Rotavirus Vaccine Could Prevent Gastroenteritis Hospitalizations

Burden of Acute Gastroenteritis Hospitalizations and Emergency Department Visits in US Children That Is Potentially Preventable by Rotavirus Vaccination: A Probe Study Using the Now-Withdrawn RotaShield Vaccine.

Tate JE, Curns AT, et al:
Pediatrics; 123 (March): 744-749

The now withdrawn RotaShield vaccine seems to have been very effective in preventing hospitalizations and emergency department visits due to acute gastroenteritis.

Background: The rotavirus vaccine, introduced in 2006, has had a difficult history. Rotavirus accounts for 30% to 50% of hospitalizations for acute gastroenteritis and perhaps even more emergency department (ED) visits. Because rotavirus is not always tested for and detected, data are incomplete. Without knowing the actual burden of rotavirus, it is impossible to determine how the vaccination will affect it.

Objective: To accurately estimate the burden of rotavirus caused acute gastroenteritis hospitalizations and (ED) visits in the United States.

Design/Methods: This retrospective cohort study used data from the Vaccine Safety Datalink project, a collaboration between the Centers for Disease Control and Prevention and several managed care organizations. The cohort studied involved children eligible to receive the RotaShield vaccine in 1998 to 1999. Data on hospitalizations and ED visits were gathered for 2 follow-up periods in 1999 and 2000. Vaccination status was determined by records of administration. The main outcomes of interest included hospital and ED discharges for acute gastroenteritis. Comparison data were gathered during non-rotavirus season and in years after the vaccine was recalled.

Results: During the time of the RotaShield vaccine, almost 65,000 children were eligible to receive it. Approximately 20% received at least 1 dose of the vaccine, 5% received 2 doses only, and 3% received all 3 doses. The effectiveness of the RotaShield series was 83% in preventing hospitalizations for all-cause gastroenteritis, and the effectiveness was 43% against ED visits. Although there appeared to be an increased effectiveness against hospitalizations with increased number of doses, no true effect could be established against ED visits. The number of visits and hospitalizations prevented was greater than the number thought to be caused by rotavirus.

Conclusions: A rotavirus vaccine appears to have been (and would be) very effective in preventing hospitalizations and ED visits for acute gastroenteritis. The percentage of all-cause gastroenteritis caused by rotavirus may be higher than previously estimated. Once again, vaccines appear to work and should be encouraged.

Reviewer’s Comments: We cannot rewrite history, but it seems that the old rotavirus vaccine was very effective. One does not need to do a cost-benefit analysis to show that expensive hospitalizations were decreased by a relatively inexpensive immunization. In some third-world countries where many young children die from rotavirus, the benefit is lives saved rather than decreased hospitalizations. Many experts have opined that the withdrawal of RotaShield was premature; public alarm outweighed the science. Now that we have a new vaccine available, we need to make sure it gets used.

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Does Normal CT of Abdomen Rule Out Appendicitis?

**Suspected Appendicitis in Children: Diagnostic Importance of Normal Abdominopelvic CT Findings With Nonvisualized Appendix.**


Appendicitis can be excluded with a nonvisualized appendix on CT scan in patients with abdominal pain.

**Objective:** To determine if a nonvisualized appendix on CT scan can help exclude appendicitis.

**Methods:** The study was performed over a 4-year period with children presenting to the emergency department with abdominal pain that called for appendicitis to be ruled out. Two certified pediatric radiologists read the films for evaluation of the appendix. CT scans that were normal were included in the study. Normal CT scans were broken down into 3 subsets: nonvisualized, fully visualized, and partially visualized appendices. The scans were compared to outcomes in the hospital on whether appendicitis was actually present. The control group involved patients with either a fully or partially visualized appendix.

**Results:** 156 of 1139 abdominal CT scans were diagnosed as nonvisualized appendix. The control group had 421 patients. There were no differences in age or gender between groups. Two patients had a nonvisualized appendix on CT scan and had appendicitis (1.3% false-negative rate). One patient in the control group developed appendicitis (0.2% false-negative rate). The patient with appendicitis in the control group was taken to the operating room because of the surgeon's concerns. The 2 patients with nonvisualized appendices also went to the operating room within 24 hours due to worsening symptoms; neither appendix was ruptured. There was no statistical significance between the nonvisualized appendix group and the control group.

**Conclusions:** Abdominal CT scans in which the appendix is not visualized have significant negative predictive value for determining if appendicitis is present or not.

**Reviewer's Comments:** Appendicitis is still a difficult diagnosis at times. The use of an abdominal CT scan is a good diagnostic tool to help rule out this disease. Clinical exams and close monitoring of the patient can still be the best test to determine which patients need surgery.

**Additional Keywords:** CT

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Abdominal Pain in Children Can Be Sign of Other Problems

*A Prospective School-Based Study of Abdominal Pain and Other Common Somatic Complaints in Children.*

Saps M, Seshadri R, et al:
*J Pediatr;* 154 (March): 322-326

Abdominal pain is associated with depression, anxiety, and worse quality of life in school children.

**Background:** Abdominal pain (AP) is perceived as an extremely common childhood complaint. However, previous estimates of the prevalence and impact of AP in children have had numerous methodological limitations.

**Objective:** To determine the prevalence and impact of pediatric AP.

**Design/Participants:** A prospective study of third- to eighth-grade students at 2 Chicago public schools.

**Methods:** For 16 to 24 consecutive weeks, children answered weekly questionnaires about the presence and severity of both gastrointestinal (GI) and non-GI symptoms during the previous week. Information about the presence of fever, the child's pain-related behavior, and parent's responses was collected from the parent/caregiver. The children also completed validated questionnaires that assessed depression, anxiety, somatization, quality of life, and pain-coping strategies. Information was collected about school absences, child care arrangements, missed parent work days, and AP medical evaluations. Costs of child care and foregone work earnings were calculated. The authors examined the prevalence, frequency, and severity of AP and examined the association of AP with psychological complaints and school absenteeism. They also calculated the cost of AP on parents' foregone wages and child care expenses.

**Results:** 237 of 495 children (average age, 12 years) were enrolled in the study with 100% retention. The ethnicity of the population was diverse (33% African-American, 22% Latino, and 21% Caucasian). The weekly prevalence of AP was 38%, and 90% of children reported AP at least once. Children who complained of AP at the beginning of the study were more likely to continue experiencing pain. AP persisted for 4 consecutive weeks in 52% and 8 weeks in 24%. AP prevalence varied by month and was more common during winter. Increasing AP severity was associated with higher anxiety and depression scores and worse quality of life; 23% of children missed school for AP without fever at least once during the study, but only 4 children sought medical attention for AP during this time. Ten percent of parents missed work to care for a child with AP, and 3% hired a babysitter to care for a child with AP, resulting in an estimated $313 of lost earnings and $252 in child care expenses.

**Conclusions:** AP is a common and often chronic complaint among school-aged children that may be associated with depression and anxiety, as well as worse quality of life.

**Reviewer's Comments:** This study documents our clinical experience that AP is common and is a chronic complaint among school children. The finding that AP has a seasonal pattern and is more common in winter is interesting but does not help us with clinical management of a patient in our offices. The warning that AP is associated with depression, anxiety, and worse quality of life in school children should alert us to evaluate not only the pain, but also these other problems.

**Additional Keywords:** Somatization

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**Prevalence and Natural History of GER**

*Prevalence and Natural History of Gastroesophageal Reflux: Pediatric Prospective Survey.*

According to this study, approximately 12% of infants met the diagnosis for GER under ROME criteria, and most were symptom free by 12 months of age.

**Background:** Gastroesophageal reflux (GER), a very common condition of infancy, occurs at least once a day in 2 of 3 infants aged 4 months. Unfortunately, many parents think that regurgitation in infants is abnormal. Many studies that have examined the natural history of GER have been cross sectional, meaning that little is truly known about how the condition progresses.

**Objective:** To document the prevalence and natural history of GER in a group of Italian children in the first 2 years of life.

**Methods:** All children from birth to 14 years of age in Italy are enrolled in the National Health Service; every pediatrician is assigned approximately 800 children. Fifty-nine pediatricians agreed to take part in the study. From April 1 to June 30, 2004, each participating pediatrician recorded the number of patients seen and used a ROME II questionnaire to assess infant regurgitation. Those who were diagnosed with GER were re-examined every 2 months until the age of 2 years. The Infant Gastroesophageal Reflux Questionnaire (I-GERQ) was used to score the GER at every visit.

**Results:** Over the 3-month study recruitment period, 2642 infants were enrolled. Of these, 313 infants (12%) received a diagnosis of GER according to ROME criteria. Frank vomiting was seen in 34 of the 313 patients. Data were available on 210 infants until the end of the study period. Regurgitation had ceased in 56 of 210 infants by 6 months of age; in 128 more infants at 12 months; in 23 more at 18 months; and in 3 more by 24 months. At the end of the study, only 1 child had developed gastroesophageal disease with esophagitis; 1 other patient was diagnosed with milk protein intolerance. The I-GERQ score reached 0 after an average of 8.2 months in breast-fed infants and 9.6 months in formula-fed infants.

**Conclusions:** Approximately 12% of infants met the diagnosis for GER under ROME criteria, and most were symptom free by 12 months of age. Only 1 patient was found to eventually have gastroesophageal reflux disease.

**Reviewer’s Comments:** Although we know that GER is common and resolves spontaneously in most infants, it is good to see it confirmed so nicely. Very few infants with GER go on to have pathologic illness. Reading these results may help reduce unnecessary testing and consultations. The next study should determine the cost of evaluating a symptom that should clear for 88% of infants; then we can focus on the remaining 12%.

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Calories Do Matter When It Comes to Weight Reduction

Comparison of Weight-Loss Diets With Different Compositions of Fat, Protein, and Carbohydrates.

Sacks FM, Bray GA, et al:
N Engl J Med; 360 (February 26): 859-873

Reduced-calorie diets combined with intensive support result in modest weight loss in a motivated population regardless of which macronutrient the diet emphasizes.

Background: Many believe that a particular blend of macronutrients in a diet (such as high-protein or low-fat diets) conveys intrinsic advantages for weight loss.

Design/Objective: This study prospectively compared, over a 2-year period, diets containing different ratios of proteins, fat, and carbohydrates to determine if a certain blend of the 3 was better for adults than others.

Methods: The authors randomly assigned adults to 1 of 4 diets with the percentages of energy from fat, protein, and carbohydrates, respectively, as follows: 20%, 15%, and 65%; 20%, 25%, and 55%; 40%, 15%, and 45%; and 40%, 25%, and 35%. Participants were offered group and individual instruction throughout the study. The primary outcome measured was a change in body weight after 2 years. Major exclusions for participation included insufficient motivation for weight loss as assessed by interview and questionnaire, diabetes, unstable cardiovascular disease, and medications that affect body weight.

Results: Of the 1638 participants who were screened, 50% met eligibility criteria and were assigned to a diet. The average weight loss of the 80% of subjects who completed the trial was 4 kg. Peak weight loss occurred after 6 months, but participants slowly regained weight over the last 12 months of the study. There was no significant difference in weight loss among the 4 diet groups. Satiety, satisfaction with the diet, and attendance at group sessions were similar for all diets. Attendance at the group sessions was strongly associated with weight loss (0.2 kg per session attended). The diets improved lipid-related risk factors and fasting insulin levels.

Conclusions: Reduced-calorie diets combined with intensive support resulted in modest weight loss in a motivated population regardless of which macronutrient the diet emphasized. The strong connection between attendance at group sessions and weight loss suggested that support and acknowledgment of success worked better for weight loss than did the contents of the diets themselves.

Reviewer’s Comments: This study had several limitations. Only half of the screened participants were motivated and healthy enough to qualify for the study, limiting its generalizability. Furthermore, despite the prescribed diets, the actual proportions of fats, proteins, and carbohydrates did not differ much from arm to arm of the study. This shows how difficult it is for even well-supported participants to adhere to a prescribed diet. If participants cannot adhere to a high-protein or low-fat diet over time, what practical distinction could we expect to see from such diets? Also, the slow trend toward regaining weight over the second year of the study suggests weight loss may vanish over time, especially once the support sessions stop. Perhaps community-based or behaviorally focused interventions may have a stronger impact on obesity than cognitive-based strategies, such as prescribed diets.

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Does Smoking Affect Mortality in Obese Individuals?

Combined Effects of Overweight and Smoking in Late Adolescence on Subsequent Mortality: Nationwide Cohort Study.

Neovius M, Sundstrm J, Rasmussen F:

*BMJ*; 338 (b496):

Obesity, regardless of smoking status, represents the greatest increased risk of mortality.

**Objective:** To determine if obesity and smoking have a synergistic effect on long-term mortality.

**Methods:** This study was performed in Sweden, where all men born in 1949 to 1951 had compulsory enrollment in the armed forces in 1969 and 1970; 97% of all men were enrolled in the armed forces. There is a death registry database in Sweden that will link a man's military identification to their cause of death. During their enrollment, all men had their weight and height measured, and self-reported their smoking habits. Body mass Index (BMI) was calculated based on the height recorded when the men were 18 years of age. Men were categorized as either non-smokers, light smokers (1 to 10 cigarettes a day), or heavy smokers (>10 cigarettes a day). Mortality data were recorded from the national cause of death registry.

**Results:** 45,920 men with complete data were included in the study. The incidence of death was highest in obese men and lowest in the normal-weight men. The mortality risk increased with high smoking frequency. The mortality risk with smoking as related to BMI remained the same regardless of smoking habits. There were similar rates of mortality for obese non-smokers and normal-weight heavy smokers. Heavy obese smokers had more than 2- to 5-times the risk of mortality than normal-weight smokers.

**Conclusions:** Obesity regardless of smoking status represented the greatest increased risk of mortality.

**Reviewer's Comments:** Both smoking and obesity are a significant threat to long-term survival. This article illustrates that smoking status is a risk for mortality, yet it did not change the risk in obese males. Some of the limitations of this study are that it was performed only in men and was done in a single country without significant variable genetic make-up. Smoking habits were self-reported and could have been under-reported. This study does not endorse smoking in obese subjects, but obesity risk has a larger role or dominance in determining ultimate long-term mortality.

**Additional Keywords:** Long-Term Mortality

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Delayed Repair of Inguinal Hernias in Infants Increases Risk of Incarceration

Impact of Wait Time on Outcome for Inguinal Hernia Repair in Infants.
Chen LE, Zamakhshary M, et al:
Pediatr Surg Int; 25 (March): 223-227

Prolonged waiting times are associated with an increased risk for incarceration in infants diagnosed with an inguinal hernia, particularly if the initial presentation is incarceration rather than a reducible hernia.

Background: The recommendation of the Canadian Association of Pediatric Surgeons is that infants with inguinal hernias have repairs within 1 week.

Objective: To determine if rates of incarceration and adverse outcomes were related to increased wait times for repair of inguinal hernia.

Design/Methods: A retrospective review was performed of the medical records of all children 24 months of age diagnosed in 2002 and 2003 with an inguinal hernia at the Hospital for Sick Children in Toronto and St. Louis Children's Hospital. A hernia was considered "incarcerated" if the pediatrician or parent was unable to reduce the hernia, and this prompted a visit to an emergency department or surgical clinic. The principle waiting time studied was the time from the initial surgical consultation until surgery for hernia repair.

Results: During the 2-year period, 391 infants (154 in Canada and 237 in the United States) were diagnosed with inguinal hernia. Patients in Canada were slightly older (9.2 vs 6.6 months). In St. Louis, the typical wait time was 27 days versus 99 days for Toronto. Only 20% of patients in Canada met the Canadian Association of Pediatric Surgeons' recommendation of surgery within a week of diagnosis. In the United States, this rate was 32%. However, only 7 of 63 patients (11%) who presented with incarceration in Canada were actually hospitalized, as most hernias were actually reducible by the pediatric surgeon. In the United States, 16 of 26 patients initially seen for incarcerated hernias were admitted. Of patients who presented with incarceration, the wait in Canada was longer than in the United States (60 vs 11 days). Of all patients, no U.S. patients developed incarceration in the interim. However, in Canada, of the 154 patients, 30 (20%) experienced an incarcerated hernia while waiting for repair. Of these, 90% also had an incarcerated hernia as the presenting symptom. Only 3 of 91 infants (3%) with easily reducible hernias at presentation subsequently developed incarceration. Two patients in Canada had intestinal obstruction due to incarceration and bowel resection for necrosis in a strangulated hernia. No cases occurred in the U.S. hospital.

Conclusions: Prolonged waiting times are associated with an increased risk for incarceration in infants diagnosed with an inguinal hernia, particularly if the initial presentation is incarceration rather than a reducible hernia.

Reviewer's Comments: The study demonstrates that you wait with peril if there is a delay in surgery for inguinal hernias in infants. If an infant presents with incarceration, subsequently reduced, the potential for recurrent incarceration during the waiting period is increased 12-fold. Clearly, infants with this presentation, even after reduction, should be placed in a category of higher urgency for repair than those who have a readily reducible hernia.

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History and Physical Best Tools to Diagnosis Crying Infants in ED

The Crying Infant: Diagnostic Testing and Frequency of Serious Underlying Disease.
Freedman SB, Al-Harthy N, Thull-Freedman J:
Pediatrics; 123 (March): 841-848

A thorough history and physical examination is imperative when faced with diagnosing a crying infant.

**Background:** The differential diagnosis of the crying infant who presents to the emergency department (ED) is quite broad, ranging from hunger to a serious life-threatening illness. A previous study recommended fluorescein staining of the cornea, eyelid eversion, and rectal examination in the search for a treatable finding in crying infants.

**Objective:** To identify the rate of serious conditions associated with infants presenting to the ED with crying.

**Design:** Retrospective review.

**Participants:** 238 infants <1 year of age presenting to the ED with crying, irritability screaming, colic, or fussiness.

**Methods:** The primary outcome measure was the proportion of infants with a serious etiology for the crying. A diagnosis of a serious condition was generated prior to the chart review by organ system, such as intussusception, sepsis, and fracture. An additional outcome was the proportion of children with a serious diagnosis not considered on the initial history or physical (H&P) examination and the determination of studies that would yield a high rate of identifying serious conditions. Children were grouped into 1 of 4 categories: diagnosis made on H&P; diagnosis made with test results obtained because the H&P failed to make a diagnosis; diagnosis made based on tests ordered for findings on H&P; and neither H&P nor tests were diagnostic.

**Results:** Males represented 52% of the population, and 55% were firstborn. Most infants (63%) presented between 6 PM and 6 AM. Only 12 of 238 infants (5%) met the criteria of a serious underlying etiology, and 10 of the 12 were correctly diagnosed at the initial visit. The most serious condition was urinary tract infection. Urinalysis and urine culture were the most frequently performed tests. The highest rate of positivity was urine culture in infants aged <1 month (10%). H&P alone positively diagnosed crying in 66.4% of cases. Of the 541 tests performed, only 81 (14.1%) were positive. Only 2 cases (0.8%) were identified on testing in the absence of findings on an H&P. Fluorescein and stool for occult blood testing were performed infrequently and were found to be negative.

**Conclusions:** History and physical examinations are the best tools to diagnose crying infants in the ED. Urine evaluations should be considered in young infants.

**Reviewer's Comments:** Although this study is retrospective, it is refreshing to learn once again that a thorough H&P is far more useful than untargeted investigations, with the possible exception of urine testing in young infants. It was interesting to note the lack of utility of fluorescein testing, once thought to be a test with a high yield in this population.

**Additional Keywords:** Diagnostic Testing

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Can Community Health Workers Reduce Hospitalizations for Asthma?

A Randomized Controlled Evaluation of the Effect of Community Health Workers on Hospitalization for Asthma: The Asthma Coach.

Fisher EB, Strunk RC, et al:
Arch Pediatr Adolesc Med; 163 (March): 225-232

An asthma coach can be beneficial in reducing hospitalizations for asthma in low-income African-American children.

**Background:** Asthma causes significant morbidity and mortality in children each year. Community health workers may help ameliorate the increased burden of asthma on low-income families and children. A number of studies have shown the benefits of community health workers, especially on reduced acute care and urgent care. No evidence exists, however, describing how community health workers might prevent hospitalizations.

**Objective:** To determine if community health workers can reduce hospitalizations for asthma among low-income children of African-American parents.

**Design/Methods:** This was a randomized, controlled trial of parents of children hospitalized in a children's hospital in the Midwest. To be eligible for the study, parents had to be covered by Medicaid, have a child aged 2 to 8 years with asthma, and reside in a zip code area with a largely African-American population. Participants were assigned randomly to 1 of 2 groups. In the intervention group, the parents were assigned an asthma coach, who reinforced asthma education and encouraged better behaviors through telephone calls and home visits. They provided tailored support and were trained to use cooperative and accepting methods to provide a nondirective supportive style. The control group received usual care. The main outcomes of interest included measures of contact between the coaches and parents and rehospitalizations for asthma over a 2-year period.

**Results:** Of the 306 parents who were eligible, 200 were contacted and 191 were enrolled in the study; of these, 97 were randomized to the intervention group and 94 to the control group. In the first 3 months of the intervention, 90% of parents had contact with the coach. On average, there were >21 contacts over the 2-year study. Rehospitalizations occurred in 37% of the intervention group compared to 59% of the control group. This difference was statistically significant even after controlling for confounding factors. The nondirective approach to support was noted as important in surveys of parents receiving the intervention.

**Conclusions:** An asthma coach can be beneficial in reducing hospitalizations for asthma in low-income African-American children. In this study, an asthma coach was successful in making contact with assigned low-income African-American families. Contact with the coach was successful in significantly reducing hospitalizations for asthma in the children of these families. The nondirective approach of these coaches was noted as an important factor in dealing with the families.

**Reviewer's Comments:** Case management through community health care workers has been shown to be beneficial to decrease acute care and urgent care utilization. In this study, it has been shown to reduce hospitalizations as well. How much more evidence do we need?

**Additional Keywords:** Community Health Workers

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Sexual Abuse Findings More Common if Exam Done Within 7 Days

The Timing of Medical Examination Following an Allegation of Sexual Abuse: Is This an Emergency?

Watkeys JM, Price LD, et al:
Arch Dis Child; 93 (October): 851-856

There are differences in findings depending on the time elapsed since an alleged abusive incident. Pubertal and post-pubertal girls are more likely to have abnormal genital signs if examined within 7 days of the last episode of sexual abuse.

**Objective:** To determine the frequency of significant anogenital physical examination findings in relation to the timing of the examination related to the alleged incident.

**Design/Methods:** In this case series from South Wales, children were examined for possible sexual abuse if they had made a disclosure, had symptoms, or if suspicious bruising was noted. The records of all children aged <17 years with alleged sexual abuse from 2002 to 2005 were examined. Diagnostic features involved in this classification included acute lacerations or extensive bruising of the anogenital area, various hymenal abnormalities, or anal dilatation >2 cm without other predisposing factors.

**Results:** 257 children alleged penetrative abuse, either penile or digital. Mean age was 8.8 years, and 82% were girls. In 114 of 257 children (44%), the time since the last alleged abuse was <7 days; in the other 143 children, the time ranged from 7 days to 1 month in most cases (51%) but up to >6 months in 20%. The authors found that, of the 23 children who had alleged penetrative anal abuse within the previous 7 days, 56% (13 of 27) had abnormal findings compared with only 18% (9 of 50) with the alleged abuse occurring >7 days prior to the exam. Of the 92 girls who alleged penetrative vaginal abuse and stated that the abuse took place within the previous 7 days, an exam was abnormal in 50% (46 of 92) compared to 30% (31 of 101) for whom the abuse occurred at >7 days.

**Conclusions:** Differences in findings were noted depending on the time elapsed since an alleged abusive incident. Pubertal and post-pubertal girls were more likely to have abnormal genital signs if examined within 7 days of the last episode of sexual abuse. The data suggest that these findings also apply for suspected abuse with anal penetration.

**Reviewer's Comments:** It makes intuitive sense that the earlier a pediatric patient is seen after an abusive episode takes place, the greater the likelihood that there may be a discovery of an abnormality. The genital area is quite vascular, and healing of lacerations and abrasions can be rapid. How late is too late for a potentially definitive diagnosis? This study found that, if a patient is seen within 7 days after an episode of sexual abuse, the patient is more likely to have significant genital findings. Consequently, there is an urgent need for patients in this time frame to have a thorough evaluation, most ideally by a forensically trained pediatrician. Any unnecessary delays beyond this time frame may result in a falsely unrevealing exam. One note of caution is that the relevance of various exam findings in the anogenital region continues to be the subject of controversy and debate.

**Additional Keywords:** Timing of Examination

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Treatment Rate Declining for Familial Tall Stature in Girls

Referrals for Tall Stature in Children: A 25-Year Personal Experience.
Thomsett MJ:
J Paediatr Child Health; 45 (January/February): 58-63

Over the last 25 years, the decision to treat tall stature has significantly declined, especially in girls.

**Background:** Treatment for tall stature, first implemented in 1956, continues to be offered to families concerned about their child’s self-esteem.

**Methods:** A review of the medical records was conducted for all patients referred for tall stature from 1980 to 2004. All patients were interviewed, underwent physical examination, bone-age radiographs, and calculation of estimated final height (EFH). Parents were encouraged to consider potential advantages and disadvantages, and reported their informed decision at a later visit. Treatment protocols consisted of estrogen combinations for girls and intramuscular testosterone injections for boys. Patients were monitored with measurements every 3 months, and bone age films every 6 months. Final height was defined as no gain in height over a 9-month period or <1 cm height growth over a 12-month period. Patients were advised to return for follow-up in an additional 12 months.

**Results:** Over the 25-year study period, 345 patients were referred for tall stature (70% girls, 30% boys). Familial tall stature was the most common diagnosis (85%), though medical causes included Marfan syndrome, constitutional growth advancement, precocious puberty, Sotos syndrome, Klinefelter syndrome, and nonclassical congenital adrenal hyperplasia (each in small percentages). Sixty-eight families (19.5%) opted for treatment, of which 78% were girls and 22% were boys. Overall, boys and girls presented with similar pretreatment heights, but families of girls opted to start treatment at a lower EFH. Treated children were from tall families, but were predicted as ultimately taller than their parents. Following treatment, there was significant reduction in final height for both girls (approximately 4.2 cm) and boys (approximately 5.1 cm) as compared to EFH. Complications of treatment were reported by 51% of girls and included headache, nausea, and dysmenorrhea; 9.4% of girls ended treatment due to unacceptable weight gain. Thirty-three percent of treated boys complained of acne and edema. From 2000 to 2004, referrals declined by 28% compared to the early years of the study. There was a corresponding decline in treatment that was more marked and statistically significant for girls.

**Conclusions:** Familial tall stature is the most common diagnosis in children treated with sex steroids to curtail height. There is a high risk of mild adverse effects due to treatment. In recent years, referrals and decisions to treat have substantially declined for girls.

**Reviewer’s Comments:** Tall stature, usually addressed in early puberty, raises concerns regarding self-image and social acceptance. Though tall stature has been associated with major depression, the recent decline in referrals and treatment, shown in this study, may reflect changing attitudes toward tallness, especially in girls. The high rate of mild complications and risk of adult fertility consequences (shown in prior studies), should deter further recommendations to pursue hormonal treatment. As a result, increased attention to the mental health needs of adolescents with poor body image concepts will be needed.

**Additional Keywords:** Body Image

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### Best Tx for Severe Ankle Sprains

**Mechanical Supports for Acute, Severe Ankle Sprain: A Pragmatic, Multicentre, Randomised Controlled Trial.**  
Lamb SE, Marsh JL, et al:  
*Lancet;* 373 (February 14): 575-581

Below-knee casting is the most effective treatment for severe ankle sprains.

**Background:** Ankle sprains can range from mild, self-limited injuries (in which the ligament is stretched) to more severe injuries (in which the ligament is torn or ruptured). They can result in long-lasting symptoms and recurrent injury. The traditional treatment of ankle sprains is RICE (rest, ice, compression, and elevation). Lately, however, experts have pushed early mobilization and exercise as a way to improve outcomes.

**Objective:** To compare the effectiveness of various types of mechanical support and immobilization of the ankle.

**Design:** Multicenter, randomized trial.

**Participants:** Patients aged >16 years with severe ankle sprains.

**Methods:** Patients were randomized to 1 of 4 treatment groups for 10 days: Tubular compression (Ace) bandage (provides compression but allows movement), below-knee cast (complete immobilization), Aircast (allows plantar and dorsiflexion, but not inversion/eversion), and short-leg walking boot (complete immobilization, but can be removed). Participants were also provided with elbow crutches, and written and verbal instructions on when to remove the support, regular elevation of the leg, pain control, use of ice, and exercises. Patients were surveyed at 1 month, 3 months, and 9 months after enrolment for pain, symptoms, activities of daily living, ability to play sports, and overall quality of life.

**Results:** 584 patients were enrolled, and 76% completed the study. Serious adverse effects were rare and did not differ among interventions (3 deep vein thromboses, 1 pulmonary embolus, and 2 cases of cellulitis). The Ace bandage and the walking boot were the least effective treatments. At 3 months, patients who had been treated with a below-knee cast had the best outcomes in terms of ankle pain and function, including activities of daily living and sports. The Aircast at 3 months resulted in improved overall function, but not improve pain or the ability to function in daily living and in sports. At 9 months, there was no difference between any of the groups in any of the outcome measures.

**Conclusions:** Severe ankle sprain can be extremely debilitating and can require a prolonged period of recovery. Based on this study, below-knee cast was the most effective treatment, implying that early complete immobilization is likely the most effective strategy for promoting early recovery from severe ankle sprains.

**Reviewer’s Comments:** A cast may be most effective because patients cannot remove it. Once one starts feeling a little better, there is often the temptation to remove the immobilization device earlier than prescribed. This study did not measure compliance with the prescribed treatment. In addition, this study was limited to adults with severe ankle sprains. However, there is growing evidence that post-traumatic joint laxity may be an important factor in development of chronic disability. Complete immobilization may allow the stretched out or torn ligament to heal more rapidly and with a minimum of ligament laxity.

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Atropine Equivalent to Patching in Tx of Moderate Amblyopia in Older Children

Patching vs Atropine to Treat Amblyopia in Children Aged 7 to 12 Years: A Randomized Trial.

Pediatric Eye Disease Investigator Group:
Arch Ophthalmol; 126 (December): 1634-1642

Similar degrees of improvement among 7- to 12-year-olds with moderate amblyopia occur with treatment utilizing patching or atropine.

Objective: To compare the efficacy of atropine versus patching in the treatment of 7- to 12-year-olds with moderate amblyopia.

Design/Participants: Patients between 7 and 12 years were recruited for a multicenter study; all had been diagnosed with amblyopia and had visual acuity in the amblyopic eye between 20/40 and 20/100 (defined as moderate amblyopia) compared with the other eye of 20/25 or better.

Methods: These were quantified using number of letters correctly identified on a Snellen vision chart. Patients were randomly assigned to receive either atropine (1% each weekend day in the sound eye) or patching of the sound eye for 2 hours per day. Adherence to the treatment protocol was evaluated by parental diary. Follow-up was performed at 5 weeks and 17 weeks, with the vision tester blinded to the therapy being done. A change in vision in the amblyopic eye at 17 weeks was the primary outcome measure.

Results: 193 children participated. The mean age in both groups was about 9 years, and approximately 90% in each group completed the study. At 17 weeks, visual acuity had increased in both groups by an average of 7.6 letters in the atropine group and 8.6 letters in the patching group, which after adjusting for baseline acuity was statistically found to be an equivalent change. Also, in 17% of the atropine group and 24% of the patching group, visual acuity improved to 20/25 or better, which was again a statistical equivalent.

Conclusions: Similar degrees of improvement among 7- to 12-year-olds with moderate amblyopia occurred with treatment utilizing either patching or atropine. Visual acuity improvements to 20/25 or better in the amblyopic eye occurred in approximately 20%.

Reviewer's Comments: An estimated 1% to 3% of children have amblyopia. This condition is a decrease in visual acuity (typically in 1 eye) caused by poor visual input into that eye during the critical visual development of early childhood, generally up to 8 years of age. Causes can include refractory problems (the most common category with acuity differences between the 2 eyes), strabismus, or deprivation abnormalities (such as cataracts or corneal opacities). Lack of clear input to an eye over time for any reason can result in vision loss. A key goal for any pediatrician is to identify these patients early. This study team, The Pediatric Eye Disease Investigator Group, had previously shown that both atropine and patching were effective for moderate amblyopia for children 7 to 12 years of age. This paper expands that equivalency of those regimens for older patients as well.

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Even Children With Mild TBI May Experience PCSs

Longitudinal Trajectories of Postconcussive Symptoms in Children With Mild Traumatic Brain Injuries and Their Relationship to Acute Clinical Status.

Yeates KO, Taylor HG, et al:

Pediatrics; 123 (March): 735-743

Pay special attention to children with mild traumatic brain injuries who have anemia, disorientation, or mental status changes.

Background: Nearly 500,000 children experience a traumatic brain injury (TBI) each year. Of these, approximately 90% are considered mild or without sequelae. However, studies have looked predominantly at cognitive function and not postconcussives (PCSs), and those who have looked at PCSs have not stratified outcome groups.

Objective: To evaluate whether mild TBI and clinical findings indicative of brain injury have different associated trajectories of PCSs.

Design: Prospective cohort study.

Participants: Cases were 8 to 15 years old with mild TBI, including those with skull fractures. Controls were 8 to 15 years old, with orthopaedic injuries (OI), specifically an extremity fracture.

Methods: Upon entry into the study, all cases had an MRI performed. Both cases and controls were assessed for PCSs at study initiation, and at 3, 6, and 12 months later. At initiation, all parents of participants completed a retrospective review of pre-injury symptoms. Both groups were assessed for acute clinical features associated with intracranial injury at the time of injury, such as loss of consciousness, a Glasgow Coma Scale score <15, other bodily injury, concussion, amnesia, nausea, vomiting, headache, diplopia, dizziness, disorientation, or other mental status changes. Trajectories were modelled using the PCSs data acquired over 12 months after removing pre-injury symptoms. Associations between trajectories and acute clinical features were evaluated.

Results: 4 trajectories, and, therefore, stratified groups, were determined and labelled as; (1) no PCSs; (2) moderate persistent PCSs; (3) high acute/resolved PCSs; and (4) high acute/persistent PCSs. The odds ratio (OR) of the latter 3 groups were determined against the "no PCS" group, and those participants with mild TBI had a higher OR of being in the high acute/resolved or high acute/persistent groups than the OI controls. Participants in the high acute/resolved or high acute/persistent stratifications were more likely to demonstrate amnesia, disorientation, or mental status changes at time of injury. Additionally, those with loss of consciousness, other bodily injury, nausea, vomiting, dizziness, disorientation or mental status changes at time of injury had a higher OR of being in the high acute/persistent trajectory.

Conclusions: Children with mild TBI, especially those with acute clinical features at the time of injury, have increased PCSs in the first year after injury compared with controls.

Reviewer's Comments: In reading the article, I worried that the investigators altered the definition of TBI by including acute clinical status symptoms. They defined mild TBI and acute clinical signs separately, yet their interpretation of the results and discussion seemed to blur the lines between the 2 and caused me to wonder if the trajectories associated with acute clinical symptoms actually represented moderate TBIs. It would have been helpful had they defined moderate or severe TBI so I could have interpreted the results accordingly.

Additional Keywords: Post-Concussive Symptoms

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More Morbidity Associated With Infant Carrier-Related Falls

Infant Carrier-Related Falls: An Unrecognized Danger.

Greenberg RA, Bolte RG, Schunk JE:
Pediatr Emerg Care; 25 (February): 66-68

Falls from infant car seat carriers are not uncommon and result in more morbidity than other types of falls.

Background: Children falling (a significant cause of head injury) accounts for 5000 emergency department (ED) visits per 100,000 children each year in this country. Although most nonambulatory injuries due to falls are from rolling off a bed or being dropped, a surprising number may be associated with car seats/carriers.

Objective: To determine how young children are injured during use of infant carrier car seats compared to other mechanisms of falls.

Design/Participants: A retrospective case series from a chart review of patients seen in the ED of a tertiary care academic hospital from 2004 to 2005. Eligible children were 18 months of age and presenting to the ED because of a fall.

Methods: The main outcome was the number of injuries sustained from falls from infant car seat carriers and the types of injuries that occurred. A secondary outcome of interest was to compare these patients to similar children with injuries from falls of other mechanisms.

Results: During the study period, 803 patients (mean age, 10.6 months) were identified who met the eligibility criteria. Of the 803 patients, 62 (7.7%) had falls in or from infant car seat carriers. These children had a mean age of 4.4 months. The mechanisms of these falls included falls from a counter (18%), furniture (16%), while carried (15%), and from a shopping cart (8%). Most of these children (87%) were not buckled into the car seat carrier at the time of injury. One-third of these car seat carrier falls resulted in a hospitalization, and 10% resulted in a stay in the ICU. Thirteen of the 62 patients had intracranial injuries, 1 of which required a craniotomy. When compared to children with falls unrelated to car seat carriers, the 62 patients had significantly more intracranial injuries and hospitalizations.

Conclusions: Falls from infant car seat carriers are not uncommon and result in more morbidity than other types of falls. Falls from infant car seat carriers are not uncommon in infants. Injuries sustained from these types of falls are more likely to be serious and require hospitalization than other types of falls. Education and/or prevention programs might help prevent some of these injuries.

Reviewer's Comments: Although falls from car seat carriers are ubiquitous, they are serious and preventable, and they appear to be more dangerous than some other mechanisms. In addition to the danger to the child, the costs of ED visits, imaging studies and hospitalizations add to our health care burden. We need to focus efforts on educating people about the proper use of these devices and the potential dangers that can arise from them.

Additional Keywords: Injuries

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Inexpensive Device Improves Infants' Adherence to Bitter-Tasting Medication

Infant Acceptance of a Bitter-Tasting Liquid Medication: A Randomized Controlled Trial Comparing the Rx Medibottle With an Oral Syringe.

Purswani MU, Radhakrishnan J, et al:
Arch Pediatr Adolesc Med; 163 (February): 186-187

The Medibottle may improve infants' ingestion of bitter-tasting medicine and improve maternal satisfaction with administration of the medication.

**Background:** Medication acceptance by infants is a common and confounding problem. The Medibottle is a $15 bottle with an attachment for a medication syringe that allows a caregiver to depress the syringe in repeated small squirts that coordinates with the infant's drinking the bottle's contents.

**Objective:** To compare the Med bottle to an oral syringe in administering prednisolone to infants <2 years of age.

**Methods:** Hospitalized infants <2 years old who were not breastfed, requiring supplemental oxygen, or prohibited from oral intake were eligible for this study. Participants were assigned randomly to prednisolone via Medibottle or oral syringe (n=38 for each group). Outcome measures included administration of the entire dose, a nurse-assessed infant medication acceptance scale, a rating from a child-life therapist's rating of a video recording of the medication administration, and a maternal satisfaction scale.

**Results:** Infants in the Medibottle arm had clinically and statistically significant better outcomes in nurse-based and child life-based medication acceptance scores, maternal satisfaction (94.6% vs 48.6%), and administration of the entire dose (62.2% vs 31.4%).

**Conclusions:** Use of the Medibottle was more effective at medication administration than the use of an oral syringe. Noting that only 30% of the infants in their study who received prednisolone via oral syringe received the whole dose, the authors suggest that the Medibottle may be particularly important when a high level of adherence is critical. They also remind us that Medibottle is limited to drugs whose absorption is unaffected by food, and that the infant needs to be hungry when taking the dose via the Medibottle. The Medibottle is hand washable.

**Reviewer's Comments:** Any nurse or doctor knows that bad-tasting medications are difficult to administer to infants and toddlers. This small, nonblinded study suggests that a $15 device may make it easier to administer medication and increase maternal satisfaction. Primary care offices might consider purchasing some of these bottles for optional resale to patients' families as the situation arises for them.

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Predictive Factors May Help Identify Osteomyelitis in SCD Patients

Sickle Cell Disease in Children: Differentiating Osteomyelitis From Vaso-Occlusive Crisis.

Berger E, Saunders N, et al:
Arch Pediatr Adolesc Med; 163 (March): 251-255

Five factors can help differentiate osteomyelitis from a vaso-occlusive event in sickle cell patients.

Background: There is no definitive test to differentiate a vaso-occlusive event (VOE) from osteomyelitis in patients with sickle cell disease (SCD). Thus far, small studies have suggested some predictive factors to aid in differentiation.

Objective: To highlight features that SCD patients present with that are predictive of osteomyelitis.

Design: Retrospective case-controlled study.

Participants: Patients 18 years old with SCD.

Methods: Cases were patients with a discharge diagnosis of osteomyelitis and either a positive blood, bone, or joint aspirate culture or a radiographic finding consistent with osteomyelitis. Controls were patients with a discharge diagnosis of VOE. For each case and control, investigators collected data on the duration of pain prior to presentation, the length of fever before presentation, the number of painful sites for each patient, if swelling was noted by the clinician, and the absolute white blood cell count on the day of admission. Cases and controls were compared by these 5 factors. Each determinant also underwent multilinear regression analysis for its predictive capabilities.

Results: When the 5 factors were compared between cases and controls, investigators found that (a) cases experienced more days of pain than controls prior to admission, (b) cases reported more days of fever prior to presentation, (c) cases had fewer painful sites (with a median of 1) versus controls (with a median of 2), (d) physicians more frequently noted swelling of the affected area in the cases versus the controls, and (e) the white blood cell counts were higher on admission for cases compared to controls. Multivariate regression revealed that the presence of each determinant was independently predictive of osteomyelitis in patients with SCD.

Conclusions: The diagnosis of osteomyelitis should be strongly considered in patients with SCD when they present with 1 of the following: increased number of days of fever or pain prior to presentation; decreased number of painful sites; swelling in the affected area; or an elevated white blood cell count.

Reviewer's Comments: The need to be able to differentiate VOE from osteomyelitis in SCD patients is significant. Unfortunately, this study's design prevents us from having confidence in its findings. Because it was a retrospective study, too many variables were left uncontrolled for and, therefore, too many questions remain. For example, how high were the fevers? What level and quality of pain were they experiencing? What was the relative rise in the white blood cell counts of the cases? Did the patients with osteomyelitis think the symptoms were similar or distinct from their "typical" VOEs? Answers to such questions would make the factors found in this study more relevant and manageable to everyday practice.

Additional Keywords: Osteomyelitis vs Vaso-Occlusive Crisis

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Childhood Constipation Triples a Family's Health Care Costs

Health Utilization and Cost Impact of Childhood Constipation in the United States.

Liem O, Harman Jeffrey, et al:
J Pediatr; 154 (February): 258-262

Although it is widely perceived as a benign problem, childhood constipation triples a family's health care costs and nationally adds nearly $4 billion to health care costs.

**Objective:** To estimate costs in the U.S. for children with constipation.

**Design/Participants:** The study utilized data from the 2003 and 2004 Medical Expenditure Panel Survey (MEPS), which is an ongoing nationally representative survey under the auspices of the Agency for Healthcare Research and Quality. A total of 21,778 children, ages birth to 18 years, are included in the group and represent 158 children nationally. Data are collected over a 2-year period in 5 rounds of interviews with the respondents who are required to keep a calendar of medical events and supporting paperwork for those events. Part of this data includes school days missed and workdays missed by caregivers to take care of another ill household member. ICD-9 codes or laxative prescriptions were used to identify children with constipation. Health care service utilization and costs were the primary outcome measures. The services included any physician visits, inpatient or outpatient services, and prescriptions.

**Results:** Extrapolating from the MEPS data, approximately 1.1% of children, or approximately 1.1 million children nationally, reported constipation in the 2-year period of study. No demographic differences were noted between those with and without constipation. In children with constipation, their health care costs were significantly higher at $3430/year compared to $1099/year for those without constipation. When accounting for all children with constipation, this amounts to an additional cost of $3.9 billion/year.

**Conclusions:** Childhood constipation has a significant medical care services utilization and cost, which is approximately 3 times that of those without constipation and a national cost impact of almost 4 billion dollars at least.

**Reviewer's Comments:** This same database has been used previously to study health care utilization costs for children with ADHD, influenza, and behavioral disorders. Although most pediatricians would certainly appreciate the relatively high prevalence of constipation, the relative increase in costs, both individually and by extrapolation nationally, are remarkably elevated. It is a condition with repercussions that may be overlooked by pediatricians due to its relatively high frequency and perception as benign and transient. However, this study shows the financial costs may be quite high. This study did not address other costs, such as physical and emotional distress, which can also be quite high. Additionally, other studies have shown that in approximately one-third of young patients with chronic constipation, the problem extends into young adulthood. Earlier recognition and treatment of constipation appears to result in better outcomes. Pediatricians should take heed.

**Additional Keywords:** Health Utilization/Cost
Folic Acid During Pregnancy Increases Risk of Early Respiratory Dz

*Folic Acid Supplements in Pregnancy and Early Childhood Respiratory Health.*


The use of folic acid supplements in the first trimester of pregnancy confers a slightly higher risk of respiratory tract infection and wheezing in the first 18 months of life.

**Background:** While folic acid supplementation during pregnancy is known to decrease the risk of neural tube defects and other congenital malformations, its influence on early childhood airway inflammation is not known. Methylation, occurring via methyl donors such as folic acid, has a proven impact on the development and function of regulatory T-cells, potentially influencing immune and respiratory diseases.

**Objective:** To assess the relationship between folic acid supplements during pregnancy and the risk of lower respiratory tract infection and wheezing in children <8 months of age.

**Methods:** Data were collected as part of the Norwegian Mother and Child Cohort Study, a population-based cohort study involving 100,000 pregnancies. For this analysis, children born between 2000 and 2005, who had reached 18 months of age, and with mothers who had completed interval questionnaires at specified times during pregnancy were included. Respiratory outcomes included episodes of wheeze and lower respiratory tract infection (LRTI), including respiratory syncytial virus, bronchiolitis, and pneumonia. Exposures to folic acid supplements during and after the first trimester were recorded. Covariates, such as other vitamin supplements, cod liver oil, sex, birth weight, month of birth, maternal atopy, smoke exposure, and breastfeeding were considered.

**Results:** 79.3% of the women took folic acid supplements at some point during pregnancy (22.3% in the first trimester). Compared to children not exposed to folate at any time during pregnancy, LRTIs and wheeze were most strongly associated with supplementation in the first trimester. The relative risks for wheeze, LRTI, and hospitalization for LRTI were 1.06, 1.09, and 1.24, respectively.

**Conclusions:** Exposure to folic acid supplements during pregnancy, particularly in the first trimester, confers a slightly increased risk of LRTI and wheeze in the first 18 months of life.

**Reviewer’s Comments:** The Centers for Disease Control and Prevention recently reported increases in childhood asthma prevalence of 4.6% per year from 1980 to 1997 and a plateau at historically high levels in 2007. The present study suggests that epigenetic mechanisms, factors affecting expression of disease phenotypes, may provide insight into the rising trend. In the U.S., folic acid supplements are universally recommended for women of childbearing age, and flour is generally fortified with folate due to known fetal benefits. The potential influence of higher folate exposure on gene methylation and immune mechanisms has been demonstrated in animal models. While results here show a very modest risk of early respiratory disease, this study adds to the limited data collected in humans thus far.

**Additional Keywords:** Folic Acid Supplements

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Most Children Taking MV Supplements Do Not Need Them


Most children who use vitamin and mineral supplements probably do not need them.

Background: Although vitamin and mineral (VM) supplementation is not necessary or recommended for children who have a varied diet, almost $2 billion are spent annually on supplements in the United States.

Objective: To determine the relationship in children of VM supplementation and (1) nutrition habits, (2) food security, (3) level of physical activity, (4) health care access, and (5) weight.

Design: Secondary data analysis.

Methods: The authors conducted a secondary analysis of 1999 to 2004 National Health and Nutrition Examination Survey (NHANES) data, which surveyed 10,828 children 2 to 17 years of age and their parents. Parents were asked about demographics (including income, food stamps, health insurance coverage), number of health care visits, body mass index, nutrition behavior, physical activity, and use of VM supplementation.

Results: 34.2% of subjects had taken a VM supplement in the previous 30 days, and many of these took a daily supplement. In the multivariate analysis model, VM supplement use was significantly more likely in younger children (OR, 2.5 for 2- to 4-year-olds) and children not living in poverty (OR, 2.2). Mexican-American and African-American children were less likely to use VM supplementation (OR, 0.6 and 0.4, respectively). VM supplement use was also significantly higher in children who had 4 health care visits in the past year (OR, 1.4), greater activity levels (OR, 1.3), and 2 hours daily of TV/video/computer use (OR, 1.3). Those with a good health status was less likely than those with an excellent health status to use VM supplementation (OR, 0.8), and those obtaining health care at a community health clinic (OR, 0.76) or emergency department (OR, 0.57), compared with obtaining health care at a physician's office, were less likely to use VM supplementation. Food security, having a routine place for health care, and frequency of eating restaurant food were not associated with VM supplement use.

Conclusions: Children with healthier eating habits, more active lifestyles, greater food security, and greater health access are more likely to use VM supplementation.

Reviewer’s Comments: The authors had hypothesized that children with greater food insecurity and less healthy habits would be more likely to use VM supplementation, but it appears from this study, that the children who are more likely to benefit from VM supplementation are the ones that are least likely to use them, perhaps because of financial limitations.

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Breast-Feeding May Reduce Pain During Immunization

Interventions to Reduce Pain During Vaccination in Infancy.

Dilli D, Kk IG, Dallar Y:

*J Pediatr*; 154 (March): 385-390

Breast-feeding in infants <6 months old and sucrose or lidocaine-prilocaine cream in children 6 to 48 months old may reduce the pain associated with immunizations.

**Background:** Immunizations are a painful procedure, and the memory of this procedure causes infants and young children to react more intensely when the procedure is repeated. Studies have shown sucrose to be beneficial in mitigating pain in young infants, but its effect on older infants and the utility of breast-feeding infants have not been studied.

**Objective:** To determine the analgesic effect of breast-feeding, sucrose water, and lidocaine-prilocaine cream in infants and young children during vaccinations at a well-child visit.

**Design:** Prospective, randomized, clinical trial.

**Population:** 243 children between 0 and 48 months of age seen in a Turkish well-child unit and undergoing routine immunizations were included.

**Methods:** Infants 0 to 6 months old who were exclusively breast-fed were randomized to breast-feeding or no breast-feeding during the vaccination. Children 6 to 48 months were randomized to receive 12% sucrose solution, lidocaine-prilocaine cream administered 1 hour before the immunization, or no treatment. The pediatrician performing the assessments was blinded to the latter group's treatment. Age, sex, educational level, and socioeconomic status were collected. Outcomes measured included crying time, and pain response using the Neonatal Infant Pain Scale (NIPS) for infants <12 months (for which the maximum score is 7 and a score >3 indicates pain) and the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) for children >1 year (for which the maximum score is 13 and a score over 4 indicates pain).

**Results:** There were 158 children <6 months old, 27 between 6 and 12 months old, and 58 children between 13 and 48 months old. In the breast-fed group, median crying time was significantly shorter compared to controls (20 seconds vs 150 seconds; *P* <0.001). The NIPS was significantly lower in the infants breast-fed compared to controls (3 vs 6; *P* <0.001). Similar findings were seen in infants 6 to 12 months old with both sucrose and lidocaine-prilocaine groups documenting significantly shorter crying times and lower NIPS compared to controls. In the older age group, crying times and CHEOPS scores were significantly higher compared to both the sucrose group (*P* =0.002) and the lidocaine-prilocaine group (*P* =0.001). Using multivariate analysis, the only variable associated with higher pain scores was the lack of maternal distraction (OR, 1.8; 95% CI, 1.0 to 3.0). No differences were seen between the oral sucrose and prilocaine-lidocaine groups.

**Conclusions:** Significant analgesia occurs during immunizations when infants (0 to 6 months old) are breast-fed and older infants and young children receive either oral sucrose or lidocaine-prilocaine cream.

**Reviewer's Comments:** The authors note that the sample size was small and that breast-feeding could not be blinded. However, these therapies, in addition to effective distraction, are relatively simple and appear to offer relief to infants and young children subject to repeatedly painful immunizations.

**Additional Keywords:** Pain Intervention

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Melamine-Contaminated Formula Increase Risk of Stone Development

Melamine-Contaminated Powdered Formula and Urolithiasis in Young Children.

Guan N, Fan Q, et al:
N Engl J Med; 360 (March 12): 1067-1074

Exposure to melamine-contaminated formula is associated with the development of kidney stones in children.

**Background:** Melamine was added to increase the protein content in formula. In the past year in China, there was an increased epidemic of kidney stones in children. Melamine was hypothesized to be the cause of development of kidney stones.

**Objective:** To determine if melamine contaminated formula was a risk factor for kidney stone or renal disease.

**Methods:** Following a mandate from the government, children were screened in a hospital in Peking for urinary stones. Questions about demographics included age, sex, full-term or preterm, exposure to contaminated formula, and physical symptoms associated with urinary problems or infections. The Chinese government determined that 22 formulas were contaminated with melamine. The formula consumed was designated as high level, moderate level, or no melamine. Routine serum levels for blood urea nitrogen, creatinine, and alanine aminotransferase and urine tests for microalbumin, transferrin, urine calcium, and creatinine were performed. The ultrasounds of the kidneys were designated as stone free, suspected stones, or definite stones. Children with exposure to melamine-contaminated formula for 30 days and had stones or other renal issues were considered to have melamine-associated urolithiasis.

**Results:** 589 children were screened (58% boys and 42% girls). Contaminated formula was ingested by 421 of the infants; 8.5% had definite stones and 19% had suspected stones. Four children had stones and evidence of renal obstruction. Urinalysis was performed in 372 children. Hematuria was present in 6% of the children with definite stones and no hematuria was observed in children with suspected stones. All blood tests that were performed were normal despite the presence or lack of stones. Age, sex, and use of formula alone or with breast-feeding had no relationship to stones. Preterm birth and exposure to high levels of melamine had a significant association for the presence of stones. Children were 7 times more likely to form stones with exposure to high-level melamine formula.

**Conclusions:** Melamine-contaminated formula was a significant factor in developing kidney stones in children.

**Reviewer's Comments:** This article showed a clear link between the contamination of infant formula and the development of kidney stones. After this article appeared, there were reports that melamine was present in formula outside of China, but did not seem to cause kidney stones in these children. Improved oversight of formula manufacturing can help prevent future problems in young children.

**Additional Keywords:** Melamine
**Stool Patterns Change With Age**

*The Variation in Stool Patterns From 1 to 42 Months: A Population-Based Observational Study.*

Steer CD, Emond AM, et al:  
*Arch Dis Child*; 94 (March): 231-234

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Stools tend to become less frequent and firmer over the first 3.5 years of life.

**Background:** Parents are often concerned by what they perceive as abnormal patterns and appearances of stool during childhood. Indeed diarrhea and constipation are common complaints among parents of children aged 0 to 4 years old. However, no information has been systematically collected on a population scale about what constitutes normal stooling patterns and appearance as children age. Previous studies that have tried to characterize this have been limited by sample size and study design.

**Objective:** To document the normal stool patterns of children aged 0 to 4 years old.

**Participants:** 14,541 pregnant women enrolled in the Avon Longitudinal Study of Parents and Children in the U.K. resulting in 14,062 live births.

**Methods:** Stool patterns were assessed at 4 weeks and at 6, 18, 30, and 42 months after birth using a questionnaire completed by the child's mother or main caregiver. Questions were asked about stool frequency, consistency, and color. The authors examined the effects of age on stool frequency, stool consistency, and color. They also compared variances in stool frequency at different ages and created centiles for frequency of outcomes.

**Results:** Data were available for 12,984 children. The completeness of data ranged from 44% to 69% depending on the outcome. Frequency of stools declined steadily during the first 4 years of life from an average of 3 times/day at 4 weeks to 1.8 times/day at 18 months, to 1.3 times/day at 3.5 years. There was also a significant variability in stool frequency by age, as 4-week-old babies had more varied stool patterns (SD = 2.00) compared to 3.5-year-olds (SD = 0.72). Stool consistency also varied by age with 4-week-olds usually passing soft, liquid, or curdy stools and only 13.6% passing hard stools. By 3.5 years old, 29.8% of children were usually passing hard stools, while only 0.12% was passing liquid stools. While stools were most commonly yellow at 4 months, by 6 months, the most common stool color was brown. Green stools were rarely reported after 18 months and black stools were not consistently reported, regardless of the child's age.

**Conclusions:** Stools tend to become less frequent and firmer over the first 3.5 years of life.

**Reviewer's Comments:** Stooling patterns in children change over time. Stool consistency and frequency is variable in infants at 1 month of age, and tend to become harder and less frequent as children get older.

**Additional Keywords:** Variations

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Prevention of Pertussis in Newborns Decreases Infant Mortality


Contact of unimmunized adults with young infants may cause death from pertussis, as parents and other close contacts of infants are the most commonly identified source of pertussis.

**Background:** Infants <12 months of age have the highest rates of complications and death from pertussis. Adults who have contact with infants (especially infants too young to be fully immunized) have been identified as the source of *Bordetella pertussis* in infected infants.

**Objective:** To identify infant and maternal characteristics associated with infant pertussis death in the United States.

**Methods:** The U.S. Multiple Cause of Death and Linked Birth/Infant Death data from 1999 to 2004 were examined to identify infants who died from pertussis. A retrospective case-controlled design was used to determine the risk factors for these deaths.

**Results:** There were 90 deaths from *B. pertussis* and 1 from *B. parapertussis*. Fifty-three were in infants <2 months of age, and 38 were >2 months of age. In addition to pertussis, 64 of the death certificates reported pulmonary complications in 59% of the cases. The median age of death was 50 days (mean, 60 days). Increased risk of infant pertussis death was associated with birth weight <2500 g, female sex, gestational age <36 weeks, 5-minute Apgar score <8, and Hispanic origin. Maternal characteristics associated with increased risk of pertussis death included prenatal care started after the first trimester, <12 years of education, and prior preterm birth. The authors noted that during the study time, there was an increased reporting of pertussis in adolescents and adults. Parents and other close contacts are the most commonly identified sources of pertussis, but the contact is not found in 50% of the cases.

**Conclusions:** Although there is no direct causal relationship between specific characteristics of infants or adults and death from pertussis, the findings in this study emphasize the need to assure that all contacts with infants too young to be immunized against pertussis receive the appropriate pertussis protection. Parents and other close contacts of infants are the most commonly identified source of pertussis.

**Reviewer's Comments:** The mothers of infants who died from pertussis tended to seek prenatal care in the second and third trimester; 6% of the mother of infant who died and 3% of mothers of all infants did not get prenatal care until the third trimester. Although not addressed in this study, it would be interesting to know the immunization rate of these mothers. The Academy of Pediatrics recommends a dose of combined tetanus, diphtheria and pertussis (Tdap) for adolescents 11 to 18 years of age, including adolescents during the second and third trimester. The Advisory Committee on Immunization Practices recommends that all adolescents and adults, including postpartum women but not pregnant women, have a single booster with Tdap vaccine. It is important to check the immunization status of contacts of newborns, especially those in the high-risk category.

**Additional Keywords:** Pertussis

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