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## Using QI to break bad habits

**— Ivor D. Hill, MB, ChB, MD**

When you take your car to Meineke, chances are you will get a muffler. Well, it seems when you take children to the emergency department or an urgent care center for abdominal pain due to constipation, chances are they will get an abdominal x-ray (AXR). Children discharged with a diagnosis of constipation account for up to 25% of cases seen in some emergency departments or urgent care centers, and as many as 30%-90% will have an AXR as part of their evaluation. Evidenced-based guidelines for the "Evaluation and Treatment of Functional Constipation in Infants and Children" published jointly by the North American and European Societies for Pediatric Gastroenterology, Hepatology and Nutrition, state the diagnosis of functional constipation is based on history and examination and, in the absence of alarm signs and symptoms, routine use of an AXR has no role in the diagnosis. Therefore, it appears many children with functional constipation are being exposed to unnecessary irradiation and the use of AXRs is adding nothing to management but is simply adding to the already high costs of health care in the US. How then can we break some bad habits?

One way would be to develop a quality improvement (QI) program aimed at reducing the number of unnecessary AXRs in emergency departments and urgent care clinics. In this volume of *The Journal*, Moriel et al demonstrate just how effective such a program can be. Using Plan-Do-Study-Act cycles they were able to reduce the use of AXRs for functional constipation from 43% to 21% by emergency department attendings and fellows and from 31% to 16.5% by urgent care clinic pediatricians and pediatric nurses. Together this translated into a reduction of unnecessary AXRs from 36% to 18% with no increase in missed diagnoses or other adverse outcomes.

QI activities can be highly effective means of changing practice. Two keys to success in this program were the presence of a "champion" and the provision of individualized data reports to the providers. As physicians we are all somewhat competitive so comparing our individual results to those of our peers can serve as a powerful motivating factor to do better. Hopefully, this report will spur others to design similar projects to decrease unnecessary testing in children seeking health care in the future.

Article page 109 ►

## A "handy" reminder

**— Raye-Ann deRegnier, MD**

Because of the long-term risk of neurodevelopmental impairments, many neonatal intensive care unit (NICU) graduates receive developmental surveillance in high risk infant follow up programs. There are no national recommendations for the duration of follow up but a survey published in 2014 (*J Perinatol* 2014;34: 71-74) showed that programs rarely extend through 5 years of age. A longitudinal study of extremely preterm children published this month in *The Journal of Pediatrics* reminds us that longer follow up may be necessary for many children.

Duncan et al showed that toddlers who had difficulties with bimanual hand function at 18-22 months of corrected age continued to have both fine and gross motor

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difficulties at 6-7 years of age, independent of whether they had participated in occupational or physical therapy at 18-22 months.

Duncan et al did not study whether the children in their study were monitored between study timepoints or if therapy services were continued between 18-22 months and 6-7 years. However, 35% of the cohort had fine motor impairments at 6-7 years suggesting they may have benefited from ongoing developmental monitoring and timely therapy services. We need more studies that help us understand the path between early impairments and school function and studies that help us to prepare high risk infants for school and ameliorate the impact of preschool impairments. Although this study focused on motor difficulties, we know that NICU graduates also are at risk for cognitive, social, and behavioral difficulties. This study therefore serves as a "handy" reminder to maintain developmental vigilance during the toddler years.

Article page 51 ►

## Repeated clinical assessments surpass a laboratory test screening approach for early onset sepsis

**— Sarah S. Long, MD**

Frymoyer et al report the second, sustainability phase of a quality improvement initiative that was begun 5 years earlier at the Lucile Packard Children's Hospital at Stanford. The initiative replaces the approach of screening laboratory tests and empiric antibiotic treatment for infants at perceived risk for early onset sepsis (EOS) with a solely clinical approach. Managing >20 000 neonates born at >35 weeks' gestation over the intervention and sustainability phases, laboratory testing and ampicillin use declined substantially in phase 1, was sustained in phase 2, and the approach was safe. With the current extremely low incidence of EOS of 0.34 cases per 1000 live births at >35 weeks' gestation (7 cases in the 5-year study period) it would be difficult to imagine re-instating the imperfect laboratory screening/empiric therapy approach. Weighing the downsides of screening tests and empiric therapy, the equally safe clinical approach should be considered superior.

There are 2 caveats. The defensive culture of neonatal care and parents' lack of awareness of infection risks during the first days of life should change. Not every instance can be prevented or predicted, but vigilance can be promised. Second, the clinical observation approach in the Stanford initiative and wherever the approach is adopted, is not nothing. It is deliberative, with a prescribed 10 examinations with recordings by a nurse in the first 24 hours of life and was found to be safe when the nursing ratio to neonate-mother couplet in the postpartum unit was 1:3.

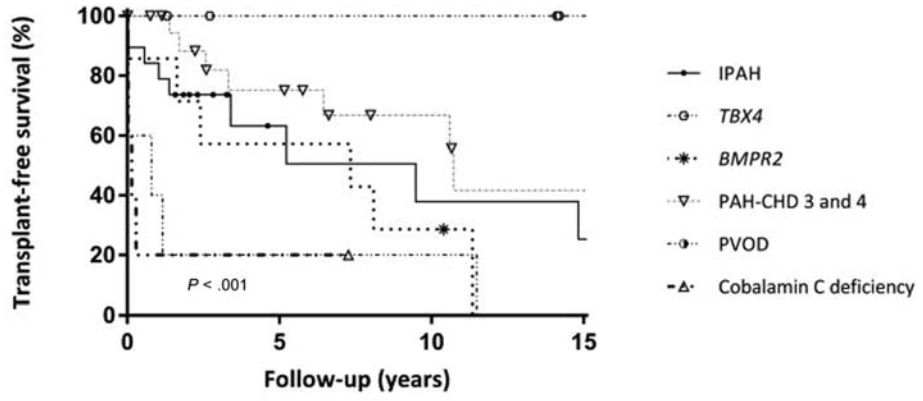
Article page 263 ►

## The importance of genotype in understanding phenotype—The example of pulmonary arterial hypertension

**— Denise M. Goodman, MD, MS**

With continued advances, it is becoming clear that pulmonary arterial hypertension in children is a heterogeneous disease, and distinct from the same syndrome in adults. In this volume of *The Journal* the work of Haarman et al underscores both the differences and their importance. Using a national cohort of children with pulmonary arterial hypertension from a Dutch national registry they describe detailed genotype and phenotype descriptions for 70 children (**Figure**). Importantly the most common genetic variant was in *TBX4*, compared with adults where BMPR2 is most common. For 23 of the 70 children there were no identified genetic abnormalities. Severity of illness and outcomes also differed by genotype. This work illustrates how understanding genotype/phenotype associations refines not only our insight into pathophysiology, but patterns of presentation and prognosis as well.

Article page 65 ►




| Patients at risk, n | | | | |
|---|---|---|---|---|
| IPAH | 19 | 5 | 3 | 2 |
| *TBX4* | 7 | 5 | 5 | 3 |
| *BMPR2* | 7 | 4 | 2 | 0 |
| PAH-CHD group 3 and 4 | 20 | 11 | 6 | 3 |
| PVOD | 5 | 1 | 1 | 0 |
| Cobalamin C deficiency | 5 | 1 | 0 | 0 |

**Figure.** Transplant-free survival of children with pulmonary arterial hypertension with different genetic backgrounds truncated at 15 years follow-up.

## Improving NICU outcomes–A worldwide endeavor

**— Robin H. Steinhorn, MD**

In this volume of *The Journal*, D'Apremont et al report on mortality and morbidity outcomes over 15 years (2001-2016) for nearly 14 000 very low birthweight infants (500-1500 grams) at NEOCOSUR centers (30 Neonatal Units from Argentina, Brazil, Chile, Paraguay, Peru, and Uruguay). While many national and international NICU collectives from the US, Canada, Europe, Australia, and Japan have published large scale NICU outcome data, D'Apremont et al provide the first substantial multi-year report from a similar NICU collaborative based in middle-income countries. Despite introducing many evidence-based practices, including increased use of antenatal corticosteroids and noninvasive ventilation, the NEOCOSUR centers did not observe a reduction in mortality in VLBW infants in NICUs. This was probably because of a drop in survival for the most premature babies born at ≤25 weeks gestational age. On the other hand, survival without major morbidity substantially improved for moderately preterm babies >29 weeks gestational age. The NEOCOSUR report demonstrates the ability to collect high quality data from middle-income countries, which is particularly meaningful as neonatal mortality remains stubbornly high in middle- and low-income countries and accounts for over 98% of neonatal mortality worldwide. We hope that NEOCOSUR finds novel ways to compare and contrast their findings with those of high income countries as they continue to improve care for their youngest NICU citizens—these are countries that have learned to walk and deserve to run.

Article page 44 ►