobials in patients. The low volume of patients admitted with and the failure of the provider query process deemed the project unsuccessful. The CAP project intent was to create a process that included the utilization of a standardized medical criteria and provider query process to reduce the use of antimicrobials. The provider query process must be evaluated in order to identify the barriers and redesign this process.

### **Conclusion**

The CAP Project was a collaborative interdisciplinary approach to caring for patients with CAP at one community hospital. Grounded in Jean Watson's Theory of Human Caring, the CAP Project was intended to integrate human caring-healing with the cost benefit and cost effectiveness model that is present in many acute care organizations. The CAP Project leader used PDSA cycle framework for the project design. The purpose of this project was to implement standardized criteria and provider query process for the de-escalation of antimicrobial



agents for patients admitted to the acute care setting with CAP. The project Care Coordinators implemented assessment using the standardized criteria; however, the query process was not successfully implemented. The low volume of patients in the project group and the failure to initiate the query process by the Care Coordinators indicated that the process, as implemented, is not feasible or sustainable.

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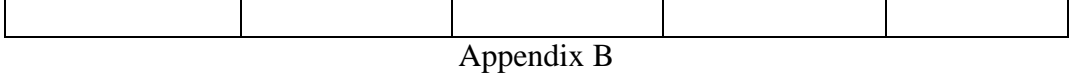
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Appendix A

CAP Review Form

| INFECTIOUS DISEASE STATE MANAGEMENT –Community Associated Pneumonia Review Form                         |          |                                     |                     |
|---|----------|-------------------------------------|---------------------|
| <b>**THIS DOCUMENT IS NOT PART OF THE PERMANENT MEDICAL RECORD**</b>                                    |          | <b>Admit Date:</b>                  | <b>Unit:</b>        |
| <b>PATIENT STICKER</b>  |          |                                     | <b>Review Date:</b> |
| <b>Community-Acquired Pneumonia (CAP)</b>   |          |                                     |                     |
| <b>Protocol: Y / N</b>  |          |                                     |                     |
| <b>STOP If Yes: Fax form to Infection Control 313-3090</b>  |          |                                     |                     |
| <b>Sputum Culture: Y / N</b>  |          | <b>Blood Culture: Y / N</b>         |                     |
| Community Associated Pneumonia Criteria   |          |                                     |                     |
| Criteria  | Findings | Criteria                            | Findings            |
| Off mechanical ventilation  | Y / N    | Blood cultures negative             | Y / N               |
| Hypoxemia treated<br>SaO <sup>2</sup> > 90%   | Y / N    | No pulmonary effusion               | Y / N               |
| Temperature ≤ 101 F x 48 hrs  | Y / N    | No steroids, cytotoxic chemotherapy | Y / N               |
| WBC ≤ 15 K  | Y / N    |                                     |                     |
| <b>All Criteria- Yes – Contact ordering MD or Unit Pharmacist for rapid de-escalation of antibiotic</b> |          |                                     |                     |
| <b>Any criteria = No: Review every 24 hours</b>   |          |                                     |                     |
| <b>Ordering MD or Unit Pharmacist Contacted: Y / N Dated Contacted:</b>                                 |          |                                     |                     |
| <b>MD or Unit Pharmacist Name:</b>  |          |                                     |                     |
| <b>MD or Unit Pharmacist Agreed to De-escalation: Y / N If yes answer the questions below.</b>          |          |                                     |                     |
| <b>Orders before de-escalation request:</b>   |          |                                     |                     |
| <b>Orders after de-escalation request:</b>  |          |                                     |                     |
| <b>**THIS DOCUMENT IS NOT PART OF THE PERMANENT MEDICAL RECORD**</b>                                    |          |                                     |                     |







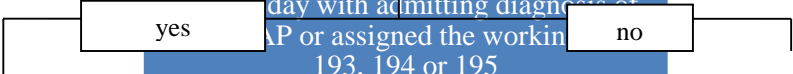
Appendix C

|  | Week One | Week Two | Week Three | Week Four | Week Five | Week Six | Week Seven | Week Eight |
|--|----------|----------|------------|-----------|-----------|----------|------------|------------|
| Education of the Care Coordinators Department:               |          |          |            |           |           |          |            |            |
| Education of the Care Coordinators: 4 A specific education   |          |          |            |           |           |          |            |            |
| Present overview to the AMT                                  |          |          |            |           |           |          |            |            |
| Begin the utilization of the CAP Standardization Review Form |          |          |            |           |           |          |            |            |
| Request Records for Retrospective Review                     |          |          |            |           |           |          |            |            |
| Conduct Retrospective Review                                 |          |          |            |           |           |          |            |            |
| Conduct Concurrent Data Abstraction                          |          |          |            |           |           |          |            |            |
| Data Analysis  |          |          |            |           |           |          |            |            |
| Complete Paper   |          |          |            |           |           |          |            |            |
| Submit for Review  |          |          |            |           |           |          |            |            |

|              |  |                                |  |
|--------------|--|--------------------------------|--|
| Presentation |  | <b>CAP Review Process Flow</b> |  |
|--------------|--|--------------------------------|--|

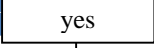
Care Coordinator performs Admission Review on patients admitted 48 hours or greater

Patients admitted Saturday through  
 Sunday with admitting diagnosis of  
 CAP or assigned the working  
 193, 194 or 195



Care Coordinator completes the CAP Standardization Review Form.  
 Patient meets medical criteria for de-escalation

No further action

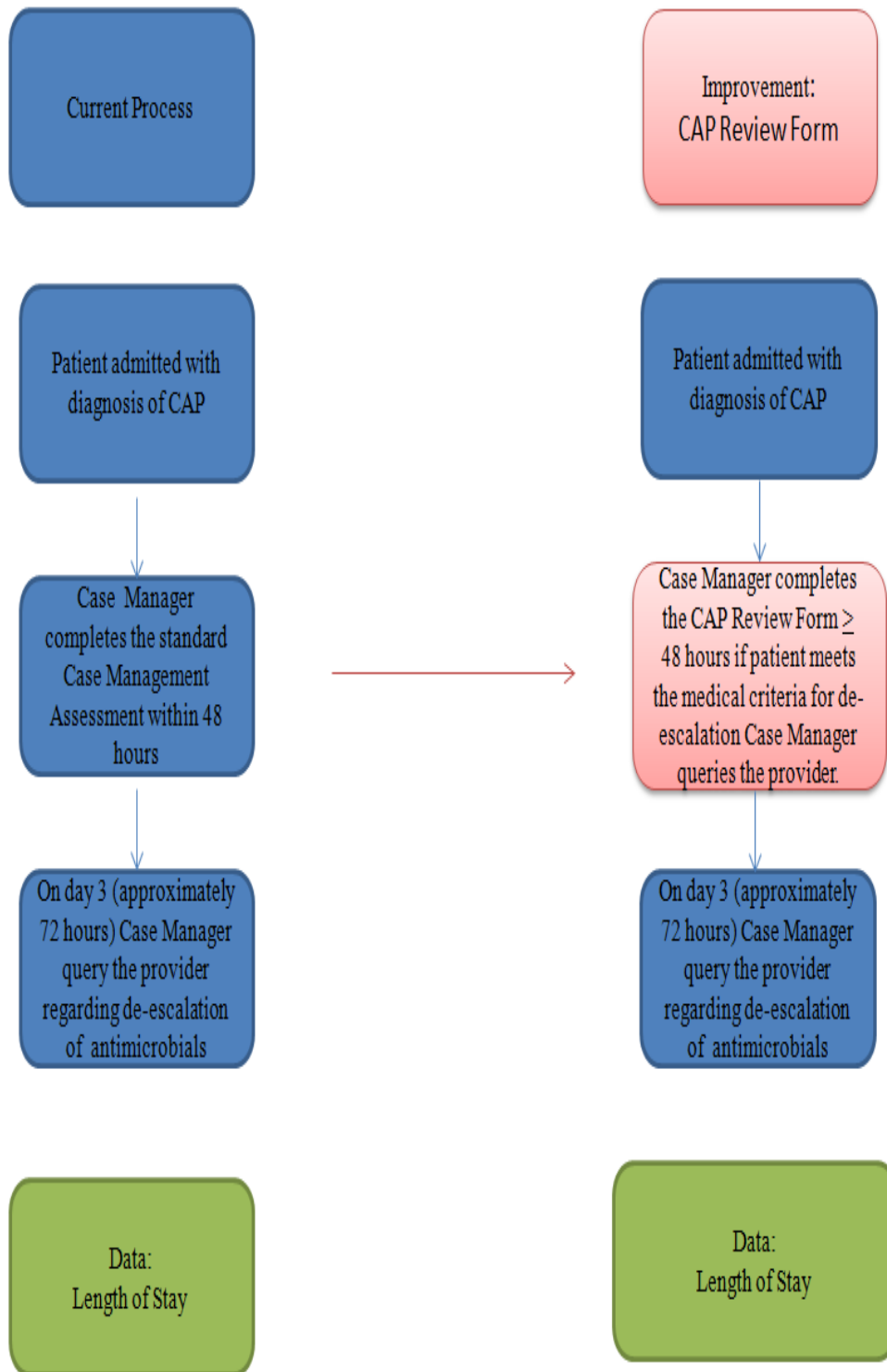


Query provider regarding de-escalation of antimicrobial agents

Fax completed form to the Care Coordination office for distribution to the pilot lead

Data will be abstracted by the project lead

Completed forms will be filed in with the project lead





1 Saint Joseph Drive  
Lexington, KY 40504

July 6, 2015

TO: Eastern Kentucky University IRB

RE: Patricia Heaney

To Whom It May Concern:

St. Joseph Hospital in Lexington, KY is authorizing the CHI IRB to waive their review of the study entitled: "CAP Project". The study PI, Patricia H. Heaney, is an Eastern Kentucky University student; therefore, the Eastern Kentucky University Institutional Review Board has agreed to serve as the IRB of record for the above mentioned study.

Sincerely,

Rebecca S. Thomas, RN, BSN | Regional Research Manager  
Institute for Research & Innovation | Center for Clinical Research  
Kentucky One Health



Eastern Kentucky University  
Department of Baccalaureate and Graduate Nursing  
Doctor of Nursing Practice Program

### Statement of Mutual Agreement for Capstone Project

The purpose of a Statement of Mutual Agreement is to describe the agreement between a designated clinical agency and the DNP student regarding the student's Capstone Project.

#### I. General Information

Student Name: Patricia Heaney  
 Project Title: Community Acquired Pneumonia  
 Agency: Saint Joseph Hospital Lexington, KY  
 Agency Contact: Carol Dwyer, Vice President Patient Care and Chief Nursing Officer

#### II. Brief description of the project

- Evidence-based intervention
- Expected project outcomes (products, documents, etc.)
- On-site Activities (DNP student role, required meetings, access to agency records, non-disclosure expectations)
- Products resulting from DNP Capstone Project with potential market value.  
Any products produced from collaboration with the agency must be discussed with the student, Capstone Advisor, and appropriate agency representative. The ownership of intellectual property rights must be determined prior to the implementation of the project.

Copy of Capstone Proposal given to and reviewed by:  
 Carol Dwyer MDN RN CNO  
 Russ Judd PhD (AMT)

