Infants with low-risk jaundice can be treated more quickly and more efficiently in an observational unit than in a traditional inpatient setting.

**Background:** About 60% of neonates develop hyperbilirubinemia in the first week of life. Most neonatal jaundice is benign, but the small risk for kernicterus is what makes it a concern to clinicians. The actual incidence of kernicterus is not well understood, but many are concerned that it is rising again.

**Objective:** To determine how well an emergency department (ED) observation unit can treat neonatal hyperbilirubinemia compared to a traditional inpatient unit.

**Design:** Before-after study using a historical control.

**Methods:** A hospital implemented an ED observational unit to treat neonatal hyperbilirubinemia and compared outcomes from the year 2006 (with the unit) to the year 2004 (no unit). To be included in the study, newborns had to be low risk according to the protocol. Those who were moderate or high risk were admitted to the hospital. Newborns who met protocol were started on care within 1 to 2 hours of arrival to the ED. Phototherapy was provided by blanket or lamp. Primary outcome of interest was length of stay from triage to discharge before and after the unit's creation. Secondary outcome was time to phototherapy initiation after triage.

**Results:** 167 neonates were included in the study; 62 were in the observation unit and 105 were in the inpatient unit. There were no significant differences between infants treated in either unit. Average bilirubin levels were 19.5 mg% in the inpatient unit and 17.8 mg% in the observation unit groups. Length of stay in the observation unit group was 17.8 hours, which was significantly shorter than in the inpatient unit (41.8 hours). Median time to receive phototherapy was also significantly less in the observation unit (1.6 vs 6.7 hours). Eleven of the neonates in the observation unit (18%) were eventually admitted to the hospital after 24 hours of therapy.

**Conclusions:** Infants with low-risk jaundice can be treated more quickly and more efficiently in an observational unit than in a traditional inpatient setting.

**Reviewer's Comments:** Infants treated for low-risk jaundice have significantly shorter lengths of stay in an observational unit than in a traditional inpatient unit. Infants also start therapy more quickly in the observational unit. There is likely a significant cost reduction in treating infants in this fashion. We need more studies like this and for the hospital to act on them. There was no mention of whether the babies were breast-fed or bottle-fed, blood type, or state of hydration in the analysis. Some centers focus on hydration and find that breast-fed babies may be slightly dehydrated and respond to fluid therapy, even before phototherapy is started. (Reviewer-Aaron E. Carroll, MD, MS).

© 2010, Oakstone Medical Publishing

**Keywords:** Jaundice, Hyperbilirubinemia

**Print Tag:** Refer to original journal article
Be Wary of Bilious, or Green, Vomiting in a Newborn!

_Bilious Vomiting in the Newborn: 6 Years Data From a Level III Centre._

Malhotra A, Lakkundi A, et al:

*J Paediatr Child Health 2010; 46 (May): 259-261*

Bilious vomiting in the newborn period is associated with a significantly increased likelihood of a surgical problem, and diagnostic evaluation should be prompt.

**Objective:** To determine how likely it is that bilious vomiting in a baby is associated with significant and surgical pathology.

**Design/Methods:** Retrospective audit of the records of newborns from 2001 to 2007 who were admitted to a level III intensive care unit (ICU) in Australia with a diagnosis of bilious vomiting. Demographic details, diagnostic evaluations, and final operative diagnoses, when applicable, were recorded. During that period, 61 infants were admitted to the ICU. Mean gestational age was 38 weeks, and mean weight was around 3100 grams. For diagnostic evaluation, all infants had plain abdominal x-rays and 87% (53/61) had upper gastrointestinal contrast imaging.

**Results:** 85% of plain x-rays were abnormal and about one third (34%) of contrast studies were abnormal. A total of 26% of patients (16 of 61) had exploratory laparotomies. Of these 16 patients, 6 had malrotation with volvulus, 2 had small bowel obstruction, 2 had meconium ileus, 2 had Hirschsprung’s disease, 2 had other findings (ascites, adhesions), and 2 were normal. No cause for the bilious vomiting could be identified in 38 patients (62%), and the symptoms resolved with conservative management. The authors determined that the sensitivity of a plain x-ray to detect intestinal obstruction was only 50%. In this study, however, the sensitivity of contrast imaging to detect intestinal obstructions was 100% with a positive predictive value of 85%. No patient with a normal contrast study subsequently had a surgical cause identified for the bilious vomiting.

**Conclusions:** Bilious vomiting in the newborn should be treated as a surgical emergency with prompt investigations warranted, including contrast studies as the most productive of such evaluations.

**Reviewer’s Comments:** There’s an old surgical axiom that bilious vomiting in a neonate indicates intestinal obstruction until proven otherwise. This study verifies that this one colorful symptom must be taken very seriously, because 14 of 61 patients (23%, or nearly 1 in 4) had a surgical problem. That is too high a number to think about "watchful waiting" as a strategy, particularly if the patient did have a case of malrotation with midgut volvulus. In this worst-case scenario, unless an aggressive diagnosis is pursued, midgut ischemia may progress with catastrophic results. This study also highlights the importance of not necessarily being reassured by a plain abdominal x-ray, because the sensitivity is quite low. By the way, what color is bile? In a 2006 *British Medical Journal* article, investigators asked parents and general practitioners (GPs) to state just that—the color of bile. Over one half of parents and one quarter of GPs did not know that bile was green. So, when you’re taking your history about vomitus color, don’t use the term "bilious" but do ask about "green." (Reviewer-Mark F. Ditmar, MD).

© 2010, Oakstone Medical Publishing

**Keywords:** Bilious Vomiting

**Print Tag:** Refer to original journal article
Researchers Study the Cognitive, Behavioral Outcomes of Healthy Late-Preterm Infants

Long-Term Cognition, Achievement, Socioemotional, and Behavioral Development of Healthy Late-Preterm Infants.

Gurka MJ, LoCasale-Crouch J, et al:

Arch Pediatr Adolesc Med 2010; 164 (June): 525-532

The long-term cognitive and behavioral outcomes for healthy late-preterm infants are not meaningfully different than for full-term infants.

Objective: To prospectively compare the cognitive and behavioral outcomes of healthy late-preterm infants 34 to 36+ weeks’ gestational age (GA) with full-term infants from ages 4 to 15 years.

Methods: The cohort was recruited from 8986 mothers who gave birth at 10 United States sites in 1991. A total of 5416 mothers agreed to participate and were eligible. Of these mothers, 3015 (56%) were randomly selected for a telephone interview. Families were excluded if the infant had been hospitalized >7 days, if the infant or mother was seriously ill, if the mother was known to be addicted to drugs or alcohol, if a chromosomal abnormality was evident at birth, or if there was a congenital defect causing a developmental handicap or disfigurement, cerebral palsy, or a congenital infection. A total of 1526 remained eligible. Of these, 1364 completed the home interview at 1 month after birth, and 1056 remained enrolled 15 years later. Outcomes were measured by Woodcock-Johnson Psycho-Educational Battery-Revised, the Child Behavior Checklist, the Social Skills Rating System-Teacher Form, and the Student-Teacher Relationship Scale.

Results: Of 1348 children whose GA was collected and whose mothers were interviewed when the child was 1 month of age, 53 (4%) were born after 33 and before 37 weeks. The authors compared the late-preterm children with the full-term children longitudinally through age 15 years. Cognitive and achievement scores, rates of behavioral problems, measures of child-teacher conflict, or school referrals for social services or special education were not clinically or statistically significant between groups.

Conclusions: Healthy late-preterm infants' long-term cognitive and behavioral outcomes are not meaningfully different than the outcomes of full-term infants. The sample size of late-preterm children was relatively small (n=53), but the narrow 95% confidence intervals for outcomes measured suggest no clinically meaningful differences. The authors take care to emphasize that this study’s results should not be extrapolated to all late-preterm infants, just to those identified as healthy in the newborn period. Previous studies examining these issues have demonstrated modest increased probabilities in cognitive or behavioral difficulties, but the authors report that most all of the statistically significant results were not very clinically meaningful (odds ratios, <1.5).

Reviewer’s Comments: Although the increased morbidity and mortality of late near-term infants has been well documented, it is also helpful to examine those late-preterm infants with an uneventful neonatal course. Physicians and parents of such children should be happy to hear of evidence for the commonly held belief that these children do not suffer meaningful long-term cognitive or behavioral difficulties any more often than ex-full-term children do. (Reviewer-Daniel Coghlin, MD).

© 2010, Oakstone Medical Publishing

Keywords: Cognitive, Behavioral Outcomes

Print Tag: Refer to original journal article
Many Infants With Congenital Central Hypopituitarism Will Have Normal NBS Results

Newborn Screening Results in Children With Central Hypothyroidism.
Nebesio TD, McKenna MP, et al:
J Pediatr 2010; 156 (June): 990-993

A normal thyroid newborn screening result does not rule out the presence of congenital central hypopituitarism.

**Background:** Children with congenital hypothyroidism are identified through newborn screening (NBS), but some with hypothyroidism caused by central hypopituitarism may be missed by certain screening methods.

**Objective:** To compare the NBS results among children with and those without congenital hypothyroidism from a combined thyrotropin and thyroxine (T4) screening method.

**Participants/Methods:** Children with central hypothyroidism at Riley Hospital for Children in Indiana were identified through a chart review. Children with congenital central hypothyroidism and available NBS results were included in the study. A low T4 level (T4 reference range, 5.0 to 25.0 mcg/dL) with an inappropriately normal thyrotropin level was considered an abnormal NBS result consistent with central hypothyroidism. The authors compared NBS results and clinical characteristics between infants with normal and those with abnormal NBS results.

**Results:** 42 patients (52%, male; average age, 8.9 years) met inclusion criteria and had NBS results available. Of the patients, 98% had multiple pituitary hormone deficiencies. A total of 34 children (81%) had normal NBS results, and 8 had abnormal NBS results with higher mean T4 levels (9.8 vs 3.7, \( P < 0.001 \)). TSH levels were in the reference range in both groups; however, there were no differences in the proportions of children with normal and those with abnormal NBS results who exhibited signs and symptoms of hypopituitarism. All children with abnormal NBS results had abnormal MRIs; 91% of children with normal NBS results had either abnormal MRIs or CTs. In both groups, 50% had pituitary hypoplasia on imaging. All children with abnormal NBS results had a prolonged neonatal hospitalization (>72 hours) compared to 76% of those with normal NBS results. Children with normal NBS results had a longer time until the endocrine consult (17.0 vs 4.6 days; \( P = 0.037 \)). Most often they were referred for vision problems, nystagmus, or optic nerve hypoplasia (41%), short stature and poor growth (21%), hypoglycemia (15%), or micropenis (15%). Of note, developmental delay was more prevalent among these children with normal NBS results (56% vs 25%; \( P = 0.115 \)).

**Conclusions:** Infants with congenital central hypothyroidism can have normal NBS results and take longer to be referred to a specialist despite the presence of clinical characteristics consistent with congenital hypopituitarism.

**Reviewer's Comments:** Despite its excellent performance, NBS is not perfect, especially when it comes to screening for congenital hypothyroidism. The practicing physician should heed these results when they are evaluating children in whom they suspect congenital hypopituitarism. One should never be reassured by normal NBS results when confronted with suspicious clinical signs and symptoms. The message here is, when suspicious, test! (Reviewer—Beth A. Tarini, MD).

© 2010, Oakstone Medical Publishing

Keywords: Congenital Central Hypothyroidism, Newborn Screening

Print Tag: Refer to original journal article
Childhood hardships have long-term repercussions on birth outcomes, partially through an increase in maternal smoking during pregnancy.

**Background:** There is an increasing body of evidence that points to a link between maternal psychosocial stressors during pregnancy and poor birth outcomes. It is possible that stressors and hardships that occur early in life may lead to worse birth outcomes. It is unknown whether childhood hardships change biological factors that directly affect fetuses or whether hardships lead to behavior changes and, therefore, indirectly affect how fetuses develop.

**Objective:** To determine if there is a relationship between childhood hardship and later birth outcomes in women.

**Design/Methods:** Analysis of data collected for the National Child Development Study, a cohort study of children born in the United Kingdom in 1 week in 1958. Originally, >18,000 participants were enrolled. They were followed up at ages 7, 11, 23, 33, and 41 years. Almost three quarters of participants still had data available in the last 2 time points. At these times, participants were asked if they had ever been pregnant. If they had been pregnant, additional questions were asked about outcomes of the pregnancy. Specifically, the main outcomes of interest were premature birth (>3 weeks early), low birth weight (<2500 g), or smoking in pregnancy. The exposure of interest was childhood hardship as measured at the 7-, 11-, or 16-year-old visit. These included financial problems, lack of parental interest in education, violence, mental health issues, family dysfunction, or family structure.

**Results:** Most women in this study had their first child in their 20s and had 1 to 3 children overall. Hardships ranged from prevalent (30% with fathers not interested in education) to rare (1% had family problems with alcohol). About 6% of births resulted in a low birth weight baby and 7% in preterm birth. Just under 40% of women smoked during pregnancy. There was a significant association between childhood hardships and smoking during pregnancy (odds ratio [OR] for ≥4 hardships, 2.0). Even after adjusting for smoking and socioeconomic status in adulthood, childhood hardships were associated with low birth weight (OR, 1.5) and preterm birth (OR, 1.4).

**Conclusions:** Childhood hardships have long-term repercussions on birth outcomes. Some of this is due to increased smoking during pregnancy in women who have had hardships in childhood. Even after controlling for this, however, women who had childhood hardships still had increases in low birth weight and preterm births.

**Reviewer's Comments:** It is stunning to realize exactly how much damage childhood hardships can do to long-term outcomes. Here we see that they not only affect a girl as she grows but also her future pregnancies and, perhaps, children. (Reviewer-Aaron E. Carroll, MD, MS).

© 2010, Oakstone Medical Publishing

Keywords: Hardship, Pregnancy, Smoking

Print Tag: Refer to original journal article
MRI can be a safe procedure for very low birth weight infants who are stable.

**Background:** Many very low birth weight (VLBW) babies have neurologic sequelae. Ultrasound, the traditional imaging modality, has poor sensitivity for detection of white matter injury. Head MRI is more sensitive and specific, but obtaining MRIs for VLBW infants is complicated, as these babies are prone to hypothermia, hemodynamic instability, and respiratory instability. MRI scanners are not usually in close physical proximity to the neonatal intensive care unit (NICU); therefore, patient stability during transport is of concern.

**Objective:** To evaluate the safety of MRI in VLBW infants in a hospital where the MRI scanner and the NICU were not close together.

**Methods:** 33 VLBW infants in the NICU underwent 2 MRI scans. One MRI was performed in the first 10 days of life, and the second was performed when the infant reached term gestation. Babies with hemodynamic or respiratory instability were excluded, or the scan was postponed. Infants were transferred to the MRI scanner in a transport incubator, placed into the bore of the magnet on a gel mattress pre-warmed to 37-degrees C under a blanket that kept the baby in position and maintained body temperature. No sedation was needed. Ear plugs and neonatal noise-attenuating ear muffs were placed. During the scan, the infant was visible on a screen. Heart rate, temperature, blood pressure, and pulse oximetry were measured before transport, during transport and scan, and after returning to the NICU.

**Results:** 45 scans were performed on 33 infants. Mean birth weight was 1258 g, and mean gestational age at birth was 29.5 weeks. Median age was 6.6 and 50.4 days for the early and term scans, respectively. Infants were in the bore of the magnet for a mean 13 minutes. They were out of the NICU for 26.8 and 22.5 minutes for the early and term scans, respectively. Two infants were receiving mechanical ventilation, 2 continuous positive airway pressure, 9 nasal cannula, and 33 room air. There were no changes in any of the measured variables in any of the scans.

**Conclusions:** MRI is a safe procedure for stable VLBW infants, even in hospitals that do not have a scanner close to the NICU or MRI-compatible incubators.

**Reviewer's Comments:** The advantage of ultrasound is that it can be used at the bedside for critically ill infants. I was hoping this study would discuss use of MRI scanning in these infants; however, the exclusion of unstable infants, while understandable, makes the results a bit underwhelming. Because periventricular leukomalacia is generally a later finding, it may be acceptable to wait until the infant is stable to get the MRI. This study, however, does not make me feel more comfortable about transporting a critically ill premature infant for an MRI. (Reviewer-Rachel Moon, MD).

© 2010, Oakstone Medical Publishing
In a recent study, over 4 in 10 patients who failed conventional cardiopulmonary resuscitation (CPR) after an in-hospital arrest and who were treated with extracorporeal membrane oxygenation-CPR survived to hospital discharge.

**Objective:** To review the outcomes and factors associated with survival in children treated with extracorporeal membrane oxygenation (ECMO) resuscitation during cardiopulmonary arrest.

**Methods/Participants:** The authors sought to describe the types of patients treated with ECMO-cardiopulmonary resuscitation (CPR), also termed E-CPR, as well as to determine trends in its use and factors associated with survival after its use. They used an American Heart Association multicenter database incorporating 285 hospitals that rigorously documents adult and pediatric in-hospital cardiac arrests. They studied pre-arrest and arrest variables. Primary outcome was survival to hospital discharge with a secondary diagnosis of neurologic status after ECMO at discharge. Data were included for events occurring from 2000 to 2007.

**Results:** The authors found >6200 reported cardiorespiratory arrests. A total of 199 (3.2%) had used extracorporeal CPR, which does involve instituting ECMO during the continuation of active chest compressions. Of these E-CPR patients, 44% (87 of 199) survived to hospital discharge. The authors argue that these patients would have died without E-CPR intervention. Of 59 patients who had neurologic status determined by a standardized scale, 95% had a favorable outcome. ECMO patients who were less likely to survive were those with pre-existing renal insufficiency, those with arrest abnormalities with metabolic or electrolyte abnormalities, and those for whom sodium bicarbonate was used during resuscitation. Survival was increased with ECMO if the patient had pre-existing cardiac illness.

**Conclusions:** Over 4 in 10 patients who failed conventional CPR after an in-hospital arrest and who were treated with E-CPR survived to hospital discharge, with the majority having a favorable neurologic outcome. Patients with pre-existing cardiac illness were more likely to survive after treatment with ECMO.

**Reviewer's Comments:** Why should cardiac patients be more likely to survive? The authors hypothesize that these patients have less cardiopulmonary reserve. Their problem, being primarily cardiac, may result in less dysfunction of other organ systems at time of arrest. This is akin to the fact that adults survive arrests outside the hospital better than children. Children become hypoxic before the arrest, whereas adults arrest before hypoxia due to heart attacks or ventricular dysrhythmias. The fact that patients with metabolic abnormalities (often metabolic acidosis) did more poorly supports the idea of significant hypoxia as a major risk factor for non-survival. The authors can make no blanket statement about use of ECMO due to the retrospective nature of the study. Where ECMO as a resuscitation tool was once considered extreme, this study shows that it is being increasingly used to provide blood flow and oxygenation when conventional CPR is not succeeding. A longer follow-up is needed. (Reviewer-Mark F. Ditmar, MD).

© 2010, Oakstone Medical Publishing

Keywords: Extracorporeal Cardiopulmonary Resuscitation

Print Tag: Refer to original journal article
Objective: To determine reasons for parent satisfaction or dissatisfaction after medical clinic visits. Setting: University of California San Francisco pediatric ambulatory clinics and hospital.

Design/Methods: Parent/guardians in the waiting rooms of pediatric ambulatory clinics were asked to complete a patient satisfaction survey. Random clinic sessions were selected to get a sample size. There were English and Spanish versions of the survey. The survey was voluntary and did not affect their care if they elected not to complete the survey. There was no compensation for filling out the survey. The sites that were selected included 3 sites at the medical center that total 32,000 visits per year. The majority of children seen at these sites had public health insurance. The following questions were asked: the name of the physician who provided care, parking difficulty, if a medical student was involved with the care, and time elapsed from when they saw the receptionist to the time the visit was concluded. They were also asked if they would recommend a friend to this doctor. A clipboard with a timer measured the elapsed time. Patents were asked to write the name of their physician. The level of parking difficulty was based on a 6-point scale. A "yes" or "no" or "do not recall" question was asked if a medical student was involved in the care. The "refer a friend" question was a measure of satisfaction with the visit.

Results: The study period was over 18 months, and there were 1005 participants. A total of 92% were satisfied with the visit. There were 29% who had a medical student participate in the visit. A total of 72% had difficulty with parking. When looking at multivariate analysis of the data, parents who remembered the name of the physician were more likely to be satisfied. Dissatisfaction was significantly associated with poor parking and longer visit duration. The odds ratio for dissatisfaction increased for every 15 minute of extra wait time. In the urgent care setting, knowing the physician's name increased the satisfaction, but it did not have an effect in a well-care visit setting. Difficulty with parking in the urgent care was significantly associated with being dissatisfied.

Conclusions: Parental satisfaction during an acute care medical visit was positively associated with remembering the name of the physician who took care of their child.

Reviewer's Comments: Now, it is nearly impossible to ask about every facet of the visit and physical setting to see what would help a parent be more satisfied. For an urgent or sick visit, simply introducing yourself can help increase the likelihood that your patient might refer a friend to your practice. To assume the nurse or medical assistant has already introduced the physician may not be enough. There was no surprise that increased wait times and poor parking were associated with dissatisfaction. (Reviewer-Charles I. Schwartz, MD).

© 2010, Oakstone Medical Publishing

Keywords: Parental Satisfaction

Print Tag: Refer to original journal article
Battery Ingestions Have Become More Serious Due to Changes in Technology

Emerging Battery-Ingestion Hazard: Clinical Implications.
Litovitz T, Whitaker N, et al:

Pediatrics 2010; 125 (June): 1168-1177

Although battery ingestions have not necessarily become more common, they have become more serious over time due to changes in technology.

**Background:** Prior research investigated the outcomes of cases of battery ingestion. The vast majority led to no significant sequelae—no deaths and only 0.1% with major effects. Batteries that posed the greatest risk were button batteries, but smaller ones passed through the body with no intervention once they moved beyond the esophagus. Battery technology has evolved over the last 2 decades, and the nature of ingestions may have changed.

**Objective:** To determine the trends of battery ingestion outcomes as well as predictors of more serious sequelae.

**Design/Methods:** This was a retrospective analysis of 3 data sources. The first was the National Poison Data System, which contained >56,000 button battery ingestion cases from 1985 to 2009. The second was the National Battery Ingestion Hotline, which included >8468 battery cases, both button and cylindrical, from 1990 to 2008. Finally, the medical literature was examined for fatal or major outcome cases of battery ingestions.

**Results:** Button battery ingestion remained somewhat consistent over the study period, with a range of 6.3 to 15.1 ingestions per million population. Just over two thirds of ingestions were in children aged <6 years, and an additional 20% were in children ages 6 to 19 years. Ingestions that led to clinically significant outcomes were rare (1% of cases), but the percentage more than quadrupled from the first 3 years of the analysis to the last 3 years. In fact, when the analysis was restricted to the most serious outcomes, major or fatal outcomes increased about 6.7-fold in the last 3-year period compared to the first 3-year period. Cases involving batteries from 20 to 25 mm increased from 1% to 18% of ingestions, which parallels the increase in ingestions involving lithium-cell batteries. The most severe outcomes were associated with 20-mm lithium cell batteries. Almost all (92%) of the fatal and the majority (56%) of the major outcome cases were unwitnessed. Severe burns usually occurred within 2.0 to 2.5 hours. A significant number of cases with the worst outcomes were initially misdiagnosed.

**Conclusions:** Although battery ingestions have not necessarily become more common, they have become more serious over time due to changes in technology.

**Reviewer's Comments:** There have been changes in the technology of batteries, and we have to adapt protocols to make sure we are handling battery ingestions adequately. The number of cases of battery ingestions has remained stable over time, but outcomes have worsened. This is likely due to the increased number of lithium-cell batteries involved in ingestions. Treatment guidelines need to promote expedited removal from the esophagus to prevent burns as well as a higher concern for delayed complications and lower threshold to get radiographs to confirm the diagnosis. (Reviewer-Aaron E. Carroll, MD, MS).

© 2010, Oakstone Medical Publishing

Keywords: Battery, Ingestions

Print Tag: Refer to original journal article
Increased Bacterial Resistance to a Particular Antibiotic Persists for Up to 1 Year

Effect of Antibiotic Prescribing in Primary Care on Antimicrobial Resistance in Individual Patients: Systematic Review and Meta-Analysis.

Costelloe C, Metcalfe C, et al:

BMJ 2010; 340 (May 18): c2096-c2107

Individuals prescribed antibiotics are significantly more likely to develop resistance to that antibiotic; the effect is greatest in the first month after therapy but potentially persists for up to 1 year.

Objective: To evaluate the effect of antimicrobial use on subsequent antibiotic resistance for individuals in primary care.

Design: Systematic review with meta-analysis that included 24 studies, 19 of which were observational and 5 of which were randomized trials. The studies incorporated a variety of sampled bacteria from patients with urinary tract infection, respiratory tract infections, otitis media, and asymptomatic volunteers.

Methods: A wide variety of antibiotic exposures were also analyzed. In most of these studies, bacteria were sampled at the start of therapy and at different times ranging from <1 month to 1 year following antibiotic consumption. The authors calculated odds ratios to determine the likelihood of the patient developing or maintaining resistant bacteria over a period of time.

Results: In the treatment of urinary tract infections, patients on antibiotics were 2.5 times more likely to have resistant bacteria at 2 months, which decreased to 1.33 times more likely at 1 year. For respiratory infections, the 2-month number was similar, 2.4 times more likely, but resistance continued unchanged at 1 year. In the only prospective long-term study, resistance was 12.0 times more likely at 1 week and fell to 6.0 times more likely at 1 month and 2.2 times more likely at 6 months. The greater the number or duration of antibiotics prescribed in the previous 12 months, the greater was the likelihood that resistant bacteria would be isolated from the patient.

Conclusions: Individuals prescribed an antibiotic for either a respiratory or urinary tract infection develop bacterial resistance to that antibiotic. Although the effect is greatest in the first month immediately after treatment, the effect may persist for up to 12 months. Not only does antibiotic use increase the population carriage of organisms resistant to first-line antibiotics, but conditions are thus created for possible increases in the use of second-line antibiotics in the community.

Reviewer’s Comments: This study attempts to quantify the increased resistance risks in individuals. It appears this resistance persists for as long as 12 months. Certainly, as pediatricians who deal with issues of day care, we must be mindful of the fact that resistance is carried on plasmids which can be transferred between commensal organisms and potential pathogens among patients. It has been demonstrated that resistant organisms increase in the nares of untreated day-care attendees when a playmate is treated with an antibiotic. Be mindful that antibiotic resistance in the individual does increase for up to a year after treatment when you are weighing the pros and cons of antibiotic use for borderline indications. (Reviewer-Mark F. Ditmar, MD).

© 2010, Oakstone Medical Publishing

Keywords: Antimicrobial Resistance

Print Tag: Refer to original journal article
Is Behavior Therapy Beneficial for Children With Tourette Disorder?

Behavior Therapy for Children With Tourette Disorder: A Randomized Controlled Trial.

Piacentini J, Woods DW, et al:

JAMA 2010; 303 (May 19): 1929-1937

Comprehensive behavior therapy offers benefit over conservative therapy and education for the treatment of Tourette disorder.

**Background:** Tourette disorder affects 1 to 10 per 1000 school-aged children and may be associated with considerable impairment and social isolation. Treatment with antipsychotic medication is fraught with unacceptable side effects. Long-term data on the efficacy of medical therapy are limited. Habit reversal training, which recognizes the effect of situational factors and internal experiences of premonitory urges, seems to be a promising therapy.

**Objective:** To measure the efficacy of a comprehensive behavioral intervention for tics (CBIT) in reducing the severity of tics in children and adolescents with Tourette disorder.

**Design:** Randomized, observer-blind, controlled trial.

**Participants:** 126 children ages 9 to 17 years.

**Methods:** Eligibility included severity that was moderate or greater, fluency in English, and IQ >80. Children with co-morbidities (such as attention-deficit hyperactivity disorder) or those on a stable dose of medications were permitted to enroll. Children were randomized to receive CBIT or control treatment, which involved supportive psychotherapy and education. CBIT, or habit reversal training, involves tic-awareness and competing-response training. The former requires self-monitoring and recognition of premonitory urges that lead to tics. The latter involves engagement in a competing voluntary behavior to suppress each of the tics. For example, slow rhythmic breathing is used to compete with vocal tics. Children were praised for using this intervention, and parents were taught to manage their reactions. Eight sessions were offered over 10 weeks. Primary outcome assessments were the Yale Global Tic Severity Scale Total Tic score and the Clinical Global Impressions-Improvement scale.

**Results:** Most of the children were boys (78.6%) and white (84.1%). Medications were being given to 36.5% of children. Discontinuations were 8% and 11% for the CBIT and control groups, respectively. At 10 weeks, the Yale Global Tic Severity Scale Total Tic score was significantly lower in the behavioral group ($P<0.001$); the difference (4.1, 95% CI: 2.0 to 6.2) was felt to be clinically meaningful. The rate of children showing either very much improvement or much improvement on the Clinical Global Impressions-Improvement scale was 52.5% in the behavioral group and 18.5% in the controls ($P<0.001$). Tic worsening was seen in 6.2% and 1.6% in the CBIT and control groups, respectively. A durable response at 6 months was seen in 87% of those who responded and were available for evaluation.

**Conclusions:** CBIT was more effective at improving symptoms in children and adolescents with Tourette disorder than standard treatment.

**Reviewer's Comments:** This was a well-designed study that was remarkably well received by parents and children based on the low attrition rate and low rate of deterioration. It also gives children an opportunity to develop autonomy in the treatment of this frustrating disorder. The response is similar to that seen in trials studying psychotropic medications, suggesting CBIT is a viable alternative to traditional medical intervention. (Reviewer-Seth L. Schulman, MD).

© 2010, Oakstone Medical Publishing

Keywords: Tourette Syndrome, Behavior Therapy

Print Tag: Refer to original journal article
ED Physicians vs the Computer in Diagnosing Serious Bacterial Infections

The Accuracy of Clinical Symptoms and Signs for the Diagnosis of Serious Bacterial Infection in Young Febrile Children: Prospective Cohort Study of 15 781 Febrile Illnesses.
Craig JC, Williams GJ, et al:
BMJ 2010; 340 (April 20): c1594

Compared to a computerized model to distinguish serious bacterial illness (SBI) from non-bacterial illnesses, ED physicians underestimate the likelihood of SBI; this suggests a computer-assisted diagnostic tool might increase sensitivity of diagnosis.

Objective: To determine, in an emergency department (ED) setting, how young children with fever are being assessed, and to evaluate the reliability of the clinical evaluation by humans versus a computer-assisted diagnostic tool in distinguishing serious bacterial infections from self-limiting non-bacterial illness.
Participants/Methods: From 2004 to 2006, consecutive children aged <5 years who presented with fever >38 degrees C to a Children's Hospital ED in Australia were enrolled. At start of the study, an electronic template was introduced that included mandatory entry of 40 clinical symptoms and signs that were recorded prospectively and in real time by the ED physician. Following evaluation of the patient, physicians were asked to estimate their impressions on the probability of 1 of 10 potential diagnoses, which included occult serious bacterial infections, clinically apparent infections, and viral illness. These probability assessments were completed before any test results were available. Disposition, use of antibiotics, and subsequent results of cultures were documented. Follow-up by phone was done on patients discharged from the ED.
Results: Among >15,000 patients, 7.2% (1120 of 15781) had either a urinary tract infection (UTI) (3.4%), pneumonia (3.4%), or bacteremia (0.4%). Of these patients with serious bacterial infections, only 66% of those with UTIs, 69% of those with pneumonia, and 81% of those with bacteremia were started on antibiotics at time of evaluation. Data from the electronic clinical indicator panel were compiled to determine an odds ratio of symptoms or signs being indicative of a bacterial process. The most strongly predictive factors were urinary symptoms, an ill appearance, no fluid intake, and temperature above 39 degrees C. Physicians had a low sensitivity (10% to 50%) for diagnosing likely bacterial infections. A computerized diagnostic model did better, providing a higher estimate of risk of serious bacterial infection.
Conclusions: ED physicians tended to underestimate the likelihood of serious bacterial infections, which led to an undertreatment with antibiotics. The authors believed a computerized clinical diagnostic decision model might increase sensitivity for detection of serious bacterial infection.
Reviewer's Comments: The results run counter to a general impression of many pediatricians that children are overtreated with antibiotics when they are seen in an ED setting. The authors note that much of the undertreatment was explained by, although that appropriate tests were obtained (such as urinalysis or chest x-ray), the results were misinterpreted. Interestingly, of those patients with UTIs not treated initially, only two thirds were subsequently prescribed antibiotics. This indicates a possible significant rate of spontaneous resolution. The authors make their case for a computer-assisted system to improve sensitivity compared to physician judgment. As the electronic medical record expands, that will not seem so far-fetched. (Reviewer-Mark F. Ditmar, MD).

© 2010, Oakstone Medical Publishing

Keywords: Fever, Serious Bacterial Infection

Print Tag: Refer to original journal article
Overall complication rates are no different between the Nuss and Ravitch procedures for pectus excavatum repair.

**Background:** The Ravitch procedure for pectus excavatum (PE) involves resection of the deformed cartilages with a sternal osteotomy and anterior fixation to the sternum. This was the main procedure used to correct PE in the last 50 years. The Nuss procedure started in 1998 and is a minimally invasive procedure using a thoracoscope that through 2 small incisions in the side of the chest a concave bar is guided underneath the ribs. When it is flipped, the chest wall is pressed out anteriorly and the bar is fixated to the ribs with a stabilizer.

**Objective:** To compare the complication rates of the Nuss and Ravitch techniques for repairing PE.

**Methods:** The authors looked at studies using the Nuss and Ravitch procedures for PE. The studies were used for comparison if they were case-controlled, prospective, retrospective, or cohort studies. Primary outcome for this study was complication rates. Secondary outcomes were days of hospitalization, duration of surgery, time to ambulation, pain management, and patient satisfaction. There were no randomized trials, but there were 9 prospective and retrospective studies included for this study.

**Results:** There were no significant differences in overall complication rates between the techniques. Specific complications from surgery were evaluated, such as rates of reoperation, pneumothorax or hemothorax, or blood transfusion. The rate of reoperation was higher in the Nuss procedure due to bar migration or persistent deformity. The incidence of hemothorax and pneumothorax was higher in the Nuss procedure group. There was no difference in blood transfusion rates between the different operations. The Ravitch procedure was longer by an average of 70 minutes. The authors found no difference between length of hospital stay and time to ambulation. Because of different types of pain management within the 9 studies (epidural, intravenous, oral), it was difficult to have a true comparison between pain needs after the specific procedures. Patient satisfaction with the cosmetic results after the 2 techniques showed no significant differences; 92% in the Ravitch group and 93% in the Nuss group were satisfied with their appearance.

**Conclusions:** The overall complication rates were no different between the Nuss and Ravitch procedure for PE repair.

**Reviewer's Comments:** Parents seem to consult the general pediatrician about surgical procedures. The first answer should be that the overall complication rates were the same for repairing PE. Each procedure has its own issues. There were slightly higher reoperation, hemothorax, and pneumothorax rates in the Nuss procedure group. The Ravitch technique is a longer surgery (just over an hour). (Reviewer-Charles I. Schwartz, MD.)

© 2010, Oakstone Medical Publishing

Keywords: Pectus Excavatum

Print Tag: Refer to original journal article
Some Adolescents May Benefit From Operative Repair of Midshaft Clavicle Fractures

Operative Versus Nonoperative Treatment of Midshaft Clavicle Fractures in Adolescents.

Vander Have KL, Perdue AM, et al:

J Pediatr Orthop 2010; 30 (June): 307-312

Some adolescents may benefit from operative repair of displaced midshaft clavicle fractures.

Objective: To report the outcomes after nonoperative treatment versus operative treatment of displaced midshaft clavicular fractures in adolescents.

Participants/Methods: Adolescents who sustained closed midshaft clavicle fractures were identified consecutively via a trauma registry. Exclusion criteria included open fracture, neurovascular injury, medical contraindication to surgery, and pathologic fractures. Patients were nonrandomly assigned to either the operative group (if their clavicle fracture displacement was 2 cm) or the nonoperative group (if the displacement was 2 cm). Patients in the operative group were treated with nonlocking compression plating. Patients in the nonoperative group were treated with a sling or figure-of-8 brace.

Results: Investigators identified 42 patients (ages 12 to 17 years; mean, 15.4). Of these patients, 17 were treated operatively and 25 were treated nonoperatively. Mean time to radiographic union was significantly quicker for the operative group than for the nonoperative group (7.5 vs 9.9 weeks; \( P =0.003 \)). Patients returned to activity sooner in the operative group than in the displaced-but-nonoperative group (12 vs 16 weeks), but the authors did not report if this result was significant. Both groups had complications. For the operative group, 3 patients (17.6%) chose to have subsequent hardware removal due to local prominence. For the nonoperative group, 5 of 25 (20%) returned within 6 to 24 months with pain or fatigue complaints, presumptively due to clavicular shortening. All of these cases involved the patients' dominant arms. Four of 5 of those patients underwent corrective osteotomy with internal fixation for clavicular shortening and returned to activity an average of 12 weeks later.

Conclusions: Surgical correction of displaced midshaft closed clavicular fractures in adolescents reliably restores clavicular length. Given the small sample size and nonrandomized design of this study, however, it remains controversial whether to recommend primary surgical repair or nonoperative management with secondary reconstruction of symptomatic clavicular malunions (shortening), if indicated.

Reviewer's Comments: This study re-examines the customary practice of nonoperative management of displaced midclavicular fractures in adolescents. The authors report 2 benefits of operative management: quicker radiologic union and much lower malunion rates. These benefits must be tempered by the operative complication of "local hardware prominence," leading to a second surgery for hardware removal in some cases. Furthermore, no follow-up results were reported for the resolution of symptoms in the malunion cases or the resolution of hardware prominence postoperatively. In addition, the authors fail to comment on a potentially important outcome that may guide adolescents' decision whether or not to elect primary surgical repair: the time to return to activity. If the surgically corrected group truly does return to activity a month earlier, that may especially appeal to the competitive athlete. (Reviewer-Daniel Coghlin, MD).

© 2010, Oakstone Medical Publishing

Keywords: Clavicle Fractures

Print Tag: Refer to original journal article
Nutritional labeling on restaurant menus will change the ordering and eating behaviors for at least some customers.

**Background:** A large proportion of food intake occurs in restaurants, and these meals may have higher caloric and fat content than meals eaten at home. There has recently been increasing support for nutritional information to be included in restaurant menus.

**Objective:** To determine if the addition of nutritional information to restaurant menus changes food-ordering patterns.

**Participants/Methods:** 18 locally owned restaurants in Pierce County, Washington, provided health department staff with recipes for all regular menu items. Nutrient values were estimated using standard formulas. Some restaurants changed their recipes or portion sizes after receiving nutritional data. Menus were changed to include nutritional labeling (calories, fat [g], sodium [mg], and carbohydrates [g]) per regular entrée (not daily specials). Six restaurants provided detailed sales data for the month immediately before and the month immediately after nutritional labeling began. In addition, a convenience sample of patrons at these 8 restaurants was surveyed 2 to 12 months after menus were labeled to determine if patrons looked at the nutritional information, understood the information, and if they changed their order based on the information.

**Results:** Approximately 16,000 entrées were ordered from the 6 restaurants during the study period. In 4 restaurants, entrées sold post-labeling had significantly fewer calories. In 5 restaurants, entrées sold post-labeling had significantly lower fat content. The average change in nutritional content post-labeling was 15.0 fewer calories, 1.5 fewer fat grams, and 45.0 fewer milligrams of sodium. There was no change in carbohydrate content of the entrées ordered. There were 206 survey respondents; 55% were female; 48% were ages 18 to 45 years, and 52% were aged >45 years. Approximately one third of respondents changed their order after seeing the nutritional content; 20.4% chose an entrée lower in calories, and 16.5% chose one lower in fat. A total of 71% of patrons noticed the nutritional labeling; however, only 59% of those who noticed and understood the information changed their ordering or eating behavior based on the information. Patrons were more likely to notice the nutritional labeling if they were ages ≤45 years (83% vs 60%; \( P < 0.001 \)).

**Conclusions:** Having nutritional data for restaurant food can affect what is consumed. It may change restaurant behavior (modifying recipes or portion sizes) or patron behavior.

**Reviewer’s Comments:** It is often shocking to discover how many calories are in a typical American meal, particularly those purchased at restaurants, and the wide variability in nutritional value, even in a single menu item. The authors describe that the nutritional value of a Reuben sandwich among the 6 restaurants varied, with ranges of 480 to 1730 calories, 19 to 83 grams of fat, 1770 to 4990 mg of sodium, and 39 to 182 grams of carbohydrates. This type of information will help at least some consumers make healthier choices. (Reviewer-Rachel Moon, MD).

© 2010, Oakstone Medical Publishing

Keywords: Menu-Labeling Program, Restaurants

Print Tag: Refer to original journal article
Ambulatory blood pressures in obese children may be elevated, even in the presence of normal clinic blood pressures.

**Background:** Studies have shown a relationship between obesity and elevated systolic and diastolic blood pressure (BP). The relationship between insulin resistance, often associated with significant morbidity, and BP is less clear. In addition, the effect of masked hypertension, defined as abnormal ambulatory BP (ABP) in the face of normal clinic BP (CBP), has not been studied in broad-ethnic populations.

**Objective:** To study the relationship between ABP, insulin resistance, and body mass index (BMI) in a diverse population of obese children and adolescents.

**Design:** Prospective cohort study.

**Participants:** 43 obese children between 7 and 17 years of age with normal CBP.

**Methods:** Excluded were children with a history of hypertension or diabetes mellitus or those on medications that could affect BP. Children had a detailed history and physical examination, including anthropomorphic measurements. The average of 3 seated BP measurements was used. An oral glucose tolerance test and lipid panel was performed. The homeostasis model assessment (HOMA) to assess insulin resistance using fasting glucose and insulin levels was calculated. Urine was collected for creatinine and microalbumin. ABP was measured over 24 hours, during which time vigorous physical activity was discouraged. Mean daytime, nighttime, and overall BPs were assessed. BP load was the proportion of elevated (>95th percentile) readings, and it was considered abnormal if ≥25%. Nocturnal dipping was calculated to be the difference between daytime and nighttime BPs divided by the mean daytime pressure (x100) and considered normal if ≥10%. Children were divided in a dichotomous manner by BMI, HOMA, ABP load, and nocturnal dipping.

**Results:** The population included 51% Hispanics and 33% African Americans. An abnormal systolic ABP was identified in 14% of children despite normal CBP. The absence of normal nocturnal systolic dipping was seen in 62.8% of children. Those with severe obesity had higher mean 24-hour systolic BP and mean systolic load than those with moderate obesity. Although a higher clinical systolic BP and waist circumference were seen in children at the highest quartile HOMA, no difference in ABP was identified. In multiple linear regression analysis, BMI standard deviation score was associated with mean 24-hour systolic BP. Similar relationships were not seen in diastolic BPs. Tanner 1 children had higher mean 24-hour and daytime diastolic BP compared to children with Tanner stages 2-5. This relationship was not seen comparing sex, race, or age.

**Conclusions:** A significant prevalence of elevated ABP was seen in a diverse population of obese children with normal CBP.

**Reviewer's Comments:** This study is unique in that the minority of children was Caucasian, and the study identified a large population of children with masked hypertension, especially at night. Thus, obese children could be at greater risk for cardiovascular and renal disease than initially considered. (Reviewer-Seth L. Schulman, MD).

© 2010, Oakstone Medical Publishing

**Keywords:** Hypertension, Obesity

Print Tag: Refer to original journal article
In severe-intractable asthma, low-dose erythromycin helps reduce inflammatory mediators and improves bronchial asthma symptoms.

**Background:** In certain patients with panbronchiolitis, low-dose erythromycin suppresses interleukin-8, a neutrophilic inflammation mediator. Asthma is usually caused by an eosinophil inflammatory process. Erythromycin has not been used for patients with asthma, but some studies have shown a positive effect from erythromycin therapy.

**Objective:** To determine the effect of low-dose erythromycin in addition to regular therapies for children with bronchial asthma.

**Participants/Methods:** 55 children with asthma were selected using strict criteria for global initiative for asthma. Children with severe-intractable asthma were selected who had been on inhaled steroids, leukotrienes inhibitors, and theophylline for >1 year. Four patients met criteria for this study. Blood was collected during a stable noninfectious period. Interleukin-8, neutrophil chemokine, eotaxin, eosinophilic chemokines, vasculature endothelial growth factor (VEGF), and other chemical mediators were studied. Low-dose erythromycin was added to the current regimen of inhaled steroids (leukotriene inhibitors and theophylline).

**Results:** Administration of low-dose erythromycin improved the levels in interleukin-8 and VEGF levels. Of 4 children with severe asthma, 3 had delayed theophylline clearance. There were improved symptoms of bronchial asthma.

**Conclusions:** In severe-intractable asthma, low-dose erythromycin helped reduce inflammatory mediators and improved bronchial asthma symptoms.

**Reviewer’s Comments:** Using antibiotics for alternative uses is a different approach for treating asthma. This was a limited study because of the small number of patients and the specific severe asthma types selected. Changes in chemical mediators showed there may be a benefit for those with severely affected asthma. Effect of erythromycin on these mediators could have been from the effect of reduced theophylline clearance and not the antibiotic’s effect directly on these mediators. In practical terms, for most asthma patients who are seen daily in the general pediatric’s office, based on this study, erythromycin would not be recommended. Most asthma patients are mild or moderates and have good control on conventional therapies with inhaled-corticosteroid leukotriene inhibitors and beta-agonists. Expanded use of erythromycin would, in reality, have little effect in these milder diseases and have increased the risks for antibiotic resistance in the asthmatic children population. (Reviewer-Charles I. Schwartz, MD).
There appears to be a relatively low risk of adverse events in children undergoing anesthesia for procedures.

**Background:** Members of institutional review boards (IRBs) are tasked with evaluating potential research to weigh the risks and benefits to participants. To estimate risk, especially to children, they often use evidence from past research to determine the danger from future work. Studies involving radiological studies are very different in adults than in children, and younger patients may require significant anesthesia to undergo imaging. Sedation can vary greatly by protocol and drug.

**Objective:** To determine the incidence of anesthesia-related adverse events (AEs) needing intervention that occurs during sedation for research-driven imaging studies and noninvasive procedures.

**Methods:** Data were abstracted from subject records from imaging studies from 2000 to 2008 approved by IRBs at the National Institute of Health. To be included, these imaging (and non-imaging) studies had to include some sort of anesthesia. Unless contraindicated, propofol was the anesthetic of choice. Data gathered included age, sex, diagnosis, procedure type, physical status, IV line placement, agents and drugs used, time in the postanesthesia care unit, and AEs. AEs were defined as occurrences that warranted intervention and were noted in the record. All records were reviewed by 1 author; if an AE was noted, then the record was also reviewed by an anesthesiologist. Control records were also reviewed by the anesthesiologist. Events were coded in 1 of 3 classes: cardiovascular, respiratory, or miscellaneous.

**Results:** Over the study period, 607 children receiving 1480 anesthetic procedures were identified. Median age was just over 5 years, and 349 (57%) were male. Only 7% of those reviewed had abnormal airways. Average duration of anesthesia was just under 2 hours, and 13% required airway devices. There were 98 AEs that occurred in 79 procedures for an overall rate of ≥1 AEs in 534 per 10,000 procedures. No events had long-term morbidity or mortality. Factors significantly associated with AEs included physical status (odds ratio [OR], 2.9), anesthetic effect duration (OR, 1.5), and airway abnormalities (OR, 4.4).

**Conclusions:** There appears to be a relatively low risk of AEs in children undergoing anesthesia for procedures.

**Reviewer's Comments:** The risk of AEs for high-risk children under anesthesia is low. The risks of long-term sequelae from these events are almost nonexistent. Children with more significant diseases or disabilities, airway abnormalities, and longer duration of anesthetic were more at risk for AEs. Although propofol remains a serious drug, it is good to see evidence that when it is used properly, the risks remain low. It is also essential to have this type of evidence to adequately judge risk when thinking about research in children. (Reviewer-Aaron E. Carroll, MD, MS).

© 2010, Oakstone Medical Publishing

Keywords: Anesthesia, Risks, Sedation

Print Tag: Refer to original journal article
Elbow flexion at age 3 months is a good prognostic sign for brachial plexus palsy.

**Background:** Obstetric brachial plexus palsy (OBPP) occurs in about 2 per 1000 births; fortunately, most babies recover. Since the muscle groups responsible for external rotation of the shoulder and forearm supination are the last to recover, presence of absence of this function at 3 months of age appears to be a good indicator of prognosis.

**Objective:** To study the incidence of OBPP, to follow the recovery process, to assess the function outcome at 18 months, and to find early prognostic indicators.

**Participants/Methods:** Of 38,749 births in Sweden, 114 babies were diagnosed with OBPP. The babies were seen by a physiotherapist at 1, 2, and 12 weeks and at 6, 12, and 18 months. A protocol was used for recording muscle strength, range of motion, and hand preference.

**Results:** 114 infants (2.9%) were initially identified. For children delivered vaginally, the incidence was 3.6%. Six parents did not join the study, and 9 did not complete all the examinations. Records of 5 children did not have information about the examination at 3 months. The result was 93 completed the study. The prevalence of OBPP at 18 months was 0.46 per 1000. At 3 months, 49 (50%) regained full function; at 18 months, 80 (82%) had full function. Of the children, 18 (18%) still had signs of OBPP. Of the babies who regained elbow flexion at 3 months, 100% had normal function at 2 years. When shoulder external rotation and forearm supination were analyzed, the positive predictive values were 99% and 96%, respectively. Sensitivities were 89%, 96%, and 99%. Most common injury site was C5 and C6 (85%). For the 18 children who did not completely recover, the injury site was C5, C6 (3 of 18), C5 to C7 (4 of 18), and 11 of 18 had lesion extending from C5 to T1. Three of 18 had reconstructive surgery at 6 and 10 months.

**Conclusions:** Incidence of OBPP was about 3.0 per 1000, and 0.5 per 1000 still had functional disability at 18 months. Normal or near-normal muscle strength in elbow flexion, shoulder external rotation, and forearm supination at 3 months of age was almost always associated with complete recovery.

**Reviewer's Comments:** Well-constructed study with excellent follow-up provides important information we can provide to parents of a child with arm weakness detected after delivery. Information from the 3-month examination has excellent predictive value. Not included in this study were babies with temporary arm weakness at 24 hours that resolved prior to discharge. These fortunate infants would not have made the study, because the enrollment started at 1 week. Fortunately, today there are centers that perform nerve transplants on infants with major weaknesses. (Reviewer-Charles I. Schwartz, MD).
In severe acute wheezing episodes in children, pathogenic viruses are present in nearly 75%, most commonly respiratory syncytial virus and rhinovirus; however, emerging viruses appear to play an important role.

**Objective:** To estimate the frequency of various viral infections (including some of the recently discovered viruses) that are isolated in hospitalized children with an acute wheezing episode, and to compare clinical and epidemiologic features between traditional and newer respiratory viruses.

**Design/Participants:** Cross-sectional, prospective, descriptive study involving children aged <14 years consecutively hospitalized at a hospital in Madrid, Spain, for acute wheezing from 2005 to 2008.

**Methods:** Children with bronchiolitis, defined as those age <2 years with first-time wheezing, were excluded. Nasopharyngeal aspirates were obtained on admission, and polymerase chain reactions were done to test for human metapneumovirus, human bocavirus, and 14 other respiratory viruses. A variety of clinical data was obtained.

**Results:** 626 episodes of wheezing encompassing 539 patients were analyzed. In 444 episodes (71%), a viral pathogen was identified. The most common was respiratory syncytial virus (RSV) (27%). Other viruses detected included rhinovirus (24%), adenovirus (18%), human bocavirus (16%), and human metapneumovirus (5%). In about one third of cases, mixed viral infections were present. Infants aged <2 years were more likely to have a virus detected (77%) compared to older children (60%). Co-infections were also more common in the younger group (31% vs 19%). There was considerable overlap in clinical characteristics of children with virus-positive versus virus-negative wheezing episodes. Only temperature elevation was greater in those who were virus positive in children aged >2 years.

**Conclusions:** RSV and rhinovirus are the most common viruses found in children hospitalized for wheezing, both younger children and in those aged >2 years. Other viruses, including human bocavirus and human metapneumovirus, also appear to play an important role in wheezing episodes.

**Reviewer's Comments:** The authors are quick to point out that presence of a virus is not proof of its causality for wheezing. In this study, however, nearly three quarters of patients had evidence of a potentially pathogenic virus, which compares to other studies in which only 20% of healthy control groups had evidence of viral presence. An etiologic role is certainly suggested. Interestingly, in this study from Spain, the influenza virus had a very minimal presence in wheezing children: 3% of the time in children aged <2 years and 5% in those aged >2 years. (Reviewer-Mark F. Ditmar, MD).

© 2010, Oakstone Medical Publishing

Keywords: Asthma

Print Tag: Refer to original journal article
Research Shows a Compelling Decline in Rotavirus-Associated Illness After RotaTeq

Reduction in Gastroenteritis in United States Children and Correlation With Early Rotavirus Vaccine Uptake From National Medical Claims Databases.

Cortese MM, Tate JE, et al:

Pediatr Infect Dis J 2010; 29 (June): 489-494

Within 2 years of introduction of the RotaTeq vaccine, there were fewer hospitalizations and office visits for rotavirus-associated illness among infants.

**Background:** The rotavirus vaccine RotaTeq (Merck) was introduced in 2006 with a reported 98% efficacy to prevent rotavirus gastroenteritis (GE) in children.

**Objective:** To determine uptake of RotaTeq and the change in rotavirus disease cases after introduction of the RotaTeq vaccine in 2006.

**Methods:** Claims (commercial payers and Medicaid) from 2 national medical claims databases from 2003 to 2008 were analyzed. Claims contained information on office visits from 70,000 physicians and hospital discharges from 550 hospitals, two thirds with pediatric units and which represent approximately 20% of admissions in the United States. To assess vaccine uptake, authors analyzed Current Procedural Terminology-coded vaccine claims for RotaTeq from third-party payers (ie, none from universal purchase). To estimate uptake of RotaTeq for each birth cohort, they calculated the average rate of RotaTeq vaccination relative to DTaP and then multiplied this by the annual regional uptake of DTaP. To assess the effect of RotaTeq on disease burden, the authors analyzed claims with any type of GE event or rotavirus code. They calculated the rotavirus visit burden by subtracting the number of actual rotavirus visits during rotavirus seasons from the estimated number of rotavirus-associated GE visits during rotavirus seasons. They used the National Respiratory and Enteric Virus Surveillance System to determine the number of months in a region's rotavirus season. They estimated rotavirus visits by multiplying the rate of non-rotavirus GE visits in non-rotavirus seasons by the number of months in rotavirus season.

**Results:** On average, by January 1, 2008, 57% of infants aged <1 year, 17% of 1-year-old children, and <1% of 2-year-old children received RotaTeq. Before introduction of RotaTeq, hospital discharge rates for any GE event ranged from 9% to 19%. Although three fourths of these GE hospitalizations occurred during rotavirus season, only 20% were associated with rotavirus. After introduction of RotaTeq, GE hospital and office visits (per annual non-GE visits) decreased by 90% among infants. A similar reduction was seen among non-infants. Rotavirus-associated hospitalizations decreased by 69% to 81% across regions (South, Northeast, Midwest) and age groups (0 to 5 years). For unclear reasons, the western region had lower reductions in rotavirus visits (~44%). Of note, there was no decrease in rate of GE visits during non-rotavirus season across age groups and regions.

**Conclusions:** By 2 years after introduction of RotaTeq, over half of infants received the vaccine. This uptake was associated with a reduction in number of rotavirus-related hospitalizations and office visits in the 2007 to 2008 season.

**Reviewer's Comments:** In this analysis, the authors demonstrate a compelling decline in rotavirus-associated illness in infants after introduction of RotaTeq. Even more important, though, is that this effect was seen in unvaccinated infants and older children. This finding reinforces the important fact that vaccination protects the community as well as the individual. (Reviewer-Beth A. Tarini, MD).

© 2010, Oakstone Medical Publishing

Keywords: Rotavirus Gastroenteritis, RotaTeq

Print Tag: Refer to original journal article
Study Links Low Levels of Vitamin D to Asthma in African-American Youth

High Prevalence of Vitamin D Deficiency Among Inner-City African American Youth With Asthma in Washington, DC.


Vitamin D deficiency is more prevalent among African-American youth with asthma compared to those without asthma.

**Background:** Low levels of vitamin D have been associated with increased respiratory infections among asthmatics. In addition, both vitamin D deficiency and asthma are more common among African Americans living in urban environments. 

**Objective:** To measure the level of vitamin D deficiency and insufficiency among African-American youth with asthma. 

**Design/Setting:** Case-control study at Children’s National Medical Center in Washington, DC. 

**Participants/Methods:** Cases were African-American children ages 6 to 20 years with physician-diagnosed asthma. Controls were a convenience sample of African-American children ages 6 to 9 years with no history of asthma who were enrolled in an urban bone health study. Levels of 25-hydroxyvitamin D were measured in all children, and vitamin D insufficiency and deficiency were defined as <30 ng/mL and <20 ng/mL, respectively. Authors compared vitamin D levels among cases and controls, and they adjusted for the following confounders: age, sex, body mass index percentile, and season of sampling. 

**Results:** There were 92 cases and 21 controls. Cases were more likely to be male (63% vs 38%) and older (11 years vs 7 years). A total of 86% of cases had insufficient vitamin D levels and 54% had deficient levels. Seasonal variation was noted in vitamin D levels (all samples collected in winter were in the insufficient range). Median level of vitamin D was significantly lower in cases (18.5 vs 40.4; \( P = 0.002 \)). After adjusting for confounders, cases were more likely to be vitamin D insufficient (odds ratio [OR], 20; 95% CI, 1.4 to 272.0) and vitamin D deficient (OR, 42; 95% CI, 4.4 to 399.0). Even after restricting the analysis to children aged <9 years, the authors found similar results. 

**Conclusions:** African-American youth with asthma have lower vitamin D levels and a higher prevalence of vitamin D deficiency than those without asthma. 

**Reviewer’s Comments:** This is an interesting study that links low levels of vitamin D to asthma in African-American youth. In the last year, vitamin D has become somewhat of a wonder vitamin implicated in the healing of wounds, treatment of depression, and prevention of cancer. Now we may be able to add prevention of asthma to that list. But before we do that, more research is needed to determine if low vitamin D levels in asthmatics are a contributor to the severity of their asthma or the result of inhaled and oral steroids, which has been shown in previous studies. (Reviewer-Beth A. Tarini, MD). 

© 2010, Oakstone Medical Publishing

Keywords: Vitamin D Deficiency, African-American Youth

Print Tag: Refer to original journal article
DHA/ARA-Supplemented Infant Formula Protects Against URIs and Allergic Diseases


Birch EE, Khoury JC, et al:

J Pediatr 2010; 156 (June): 902-906

Infants fed docosahexaenoic acid/arachidonic acid-supplemented formula through the first year of life demonstrate delay to diagnosis and decreased number of episodes of many respiratory and allergic conditions.

Background: Long-chain polyunsaturated fatty acids (LCPUFAs) serve as precursors to eicosanoids and docosanoids, which modulate immune cell function and inflammatory responses. Previous studies analyzing breast-milk composition have shown an association between higher levels of docosahexaenoic acid (DHA) and decreased incidence of allergic diseases in young children.

Objective: To assess the effect of infant DHA/arachidonic acid (ARA) supplementation at levels consistent with those in human milk on respiratory infections and allergic diseases through age 3 years.

Design/Participants: Randomized, double-blind, controlled trial examining 2 cohorts of children from a previous study.

Methods: Full-term newborns were randomly assigned feeding regimens of standard milk-based formula or a formula fortified with DHA/ARA, which was given from <5 days of life through 12 months. Primary objective for the original study was to evaluate the effect of LCPUFAs on visual-evoked potentials and various metabolic parameters. For the current study, nurses reviewed patient records for a list of diagnoses, including upper respiratory infection (URI), asthma, bronchiolitis, otitis media, atopic dermatitis, and allergic rhinitis.

Results: 147 patients completed the original study (enrolled from 1997 to 2003). Of these, 89 were eligible for the current medical record review. Of the patients, 51 received control formula and 38 received DHA/ARA formula. Similarities between groups included anthropometric, sex characteristics, family history of allergic diseases, and smoke exposure. After adjusting for covariates, the DHA/ARA group had significantly lower odds of URI (odds ratio [OR], 0.32), wheezing (OR, 0.31), wheezing/asthma/atopic dermatitis (OR, 0.29), or any allergic disease (OR, 0.30). The DHA/ARA group also showed a tendency toward lower episodes of non-allergic respiratory diseases. Total number of doctor visits for illnesses, including URI, asthma/wheezing, atopic dermatitis, or any allergic disease, was higher in the control group versus the DHA/ARA group.

Conclusions: Children given DHA/ARA-supplemented formula in the first year of life demonstrate longer delay to diagnosis and lower frequency of URIs and common allergic conditions up to 3 years of age.

Reviewer's Comments: When the formula companies started promotion of infant formulas supplemented with DHA/ARA, there were little data to support their claims of developmental or immune benefits. There now seems to be mounting evidence that these LCPUFAs may positively influence brain and visual development and modulate immune responses. It should be noted that the design of the original study did not intend to assess the hypothesis that DHA/ARA-supplemented formula would decrease incidence of respiratory and allergic diseases. As such, the next step should be performance of a prospective, randomized, double-blind, placebo-controlled trial of supplemented infant formulas for this purpose. The authors of the current study are employees of Mead Johnson Nutrition (Evansville, Indiana), makers of infant formula, and, therefore, also introduce some bias into the implementation of the study and interpretation of results. (Reviewer-Alyssa Siegel, MD).

© 2010, Oakstone Medical Publishing

Keywords: Early Nutrition, Allergic Manifestations Common Respiratory Illnesses

Print Tag: Refer to original journal article