

New Community-Acquired Pneumonia (CAP) Clinical Pathway at Children's Hospital & Medical Center

From Meera Varman, M.D.

Clinical practice guidelines from the Infectious Diseases Society of America (IDSA) recommend using ampicillin in the management of uncomplicated mild CAP requiring hospitalization followed by oral amoxicillin when clinically improved. Other children's hospitals have applied this IDSA guidelines and have shown an increase in use of ampicillin and amoxicillin and decrease in use of more broad spectrum third generation cephalosporins (ceftriaxone/cefotaxime and cefdinir) with excellent clinical outcomes (Newman et al Pediatrics 2012; e597-604)

Streptococcus pneumoniae which is the most frequent bacterial cause of CAP develops resistance to beta-lactams by alteration in penicillin binding protein (PBP). However, resistance can be overcome by using appropriately high doses of ampicillin and amoxicillin which achieve effective lung concentrations.

Based on Physician Health Informatic system (PHIS) data, 41.94% of CAP patients at our hospital received ceftriaxone in 2012, compared to 34.35% in other children's hospitals; combined use of ampicillin and amoxicillin during the same time period was 27.59% for our hospital in comparison to 24.5% in 40 other PHIS hospitals. These data demonstrate that we are already shifting our practice to the narrow spectrum agents (ampicillin/amoxicillin), but that by providing clinical decision support, we may be able to significantly increase the number of patients we are effectively treating with these agents. Others have already been successful in this endeavor, including two other Midwestern academic children's hospitals that have significantly increased their narrow spectrum (amoxicillin and ampicillin) antibiotic usage to 77 and 83% per PHIS data.

Our specific aim is a reduction in the use of third generation cephalosporins (ceftriaxone) and a corresponding increase in the use of ampicillin/amoxicillin for uncomplicated CAP by 25% from our PHIS baseline by June of 2014. The anticipated outcomes would be to reduce the overall use of broad spectrum antibiotics, which could improve clinical efficiency and quality of care by creating a standardized pathway, and reduce antimicrobial resistance in the long run.

A new clinical pathway for management of uncomplicated CAP at Children's Hospital & Medical Center is being created. At the end of June 2014, PHIS data will be re-analyzed to evaluate the impact of implementation of the clinical pathway, and feedback regarding its practicality will be assessed.

The following complicated pneumonia patients will be **excluded**:

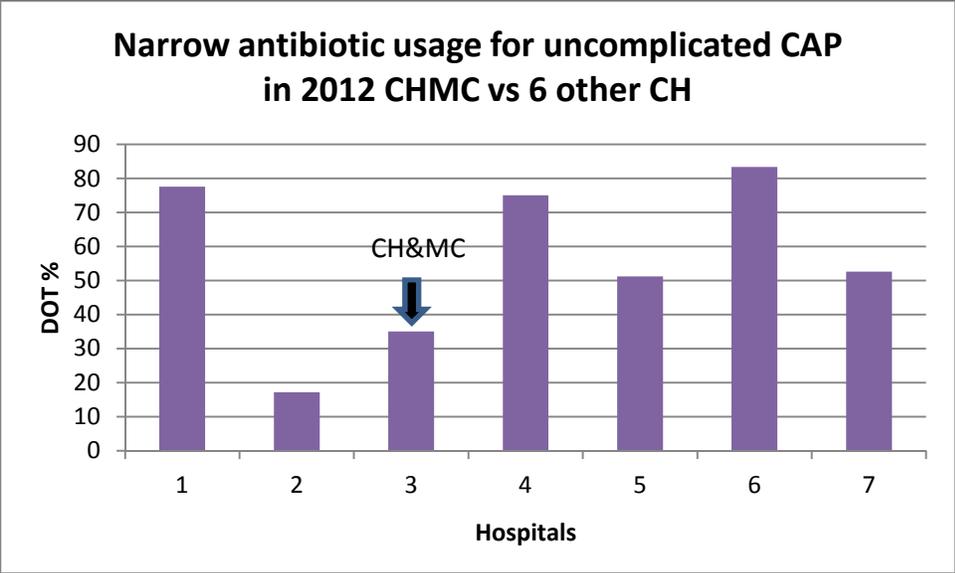
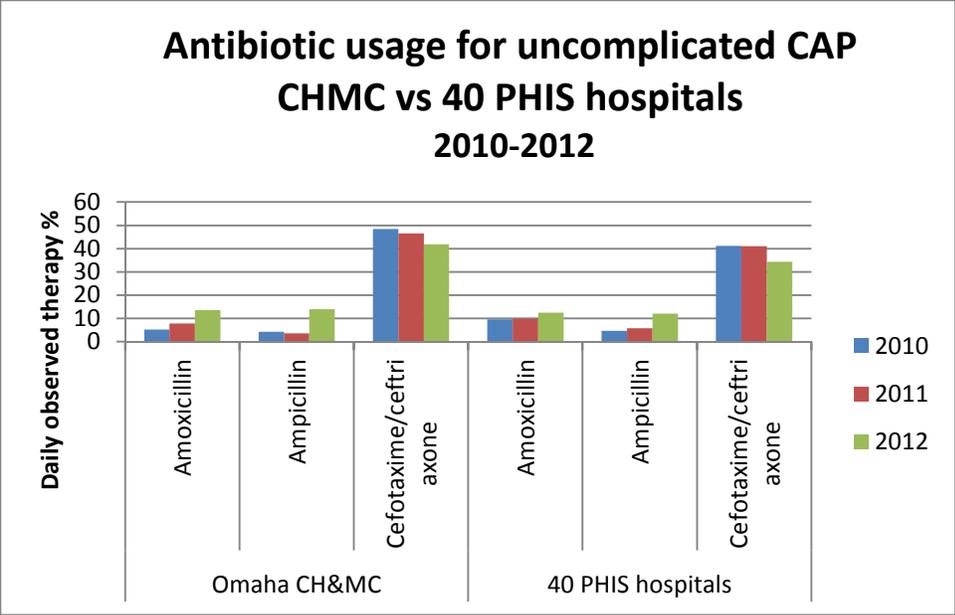
1. <2 months of age
2. <36 weeks of gestation
3. Pneumonia > 3 days after admission
4. Immunocompromised host
5. Any one of the following
 - a. Congenital heart disease
 - b. Chronic lung disease except asthma
 - c. Sickle cell disease
 - d. Neurologic/neuromuscular conditions
6. Patients with effusion requiring
 - a. Video assisted thoracoscopy (VATS)
 - b. Thoracentesis
 - c. Chest tube

De-escalation from ampicillin to oral amoxicillin is suggested when:

1. Patient is afebrile
2. Patient is taking oral feeds
3. There is no oxygen requirement.
4. Reduced respiratory rate and effort

Support from prescribers, including house staff and faculty, will be essential to implement this change and to successfully drive this quality improvement initiative.

Hospital	CAP Daily Observed Therapy %			
	Antibiotics	2010	2011	2012
Children's Hospital & Medical Center	Amoxicillin	5.27	7.75	13.62
	Ampicillin	4.2	3.6	13.97
	Cefotaxime/ceftriaxone	48.4	46.5	41.9
40 PHIS hospitals	Amoxicillin	9.57	9.9	12.5
	Ampicillin	4.7	5.8	12
	Cefotaxime/ceftriaxone	41.2	41.1	34.4



This has been discussed with Robin Stec, Kari Simonsen, M.D., Mel Hall, Thomas Deegan, M.D. and Jay Snow, M.D.