

## Five Things Physicians and Patients Should Question

1

### Do not prescribe IV antibiotics for predetermined durations for patients hospitalized with infections such as pyelonephritis, osteomyelitis and complicated pneumonia. Consider early transition to oral antibiotics.

Recent publications have demonstrated that strategies for early transition to oral antibiotics achieve equal or better outcomes for common inpatient infections and are safer than prolonged intravenous antibiotics in children. The use of intravenous lines such as peripherally inserted central catheters, which are often necessary for prolonged intravenous antibiotics, can lead to complications such as thrombosis or line infections. Antibiotic courses with predetermined durations are often not based on high-quality evidence and ignore individual response to treatments, which can vary significantly from patient to patient. Once a patient is able to tolerate them, early transition to oral antibiotics, based on individual patient clinical responses such as defervescence and other symptoms and signs of improvement, are patient and family centered and can improve the value of care for hospitalized children.

2

### Do not continue hospitalization in well-appearing febrile infants once bacterial cultures (i.e. blood, cerebrospinal, and/or urine) have been confirmed negative for 24–36 hours, if adequate outpatient follow-up can be assured.

Routinely continuing hospitalization beyond 24–36 hours of confirmed negative bacterial cultures for well-appearing infants admitted for concern of serious bacterial infection does not improve clinical outcomes. Blood culture yield is highest in the first 12–36 hours after incubation with multiple studies demonstrating >90% of pathogen cultures being positive by 24 hours. If adequate outpatient follow-up can be assured, discharging well-appearing febrile infants at 24–36 hours if cultures are confirmed to be negative will decrease length of stay, antibiotic exposure, and iatrogenic complications.

3

### Do not initiate phototherapy in term or late preterm well-appearing infants with neonatal hyperbilirubinemia if their bilirubin is below levels at which the AAP guidelines recommend treatment

The risk of poor neurologic outcomes, such as cerebral palsy due to kernicterus, is extremely low for term and late preterm newborns with modestly elevated bilirubin levels. Confirmed cases of kernicterus have average bilirubin levels near 40 mg/dL, and are typically associated with hemolysis. While phototherapy for bilirubin values above published thresholds may be useful to prevent severe hyperbilirubinemia and exchange transfusions, its use for bilirubin values below published thresholds is unnecessary and is associated with additional costs and unnecessary hospitalization.

4

### Do not use broad-spectrum antibiotics such as ceftriaxone for children hospitalized with uncomplicated community-acquired pneumonia. Use narrow-spectrum antibiotics such as penicillin, ampicillin or amoxicillin.

Using broad-spectrum antibiotic therapy does not improve rates of treatment failure, length of stay, or decrease costs when compared with narrow-spectrum antibiotic therapy for children hospitalized with community-acquired pneumonia (CAP). The use of narrow-spectrum antibiotics for children hospitalized with CAP can limit the development of multi-drug resistant organisms, while achieving similar or better outcomes.

5

### Do not start IV antibiotic therapy on well-appearing newborn infants with isolated risk factors for sepsis such as maternal chorioamnionitis, prolonged rupture of membranes, or untreated group-B streptococcal colonization. Use clinical tools such as an evidence-based sepsis risk calculator to guide management.

Unnecessary exposure of infants to antibiotics is associated with increased parental anxiety, length of stay, increased cost, gut microbiome dysbiosis, necrotizing enterocolitis and possibly allergic and autoimmune diseases. Antibiotic therapy often leads to transfers to higher levels of care and thus decreased maternal-infant bonding. The use of evidence-based sepsis calculators has demonstrated reductions in antibiotic use of 50% or more without a concomitant increase in the incidence of early onset sepsis.

# How This List Was Created

A diverse committee with representatives from the Society of Hospital Medicine's Pediatrics Special Interest Group, the American Academy of Pediatrics' Section on Hospital Medicine and the Academic Pediatric Association's Hospital Medicine Special Interest Group solicited a list of recommendations with specified criteria from colleagues and the various society listservs. Through an iterative process, recommendations were formatted, merged, and presented with an evidence review of publications from the past 10 years supporting each recommendation. From over 100 initial recommendations and through 2 rounds of a modified Delphi process, the highest scoring recommendations were chosen to represent the Pediatric Hospital Medicine Choosing Wisely list. The list was endorsed by the Boards of the Society of Hospital Medicine and the Academic Pediatric Association and peer reviewed by various AAP specialty groups and endorsed by the American Academy of Pediatrics' Executive Committee. The guidance in this list does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

## Sources

- 1 Keren R, Shah SS, Srivastava R, Rangel S, et al; Pediatric Research in Inpatient Settings Network. Comparative effectiveness of intravenous vs oral antibiotics for post-discharge treatment of acute osteomyelitis in children. *JAMA Pediatr.* 2015 Feb;169(2):120-8.  
Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management, Roberts KB et al. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatrics.* 2011 Sep;128(3):595-610.  
Shah SS, Srivastava R, Wu S, et al; Pediatric Research in Inpatient Settings Network. Intravenous Versus Oral Antibiotics for Post-discharge Treatment of Complicated Pneumonia. *Pediatrics.* 2016 Dec;138(6).  
Schroeder AR, Ralston SL. Intravenous antibiotic durations for common bacterial infections in children: when is enough enough? *J Hosp Med.* 2014 Sep;9(9):604-9.
- 2 Vachani JG, McNeal-Trice K, Wallace SS. Current Evidence on the Evaluation and Management of Fever Without a Source in Infants Aged 0-90 Days: A Review. *Rev Recent Clin Trials.* 2017;12(4):240-245.  
Biondi EA, Mischler M, Jerardi KE, et al; Pediatric Research in Inpatient Settings (PRIS) Network. Blood culture time to positivity in febrile infants with bacteraemia. *JAMA Pediatr.* 2014 Sep;168(9):844-9.  
Fielding-Singh V, Hong DK, Harris SJ, et al; Ruling out bacteremia and bacterial meningitis in infants less than one month of age: is 48 hours of hospitalization necessary? *Hosp Pediatr.* 2013;3(4):355-61.  
Tara L, Greenhow, Yun-Yi Hung, Arnd M. Herz Changing Epidemiology of Bacteremia in Infants Aged 1 Week to 3 Months *Pediatrics* Mar 2012, 129 (3) e590-e596; DOI: 10.1542/peds.2011-1546  
Mahajan, P., et al., *Risk of Bacterial Coinfections in Febrile Infants 60 Days Old and Younger with Documented Viral Infections.* *J Pediatr*, 2018. 203: p. 86-91 e2.  
Lefebvre CE, Renaud C, Chartrand C. Time to positivity of blood cultures in infants 0 to 90 days old presenting to the emergency department: is 36 hours enough? *J Pediatric Infect Dis Soc.* 2017; 6:28-32.
- 3 American Academy of Pediatrics Subcommittee on Hyperbilirubinemia. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation [published correction appears in *Pediatrics.* 2004 Oct;114(4):1138]. *Pediatrics.* 2004;114(1):297-316. doi:10.1542/peds.114.1.297  
Wu YW, Kuzniewicz MW, Wickremasinghe AC, et al. Risk for cerebral palsy in infants with total serum bilirubin levels at or above the exchange transfusion threshold: a population-based study. *JAMA Pediatr.* 2015;169(3):239-46. doi: 10.1001/jamapediatrics.2014.303  
Newman TB, Liljestrand P, Jeremy RJ, et al. Outcomes among Newborns with Total Serum Bilirubin Levels of 25 mg per Deciliter or More. *NEJM.* 2006;354(18):1889-1900.  
Newman TB, Kuzniewicz MW, Liljestrand P, et al. Numbers Needed to Treat With Phototherapy According to American Academy of Pediatrics Guidelines. *Pediatrics* 2009;123:1352-1359  
Kuzniewicz MW, Wickremasinghe AC, Wu YW, et al. Incidence, Etiology, and Outcomes of Hazardous Hyperbilirubinemia in Newborns. *Pediatrics* 2014;134:504.  
Kuzniewicz MW, Escobar G, Newman TB. Impact of Universal Bilirubin Screening on Severe Hyperbilirubinemia and Phototherapy Use. *Pediatrics* 2009;124:1031-1039. DOI: <https://doi.org/10.1542/peds.2008-2980>  
Wickremasinghe AC, Kuzniewicz MW, Grimes BA, McCulloch CE, Newman TB. Neonatal Phototherapy and Infantile Cancer. *Pediatrics.* 2016;137(6):e20151353. doi:10.1542/peds.2015-1353
- 4 Bradley JS1, Byington CL, Shah SS, et al; The management of community-acquired pneumonia in infants and children older than 3 months of age: clinical practice guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America. *Pediatric Infectious Diseases Society and the Infectious Diseases Society of America.* *Clin Infect Dis.* 2011 Oct;53(7):e25-76. doi: 10.1093/cid/cir531. Epub 2011 Aug 31.  
Derek J. Williams, MD, MPH, Matthew Hall, PhD, Samir S. Shah, et al; Narrow Vs Broad-spectrum Antimicrobial Therapy for Children Hospitalized With Pneumonia. *Pediatrics* 2013;132:e1141.  
Mary Ann Queen, MD, Angela L. Myers, MD, Matthew Hall, et al; Comparative Effectiveness of Empiric Antibiotics for Community-Acquired Pneumonia. *Pediatrics.* 2014;133(1):e23-9  
Joanna Thomson, MD, MPH, Lilliam Ambroggio, PhD, MPH, Eileen Murtagh Kurowski, MD, MS, et al; Outcomes Associated With Guideline-Recommended Antibiotic Therapy for Pediatric Pneumonia. *Journal of Hospital Medicine* 2015;10:13-18.
- 5 K.M. Puopolo, W.E. Benitz, T.E. Zaoutis, Committee on Fetus and Newborn, Committee on Infectious Diseases, Management of neonates born at  $\geq 35$  0/7 weeks' gestation with suspected or proven early-onset bacterial sepsis. *Pediatrics.* 142 (2018)  
Leonardi BM, Binder M, Griswold KJ, Yalcinkaya GF, et al; Utilization of a Neonatal Early-Onset Sepsis Calculator to Guide Initial Newborn Management. *Pediatr Qual Saf.* 2019 Sep 23;4(5):e214.  
Goel N, Shrestha S, Smith R, Mehta A, et al; Screening for early onset neonatal sepsis: NICE guidance-based practice versus projected application of the Kaiser Permanente sepsis risk calculator in the UK population. *Arch Dis Child Fetal Neonatal Ed.* 2019.  
<https://neonatalsepsiscalculator.kaiserpermanente.org/>

### About the ABIM Foundation

The mission of the ABIM Foundation is to advance medical professionalism to improve the health care system. We achieve this by collaborating with physicians and physician leaders, medical trainees, health care delivery systems, payers, policymakers, consumer organizations and patients to foster a shared understanding of professionalism and how they can adopt the tenets of professionalism in practice. To learn more about the ABIM Foundation, visit [www.abimfoundation.org](http://www.abimfoundation.org).



### About the Society of Hospital Medicine

Representing the fastest growing specialty in modern healthcare, the Society of Hospital Medicine (SHM) is the leading medical society for hospitalists and their patients. SHM is dedicated to promoting the highest quality care for all hospitalized patients and overall excellence in the practice of hospital medicine through quality improvement, education, advocacy and research.



### About the American Academy of Pediatrics

The American Academy of Pediatrics is an organization of 67,000 primary care pediatricians, pediatric medical subspecialists and pediatric surgical specialists dedicated to the health, safety and well-being of infants, children, adolescents and young adults. The AAP Section on Hospital Medicine's mission is to optimize the delivery of health care to children in hospital settings. The Section serves as the home for physicians and other providers with a special interest and commitment to general inpatient pediatric care.



### About the American Pediatric Association

The Academic Pediatric Association (APA) is dedicated to nurturing the academic success and career development of child health professionals engaged in research, advocacy, improvement science and educational scholarship to enhance the health and well-being of all children.

For more information or to see other lists of Five Things Physicians and Patients Should Question, visit [www.choosingwisely.org](http://www.choosingwisely.org).