

## Translating Best Evidence Into Best Care

**EDITOR'S NOTE:** Studies for this column are identified using the Clinical Queries feature of PubMed, “hand” searching *JAMA*, *JAMA Pediatrics*, *Pediatrics*, *The Journal of Pediatrics*, and *The New England Journal of Medicine*, and from customized EvidenceUpdates alerts.

**EBM PEARL: SYSTEMATIC REVIEW (SR), PART 1:** An SR is a methodologically-rigorous overview of the medical literature designed to answer a specific clinical question. SRs typically attempt to answer therapeutic questions. However, diagnostic test questions and other study designs may also be the basis for an SR. In the hierarchy of the EBM pyramid, the clinical utility of an SR stands above the clinical utility of individual studies, especially if the SR is based on methodologically high-quality studies (eg, randomized, controlled trials). A key distinguishing feature of an SR compared with a standard, or traditional, review, is that an SR has a methods section. Both types of reviews have their place in informing clinical practice. However, it is likely a safer bet to base a clinical decision on the results of an SR. The basic methodologic validity issues of an SR may be minimally assessed through 3 questions: 1) Did the SR address a focused clinical question?; 2) Were the criteria used to select articles for inclusion appropriate (ie, were the individual studies used in the SR of high methodological quality, eg, randomized, controlled trials)?; and 3) Is it unlikely that important, relevant studies were missed (ie, was an exhaustive search performed to identify all available relevant studies)? In the next EBM Pearl, we will discuss the basic approach to assessing the results of an SR.

**APPLICATION/TRANSLATION PEARL: PATIENT VALUES:** “EBM is a systematic approach to clinical problem solving which allows the integration of the best available research evidence with clinical expertise and patient values.”<sup>1</sup> In this installment of Application/Translation Pearls we touch on the third leg of the EBM definition: patient values. Understanding how to integrate patient values into EBM practice is the least studied, most controversial, and yet, perhaps, the most important aspect of EBM practice in terms of medical decision-making. At its most basic level, patient-value-informed EBM practice is shared medical decision-making. How patients participate in medical decisions may be influenced by many factors: personal/familial/societal-cultural mores, risk aversion, location in one's disease process, clarity of the key medical issues, anticipation of decision regret, understanding/articulating one's own values, decision making under various levels of pressure, desire to participate in the decision making process—among many other factors. The hope and expectation is that the currently evolving literature will define parameters for inclusion of patient values in medical decision-making. In the meantime, clinicians should continue to pursue effective strategies to develop sensitivity to each patient's holistic reality and use information derived therefrom—together with the patient—to achieve a satisfactory management plan.

—Jordan Hupert, MD

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### Phone app detects hyperbilirubinemia

Taylor JA, Stout JW, de Greef L, Goel M, Patel S, Chung EK, et al. Use of a Smartphone App to Assess Neonatal Jaundice. *Pediatrics* 2017;140. pii: e20170312.

**Question** Among jaundiced neonates, what is the diagnostic accuracy of BiliCam, compared with serum bilirubin, in diagnosing neonatal hyperbilirubinemia?

**Design** Prospective cohort study.

**Setting** 7 sites across the US.

**Participants** Neonates <7 days old, ≥35 weeks' gestation.

**Intervention** BiliCam (a camera-based cellphone app).

**Outcomes** Correlation between BiliCam and serum bilirubin.

**Main Results** The correlation between the BiliCam levels and paired serum measurements was 0.91 (95% CI, 0.89-0.92). Correlations among white, black, Hispanic, and Asian American newborns were 0.92, 0.90, 0.91, and 0.88, respectively. Sensitivity was 85% and 100%, and specificity was 75% and 76%, respectively, depending on which of 2 decision rules was employed.

**Conclusions** BiliCam, as a screening tool, appears to provide a sufficient level of accuracy to detect hyperbilirubinemia.

**Commentary** Aiming to minimize risks of bilirubin encephalopathy, a number of studies have explored noninvasive,

inexpensive, and easy-to-use methods to identify post-hospital-discharge newborns with hyperbilirubinemia.<sup>1-3</sup> Taylor et al, in a prospective, multicenter study with a moderate sample size, developed the BiliCam app and established its validity as a screening tool for neonatal jaundice in outpatient neonates. Newborn infants <7 days old were enrolled in this study. Although bilirubin levels typically peak in neonates at 96 hours of life, jaundice in some neonates may present at, or beyond, 3 weeks of age. Given the popularity of smartphones, and that parents are frequently the first to observe jaundice outside the hospital setting, future studies should assess the accuracy of home use of the BiliCam.

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3. Olusanya BO, Slusher TM, Imosemi DO, Emokpae AA. Maternal detection of neonatal jaundice during birth hospitalization using a novel two-color icterometer. *PLoS ONE* 2017;12:e0183882.

## Magnesium sulfate prevents cerebral palsy in premature infants

Crowther CA, Middleton PF, Voysey M, Askie L, Duley L, Pryde PG, et al. Assessing the neuroprotective benefits for babies of antenatal magnesium sulphate: An individual participant data meta-analysis. *PLoS Med* 2017;14:e1002398.

**Question** Among preterm infants, what is the therapeutic benefit of magnesium sulfate (MS) administered antenatally, compared with none, in reducing cerebral palsy (CP) rates?

**Design** Systematic review/meta-analysis of randomized controlled trials.

**Setting** Hospital based.

**Participants** Women at significant risk for preterm delivery.

**Intervention** Antenatal MS versus none.

**Outcomes** Infant death or CP.

**Main Results** The rate of CP was reduced in those babies whose mothers received MS, absolute risk reduction, 2.1% (95% CI, 0.8% to 3.4%), NNT, 43 (95% CI, 26 to 123).

**Conclusions** MS prevents cerebral palsy in premature infants.

**Commentary** Previous trials have not reliably shown a reduction in mortality or improvement in neurodevelopmental outcomes following MS administered prior to preterm birth. This meta-analysis, which includes individual participant data from previous trials using MS for fetal neuroprotection, adds

to the current literature showing both decreased mortality and decreased cerebral palsy. These results support the previously reported reduction in CP following MS administration in preterm birth, however, with a smaller NNT (42) than previously described (NNT 63).<sup>1</sup> Importantly, this study potentially alleviates confusion regarding varied dosing regimens of MS for fetal neuroprotection<sup>2</sup> by suggesting a minimal loading dose of 4 grams without maintenance therapy in this at-risk population of preterm infants. A potential caveat to interpreting the results of this study is the conclusion that MS has similar effects across a range of preterm gestational ages. Continued advances in neonatal care associated with increased survival of infants 22-23 weeks gestational age will be an important consideration in future studies as current literature reports are limited to outcomes following preterm birth of infants 24-34 weeks gestational age.<sup>3</sup> Further, the high NNT also highlights the need for new strategies to protect the brains of preterm infants.

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3. Paulsen ME, Dietz RM. Antenatal magnesium for preterm delivery reduces risk of cerebral palsy among surviving very preterm infants. *Acta Paediatr* 2018;107:175.

## Focused update on cardiopulmonary resuscitation: Utility of rescue breaths

Atkins DL, de Caen AR, Berger S, Samson RA, Schexnayder SM, Joyner BL Jr, et al. 2017 American Heart Association Focused Update on Pediatric Basic Life Support and Cardiopulmonary Resuscitation Quality: An Update to the American Heart Association Guidelines for Cardio pulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* 2018;137:e1-e6.

**Question** Is cardiopulmonary resuscitation (CPR) with chest compressions and rescue breaths superior to compression-only CPR in infants and children?

**Design** Expert review of 4 large database studies.

**Setting** Out of hospital (bystander and emergency-response administered CPR).

**Participants** Patients 0-18 years of age.

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