

Faculty Advisors: Catherine O'Brien, PharmD and Holly Maples, PharmD
Location: Arkansas Children's Hospital

2009 Pharmacy Practice Student Research Fellowship

Title: *Evaluation of Vancomycin Pharmacokinetics in Children with Cerebral Palsy*

Cerebral palsy (CP) is a neurological disorder affecting approximately 2 in 1000 people in the United States. It is caused by an injury to the brain within the first few years of life and is characterized by disordered movement and posture. The disease state can also include seizures, impairments in cognition, communication and sensory skills. Respiratory symptoms are common and may be related to oral motor dysfunction, gastroesophageal reflux, and aspiration. Vancomycin may be used as empiric therapy for pneumonia in children with CP who present with respiratory symptoms and a history of MRSA isolated from sputum cultures. Therapy with vancomycin requires therapeutic drug monitoring to ensure efficacy and minimize toxicity. As vancomycin provides its antimicrobial activity in a time-dependent manner (as opposed to concentration-dependent), it is only necessary to measure a trough level. The usual goal trough for treatment of MRSA pneumonia is about 15 ng/mL. In our experience with the Antimicrobial Stewardship Program (the "A-team") at Arkansas Children's Hospital (ACH), children with cerebral palsy tend to accumulate vancomycin and require lower doses of vancomycin as their course of therapy progresses. To our knowledge, there is no published data describing this phenomenon or, more importantly, providing recommendations and guidance on the best approach to dosing and monitoring therapy in these children.

This research project will be a retrospective chart review of inpatients with cerebral palsy treated with vancomycin for a respiratory infection in the past several years. The fellow will be responsible for submission of a protocol to the Institutional Review Board, review of medical charts for relevant information, analysis and summarization of the results, and submission of an abstract for presentation at a relevant meeting. The fellow will gain experience with IRB requirements, retrospective chart review, review of relevant literature, statistical methods, and preparation of an abstract and poster for presentation.

Faculty Advisors: Catherine O'Brien, PharmD and Holly Maples, PharmD
Location: Arkansas Children's Hospital

2009 Pharmacy Practice Student Research Fellowship

Title: *Evaluation of Level of Knowledge of Chronic Medications among Cystic Fibrosis Patients and Their Caregivers*

Cystic fibrosis (CF) is an autosomal recessive genetic disorder that affects about 1 in every 3500 births in the United States. The hallmark of the disease is a progressive decline in lung function and the primary cause of death is respiratory failure. The life expectancy of people with CF has been increased steadily over the past 50 years and in 2006 was 36.9. This is due in large part to improvements in airway clearance techniques and chronic medications. Unfortunately, many patients and their caregivers struggle with the time consuming medication regimen, especially if they do not feel "sick". An understanding of the medication regimen, including how the drugs work and the proven benefits, may help to improve medication adherence.

This study will be a prospective analysis of the level of understanding of the medication regimen among CF patients admitted to Arkansas Children's Hospital (ACH) and their caregivers. A secondary goal is to assess the correlation of understanding with self-reported medication adherence. The fellow will gain experience obtaining informed consent and assent from children with CF and their caregivers, administering a survey to assess current knowledge of medications and self-reported adherence, summarizing and analyzing the results, and preparing an abstract and poster for presentation at a scientific meeting.

Gaining better knowledge of the level of understanding of the medication regimen will help us to target our educational interventions to material that patients have the

most trouble with. This should ultimately result in a more thorough understanding on the part of the patient and caregivers of how specific medications help to extend life in people with CF. We hope that this will translate into better medication adherence and a continued improvement in life expectancy.

Faculty Advisors: Catherine O'Brien, PharmD and Holly Maples, PharmD
Location: Arkansas Children's Hospital

2009 Pharmacy Practice Student Research Fellowship

Title: *Development and Evaluation of a Teaching Tool for Medical Students and Residents to Improve Understanding of Antibiotic Dosing in Cystic Fibrosis Patients*

Cystic fibrosis (CF) is an autosomal recessive genetic disorder that affects about 1 in every 3500 births in the United States. The hallmark of the disease is a progressive decline in lung function and the primary cause of death is respiratory failure. Acute pulmonary exacerbations are treated with antibiotics based on the most recent respiratory culture results. Most patients are treated with a 2-week course of antibiotics and the endpoint of therapy is a return to baseline pulmonary function as measured by spirometry during the hospital stay. People with CF generally require higher doses of antibiotics to obtain therapeutic concentrations in lung tissue and to overcome the more rapid clearance of certain antibiotics. Subtherapeutic antibiotic dosing may result in poor outcomes including antimicrobial resistance, suboptimal improvement in lung function, and ultimately a shortened lifespan. At Arkansas Children's Hospital (ACH), Dr. Holly Maples has developed an order set for CF patients who are admitted for treatment of acute pulmonary exacerbation, including appropriate doses of antibiotics. However, in our experience, the level of understanding regarding this rationale for this dosing among medical students and interns is suboptimal. Although pharmacy faculty and residents provide dosing recommendations for all CF admissions at ACH, most medical residents and interns will be practicing at other institutions when they complete their training. It is important for them to have a thorough understanding of optimal antibiotic dosing for CF patients.

For this project, the fellow will be responsible for the development of an educational tool as well as pre- and post-tests for medical students and residents, presentation to residents and medical students on the pulmonary rotation at ACH, and comparison of pre- and post test results. The fellow will gain experience in development of an educational tool, education in a multi-disciplinary setting, as well as statistical analysis of the results.