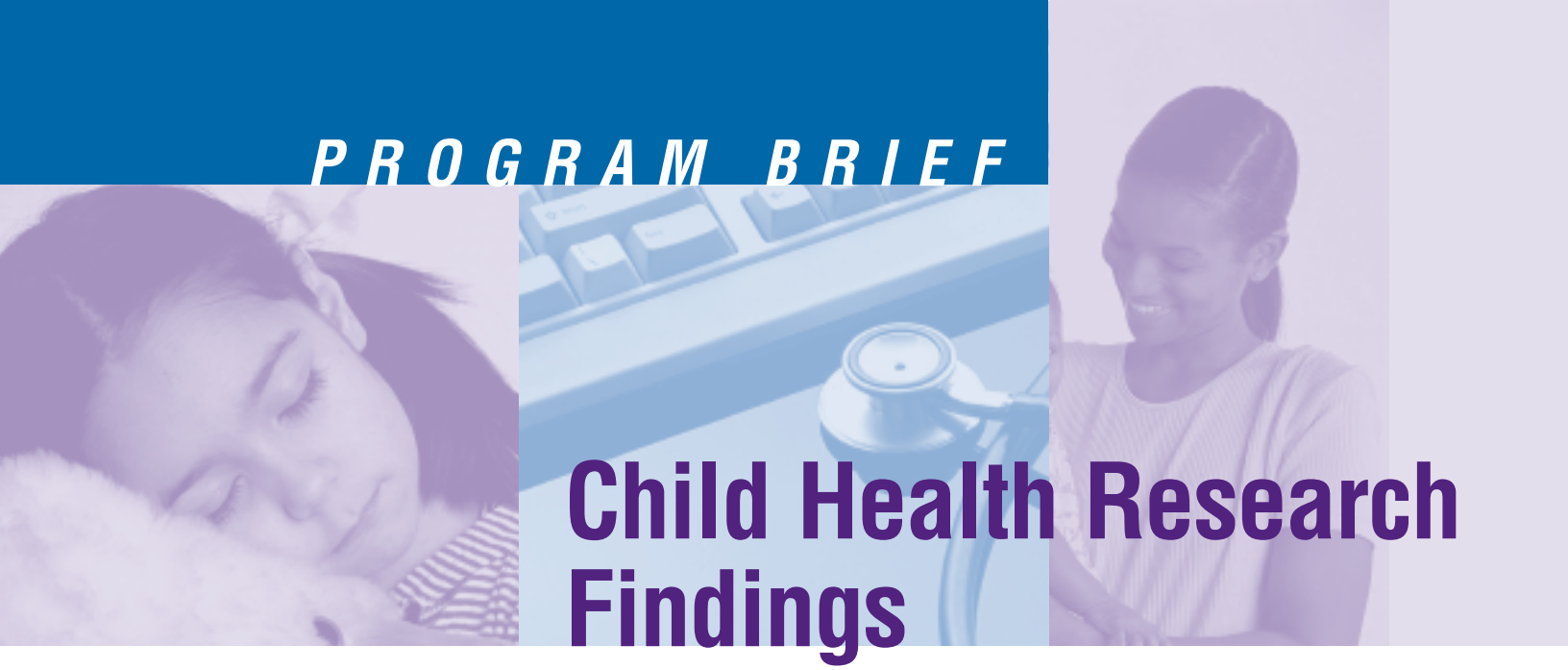
PROGRAM BRIEF



Child Health Research Findings

The mission of AHRQ is to improve the quality, safety, efficiency, and effectiveness of health care by:

- Using evidence to improve health care.
- Improving health care outcomes through research.
- Transforming research into practice.

Introduction

Children and adolescents are growing and developing, and their health care needs, use of services, and outcomes are very different from those of adults. Furthermore, adolescents have different health care needs than younger children. Thus, specialized research is necessary to improve health care services for children and adolescents.

The Agency for Healthcare Research and Quality is helping to fill the major gap that exists in evidence-based information on health care for children and adolescents. AHRQ-supported projects focused on children and adolescents are helping to provide clinicians and policymakers with the knowledge and tools they need to:

- Improve child health outcomes.
- Enhance the quality of care children receive.
- Address issues related to access, use, and costs.
- Translate evidence-based research into improved clinical practice.

AHRQ's Commitment

Finding ways to improve the quality, safety, and effectiveness of health care for America's 70 million children and

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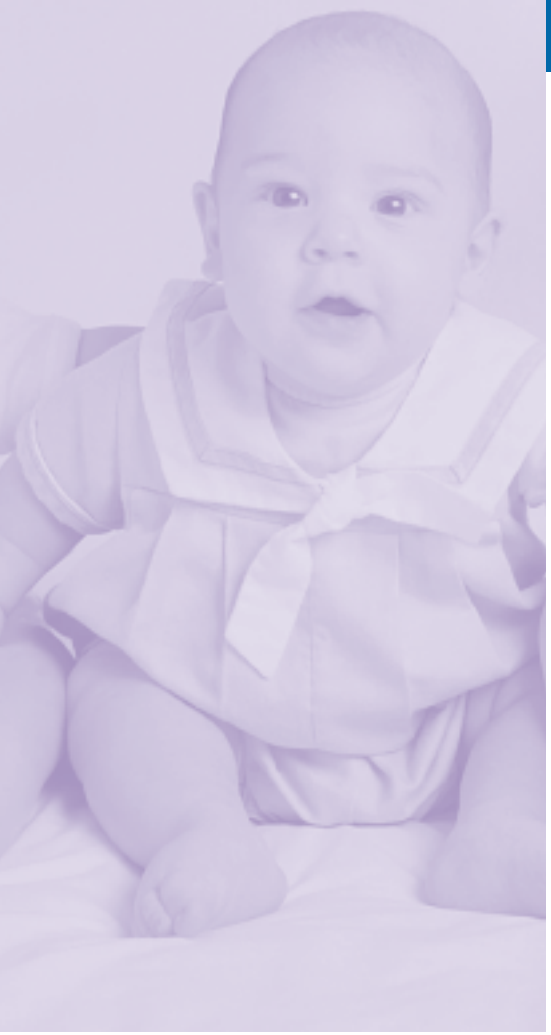


adolescents is a continuing priority for AHRQ. This program brief summarizes recent findings (2003 through 2006) from selected AHRQ-supported projects focused on health care for children and adolescents.

An asterisk (*) following a summary indicates that reprints of an intramural study or copies of other publications are available from AHRQ. Two asterisks (**) identify materials that are available from the National Technical Information Service (NTIS). Ordering information appears on page 39 of this program brief, as well as contacts for more information about AHRQ's research programs and funding opportunities. Visit AHRQ's Web site at www.ahrq.gov and click on "Child Health" to find updates on child health initiatives at AHRQ and information about current projects.

Acute Care/Injuries

In 2000, children and adolescents under age 18 had over 212 million ambulatory health care visits, including 49 million visits to hospital outpatient and emergency departments (EDs). Only 15 percent of visits to physicians' offices were for well-child care, while a high number of visits were for acute care.

Fifty-four percent of visits to hospital EDs by 5- to 14-year-olds are due to injuries, and injuries are the leading cause of death among those 1 to 24 years of age in the United States. AHRQ's research portfolio on acute care and injuries focuses on the effectiveness, quality, safety, and costs of care for children and adolescents.

- *Anatomic factors may play an important role in pediatric traumatic brain injury.*

Significant traumatic brain injury (TBI) occurs in 5 to 10 percent of all patients with blunt head trauma. Among emergency department patients who underwent computed tomography (CT) for blunt head trauma at 21 hospital EDs, men, children younger than age 10, and elderly people were most likely to have significant TBI. The researchers note that children have a larger head-to-body ratio that may allow more energy from a traumatic impact to be distributed to the head. Almost half of children under age 10 with TBI have a skull fracture. Also, certain mechanisms of injury (e.g., child abuse) are unique to children and may increase the risk of TBI. Holmes, Hendey, Oman, et al., *Am J Emerg Med* 24:167-173, 2006 (AHRQ grant HS09699).

- *Certain clinical criteria can identify children with blunt head trauma who do not need a CT scan.*

Seven clinical criteria can be used to identify pediatric victims of blunt head trauma who are at low risk for important intracranial injury (ICI) and thus are unlikely to need a CT scan. The seven factors are: evidence of significant skull fracture, altered level of alertness, neurologic deficit, persistent vomiting, presence of scalp hematoma, abnormal behavior, and blood coagulation problems. Children who do not meet at least one of these criteria are at low risk for ICI and thus are unlikely to require neurosurgical intervention or suffer significant long-term impairment. Oman, Cooper, Holmes, et al., *Pediatrics* 117(2), 2006 online at www.pediatrics.org (AHRQ grant HS09699).

- *U.S. rates of Kawasaki syndrome are highest in Japanese American children living in Hawaii.*

Kawasaki syndrome (KS), which primarily strikes children under age 5, can cause serious heart disease due to inflammation of the coronary arteries. The cause of KS is unknown. The

disease currently affects Japanese American children living in Hawaii more than any other group, including children living in Japan. During the period 1996-2001, 267 individuals younger than age 18 living in Hawaii were hospitalized for KS; 85 percent of those affected were younger than 5. The mean hospital stay for children with KS was 2 days, and the median hospital charge was $9,379. Holman, Curns, Belay, et al., *Pediatr Infect Dis J* 24(5):429-433, 2005 (AHRQ Publication No. 05-R073)* See also Holman, Curns, Belay, et at., *Pediatrics* 112(3):495-501, 2003 (AHRQ Publication No. 04-R002)* (Intramural).

- *Placing children in a semi-recumbent position provides better images from echocardiography.*

According to this study, placing children in a semi-recumbent position at a 70-degree angle with back support results in better quality images during exercise echocardiography procedures, compared with a 90-degree upright position. In the semi-recumbent posture with back support, children were able to maintain torso stability during cycling to facilitate better quality images in a shorter period of time. Chang, Qi, Larson, et al., *Am J Cardiol* 95:918-921, 2005 (AHRQ grant HS13217).

- *Child abuse is linked with increased risk of death in young children with abdominal injuries.*

Between 1995 and 2001, more than half (61 percent) of traumatic abdominal injuries in young children 0 to 4 years of age resulted from motor vehicle accidents. Other significant causes were child abuse (16 percent) and falls (14 percent). Children who were abused and had abdominal and central nervous system injury were more likely than other children with abdominal trauma to die while in the hospital, according to this analysis of data on 927 cases of blunt abdominal injuries in young children. Trokel, DiScala, Terrin, and Sege, *Child Maltreat* 9(1):111-117, 2004 (AHRQ grant T32 HS00060).

- *Instrument provides reliable information about children with brain injuries.*

Researchers developed and tested a measure of neurologic outcome for use in triage and clinical decisionmaking for children who have suffered traumatic brain injuries. They tested the instrument—the Neurologic Outcome Scale for Infants and Children—in 100 children of varying ages. They found the instrument to be practical and reliable and applicable to infants and children with a broad range of neurologic deficits. Okada, Young, Baren, et al., *Acad Emerg Med* 10(10):1034-1039, 2003 (AHRQ grant F32 HS00091).

Adolescent Health

Researchers are focusing on the distinctive health care needs of adolescents. Recent AHRQ-funded studies have focused on such adolescent prevention topics as screening for sexually transmitted diseases (STDs) and smoking cessation.

- *Quality improvement teams can improve chlamydia screening among male adolescents.*

Routine screening for *Chlamydia trachomatis* (CT) infection is recommended for sexually active young women aged 15-25 years. Only the American Medical Association recommends routine screening of sexually active male adolescents. This study involved more than 1,000 sexually active male adolescents aged 14 to 18 who were seen in pediatric clinics in the San Francisco Bay area. Those youths seen in clinics that had a quality improvement team were much more likely to be screened for CT infection than those seen in clinics without such a team. Researchers found that 4 percent of those screened had CT infection. Tebb, Pantell, Wibbelsman, et al., *Am J Public Health* 95(10):1806-1810, 2005 (AHRQ grant HS10537).

- *Hospital type and location affect discharge disposition of adolescents hospitalized for suicide attempts.*

Adolescents who are hospitalized after a suicide attempt are more likely to be discharged to a psychiatric, rehabilitation, or chronic care facility if they are hospitalized in a facility that caters to children and/or is located in the Northeast United States. This suggests that factors other than the medical and emotional needs of vulnerable adolescents are driving care. Levine, Schwarz, Argon, et al., *Arch Pediatr Adolesc Med* 159:860-866, 2005 (AHRQ grant HS00002).

- *Two factors predict risk for repeat suicide attempts among youths.*

Two factors predict which youths referred for emergency psychiatric hospitalization because of suicide attempts will try to commit suicide again: more severe clinical depression and caregivers who exert more parental control. This study involved 70 youths aged 10 to 17 who had attempted suicide and their families. Most of the families were economically disadvantaged. Huey, Henggeler, Rowland, et al., *J Clin Child Adolesc Psychol* 34(3):582-589, 2005 (AHRQ grant HS10871).

- *Wisconsin study finds hundreds of hospitalizations for self-poisoning among adolescents.*

The researchers analyzed Wisconsin hospital discharge files for 2000-2002. They focused on medication-related injuries for intention to commit suicide,

medications used, discharge status, and risk factors for self-poisoning (such as mental illness and eating disorders). During the 3-year study period, there were nearly 3,000 hospitalizations for medication-related injuries—of which 1,150 involved self-poisoning—among Wisconsin youths 12 to 17 years of age. Marbella, Yang, Guse, et al., *Wis Med J* 104(7):59-64, 2005 (AHRQ grant HS11893).

- *Physician attitudes and other factors affect decisions about use of growth hormone therapy.*

Growth hormone (GH) therapy is usually reserved for the shortest 1.2 percent of U.S. children at about age 10. The height goal is usually average height for a 16-year-old male (68.3 inches) or 14-year-old female (62.6 inches). A GH-deficient youngster who has received GH for several years typically shows gradual tapering of growth beginning in mid-adolescence. Some physicians advocate discontinuing therapy when the potential for continued growth decreases, while others seem to value even small gains as the final height goal approaches. The average cost of GH therapy is $26,000 per year. Cuttler, Silvers, Singh, et al., *Med Care* 43(12):1185-1193, 2005 (AHRQ grant HS00059).

- *Adolescents with special health care needs seldom receive adequate transition from pediatric to adult-oriented care.*

About one in five adolescents in the United States has special health care needs. Each year, 750,000 of these adolescents become adults and must transition to adult-oriented health care. Researchers analyzed data for 4,332 adolescents aged 14 to 17 years and found that about 50 percent of parents had discussed transition issues with their child's doctor. Adolescents with special needs who were older, female, had more complicated needs, and had a high-quality relationship with their doctors were more likely to receive adequate health care transition. Scal and Ireland, *Pediatrics* 115(6):1607-1612, 2005 (AHRQ grant HS15511).

- *Most teens with chlamydial infections get antibiotics but may not receive counseling and other care.*

Researchers reviewed the medical charts of 111 sexually active teens, aged 14 to 19, who tested positive for *Chlamydia trachomatis* in 2001 at five pediatric clinics in California. All but four teens received appropriate antibiotics in a timely fashion, but counseling about high-risk sex, testing for other sexually transmitted diseases, and other services were provided less often. Only 36 percent of the patients were tested for other sexually transmitted diseases, and significantly fewer boys than girls received counseling about safer sex. Hwang, Tebb, Shafer, and Pantell, *Arch Pediatr Adolesc Med* 159:1162-1166, 2005 (AHRQ grant HS10537).

- *Certain practice factors are associated with more frequent screening and counseling of adolescents about risky behaviors.*

In this study, specialized clinician training and charting tools were associated with increases in rates of screening and counseling of adolescents about risky behaviors, such as substance abuse, unsafe sex, and risky vehicle use. Ozer, Adams, Lustig, et al., *Pediatrics* 115(4):960-968, 2005 (AHRQ grant HS11095).

- *Certain factors increase the likelihood of posttraumatic stress disorder (PTSD) in adolescents who suffer a serious injury.*

Researchers surveyed adolescent trauma patients aged 12 to 19 who had been hospitalized following a serious injury to assess their outcomes at various points up to 24 months postdischarge. They found that perceived threat to life and intentional or violence-related injury doubled the likelihood that the youths would experience PTSD. Other factors that often led to PTSD included having no control over the event leading to injury or death of a family member at the scene. Girls and older adolescents had higher rates of PTSD than boys and younger adolescents, and low socioeconomic status was strongly associated with long-term PTSD. Those with PTSD were more likely to have behavioral problems, abuse alcohol and drugs, have difficulty staying in school, and suffer from depression. Holbrook, Hoyt, Coimbra, et al., *J Trauma Injury Infect Crit Care* 58:764-771, 2005 (AHRQ grant HS07611).

- *Adolescents underuse primary care and seldom receive counseling about risky behaviors.*

Researchers used data from two surveys (1993-2000) to examine adolescents' use of outpatient care and receipt of preventive counseling. They found that adolescents (particularly boys and minorities) aged 13 to 18 had the lowest rates of outpatient visits among all age groups. The researchers examined counseling on three health topics: diet, exercise, and growth/development; and five risk-reduction topics: tobacco use/exposure, skin cancer prevention, injury prevention, family planning/contraception, and prevention of sexually transmitted diseases. Only 39

percent of routine visits included counseling for diet and/or exercise. Counseling for other topics ranged from a low of 3 percent to 20 percent, with skin cancer prevention, HIV/STD transmission, and family planning/contraception ranking the lowest. Ma, Wang, and Stafford, *J Adolesc Health* 36:441e1-441e7, 2005 (AHRQ grant HS11313).

- *Physician confidence leads to increased screening of adolescents for risky behaviors.*

This study found that providers' confidence in their ability to deliver preventive services was correlated with provider-reported screening of adolescents for tobacco use, alcohol use, sexual behavior, seat belt use, and helmet use. Ozer, Adams, Gardner, et al., *J Adolesc Health* 35:101-107, 2004 (AHRQ grant HS11095).

- *Preparticipation physicals for high school athletes may be inadequate.*

High school students must have physical exams before they can participate in school-sponsored sports. However, this study found that the preparticipation physical evaluation (PPE) as currently practiced is ineffective. Medical history taking and exams are inadequate to reliably detect and exclude rare life-threatening conditions, evaluations are seldom connected with followup care, and PPE programs are inconsistently and incompletely delivered. Bundy and Feudtner, *Ambulatory Pediatr* 4(3):260-263, 2004 (AHRQ grant K08 HS00002).

- *Screening tool identifies adolescents at risk for carrying firearms.*

Answers to four simple screening questions and male sex can be used to generate a score that is fairly sensitive and specific for identifying youths that carry firearms. A FiGHTS score reflects fighting (Fi), gender (G), hurt while fighting (H), threatened (T), and smoker (S). An extended 13-item FiGHTS that includes questions about sexual behavior, substance abuse, and criminal behavior is even more sensitive. Hayes and Sege, *Ann Emerg Med* 42(6):198-207, 2003 (AHRQ grant T32 HS00060).

- *Qualitative research involving homeless adolescents is challenging.*

The main challenges of conducting qualitative research with homeless youths include establishing and maintaining healthy researcher roles and boundaries, addressing the risks of researcher burn out and safety, assuring optimal confidentiality, and avoiding sensationalism and voyeurism. The author reviews professional guidelines for such research, describes potential data sources, and recounts personal experiences. Ensign, *J Adv Nurs* 43(1):43-50, 2003 (AHRQ grant HS11414).

- *A specially designed screener helps identify adolescents who have a chronic condition.*

The researchers validated the Children with Special Health Care Needs Screener among new enrollees in Florida's State Children's Health Insurance Program. The study involved 522 adolescents and their parents who generally agreed about the presence of a chronic condition and the need for specialized health care services for the adolescent. Youngblade and Shenkman, *J Pediatr Psychol* 28(6):393-401, 2003 (AHRQ grant HS10465).

- *Adolescents who were extremely low birthweight (ELBW) infants seem to view themselves positively.*

In this study, ELBW adolescents aged 12 to 16 years did not perceive themselves to have significantly greater behavioral problems than control teens in the following six areas: conduct disorder, oppositional-defiant disorder, ADHD, overanxious state, separation anxiety, and depression. Parents, however, reported significantly higher scores for depression and ADHD for their ELBW teens than parents of control teens. Saigal, Pinelli, Hoult, et al., *Pediatrics* 111(5):969-975, 2003 (AHRQ grant HS08385).

Asthma

Asthma is a chronic inflammatory disease of the airways that affects approximately 5 million U.S. children a year. An estimated 400,000 of these children have moderate to severe asthma. It is the most common chronic disease of childhood, with about one-fourth of those affected being less than 5 years of age. Reducing asthma-related illness continues to be a major objective for the U.S. Public Health Service.

- *Parental use of a computer-based asthma kiosk in the emergency department elicits mixed results.*

Researchers asked parents to use a computer-based kiosk in the hospital ED to enter their child's asthma symptoms, current medications, and unmet care needs. The asthma kiosk printed out a tailored plan of recommended asthma care based on the parental input. The intent was for parents to share the recommendations with their child's ED clinicians. So far, the kiosk has had a small and variable impact on asthma care quality. Physicians' limited use of kiosk-generated asthma care recommendations may explain this disappointing result. A mismatch between an activated parent and a less-than-proactive provider may have widened a gap in parent-provider partnership that the kiosk was meant to

narrow, note the researchers. Porter, Forbes, Feldman, and Goldmann, *Pediatrics* 117(1), 2006; online at www.pediatrics.org (AHRQ grant HS11660).

- *Enrollment in SCHIP can improve quality of care and access for children with asthma.*

This study of more than 2,600 children with asthma in New York State found that after enrollment, in the State Children's Health Insurance Program (SCHIP) quality of care improved for the children, and asthma-related attacks, medical visits, and hospitalizations declined. Also, the number of children lacking a usual source of care declined from 5 percent to 1 percent. Szilagy, Dick, Klein, et al., *Pediatrics* 117(2):486-496, 2006 (AHRQ grant HS10450).

- *Study uncovers higher rate of asthma among Puerto Rican children compared with other U.S. children.*

Researchers analyzed 1997-2001 data on the prevalence of asthma diagnosis and asthma attacks in a sample of more than 46,500 U.S. children aged 2 to 17. They found that over one-fourth of Puerto Rican children in the study group were diagnosed with asthma at some point, compared with 16 percent of black children, 13 percent of white children, and 10 percent of Mexican children. Similarly, 12 percent of Puerto Rican children had suffered a recent asthma attack, compared with 7 percent of black children, 6 percent of white children, and 4 percent of Mexican children. These disparities were not explained by asthma risk factors (such as household smoking) or other sociodemographic characteristics. Lara, Akinbami, Flores, and Morgenstern, *Pediatrics* 117(1)43-53, 2006 (AHRQ grant HS00008).

- *Interventions that improve pediatric asthma outcomes in clinical trials may not translate to the practice level.*

Education for practice-based peer leaders and the presence of asthma nurse educators improved the use of asthma controller medications and reduced hospital visits for children with asthma who were enrolled in a randomized trial. However, when measured on all patients in the participating practices, these same interventions had no detectable impact on asthma medication use or asthma-related hospital and ER visits. The authors call for more research to develop interventions that will help practices and health plans improve chronic and preventive care for children with asthma. Finkelstein, Lozano, Fuhlbrigge, et al., *Health Services Res* 40(6):1737-1757, 2005 (AHRQ grant HS08368).

- *Having a usual source of care increases wellness visits among children with asthma.*

Researchers analyzed data from the 1996-2000 Medical Expenditure Panel Survey (MEPS) to assess wellness visits, bronchodilator fills/refills, and ER visits of 1,726 children with asthma. They also looked at the children's usual source of care, including characteristics such as ease of getting an appointment on short notice. Overall 95 percent of children had a usual source of care. Over the course of a year, one in ten children made at least one asthma-related visit to the ER, four in ten had at least one wellness visit, and half (50 percent) filled a rescue bronchodilator prescription. The researchers conclude that children who have a usual source of care are twice as likely as those who do not to have a wellness examination during the year. Kieckhefer, Greek, Joesch, et al., *J Pediatr Health Care* 19(5):285-292, 2005 (AHRQ grant HS13110).

- *Parents' use of a computerized asthma kiosk improves ER treatment of children's asthma.*

Researchers asked parents to use a multimedia, touch screen interface to provide their child's medication history while the child was receiving emergency care for an asthma exacerbation. They compared the parents' kiosk entries to the documentation of ED physicians and nurses and found that the parents' reports improved the validity of documentation by physicians across all medication details (except for medication name) and was more valuable than nursing documentation at triage. Porter, Kohane, and Goldmann, *JAMIA* 12(3):299-305, 2005 (AHRQ grant HS11660). See also Porter, Cai, Gribbons, et al., *JAMIA* 11:458-467, 2004 (AHRQ grant K08 HS11660).

- *Primary care programs that include nurse case managers and physician peer leaders can reduce children's asthma symptoms.*

According to this study, a primary care program that uses nurse case managers to educate children about their asthma and physician peer leaders to educate primary care practitioners about asthma treatment guidelines can reduce children's asthma symptoms. Children who were in the program had an average of two additional symptom-free weeks per year. The study involved 638 children aged 3 to 17 with mild to moderate persistent asthma. The program did have an impact on the annual costs of asthma care, which were $1,292 for intervention patients, compared with $385 for patients who received usual asthma care. Sullivan, Lee, Blough, et al., *Arch Pediatr Adolesc Med* 159:428-434, 2005 (AHRQ grant HS08368). See also, Homer, Forbes, Horvitz, et al., *Arch Pediatr Adolesc Med* 159:464-460, 2005 (AHRQ grant HS10411).

- *Ethnicity, environmental factors, and reduced pulmonary function can predict asthma severity in children.*

Black or Puerto Rican ethnicity, sensitization to cockroach allergens, and spirometry tests showing reduced pulmonary function greatly increased the likelihood of severe asthma in children aged 4 to 18 who were enrolled in an asthma care program in Hartford, CT. This is the first study to show an association between asthma severity and both Puerto Rican ethnicity and decreased forced expiratory volume. Ramsey, Celedon, Sredl, et al., *Pediatr Pulmonol* 39:268-275, 2005 (AHRQ grant HS11147).

- *Exposure to tobacco smoke and underuse of controller medications exacerbate asthma symptoms among preschoolers.*

This study involved 368 children ages 3 to 5 in an Arkansas Head Start program for disadvantaged preschoolers. Four out of five of the children suffered from persistent asthma, but only one-third of the children received appropriate medication to control asthma. Many of the children (52 percent of families) also were exposed to asthma triggers such as cigarette smoke. Only about one-third of children were receiving appropriate treatment for asthma. Vargas, Simpson, Wheeler, et al., *J Allergy Clin Immunol* 114:499-504, 2004 (AHRQ grant HS11062).

- *Researchers call for standardized measures of asthma severity.*

Parents of children who have asthma associate missed school days and absences from work with more severe asthma, which are different measures of asthma severity than those used by physicians and researchers. The authors of this article conclude that more widely understood asthma measures are needed. Yawn, Fryer, and Lanier, *J Asthma* 41(6):623-630, 2004 (AHRQ Publication No. 05-R047)* (Intramural)

- *Certain features of primary care practice enhance pediatric asthma care.*

The quality of asthma care could be improved for poor, Medicaid-insured children if primary care practices would promote cultural competence among their staff, provide feedback reports to individual clinicians, and ensure easy access to and continuity of care. Primary care for asthma is also improved when one practice physician is trained in asthma care guidelines as a peer leader, and nurses visit patients and provide support for patient self-management. Lieu, Finkelstein, Lozano, et al., *Pediatrics* 114(1), 2004 online at www.pediatrics.org (AHRQ grant HS09935). See also Lozano, Finkelstein, Carey, et al., *Arch Pediatr Adolesc Med* 158:875-883, 2004 (AHRQ grant HS08363).

- *Regular use of controller medication improves outcomes for children with persistent asthma.*

The researchers used health plan claims data and interviewed parents of children enrolled in five Medicaid managed care plans. They found that children with persistent asthma who were dispensed inhaled antiinflammatory medications one to three times during the year were much more likely to use hospital-based asthma care than those who received the medication six or more times during the year. Farber, Chi, Capra, et al., *Ann Allergy Asthma Immunol* 92:319-328, 2004 (AHRQ grant HS09935). See also Yoos, Kitzman, and McMullen, *Ambulatory Pediatr* 3:181-190, 2003 (AHRQ grant HS10689) and Annett, Bender, DuHamel, and Lapidus, *J Asthma* 40(5):577-587, 2003 (AHRQ grant HS09123).

- *Asthma symptom days determine annual costs of care for children with persistent asthma.*

The researchers used medical records and missed parent workdays to determine asthma symptom burden and resource use for 638 children with mild to moderate persistent asthma in four managed care systems in three U.S. geographic regions. The median total annual asthma-related cost for the group was $564, with medications accounting for more than half of direct costs. Symptom days predicted costs better than tests of lung function. Gendo, Sullivan, Lozano, et al., *Ann Allergy Asthma Immunol* 91:251-257, 2003 (AHRQ grant HS08368).

- *Enrollment in Medicaid managed care improved pediatric asthma care.*

Massachusetts children covered by Medicaid and enrolled in an HMO were only half as likely as those in a State-administered primary care case manager plan to end up in the ER or be hospitalized for asthma. Also, the HMO provided greater access to specialists and more timely followup care after asthma ED visits than the case manager plan. For the study, the researchers used claims and encounter data on 2,365 children enrolled in the Massachusetts Medicaid program in 1994. Shields, Comstock, Finkelstein, and Weiss, *Ambulatory Pediatr* 3(5):253-262, 2003 (AHRQ grant HS09327).

- *Parents need more education about asthma.*

Researchers interviewed parents to examine their beliefs, knowledge, and attitudes about asthma management. Nearly half of the parents had received minimal or no instruction when their child was first diagnosed. Half of those who were taught about their children's medications could not remember the mechanism of action. Peterson-Sweeney,

McMullen, Yoos, et al., *J Pediatr Health Care* 17:118-125, 2003 (AHRQ grant HS10689).

- *Parents misunderstand the role of antiinflammatory medicines.*

Investigators interviewed 1,663 parents of asthmatic children, focusing on the 571 who had persistent asthma. The children were enrolled in Medicaid managed care programs in California, Washington, and Massachusetts. Nearly one-fourth of the parents thought that inhaled antiinflammatory medication should be used to treat the symptoms of persistent asthma instead of daily to prevent symptoms. Farber, Capra, Finkelstein, et al., *J Asthma* 40(1):17-25, 2003 (AHRQ HS09935).

- *Pediatric asthma admissions are examined in two States.*

In this study, claims data on pediatric asthma admissions to children's and general hospitals in New York and Pennsylvania were used to compare length of stay, the probability of prolonged stay (more than 3 days), conditional length of stay, and the probability of readmission. There were no differences in the discharge rate after hospital day three. However, Pennsylvania hospitals appear more efficient in the treatment of less severely ill children. Silber, Rosenbaum, Even-Soshan, et al., *Health Serv Res* 38(3):867-886, 2003 (AHRQ HS09983).

- *School-based health centers reduce asthma-associated costs.*

Researchers evaluated whether the availability of school-based health center (SBHC) services measurably affected the health and school performance of 949 inner-city children with asthma. The rate of hospitalization was higher among children attending non-SBHC schools (17 vs. 11 percent) as was the number of school days missed (21 vs. 18 days). SBHCs may offer a practical response to the limited access that poor and uninsured children have to health care. Webber, Carpiniello, Oruwariye, et al., *Arch Pediatr Adolesc Med* 157:125-129, 2003 (AHRQ grant HS10136).

- *SBHCs can improve management of asthma among poor children.*

This study of school-based health centers in four elementary schools in New York City shows that they are providing primary care, including asthma management, to low-income, inner-city children who often have no other regular source of primary care and end up in the ED with uncontrolled asthma. However, the school care providers do not closely adhere to established asthma care guidelines. Oruwariye, Webber, and Ozuah, *J School Health* 73(5):186-190, 2003 (AHRQ grant HS10136).

- *Parents of hospitalized children change smoking behaviors after intervention.*

The Stop Tobacco Outreach Program was offered to 71 parents who smoked and whose children were hospitalized for asthma, pneumonia, or other respiratory illness. Eighty percent of parents completed the counseling sessions, 49 percent had a stop-smoking attempt of 24 hours or more, and 21 percent had not smoked a cigarette in the last 7 days. Also, 71 percent of the parents prohibited smoking in the home after the program (vs. 29 percent at enrollment). Winickoff, Hillis, Palfrey, et al., *Pediatrics* 111(1):140-145, 2003 (AHRQ grant T32 HS00063).

- *Many children are using asthma medications inappropriately.*

Parents of 638 children with asthma who were cared for at one of 42 managed care primary care practices in three U.S. regions were interviewed. Results showed that 64 percent of the children with persistent asthma were inadequately controlled. Older age, minority race, and household poverty were significantly associated with inadequate control. Lozano, Finkelstein, Hecht, et al., *Arch Pediatr Adolesc Med* 157:81-88, 2003 (AHRQ grant HS08368).

Chronic Illness

Approximately 20 million children suffer from at least one chronic health condition. Of the 200 chronic conditions and disabilities that affect young people, AHRQ's current research focuses most predominantly on diabetes, cancer, cerebral palsy, respiratory problems, and traumatic brain injury. For a description of projects and findings on other chronic illnesses, see the sections on asthma, ADHD, and mental health in this program brief.

- *Children with type 1 diabetes can safely use the continuous subcutaneous glucose monitoring system to monitor their blood glucose levels.*

The accuracy and reliability of the continuous glucose monitoring system (CGMS) have been established in adults. According to this study involving 27 patients (18 intervention and 9 control patients), it is also safe for use by children with type 1 (insulin-dependent or juvenile) diabetes. The CGMS is a tiny glucose-sensing device that is inserted just under the skin of the abdomen where it measures levels of blood glucose every 10 seconds and sends information every 5 minutes to a device worn on a belt or the waistline of a garment. Information is transmitted to the doctor's office every 3 days, so that adjustments to the diabetes management plan can be made. Children in this study who used the CGMS had significantly lower blood glucose levels after 6 months than

children in the control group. Lagarde, Barrows, Davenport, et al., *Pediatr Diabetes* 7:159-164, 2006 (AHRQ HS10397).

- *Diabetes screening practices vary widely among pediatricians.*

The American Diabetes Association (ADA) recommends screening of children at moderate or high risk of type 2 diabetes, but this study found that only one-fifth of clinicians follow the ADA recommendation. Screening practices varied widely among pediatricians responding to this survey. When presented with three hypothetical vignettes of pediatric patients with low, moderately high, and high risk for type 2 diabetes, 21 percent adhered to the ADA recommendations, 35 percent screened only children at high risk, and 39 percent screened children at all risk levels (low, moderate, and high). Rhodes, Finkelstein, Marshall, et al., *Ambulatory Pediatr* 6(2):110-114, 2006 (AHRQ grant T32 HS00063).

- *Study reveals racial disparities in receipt of vision care among children with special health care needs.*

Nearly 6 percent of U.S. children with special health care needs (CSHCN) do not receive needed eyeglasses or other vision care. Black, Latino, and multiracial CSHCN are two to three times as likely to have an unmet need for vision care as white CSHCN, according to this study. These disparities in unmet needs persisted after controlling for differences in health status and other child and family characteristics such as insurance and income. Special needs children whose usual care provider was a generalist physician, nurse practitioner, or physician assistant were more likely to have an unmet need for vision care than children who saw a pediatrician for usual care. Heslin, Casey, Shaheen, et al., *Arch Ophthal* 124:895-902, 2006 (AHRQ grant HS14022).

- *Making treatment decisions for children with cancer is difficult for physicians and families.*

Pediatric cancer care usually involves difficult and emotionally troubling decisions for physicians and families. These researchers examined the decisionmaking process from the time a child is first diagnosed, during treatment, when there is a relapse, and when death is inevitable. Popular ethical theory holds that the family should make the decisions, but sometimes the physician takes the lead. Because cure is the ultimate goal, the physician is in a better position to assume decisional priority when a cure is possible or when there is one best medical choice. On the other hand, when there are two or more clinically reasonable choices, the family is better positioned to take the lead. Whitney, Ethier, Fruge, et al., *J Clin Oncol* 24(1):1690-1695, 2006 (AHRQ grant HS11289).

- *Children living in public housing are at increased risk for chronic health problems.*

Black and Hispanic children living in public housing are two to four times as likely as children in the general population to suffer from chronic physical and mental problems, according to this study. The top five chronic conditions reported by parents for one or more children in their households were: asthma (32 percent), vision problems (24 percent), ADHD (17 percent), dental problems (16 percent), and depression (8 percent). Bazargan, Calderon, Heslin, et al., *Ethn Dis* 15(suppl 5):3-9, 2005 (AHRQ grant HS14022).

- *Children with diabetes who need surgery must be carefully managed to prevent serious complications.*

Surgery can cause life-threatening complications for children who have diabetes, and they must be carefully managed prior to surgery to ensure their diabetes is under control. Elective surgery should be postponed until metabolic control is acceptable. Whenever possible, these surgeries should be scheduled as the first case in the morning to avoid prolonged fasting and permit optimum adjustment of diabetes treatment regimens. These authors describe a surgery management protocol for managing pediatric patients with diabetes. Rhodes, Ferrari, and Wolfsdorf, *Anesth Analg* 101:986-999, 2005 (AHRQ grant HS00063).

- *Low-dose insulin does not affect weight or development of children at risk for type 1 diabetes.*

The researchers compared differences in weight change, BMI, and physical development between two groups of children and adolescents aged 4 to 19 who had more than a 50 percent risk of developing type 1 diabetes within 5 years. One group (55 children) received injections of low-dose insulin twice daily and an annual intravenous insulin infusion. Children in the other group (n = 45) were closely monitored but did not receive either insulin or placebo. The researchers found no differences over 2 years between the two groups for changes in weight, height, BMI, or stage of growth and development. Rhodes, Wolfsdorf, Cuthbertson, et al., *Diabetes Care* 28(8):1948-1953, 2005 (AHRQ grant HS00063).

- *Newer HIV therapies have led to a marked decrease in illness and death among HIV-infected children.*

Children who receive highly active antiretroviral therapy (HAART) are less likely than adults to achieve HIV suppression, and HIV tends to progress more rapidly among children. Unlike adults who take HAART, most children are unable to reduce their viral load below detectable levels. Nevertheless, this study of 263 HIV-infected children receiving HAART found that the majority had near-normal CD4 counts, an indicator of good immune system function. Rutstein, Gebo, Flynn, et al., *Med Care* 43(9 suppl):15-22, 2005 (AHRQ-supported HIV Research Network).

- *Researchers find an overall drop between 1991-1992 and 2000-2001 in pediatric HIV care.*

This study revealed lower hospitalization rates and similar use of outpatient care among HIV-infected children in 2000-2001 compared with the pre-HAART era. This drop in care use can be attributed in part to the use of newer antiretroviral therapies, but it also corresponds with the general aging of the pediatric HIV-infected population, according to the researchers. In 1991-1992, 6 percent of pediatric patients were younger than 12 months, with no child older than 12 years. In 2000-2001, the children ranged from birth to 17 years, and less than 7 percent of children were younger than age 2. Rutstein, Gebo, Siberry, et al., *Med Care* 43(9):31-39, 2005 (AHRQ-supported HIV Research Network).

- *Children who need special care often don't receive the services they need.*

Only a small proportion of children with special health care needs receive needed therapy; assistive devices, such as wheelchairs, hearing aids, or glasses; and

related services, according to this study. Medicaid enrollment increased access to assistive devices and other services for children with special needs. Dusing, Skinner, and Mayer, *Ambulatory Pediatr* 4:448-454, 2004 (AHRQ grant HS11309).

- *Leukemia relapse is common among children, but most benefit from autologous stem-cell transplant.*

Relapse is common among children with acute myeloid leukemia, regardless of treatment modality. This study found that a substantial proportion of children in second complete remission who underwent autologous stem-cell transplant achieved long-term, leukemia-free survival, especially those who were experiencing relapse after a long first complete remission. Treatment failure and mortality were higher for patients in second complete remission after a short first complete remission. Godder, Eapen, Laver, et al., *J Clin Oncol* 22(18):3798-3804, 2004 (cosponsored by AHRQ, NCI, NIAID, and NHLBI).

- *Children with chronic illness see a specialist twice as often as other children.*

About 26 percent of U.S. children with a chronic condition or disability saw a specialist during 1999. Specialist visits for these children varied by household income, insurance status, and race. Use of specialty care was 45 percent lower for children in families between 100 and 200 percent of the Federal poverty level. The likelihood of uninsured children seeing a specialist was 59 percent lower relative to children who had either private insurance or Medicaid. Finally, use of specialty care was 41 percent lower for blacks, 54 percent lower for Hispanics, and 39 percent lower for other ethnic groups compared with whites. Kuhlthau, Nyman, Ferris, et al., *Pediatrics* 113(3), 2004 online at www.pediatrics.org (AHRQ grant HS13757).

- *An increase in B-type natriuretic peptide after heart transplant in children may signal rejection.*

B-type natriuretic peptide (BNP) is a circulating hormone released by the heart. Plasma BNP concentration becomes elevated in children following orthotopic heart transplant (OHT) and decreases gradually over time. A disproportionate increase in BNP concentrations after an initial decrease may be a warning sign of rejection of the transplanted heart, according to this study of 44 pediatric patients at 1 month to 14 years after OHT. Lan, Chang, Alejos, et al., *J Heart Lung Transplant* 23:558-563, 2004 (AHRQ grant HS13217).

- *Deaths among children with single ventricle congenital heart disease are common.*

Children with two types of congenital heart disease—double-inlet left ventricle and tricuspid atresia with transposed great arteries—often have an associated aortic arch anomaly and may develop pulmonary vascular disease due to excessive blood flow. Even with improvements in surgery, only 52 percent of patients with a single left ventricle are expected to survive beyond 25 years. Lan, Chang, and Laks, *J Am Coll Cardiol* 43(1):113-119, 2004 (AHRQ grant HS13217).

- *Many chronic and mental illnesses affecting adults are rooted in childhood.*

According to these researchers, reducing exposure to environmental toxins, preventing childhood stress and obesity, curtailing adolescent smoking, and preventing sexual abuse of children will greatly reduce the incidence of chronic and mental disorders in adults. They discuss the life-course model of health which focuses on preventing the precursors of illness in later life. Forrest and Riley, *Health Aff* 23(5):155-164, 2004 (AHRQ grant K02 HS00003).

- *Characteristics of managed care may explain variations in outpatient pediatric care.*

The researchers examined the relationship between the composition of managed care provider networks (number of pediatricians, family practitioners, and pediatric subspecialists), strategies to coordinate or facilitate care for children with special health care needs, and the effects of reimbursement practices on access to care for 2,223 children with special needs enrolled in one of eight Florida managed care organizations (MCOs). MCO characteristics, not child-level factors, explained most of the variation in use of outpatient care by children in the eight MCOs. Shenkman, We, Nackashi, and Sherman, *Health Serv Res* 38(6, Part I):1599-1624, 2003 (AHRQ grant HS09949).

- *Proper classification of disability in children with cerebral palsy may increase access to needed services.*

The researchers assessed the reliability of classification of cerebral palsy (CP) in children aged 2 to 8 who had been low birthweight babies in the United States, the Netherlands, Canada, and Germany. Five pediatricians with expertise in CP diagnosis grouped children into three categories: disabling CP, non-disabling CP, and no CP. When information on motor function was used, children with CP could be identified more reliably from clinical records. Paneth, Qui, Rosenbaum, et al., *Develop Med Child Neurol* 45(9):628-633, 2003 (AHRQ grant HS08385).

- *Children with certain forms of leukemia have a very high relapse rate.*

This study identified 11 out of 470 children newly diagnosed with acute myelogenous leukemia (AML) and myelodysplastic syndrome who had certain complex chromosomal abnormalities. Nine of the 11 children relapsed within 12 months, an 82 percent relapse rate. This was higher than the 46 percent relapse rate of other AML children studied. However, survival and event-free survival at 6 years were not different from other children with AML studied. Casillas, Woods, Hunger, et al., *J Pediatr Hematol Oncol* 25(8):594-600, 2003 (AHRQ grant T32 HS00020).

- *Many pediatric cancer patients receive complementary therapy.*

Nearly half (46 percent) of the predominantly white, well-educated parents of children with cancer in this study used complementary therapy (CT) for their children, and 33 percent began using a new CT following their child's cancer diagnosis. These therapies ranged from acupuncture and magnets to dietary supplements and herbal remedies. Gagnon and Recklitis, *Psycho-Oncology* 12:442-452, 2003 (AHRQ grant T32 HS00063).

Costs, Use, and Access to Care

AHRQ's research indicates that more than 10 million U.S. children ages birth to 17 were uninsured all year in 2004. Obtaining adequate access to care and maintaining a usual source of care are special challenges for these young people and their families. There also are significant racial and ethnic differences in children's access to health care that cannot be explained by insurance and socioeconomic factors alone.

- *Medical injuries among children result in longer hospital stays and higher charges.*

This study found that 3.4 percent of children hospitalized between 2000 and 2002 in Wisconsin suffered a medical injury while in the hospital. These injuries were due to problems with medications, procedures, and medical devices. Injured children had a longer hospital stay (0.5 day) and higher charges ($1,614) than children who were not injured. The study involved more than 318,000 children admitted to 1 of 134 Wisconsin hospitals between 2000 and 2002. Meurer, Yang, Guse, et al., *Quality Safety Health Care* 15:202-207, 2006 (AHRQ grant HS11893).

- *Immunocompromised children who acquire fungal infections have higher costs, longer hospital stays, and an elevated risk of death.*

Some children's immune systems are compromised by diseases such as cancer or treatments such as bone marrow transplantation. During 2000, 0.5 percent of hospitalized immunocompromised children developed invasive aspergillosis (IA), the most common fungal infection to strike immunocompromised children. Nearly one in five (18 percent) of the children died in the hospital; children with cancer and IA had a 13.5 percent higher risk of dying in the hospital than children who had cancer but were not infected with IA. Median length of stay was over five times as long for immunocompromised children with IA (16 days) as for children who were not infected with IA (3 days), and their total hospital charges were also five times as high ($49,309 vs. $9,035). Zaoutis, Heydon, Chu, et al., *Pediatrics* 117:711-716, 2006 (AHRQ grant HS10399).

- *Uninsured children' access to care is affected by the availability and capacity of the local safety net.*

Researchers examined data on a nationally representative sample of more than 2,600 children aged 2 to 17 who were uninsured for at least 1 year during 1996 to 2000. They found that 60 percent of uninsured children did not visit a physician's office during the year, and more than half had no care from a provider of any type in an office-based setting. Uninsured children in rural areas were more likely to make physician visits if they lived closer to a safety net provider or in an area with a larger supply of primary care physicians. Although proximity to safety net providers was not found to be a determinant of access to care among uninsured urban children, the researchers caution that other factors affecting accessibility to care (e.g., availability of public transportation, ER crowding) were not measured and may influence the services that urban uninsured children receive. Gresenz, Rogowski, and Escarce, *Pediatrics* 117:509-517, 2006 (AHRQ grant HS10770).

- *Non-English-speaking parents report better care and access for their children when interpreters are present during doctor visits.*

Hispanic and Asian/Pacific Islander parents who always use an interpreter when their child has an outpatient medical visit report enhanced care access and quality, compared with parents who don't always use interpreters. They also report better service from their health plan when compared with parents who do not use interpreters. Morales, Elliott, Weech-Maldonado, and Hays, *Med Care Res Rev* 63(1):110-128, 2006 (AHRQ grant HS09204).

- *Having health insurance coverage greatly increases children's access to care and use of services.*

Researchers pooled 1996-2002 data from the Medical Expenditure Panel Survey (MEPS) to estimate the impact of insurance coverage on children's access to and use of care. Like other researchers, they found that public and private coverage were both associated with large increases in care access and use. The large differences between public and private coverage were reduced (and often reversed) when the researchers accounted for other characteristics of children and their families that could affect health care access and use. Selden and Hudson, *Medical Care* 44(5 Suppl):19-26, 2006 (AHRQ Publication No. OM-06-0074, for single copies of the journal)* (Intramural).

- *Medicaid primary care case management reduces children's access to primary and preventive care.*

Primary care case management (PCCM) programs reimburse providers on a fee-for-service basis. However, they assign Medicaid patients to gatekeeper providers who must make specific referrals for specialty, emergency, and inpatient care. This arrangement resulted in disruptions in established patterns of care use in Alabama and Georgia and had an unexpected negative effect on children, especially minority children, according to this study. PCCM was associated with lower use of primary care for all children (except for white children) in urban Georgia and reduced preventive care for white children in urban Alabama and for black and white children in urban Georgia. Implementation of PCCM without fee increases may affect provider decisions about Medicaid participation and ultimately may reduce provider availability, note the researchers. Adams, Bronstein, and Florence, *Med Care Res Rev* 63(1):58-87, 2006 (AHRQ grant HS10435).

- *Nearly one-quarter of Latino children living in the United States lack health insurance.*

Despite State Medicaid health insurance programs for the poor and the State Children's Health Insurance Program (SCHIP), more than 8 million U.S. children are uninsured. Latino children, in particular, are likely to be uninsured. This study found that nearly one-quarter (3 million) Latino children lack health insurance. Even in States where all low-income children are eligible for health insurance, current SCHIP and Medicaid outreach and enrollment efforts are not reaching many uninsured Latino children. Latino parents need better information about the programs, including eligibility requirements and application processes. Major obstacles to enrollment of these children include lack of knowledge about the application process and eligibility, language barriers, family mobility, and misinformation from insurance representatives. Flores, Abreu, Brown, and Tomany-Korman, *Ambulatory Pediatr* 5(6):332-340, 2005 (AHRQ grant HS11305).

- *Researchers examine factors that affect children's primary care experiences.*

This study found that having a regular provider and obtaining needed care have a greater impact on children's primary care experiences than having health insurance. After accounting for other factors that affect the primary care experience—such as the parent's language and the mother's education level—gaining or losing insurance during the 1-year study period did not have a significant effect on primary care experiences. Gaining a regular physician also did not have a significant effect on primary care experiences, but losing a regular physician was associated with much lower parental satisfaction scores. Seid and Stevens, *Health Services Res* 40(6):1758-1780, 2005 (AHRQ grant HS10317).

- *SCHIP decreases uninsurance among children from low-income families.*

During the period 1996-2002, SCHIP significantly increased public insurance for poor children, from 21.5 percent in 1996 to 26.3 percent in 2002. During the same period, uninsurance declined for this group by more than 3 percentage points, from 16.4 percent to 13.1 percent. Further study is needed to quantify the potential benefits to these children and their families from lower premiums and out-of-pocket expenditures, as well as improved access to care. Hudson, Selden, and Banthin, *Inquiry* 42:232-254, 2005 (AHRQ Publication No. 06-R018)* (Intramural).

- *Expanding public health insurance for children lessens the financial burden on low-income families.*

Expansions in public health insurance programs (e.g., Medicaid, SCHIP) between 1980 and 2000 have reduced out-of-pocket medical expenses for low-income families, according to this study. The researchers compared out-of-pocket health care expenditures and the associated financial burden for children aged 0 to 18 in six poverty level groups. They found that out-of-pocket expenses and financial burden decreased for all groups studied, ranging from a reduction of 36.5 percent for those below 100 percent of the Federal poverty level to 46.7 percent for those at or above 300 percent (four times the Federal poverty level). Wong, Galbraith, Kim, and Newacheck, *Arch Pediatr Adolesc Med* 159:1008-1013, 2005 (AHRQ grant HS11662).

- *Researchers examine methods for predicting Medicaid child health expenditures.*

In this study, researchers found that models with either pharmacy-based or diagnosis-based risk adjustment improved the prediction of Medicaid child health expenditures compared with demographic models without risk adjustment. They used Medicaid claims data from the mid-1990s for children in three States who were not covered by managed care. Kuhlthau, Ferris, Davis, et al., *Med Care* 43(11):1155-1159, 2005 (AHRQ grant HS10152).

- *Premium subsidy programs can help low-income families obtain health insurance.*

A growing number of States have begun to explore the use of premium subsidy programs to help low-income families purchase health insurance through the workplace or private plans. Three recent studies examined the benefits and difficulties encountered in several of these programs. All three studies are part of AHRQ's Child Health Insurance Research Initiative (CHIRI™). The first study examined the factors that led parents to choose Oregon's premium subsidy program over SCHIP to cover their children and compared the children's experiences with regard to access, use of services, and satisfaction. The second study found that SCHIP can improve care for vulnerable children and reduce racial/ethnic disparities in health care. The third study found that families have difficulty shifting to Medicaid primary care case management programs, which limit the providers enrollees can use for routine care. Mitchell, Haber, and Hoover, *Health Aff* 24(5):1344-1355, 2005 (AHRQ grant HS10463); Shone, Dick, Klein, et al., *Pediatrics* 115(6), 2005, online at www.pediatrics.org (AHRQ grant HS10465); and Bronstein, Adams, Florence, et al., *Health Care Financ Rev* 26(4):95-107, 2005 (AHRQ grant HS10435).

- *MEPS statistical brief details health insurance status of U.S. children.*

Data from the 2004 Medical Expenditure Panel Survey (MEPS) Household Component indicate that nearly 12 percent (8.5 million) of children under age 18 were uninsured in 2004. This estimate is significantly lower than estimates from the previous decade, mostly due to expansions in public insurance (Medicaid and SCHIP). The data also show that young adults aged 19-24 were at greatest risk of being uninsured. See MEPS Statistical Brief #85 at www.meps.ahrq.gov* (Intramural).

- *Certain features of managed care increase access to specialists for low-income children with chronic illnesses.*

This study linked certain features of managed care—having more in-network pediatricians and offering financial incentives for meeting quality of care standards—with greater access to specialty care for low-income children with chronic conditions. The study involved 2,333 children with conditions such as asthma, diabetes, and cystic fibrosis who were enrolled in an SCHIP program. The study also identified disparities in access to care; overall, black children were only half as likely as white children to receive specialty care. Shenkman, Tian, Nackashi, and Schatz, *Pediatrics* 115(6):1547-1554, 2005 (AHRQ grant HS09949).

- *Improving access and quality for low-income and minority children may require more than expanding coverage.*

Although low-income children account for nearly 40 percent of the U.S. child population, only about one-quarter of total pediatric medical expenditures are for these children. Factors other than health insurance coverage that affect access to care and quality for these children include: problems in accessing necessary care, difficulty in getting referrals for specialty care, and lack of effective communication with physicians and other care providers. Regardless of income, black children had lower health care use and expenditures than white children, according to these researchers. Simpson, Owens, Zodet, et al., *Ambul Pediatr* 5(1):6-44, 2005 (AHRQ Publication No. 05-R048)* (Intramural).

- *One in five Latino children in the United States is uninsured.*

This study examined the use of bilingual community-based case managers to assist Latino children with public insurance enrollment in two Boston-area communities. Children aged 18 and younger were divided into two groups: one group received help from trained case managers, and the other group (control) received traditional Medicaid and SCHIP outreach and enrollment. The researchers found that 96 percent of children in the intervention group enrolled in either Medicaid or SCHIP between May 2002 and September 2003, compared with 57 percent of children in the control group. Flores, Abreu, Chaisson, et al., *Pediatrics* 116(6):1433-1441, 2005 (AHRQ grant HS11305).

- *Study strengthens argument against rollbacks in SCHIP.*

High enrollment and reduced Federal allocations for SCHIP have led a number of States to begin reversing the expansion in public coverage for children. However, this study by AHRQ researchers found that rollbacks in SCHIP will not save much money. The net cost of SCHIP—both to States and

to the Federal Government—is substantially less than the average spending per enrollee would suggest, according to the researchers. They conducted a variety of simulations and found that budgetary data greatly overstate the true net costs of SCHIP and consequently the potential savings from rollbacks to reduce enrollment. Selden and Hudson, *Inquiry* 42:16-28, 2005 (AHRQ Publication No. 05-R063)* (Intramural).

- *Children of working poor parents continue to be at a disadvantage for health care access and use.*

Researchers used data from the 2001 California Health Interview Survey to compare health insurance coverage, access to care, and use of health care services for three groups of children: the working poor, nonworking poor, and nonpoor. They found that despite public health insurance, children from poor working families in California were less likely to be insured than other poor and nonpoor children in 2001. Children of the working poor also were more likely to be Latino and less likely to be black or Asian, more likely to be undocumented, and more likely to live in two-parent or larger households. Guendelman, Angulo, and Oman, *Med Care* 43(1):68-78, 2005 (AHRQ grant HS13411).

- *Children with special needs use more health services and have higher costs than other children.*

Children who have special health care needs (CSHCN) are those who have chronic physical, developmental, behavioral, or emotional problems and require more or more complex care than other children. This study found that in 2000, CSHCN had three times the health care expenditures of other children ($2,099 vs. $628). Although CSHCN make up less than 16 percent of U.S. children, they accounted for 42 percent of total medical costs and 52.5 percent of children's hospital days in 2000. Also, CSHCN used five times as many prescription drugs and substantially more home health care days than other children. Newacheck and Kim, *Arch Pediatr Adolesc Med* 159:10-17, 2005 (AHRQ/HRSA cooperative agreement). See also Jaffee, Liu, Canty-Mitchell, et al., *Psychiatr Serv* 56(1):63-69, 2005 (AHRQ grant HS10453).

- *SCHIP benefits low-income and vulnerable children.*

According to this study of children newly enrolled in the State Children's Health Insurance Program (SCHIP), more children had a usual source of care, received a preventive health visit, and had fewer unmet health care needs as a result of being enrolled in SCHIP for 1 year. Families were more satisfied with the health care their children received after enrollment as compared with before SCHIP. SCHIP minimized many, but not all, racial/ethnic health care disparities. Dick, Brach, Allison, et al., *Health Affairs* 23(5):63-75, 2004 (AHRQ Publication No. 04-R066)* (Intramural).

- *SCHIP has led to improvements in public coverage for children.*

According to this study, the percentage of children who were eligible for free or highly subsidized health insurance rose from 29 percent in 1996 to 45 percent in 2002, primarily due to enactment of SCHIP. However, the problem of uninsurance among children continues, with a total of 10 million uninsured children in 2002; 62 percent of these uninsured children were eligible for public coverage but were not enrolled. Selden, Hudson, and Banthin, *Health Affairs* 23(5):39-50, 2004 (AHRQ Publication No. 04-R067).* (Intramural)

- *Researchers track children's health insurance coverage over a 25-year period.*

According to this study, the percentage of children without health insurance of any type increased sharply between 1977 and 1987, but by 2001, it had dropped back to near the 1977 level of coverage. Also, the percentage of children with public coverage rose significantly during the period, while the percentage of children with private health insurance declined. Cunningham and Kirby, *Health Affairs* 23(5):27-38, 2004 (AHRQ Publication No. 04-R065).* (Intramural)

- *Study describes trends in children's health insurance coverage, principal care sites, and expenditures.*

From 1987 to 2001, insurance coverage for U.S. children improved, the site of care shifted toward outpatient sites, hospital use declined, and expenditures for children as a proportion of total health expenditures decreased. Several of the observed trends varied significantly by type of health insurance coverage, poverty status, and geographic region. Simpson, Zodet, Chevarley, et al., *Ambulatory Pediatr* 4(2):131-153, 2004 (AHRQ Publication No. 04-R042).* (Intramural)

- *Inner city parents often have limited knowledge of managed care rules and procedures.*

A survey of urban parents living in Boston found that most of them, especially those who were disadvantaged or had limited English, knew little about managed care rules and policies. Most of the parents were poor, minority, and covered by public health insurance; more than half of their children were

covered by managed care. For the study, researchers interviewed 1,100 parents at inner city community sites—including supermarkets, hair salons, and laundromats—about care access, insurance, and managed care. Flores, Abreu, Sun, and Tomany, *Med Care* 42(4):336-345, 2004 (AHRQ grant K02 HS11305).

- *Enrollment in certain Medicaid managed care plans increases access to services for children with special needs.*

Children with special needs who qualified for Supplemental Security Income (SSI) and were enrolled in a partially capitated Medicaid managed care plan had fewer unmet health care needs compared with similar children enrolled in Medicaid fee-for-service plans. The managed care plan was specifically designed for children who qualify for Medicaid because they receive SSI due to a disability. The researchers attribute the children's enhanced access to care to the plan's comprehensive care plan assessment, ongoing case management, primary care providers' gatekeeping role, and higher physician reimbursement. Mitchell and Gaskin, *Pediatrics* 114(1):196-204, 2004 (AHRQ grant HS10912).

- *ED use varies among children enrolled in both Medicaid and a State-run plan for children with special needs.*

Researchers found that some Michigan children who were enrolled in both Medicaid and the State's Children's Special Health Care Services plan had especially high rates of emergency department use. The children were younger than age 1 and/or had diagnoses of anemia, hemophilia, asthma, epilepsy, or juvenile diabetes. Pollack, Dombkowski, Zimmerman, et al., *Health Serv Res* 39(3):665-692, 2004 (AHRQ grant HS10441).

- *Instrument measures access to care for children with special needs.*

The researchers developed and validated the 39-item Barriers to Care Questionnaire (BCQ). The instrument was field tested in three samples of children with special health care needs. BCQ scores were higher (indicating fewer barriers) for children with a primary care physician and for those who reported no problems getting care. Seid, Sobo, Gelhard, and Varni, *Ambulatory Pediatr* 4(4):323-331, 2004 (AHRQ grant HS13058).

- *Telemedicine can increase access to health care, but there may be problems with diagnostic accuracy.*

This project assessed the usefulness of telemedicine links for increasing access to quality health care. Children who were ill were examined by an experienced pediatrician in a hospital-based primary care clinic and then assigned to receive an in-person or telemedicine duplicate exam. Children needing skilled palpation or x-rays were excluded. Among the 492 remaining children, there was a disagreement between the two exams on primary diagnosis for 54 (11 percent) of children. Disagreement was marginally more common among telemedicine cases compared with in-person exams. Kenneth M. McConnochie, PI (AHRQ grant HS10753), *Reliability and Efficacy of Telemedicine in Routine Pediatric Practice* (Final Report, NTIS Accession No. PB2003-104249).**

- *Determinants of access to care are similar for rural, suburban, and urban children.*

Rural children tend to have less access to health care than urban and suburban children due in part to time and distance to care sites, lack of transportation, and fewer doctors. According to this study, the most important determinants of care use—health insurance coverage, household income, and a parent's perceptions of a child's pain—apply to all children, regardless of where they live. Programs in rural areas that strengthen health insurance coverage and reduce poverty will have a direct impact on child health, according to these researchers. Woods, Arcury, Powers, et al., *Pediatrics* 112(2), 2003 online at www.pediatrics.org (AHRQ grant HS09624).

- *U.S. children are more likely to be referred to specialists.*

Investigators compared specialist referrals among 135,092 children in five U.S. managed health plans with 221,312 U.K. children. Compared with their U.K. counterparts, U.S. children were twice as likely to be referred to medical specialists, three times as likely to be referred to surgeons, and nearly three times as likely to be referred to psychiatrists. Forrest, Majeed, Weiner, et al., *Arch Pediatr Adolesc Med* 157:279-285, 2003 (AHRQ grant HS00003).

- *Many migrant children receive health care in Mexico.*

Nearly 70 percent of the 279 parents surveyed at Head Start preschool centers serving migrant farm workers in southern California had health insurance. However, their children received more than half of their health care in Mexico. Seid, Castenada, Mize, et al., *Ambulatory Pediatr* 3(3):121-130, 2003 (AHRQ grant HS10317).

Emergency Care/Hospitalization

Current studies are focused on improving ED triage and identifying risk factors for functional limitations in adolescents following major trauma.

- *Study finds that use of pediatric hospitalists results in lower costs and shorter hospital stays.*

According to this review, the use of pediatric hospitalists results in lower hospital costs and shorter stays for hospitalized children. This approach does not adversely affect the experiences of the referring physician, parent, or hospital housestaff. The researchers reviewed 20 studies and found an average decrease of 10 percent in both cost and length of stay. Data on quality of care were insufficient to draw conclusions. Landrigan, Conway, Edwards, and Srivastava, *Pediatrics* 117(5):1736-1744, 2006 (AHRQ grant HS13333).

- *Children who have surgery for hypoplastic left heart syndrome fare better at more experienced hospitals.*

Treatment options for children born with hypoplastic left heart syndome (HLHS)—a congenital anomaly in which the entire left side of the heart is underdeveloped—include palliation shortly after birth, heart transplantation, or comfort care. For this study, researchers examined in-hospital mortality rates for 754 infants with HLHS in 1997 and 880 infants in 2000. In 1997, children undergoing palliation surgery in teaching hospitals were 2.6 times as likely to die as those having surgery at nonteaching hospitals. By 2000, however, palliation surgery was centralized at teaching hospitals. This centralization, along with medical and surgical advances, was associated with an overall decrease in mortality from 28 to 24 percent. Yet mortality rates continued to approach 50 percent at hospitals that performed only one or two of these surgeries a year, compared with 19 percent for high-volume hospitals. Berry, Cowley, Hoff, and Srivastava, *Pediatrics* 117(4):1307-1313, 2006 (AHRQ grant HS11826).

- *Children's hospitals are much more likely that general hospitals to diagnose child abuse in severely injured infants.*

Researchers examined abuse diagnosis by hospital type for children less than 1 year of age and found that children's hospitals are more than twice as likely as general hospitals to diagnose child abuse in severely injured infants (29 vs. 13 percent, respectively). General hospitals with a children's unit identified more abuse cases (19 percent) than general hospitals without a children's unit but fewer than a children's hospital. Nearly half (49 percent) of the infants studied were admitted to general hospitals, one-fourth were admitted to general hospitals with children's units, and one-fourth were admitted to a children's hospital. Infants treated at children's hospitals tended to be younger, more severely injured, and more likely to have private health insurance than those cared for at general hospitals. The researchers suggest that the variation in abuse diagnosis may result from systematic underdiagnosis of abuse in general hospitals. Trokel, Wadimmba, Griffith, and Sege, *Pediatrics* 117(3):722-728, 2006 (AHRQ grant T32 HS00060).

- *Hospitalization rate for children with cat-scratch disease remains stable.*

Despite an increase in cat ownership from 1980 to 2000, the rate of children hospitalized for cat-scratch disease in 2000 was similar to that of the 1980s. Typically, cat-scratch disease is benign and self-limited and is characterized by enlarged lymph nodes and fever. However, atypical cat-scratch disease infections can be accompanied by inflammatory responses that lead to hospitalization. During 2000, there were an estimated 437 hospitalizations for cat-scratch disease in children younger than 18. Hospital stays were as long as 19 days for typical cases and 22 days for

atypical cases. The median charge was $6,140, with total annual hospital charges of about $3.5 million. Reynolds, Holman, Curns, et al., *Pediatr Infect Dis J* 24(8):700-704, 2005 (Intramural).

- *Children who are in the ICU and have arterial catheters are at elevated risk of dying from blood infections.*

Among 168 hospitalized children with positive blood cultures for *Candida* blood infections, 17 percent died within 1 month of the first positive culture. Children in the pediatric ICU at the time of infection were 6.3 times as likely as other children to die within 30 days, and those with an arterial line were 2.4 times as likely as other children to die within 30 days. The study involved children who were inpatients at one large hospital during the period 1998-2001. Zaoutis, Coffin, Chu, et al., *Pediatr Infect Dis J* 24(8):736-739, 2005 (AHRQ grant HS10399).

- *Limiting use of broad-spectrum antibiotics may reduce life-threatening infections in hospitalized children.*

Curtailed use of broad-spectrum cephalosporin antibiotics in children at high risk for *Escherichia coli* or *Klebsiella* species infections may reduce the incidence of such infections, according to this study. The researchers used laboratory data from the Children's Hospital of Philadelphia from May 1, 1999 to September 30, 2003 to identify children with bloodstream infections and pinpoint risk factors for such infections. Zaoutis, Goyal, Chu, et al., *Pediatrics* 115(4):942-949, 2005 (AHRQ grant HS10399).

- *Postoperative staph infection of a child's chest cavity is a risk factor for bloodstream infection.*

Up to 4 percent of children who undergo surgery that involves cutting the breastbone develop infections of the chest cavity. Children who develop postoperative chest cavity infections due to *Staphylococcus aureus* are much more likely to develop a bloodstream infection than children whose chest cavity infections are caused by other pathogens, according to this study. The researchers studied hospital data on 43 children who developed chest cavity infections after surgery between 1995 and 2003 at one urban children's hospital. Shah, Lautenbach, Long, et al., *Pediatr Infect Dis J* 24(9):834-837, 2005 (AHRQ grant HS10399).

- *Children commonly suffer from bacterial infections after stem cell transplant.*

Researchers studied 182 pediatric patients who underwent their first hematopoietic stem cell transplant for cancer and received gut decontamination with antibiotics at one children's hospital from 1999 to 2002. They examined the impact of several factors on infection, including stem cell source, donor, recent bacteremia, and graft versus host disease prophylaxis agents. Overall, 41 percent of patients developed bacterial infections. The majority were Gram-positive cocci, consistent with recent trends in immunocompromised patients. Kersun, Propert, Lautenbach, et al., *Pediatr Blood Cancer* 45:162-169, 2005 (AHRQ grant HS10399).

- *Perforated appendicitis disproportionately affects Medicaid-insured and minority children.*

In one-third of children who have appendicitis, the appendix ruptures before surgery, leading to more complications and longer hospital stays. Ruptured appendix usually results from delayed diagnosis and treatment and occurs more often among minority and Medicaid-insured children. Researchers used 1997 data from AHRQ's Kid's Inpatient Database of pediatric hospital

discharges from 22 States to determine patient and hospital characteristics associated with perforated appendicitis. Smink, Fishman, Kleinman, and Finkelstein, *Pediatrics* 115(4):920-925, 2005 (AHRQ grant T32 HS00063).

- *Rural hospitals appear to deliver care comparable to nonrural hospitals for many common pediatric conditions.*

According to this study, the more than 20 percent of children in the United States who live in rural communities receive hospital care that is comparable to care provided in nonrural hospitals. Except for children hospitalized in large metropolitan areas, the study found no differences in length of stay or readmission rates for children with 19 medical and 9 surgical diagnoses who were treated at rural and nonrural hospitals in New York and Pennsylvania. Lorch, Zhang, Rosenbaum, et al., *Pediatrics* 114(4), 2004; available online at www.pediatrics.org (AHRQ grants HS09983 and T32 HD07740).

- *Less than 10 percent of children with out-of-hospital cardiac arrest survive.*

Despite prolonged CPR and multiple doses of epinephrine, only 9 percent of children who suffer an out-of-hospital cardiopulmonary arrest survive. According to this study, efforts to prevent conditions leading to out-of-hospital arrest—such as near-drowning and poisoning—and community outreach to improve the rate of bystander CPR may have a greater impact on survival than better therapeutic methods and changes to EMS protocols. Young, Gausche-Hill, McClung, and Lewis, *Pediatrics* 114(1):157-163, 2004 (AHRQ grant HS09065).

- *Prolonged Candida infections in children with central venous catheters can have serious consequences.*

Hospitalized children with central venous catheters in place who have a *Candida* infection lasting more than 3 days are three times as likely as other children to develop bloodstream infection that affects internal organs. *Candida* is a yeast-like fungus that is the fourth most common cause of hospital-induced bloodstream infections in the United States. Zaoutis, Greves, Lautenbach, et al., *Pediatr Infect Dis J* 23(7):635-641, 2004 (AHRQ grant HS10399).

- *Parents will travel to distant hospitals to achieve better outcomes for children who need cardiac surgery.*

According to this study, nearly two-thirds of parents are willing to travel for an extra 2 hours to a referral hospital to reduce the mortality risk from 4 to 3 percent for pediatric heart surgery. This finding is based on interviews with 103 parents or adult primary caregivers of children referred to a pediatric cardiology clinic. Chang, Joyce, Castillo, et al., *Can J Cardiol* 20(9):877-882, 2004 (AHRQ grant HS13217).

- *GI disorders are a leading cause of hospitalization in children.*

Excluding normal newborn infants and conditions related to pregnancy, gastrointestinal (GI) disorders were the third leading cause of hospitalization of children in 1997. In that year, there were about 330,000 pediatric discharges associated with a principal GI diagnosis in the United States. These discharges accounted for more than 1.1 million hospital days and $2.6 billion in hospital charges. Guthery, Hutchings, Dean, and Hoff, *J Pediatr* 144:589-594, 2004 (AHRQ grant HS11826).

- *Few pediatric ER workers have received the smallpox vaccine.*

Although most pediatric ER workers say they are willing to receive the smallpox vaccine, few had done so after the first year of the national vaccination program. A 2002 survey in the weeks before the start of the program found that 72 percent of those surveyed were willing to receive the vaccine. However, fewer than 20 percent of targeted health care workers had been immunized as of October 31, probably because of concerns about vaccine-related adverse events. Everett, Zaoutis, Halpern, et al., *Pediatr Infect Dis J* 23(4):331-337, 2004 (AHRQ grant HS10399).

- *Appendicitis is the most common surgical emergency in children.*

Appendicitis requires prompt treatment because of the risk of perforation, but its diagnosis continues to be a challenge for clinicians. Between 5 and 25 percent of children with suspected appendicitis are found to have a normal appendix during surgery. These unnecessary surgeries were cut nearly in half at one hospital with use of a clinical guideline and selective use of CT scans and ultrasound as recommended by the guideline. Smink, Finkelstein, Pena, et al., *J Pediatr Surg* 39(3):458-463, 2004 (AHRQ grant T32 HS00063).

- *Better education for children and parents could reduce pediatric hospitalizations.*

Many pediatric hospitalizations might be avoided if parents and children were better educated about the child's condition, medications, need for followup care, and the importance of avoiding known disease triggers. For this study, the researchers surveyed inpatient attending physicians and the parents of 554 children who were admitted to an urban hospital over a 14-month period with avoidable hospitalization

conditions (AHCs), such as urinary tract conditions and asthma. The researchers found that 13 percent of the hospitalizations could have been avoided. Flores, Abreu, Chaisson, and Sun, *Pediatrics* 112(5):1021-1030, 2003. See also Lee, Baraff, Wall, et al., *Clin Pediatr* 42:613-619, 2003 (AHRQ grant HS10604) and Winickoff, Buckley, Palfrey, et al., *Pediatrics* 112(5):1127-1133, 2003 (AHRQ grant T32 HS00063).

- *Conflicts are common between clinicians and parents of critically ill children.*

Nearly half of the children treated in a pediatric intensive care unit (PICU) for more than 8 days had some conflict associated with their care, according to this study. Most conflicts involved disagreement between clinicians and family members, but they also occurred among clinicians (e.g., between intensive care doctors and surgical specialists). Conflicts most often involved minority patients (45 vs. 25 percent) and patients who had Medicaid coverage (43 vs. 14 percent). Ethics consultations and family meetings can resolve most conflicts and improve PICU quality of care. Studdert, Burns, Mello, et al., *Pediatrics* 112(3):553-558, 2003 (AHRQ grant K02 HS11285).

- *Hospital type and experience determine tracheotomy outcomes.*

Researchers examined tracheotomy rates and patient outcomes in 1997 using hospital discharge records from 22 States. Children cared for in children's hospitals or in teaching hospitals were significantly less likely to be discharged to a long-term care facility. Hospitals performing more pediatric tracheotomies had significantly lower mortality rates than hospitals performing fewer of these surgeries. Lewis, Carron, Perkins, et al., *Arch Otolaryngol Head Neck Surg* 129:523-529, 2003 (AHRQ grant HS00002).

- *Pastoral care providers explain spiritual care needs.*

Pastoral care providers from 115 hospitals in 42 States responded to a survey about their perceptions of the spiritual care needs of hospitalized children and their parents, barriers to better care, and the quality of spiritual care in children's hospitals. Most agreed that empathetic listening, praying with children and families, touch and silent communication, and religious rituals or rites were very effective. Feudtner, Haney, and Dimmers, *Pediatrics* 111(1):e67, 2003, online at www.pediatrics.org (AHRQ grant K08 HS0002).

Mental Health

Despite the debilitating nature and prevalence of mental health problems in children, many disorders continue to be underdiagnosed and inadequately treated. AHRQ-funded research focuses on improving delivery of mental health care in primary care practice.

- *Use of antidepressants among children increased significantly from 1997 to 2002.*

Overall use of antidepressants among children increased from 0.9 million children (1.3 percent) in 1997 to 1.4 million children (1.8 percent) in 2002. This increase was driven by a doubling in antidepressant use by adolescents, from 2.1 percent in 1997 to 3.9 percent in 2002, with no change in use among children younger than age 13. This finding is consistent with the higher prevalence of depression in adolescents (about 6 percent) than in younger children (about 2 percent). The increase in antidepressant use was most evident in groups that previously had lower levels of use, such as girls, blacks, and low-income children. By 2002, there were no significant differences in antidepressant use related to a child's race, sex, or family income. Vitiello, Zuvekas, and Norquest, *J Am Acad Child Adolesc Psychiatry* 45(3):271-279, 2006 (AHRQ Publication No. 06-R037)* (Intramural).

- *Cognitive behavioral therapy used with antidepressants offers additional benefits to adolescents with depression.*

This study involved 152 adolescents aged 12 to 18 with major depressive disorder who were in treatment at an HMO pediatric primary care practice. They were randomly assigned to receive antidepressants alone or antidepressants plus brief cognitive behavioral therapy. Adolescents who received the combination treatment used approximately 20 percent less medication than those who received medication only. The researchers note that these results are consistent with recent studies indicating that depressed youths only reluctantly take antidepressant medication and look for opportunities to discontinue it. Clarke, Debar, Lynch, et al., *J Am Acad Child Adolesc Psychiatry* 44(9):888-898, 2005 (AHRQ grants HS10535 and HS13854).

- *Mental health problems among children who have special health care needs and their caregivers are barriers to care.*

The mental health problems of children with special health care needs and their caregivers appear to be barriers to obtaining needed care, according to this study. In a survey of a random sample of 1,088 caregivers in Washington, DC, in 2002, the researchers asked about children's unmet needs, mental health

status, and the caregivers' mental health status. Caregivers with symptoms of depression were much more likely than those without depression to report children's unmet needs for hospital and physician care, mental health services, and other types of health care. Most of the children were black and urban, so these findings may differ for children of other races and those living in rural areas. Gaskin and Mitchell, *J Ment Health Policy Econ* 8:29-35, 2005 (AHRQ grant HS10912).

- *Despite questions about efficacy and safety, use of atypical antipsychotic drugs in children continues.*

Atypical antipsychotic drugs, such as risperidone and clozapine, are approved to treat schizophrenia in adults but not children. Some studies suggest more prevalent and serious side effects in children and adolescents, such as weight gain and sedation. Nevertheless, this study found that nearly one-fourth of children and adolescents with prescription claims for these drugs were aged 9 or younger. Since schizophrenia is seldom diagnosed before adolescence, it is likely that these drugs are being prescribed to treat behavior disorders such as ADHD, conclude the researchers. Curtis, Masselink, Ostbye, et al., *Arch Pediatr Adolesc Med* 159:362-366, 2005 (AHRQ grant HS10385).

- *Improving primary care access to effective treatment for adolescent depression improves outcomes.*

This randomized controlled trial involved 418 primary care patients aged 13-21 with depression who were enrolled in managed care and treated between 1999 and 2003. Subjects were randomized to either quality improvement (intervention) or usual care (control). After 6 months, intervention patients reported significantly fewer depressive symptoms than usual care patients, higher quality of life scores, and greater satisfaction with mental health care. Asarnow, Jaycox, Duan, et al., *JAMA* 293(3):311-319, 2005 (AHRQ grant HS09908).

- *Many children who have special needs for physical health care also have mental health problems.*

Over one-third of children with special health care needs for a physical problem also have a mental health problem, but only one-quarter of caregivers recognize the children's need for mental health services. The researchers recommend that mental health screenings and assessments be incorporated as a routine part of primary health care for these children. Canty-Mitchell, Austin, Jaffee, et al., *Arch Psychiatr Nurs* 18(3):79-87, 2004 (AHRQ grant HS10453).

- *Use of antipsychotic medications has nearly doubled among children enrolled in Tennessee Medicaid.*

Nearly 1 of every 100 adolescents enrolled in TennCare, Tennessee's program for the uninsured and Medicaid, became a new user of an antipsychotic drug in 2001. Study findings show that much of this increase was due to prescribing of antipsychotics for nonpsychotic conditions, such as attention-deficit/hyperactivity disorder, conduct disorder, and affective disorders. Cooper, Hickson, Fuchs, et al., *Arch Pediatr Adolesc Med* 158:753-759, 2004 (HS10384).

- *Psychosocial adjustment problems may affect some disabled school children.*

Disabled children with learning impairments and family burdens such as poverty or maternal depression are more likely than other disabled children to have poor psychosocial adjustment, according to this study. When mothers reported that the child's disability caused a work, sleep, or financial burden and when families were poor, children were about twice as likely to have poor psychosocial adjustment as other children without these problems. Witt, Riley, and Coiro, *Arch Pediatr Adolesc Med* 157(7):687-695, 2003 (AHRQ grants HS11254 and T32 HS00063).

Newborns and Infants

Four million babies are born each year in the United States. AHRQ's current research focuses on improving the babies' health outcomes, promoting breastfeeding, and reducing racial and ethnic disparities in access to care.

- *Each year, more than 1 million U.S. infants are delivered by c-section.*

One-fourth of all children born in the United States each year are delivered by cesarean section. This reflects a 38 percent increase in the use of c-section since 1997, when about one-fifth of all babies were delivered this way. This rise in the use of c-sections was accompanied by a 60 percent decline in the rate of women giving birth vaginally after having a previous child born via c-section and a 33 percent rise in the rate of repeat c-sections. The national bill for childbirth as a whole in 2003 was $34 billion, with hospital stays involving c-section delivery accounting for nearly half this amount ($15 billion). Medicaid was billed for 43 percent of childbirths overall and 41 percent of those involving c-section. These data were drawn from AHRQ's Healthcare Cost and Utilization Project (HCUP). *Hospitalizations Related to Childbirth, 2003*, Statistical Brief 11, is available at www.hcup-us.ahrq.gov/reports/statbriefs.jsp (Intramural).

- *Teamwork in the delivery room is closely related to the quality of neonatal resuscitation.*

Independent observers viewed recordings of the resuscitation of infants born by cesarean section and assessed compliance with Neonatal Resuscitation Program guidelines. All 132 clinical teams involved in the study exhibited certain teamwork behaviors—communication, management, and leadership—that are correlated with the quality of neonatal resuscitation in the delivery room. Although these correlations do not confirm a causal relationship, they may be used in training providers on how to prevent and manage neonatal resuscitation errors. Thomas, Sexton, Lasky, et al., *J Perinatol* 26:163-169, 2006 (AHRQ grant HS11164).

- *Infants born prematurely at 30-34 weeks gestation may have substantial health problems.*

Compared with full-term infants (at least 37 weeks gestation), infants born at 30-34 weeks gestation are more than four times as likely to require assisted ventilation; they also are at greater risk for pneumothorax and meningitis. Within 3 months of hospital discharge, 11 percent of premature infants born at 30-34 weeks gestation were readmitted to the hospital. Hospital readmission was more likely among male infants and those with chronic lung disease. Escobar, McCormick, Zupanic, et al., *Arch Dis Child Fetal Neonatal Ed* 91(4):F238-F244, 2006 (AHRQ grant HS10131).

- *Babies being cared for in the NICU are at risk for misidentification.*

According to this study conducted in one neonatal intensive care unit (NICU), nearly half of infants cared for in the NICU on any given day were at risk for misidentification. Indeed, during one calendar year, there was not a single day without at least one pair of patients at risk for misidentification. Misidentification could result in an infant being given a medication, procedure, or mother's expressed breast milk intended for another infant, perhaps with serious adverse consequences. The most common reasons for misidentification risk were similar appearing medical record numbers, identical surnames, and similar sounding surnames. Gray, Suresh, Ursprung, et al., *Pediatrics* 117(1):43-47, 2006 (AHRQ grant HS11583).

- *Catheterization may not be the best way to diagnose urinary tract infections in feverish infants.*

Urinary tract infections (UTIs) are the most common cause of serious bacterial infections in feverish infants younger than 3 months. Most doctors use urethral catheterization to diagnose UTIs in young infants, but its accuracy is only marginally better than bag collection. Also, it is technically difficult, invasive, and painful. In a study of 3,066 infants aged 3 months or younger, catheterization and bag collection demonstrated similar sensitivity, but bag collection had somewhat lower specificity as indicated by more false positives. False positives are of particular concern for doctors who manage UTIs aggressively with routine hospitalization and imaging. Schroeder, Newman, Wasserman, et al., *Arch Pediatr Adolesc Med* 159:915-922, 2005 (AHRQ grant HS06485).

- *Use of broad-spectrum antibiotics during labor is linked to late-onset serious bacterial infections in infants.*

Over one-third of women in labor are given antibiotics to prevent the transmission of group B streptococcus (GBS) to their infants. Although use of intrapartum antibiotics (IPA) has been very successful in preventing neonatal GBS infection in the first week of life, this study found a relationship between IPA and the occurrence of late-onset (7 to 90 days after birth) serious bacterial infections. Also, pathogens that caused these late-onset infections were more likely to be resistant to ampicillin if the mother received ampicillin during labor. Thus, penicillin—an antibiotic that treats a narrow range of bacteria—is recommended instead of ampicillin for IPA to prevent GBS. Glasgow, Young, Wallin, et al., *Pediatrics* 116(3):696-702, 2005 (AHRQ grant HS11826).

- *Delayed sternal closure increases the risk of infection in young infants who undergo heart surgery.*

Most median sternostomies (cracking open of the rib cage to permit open heart surgery) in infants are performed within the first few weeks of life to correct life-threatening, complex congenital heart disease. Infection of the mid-sternum strikes 1.4 percent of children who undergo this procedure and 3 percent of those who have heart and lung transplant. Delayed sternal closure appears to substantially elevate the risk of infection with Gram-negative bacteria, according to this study. Long, Shah, Lautenbach, et al., *Pediatr Infect Dis J* 24(4):315-319, 2005 (AHRQ grant HS10399).

- *Racial disparities found in survival of very low-birthweight babies.*

Researchers analyzed the medical records of more than 74,000 black and white very low-birthweight (VLBW) infants treated at 332 hospitals. Hospitals were defined as minority-serving if more than 35 percent of the VLBW infants they treated were black. They found that far more black infants were treated by minority-serving

hospitals than were treated at hospitals where less than 15 percent of infants were black. Both black and white VLBW babies were 28 percent more likely to die at minority-serving hospitals than at other hospitals, even though the hospitals treated similarly ill infants. Morales, Staiger, Horbar, et al., *Am J Public Health* 95(12):2206-2212, 2005 (AHRQ grants HS13280 and HS10858).

- *Study focuses on the cost-effectiveness and utility of routine circumcision.*

Eighty-six percent of male infants in the United States without a complicating diagnosis are circumcised shortly after birth. This author examines the costs and cost-effectiveness of this procedure and the importance of various sociocultural and religious precedents that support the continued use of routine circumcision. Gray, *Med Decis Making* 24:688-692, 2004 (AHRQ Publication No. 05-R029)* (Intramural).

- *QI program improves use of recommended therapy to prevent respiratory distress in preterm infants.*

Prophylactic surfactant therapy immediately after birth is recommended for preterm infants to prevent respiratory distress syndrome (RDS), but few infants routinely receive it, and many who do receive it get delayed treatment. This study showed that a collaborative quality improvement program, which included audit and feedback, reviews of the evidence on surfactant treatment, training, and ongoing faculty collaboration significantly increases the use of surfactant in the delivery room within minutes of a preterm infant's birth. Horbar, Carpenter, Buzas, et al., *Br Med J* 329:1004-1010, 2004. See also Horbar, Carpenter, Buzas, et al., *Pediatrics* 113(6):1593-1602, 2004 (AHRQ grant HS10528).

- *First-week followup of newborns helps to prevent severe jaundice and other problems.*

These researchers identified barriers to early newborn followup to prevent jaundice, including communication difficulties, problems with systems and processes of care, and lack of parental knowledge. They recommend using e-mail to notify community-based providers about the baby's birth and to provide them with lab results. They also suggest that a pediatrician be chosen before discharge, parents be given a list of early warning signs and a call-in number to report problems, and the nursery initiate a followup call to the mother. Salem-Schatz, Peterson, Palmer, et al., *Jt Comm J Qual Safety* 30(11):593-601, 2004. See also Chou, Palmer, Ezhuthachan, et al., *Pediatrics* 112(6):1264-1273, 2003; Palmer, Clanton, Ezhuthachan, et al., *Pediatrics* 112(6):1388-1393, 2004 (AHRQ grant HS09782); and Madden, Soumerai, Lieu, et al., *Pediatrics* 113(1):42-49, 2004 (HS10060).

- *Experts offer recommendations for prevention of kernicterus.*

In newborns with jaundice, blood levels of bilirubin can become high enough to result in neurotoxicity, a condition of severe jaundice called kernicterus. Left untreated, kernicterus can result in cerebral palsy, mental retardation, hearing loss, and difficulty in moving the eyes. These authors present recommendations for early identification, prevention, and treatment of kernicterus. Bhutani, Johnson, Maisels, et al., *J Perinatol* 24(10):650-662, 2004 (AHRQ grant HD/HS369145).

- *Basing NICU referrals on outcomes data may lower U.S. infant mortality rates.*

The researchers used 1994-2000 data from a collaborative network of neonatal intensive care units (NICUs) in 49 States and 22 countries to assess the potential of several approaches to improve the quality of neonatal care. NICU mortality rates ranged from 9 percent for low-mortality hospitals to 15 percent for high-mortality hospitals. The researchers conclude that more lives could be saved if referrals were based on infant outcomes data instead of high NICU volume. Rogowski, Staiger, and Horbar, *Health Affairs* 23(5):88-97, 2004 (AHRQ grants HS13371, HS10528).

- *Rehospitalization is common for premature infants with bronchopulmonary dysplasia.*

Bronchopulmonary dysplasia (BPD) affects many low birthweight and premature babies. It is marked by abnormal lung x-rays, respiratory compromise, and prolonged oxygen requirement. Infants with BPD may have pulmonary problems long past the neonatal period and thus are more susceptible to respiratory infections and other serious conditions that can lead to hospitalization. The researchers found no clinical or demographic factors that reliably predicted rehospitalization of infants with BPD. Smith, Zupancic, McCormick, et al., *J Pediatr* 144:799-803, 2004 (AHRQ grant T32 HS00063).

- *Studies focus on reducing mortality rates and improving long-term outcomes of very low birthweight babies.*

Babies who are extremely low birthweight (ELBW, 1.1 to 2.2 pounds) and very low birthweight (VLBW, less

than 3.3 pounds) are at greater risk of dying or having neurodevelopmental problems than babies who weigh more at birth. These two studies examined hospital mortality and school difficulties among ELBW children. The first study found that more ELBW babies could be saved if they were referred to hospitals based on the hospitals' past neonatal intensive care unit mortality rates rather than the volume of ELBW babies they treat. The second study found that school-aged ELBW children are burdened by childhood disability, school-related difficulties, and increased use of special educational resources. Rogowski, Horbar, Staiger, et al., *JAMA* 291(2):202-209, 2004 (AHRQ grants HS10328 and HS13371); Saigal, den Ouden, Wolke, et al., *Pediatrics* 112(4):943-950, 2003 (AHRQ grant HS08385).

- *Wage inequality is associated with infant mortality rates in wealthy industrialized countries.*

According to this study, one measure of social inequality—wage inequality—is associated with the infant mortality rate in 19 wealthy countries belonging to the Organization for Economic Cooperation and Development. After controlling for a country's gross domestic product per capita and wage inequality, variables associated with better health included higher income per capita, the method of health care financing, and more physicians per 1,000 population. Higher alcohol consumption, a larger proportion of the population in unions, and more government expenditures on health were associated with poorer health outcomes. Macinko, Shi, and Starfield, *Soc Sci Med* 58:279-292, 2004. See also Macinko, Shi, Starfield, and Wulu, *Med Care Res Rev* 6(4):407-452, 2003 (AHRQ grant T32 HS00029).

- *Relying on clinical guidelines to treat young infants with fevers may not improve outcomes.*

In this study of more than 3,000 infants aged 3 months or younger with fevers, experienced pediatricians who relied on their clinical judgment more than existing guidelines were able to minimize hospitalizations and avoid unnecessary lab testing without a negative impact on outcomes. Rather than hospitalization, physicians saw many infants in repeat office visits and had frequent telephone followup. Pantell, Newman, Bernzweig, et al., *JAMA* 291(10):1203-1212, 2004 (AHRQ grant HS06485).

- *Newborns from low-income families are more than twice as likely as other newborns to be discharged early.*

These researchers studied nearly 3,000 medically low-risk infants using a 1999 California postpartum survey and found that newborns from low-income families were more than twice as likely as other newborns to be discharged after only a 1-night stay following vaginal delivery or a 3-night stay or less after cesarean delivery. Among newborns discharged early, 68 percent did not receive followup care within the recommended timeframe. Galbraith, Egerter, Marchi, et al., *Pediatrics* 111(2):364-371, 2003 (AHRQ grant T32 HS00086).

- *Study hints at a link between breastfeeding and intelligence.*

Researchers examined the relationship between breastfeeding history and 15 indicators of physical health, emotional health, and cognitive ability among 16,903 adolescents, including 2,734 sibling pairs. They found a persistent positive correlation between breastfeeding and cognitive ability; that is, siblings who were breastfed had higher cognitive ability than those who were not. The effect was large enough to matter, and it persisted into adolescence. Evenhouse and Reilly, *Health Serv Res* 40(6):1781-1802, 2005 (AHRQ grant HS00086).

- *Short maternal length of stay does not affect breastfeeding if combined with outpatient support.*

Retrospective examinations of medical records on 20,366 mother-infant pairs was conducted to determine the impact on breastfeeding of an HMO's early discharge protocol. Results showed that hospital stays of 24 hours or less after normal vaginal deliveries did not adversely affect breastfeeding when combined with outpatient breastfeeding support and a home visitor program. Madden, Soumerai, Lieu, et al., *Pediatrics* 111(3):519-524, 2003 (AHRQ grant HS10060).

- *Strategies for identifying neonatal jaundice are examined.*

Based on a review of almost 5,000 abstracts and articles, researchers determined whether measurements by noninvasive instruments are reliable in identifying babies who need blood tests to confirm high bilirubin levels. They also suggest that future research is needed to validate newer noninvasive devices and address cost-effectiveness issues. A summary of this evidence report (AHRQ Publication No. 03-E005) and the full report, *Management of Neonatal Hyperbilirubinemia* (AHRQ Publication No. 03-E011), are available from AHRQ* (AHRQ contract 290-97-0019).

- *Clinical records can be used to identify children with disabling cerebral palsy.*

These researchers found that clinical and research study records can be used to distinguish children with disabling cerebral palsy (CP) from those with no

CP or nondisabling CP. They examined records of neurological examination findings and functional motor assessments of low birthweight children who were born in the Netherlands, Canada, and Germany and were 2 to 8 years of age at the time of the study. Panet, Qiu, Rosenbaum, et al., *Dev Med Child Neurol* 45(9):628-633, 2003 (AHRQ grant HS08385).

- *Lengthened postpartum stays may be cost effective.*

Investigators estimated life-years saved from reduced infant mortality due to lengthening postpartum stays to mandated times for 113,147 infants born in Washington State in 1989 or 1990. The infants had postpartum stays short enough to be affected by length-of-stay legislation. Results show that lengthening postpartum stays to federally mandated levels is cost effective. Malkin, Keeler, Broder, et al., *Pediatrics* 3(4):e316, 2003 online at www.pediatrics.org (AHRQ grant HS09342).

Obesity/Overweight

The increasing number of obese children and adolescents across the Nation has led policymakers to rank it as a critical public health threat. Since the 1970s, the prevalence of obesity has more than doubled for preschool children aged 2-5 years and adolescents aged 12-19 years, and it has more than tripled for children aged 6-11 years. At present, approximately 9 million children over 6 years of age are obese.

- *Youths are more likely to be counseled about diet and exercise following a diagnosis of obesity.*

The researchers used data from two surveys during the period 1997-2000 involving 39,340 outpatient visits by youths aged 2 to 18. Clinicians diagnosed obesity at less than 1 percent of all visits. Factors associated with diet counseling at well-child visits were diagnosis of obesity, being seen by pediatricians, ages 2 to 5 years compared with 12 to 18 years, and self-pay compared with private insurance. Factors associated with exercise counseling were similar, but this counseling occurred only half as often in visits by black youths as in visits by white youths. Cook, Weitzman, Auinger, and Barlow, *Pediatrics* 116(1):112-116, 2005 (AHRQ grant HS13901).

- *School-based weight loss/exercise programs found effective for some children in Louisiana.*

One-fourth of the 279 Louisiana middle school children enrolled in a school-based weight loss program were overweight or obese. Most of the children enrolled in the program were black and from low-income families. Twenty-eight of the children attended a food and fitness class; the rest of the children participated in a free alternative physical education (PE) class that involved warm-up and stretching exercises, aerobic activities, and a cool-down period. Not all students completed the PE class; those who did ended with lower body mass indexes and a total weight loss of 33.25 pounds. Children in the other group ended with a total weight loss of 6.5 pounds. Edwards, *Nurs Clin North Am* 40(4):661-669, 2005 (AHRQ grant HS11834).

- *Late bottle-weaning is associated with an increased risk of overweight.*

The American Academy of Pediatrics recommends introducing the cup to babies at 6 months and complete bottle weaning at 15 months, yet 20 percent of 2 year olds and 9 percent of 3 year olds

are still using a bottle, according to this study. This study found that children less than the 85th percentile BMI (normal weight) were weaned from a bottle on average at 18 months, compared with 19 months for those in the 85th to 95th percentile BMI (overweight) and over 22 months for children greater than the 95th percentile BMI (obese). Each additional month of bottle use corresponded to an approximate 3 percent increase in the odds of being in a higher BMI category. Bonuck, Kahn, and Schechter, *Clin Pediatr* 43:535-540, 2004 (AHRQ grant HS10900).

- *Controlling diet and physical activity can help obese and overweight children control their weight.*

Excess weight in children is due primarily to poor eating habits and inactivity. Weight loss through diet, exercise, and limits on TV viewing and computer use should focus on maintaining a child's baseline weight. For children ages 2 to 7, weight loss of no more than 1 pound per month is recommended. A more aggressive weight loss program should be considered for children older than 7 who have a BMI for age greater than 95 percent and those who are at risk for becoming overweight (BMI for age of 85 to 95 percent) and have secondary complications (e.g., high blood pressure or high cholesterol). Greaser and Whyte, *Consultant* 1349-1353, 2004 (Intramural).*

- *AHRQ and its partners have created new tools to help combat childhood obesity.*

AHRQ and FitTV have partnered to produce a fun and interactive DVD for children ages 5 to 9 and their parents. The DVD, *Max's Magical Delivery: Fit for Kids*, is a 30-minute tool that provides fun ways to incorporate physical activity and healthy foods into the daily lives of children. A second DVD, *Childhood Obesity: Combating the Epidemic*, provides pediatricians and other providers with information about new methods for assessing and treating childhood overweight and obesity. Copies of the DVDs (AHRQ Publication No. 04-0088-DVD, children and parents; 04-0089-DVD, clinicians) are available from AHRQ.*

- *Black and Hispanic children are much more likely than other children to be overweight.*

Black and Hispanic children ages 6 to 11 are much more likely than non-Hispanic white children and Asian children to be overweight, according to this analysis of interview data from the 1996 Medical Expenditure Panel Survey Household Component. The odds change dramatically when children become teenagers. As teens, Asian/Pacific Islander children are more than four times as likely as non-Hispanic white teens to be overweight. Also, regardless of their race or ethnicity, adolescents not covered by private health insurance and those enrolled in Medicaid are the most likely to be overweight. Haas, Lee, Kaplan, et al., *Am J Public Health* 93(12):2105-2110, 2003 (AHRQ grants HS10771 and HS10856).

Oral Health

In order to reverse trends of under use and disparities in oral care for children, researchers are studying incentives to improve access to and delivery of care.

- *Rural children with special health care needs often do not receive needed dental care.*

Children with special health care needs (CSHCN) who reside in rural areas are less likely than their urban counterparts to receive needed dental care. An

analysis of data on more than 37,000 CSHCN aged 2 and older revealed that children living in rural areas were 17 percent more likely than those living in urban areas to have an unmet need for dental care. The researchers cite two main reasons for this disparity: one, rural parents do not full appreciate the need for dental care, and two, dental care may be difficult to access for rural families. Skinner, Slifkin, and Mayer, *J Rural Health* 22(1):36-42, 2006 (AHRQ grant HS13309).

- *WIC participation improves poor children's access to dental care.*

Over one-third of infants born in the United States are enrolled in WIC. This study found that participation in WIC was linked with increased use of preventive and restorative dental services and decreased use of emergency services for oral problems among 50,000 preschool-aged children covered by Medicaid. Lee, Rozier, Norton, et al., *Am J Public Health* 94(5):772-777, 2004 (AHRQ grants HS11607 and T32 HS00032).

- *Project focuses on use of dental sealants.*

The goal of this project was to evaluate the effects of initiating a dental sealant benefit in the North Carolina Medicaid program on service provision, treatment outcomes, and cost-effectiveness. Richard G. Rozier, PI (AHRQ grant HS06993), *Strategies for Management of Dental Caries in Children* (Final Report, NTIS Accession No. PB2004-103390).**

- *Task Force recommends fluoride supplements for some children.*

Physicians who practice in areas where the water supply is deficient in fluoride should prescribe oral fluoride supplements to preschool children over the age of 6 months, according to a recommendation from the U.S. Preventive Services Task Force. USPSTF, *Am J Prev Med* 26(4):326-329, 2004. See also Bader, Rozier, Lohr, and Frame, *Am J Prev Med* 26(4):315-325, 2004 (290-97-0018).

- *Study associates secondhand smoke with tooth decay in kids.*

Data from household interviews and health examinations of approximately 4,000 children ages 4 to 11 show that children had an increased risk of tooth decay if they had high levels of cotinine (a by-product of nicotine). About 32 percent of the children with cotinine levels consistent with secondhand smoke exposure had decayed surfaces, compared with 18 percent of children with lower levels of cotinine. Aligne, Moss, Auinger, et al., *JAMA* 289(10):1258-1264, 2003 (cofunded by AHRQ and HRSA contract 240-97-0043).

Otitis Media/Respiratory Infection

Otitis media (middle ear infection) is a common childhood illness that affects more than half of children under age 5 each year. Current debate revolves around antibiotic use and the long-term effects of ear infection on functioning, behavioral problems, and parental stress.

- *More than two-thirds of children visiting a physician for a sore throat receive antibiotics.*

An analysis of data from the Medical Expenditure Panel Survey (MEPS) shows that 14 percent of U.S. children visit a health care provider at least once a year for a serious sore throat, and almost 70 percent of these children are prescribed antibiotics. The data also show that about one of every five children who is prescribed an antibiotic for a sore throat does not receive a throat swab to confirm a bacterial infection. *Treatment of Sore Throats: Antibiotic Prescriptions and Throat Cultures for Children Under 18 Years of Age*, MEPS Statistical Brief 137, available online at www.meps.ahrq.govmepsweb (Intramural).

- *Researchers examine trends in antibiotic use among children.*

From 1996 to 2001, children's use of antibiotics sharply declined by 8.5 percent overall and 5.1 percent for respiratory tract infections. This decline followed the launch of several national campaigns to promote the appropriate use of antibiotics. An analysis of data from AHRQ's Medical Expenditure Panel Survey found reductions in use among all subgroups of children. However, the decline in overall antibiotic use for white children was more than double the decline for black or Hispanic children. Miller and Hudson, *Med Care* 44(5 Suppl):36-44, 2006 (AHRQ Publication No. OM-06-0074, for single copies of the journal)* (Intramural).

- *Pocket card facilitates shared parent/physician decisionmaking about treatment for acute otitis media.*

A simple pocket card has been developed to help physicians and parents work together to decide on the appropriate treatment for a child with acute otitis media (AOM). The pocket card combines a parent's assessment of the child's symptoms (using a scale of facial expressions) with the clinician's assessment of tympanic membrane inflammation and middle ear appearance (using an otoscopy scale) to determine AOM severity. After considering this rating of AOM severity, the child's age, and the presence or absence of other risk factors, the clinician and parent can decide on the

appropriate treatment plan. Friedman, McCormick, Pittman, et al., *Pediatr Infect Dis J* 25(2):101-107, 2006 (AHRQ grant HS10613).

- *Four clinical factors can help diagnose pneumonia in children seen in the ER.*

This study involved 510 children aged 2 to 59 months who arrived in the emergency department of one Cincinnati hospital during the period 2000-2002. The children presented with a cough and one or more of the following symptoms: labored, rapid, or noisy breathing; chest or abdominal pain; and/or fever; 8.6 percent of children had x-ray evidence of pneumonia. The children who had pneumonia differed from those who did not on four characteristics: older age (20.9 vs. 14.8 months), faster respiratory rate (49.8 vs. 42.7 breaths per minute), lower oxygen saturation (95.5 vs. 97.8), and nasal flaring (22.7 vs. 7.7 percent). Mahabee-Gittens, Grupp-Phelan, Brody, et al., *Clin Pediatr* 44:427-435, 2005 (AHRQ grant HS11038).

- *Parents are more satisfied when doctors prescribe antibiotics for their child's cough or cold symptoms.*

Children receive an average of two to three antibiotic prescriptions a year, many of which are unnecessary. Clinicians believe that parents will be more satisfied with their office visit when antibiotics are prescribed, and findings from this study suggest they are right. Researchers interviewed 378 parents of children 2 to 10 years of age who were seen at a pediatric clinic for cough and cold symptoms. Nearly half (47 percent) received antibiotics at the initial visit, and their parents gave higher satisfaction scores (9.25 on a 10 point scale) compared with parents whose children did not receive antibiotics (8.95). When children received antibiotics at a subsequent visit, the parents' scores averaged 7.25, compared with 6.25 for parents of children who did not receive antibiotics. Christakis, Wright, Taylor, and Zimmerman, *Pediatr Infect Dis J* 24(9):1-4, 2005 (AHRQ grant HS13195).

- *Doctors still prescribe antibiotics for over half of children with sore throats.*

Prescribing of antibiotics for sore throats—most of which are viral—has declined over the last few years, from 66 percent of visits in 1995 to 54 percent of visits in 2003. Nevertheless, doctors still are ordering antibiotics for more than half of children who have a sore throat. With more than 7 million pediatric visits each year for sore throat, inappropriate use of antibiotics continues to be a serious problem. Linder, Bates, Lee, and Finkelstein, *JAMA* 294(18):2315-2322, 2005 (AHRQ grants HS14563 and HS13908).

- *Researchers compare immediate antibiotic treatment with watchful waiting for nonsevere acute otitis media (AOM) in children.*

This study found that immediate antibiotic treatment for nonsevere AOM in children 6 months to 12 years provided superior early results compared with watchful waiting, but results were nearly identical between the two groups at 30 days. The study involved 112 children who were randomized to receive immediate antibiotics (amoxicillin and symptom medication) and 111 children who were randomized to watchful waiting (symptom medication only). Two-thirds of the children in the watchful waiting group completed the study without needing antibiotics. McCormick, Chonmaitree, Pittman, et al., *Pediatrics* 115(6):1455-1465, 2005 (AHRQ grant HS10613).

See also *Trends in Children's Antibiotic Use: 1996-2001*, MEPS Research Findings No. 23 (AHRQ Publication No. 05-0020)* (Intramural).

- *Few physicians initially try watchful waiting for children with nonsevere acute otitis media.*

The investigators surveyed 160 physicians and 2,054 parents of children younger than age 6 in 16 Massachusetts communities about their attitudes toward watchful waiting in children with nonsevere AOM. A majority of physicians reported at least occasional use of watchful waiting, but few used it frequently. For example, 38 percent of physicians treating children aged 2 or older said they never or almost never used watchful waiting, 39 percent reported occasional use, and 6 percent said they used it most of the time. About one-third of parents reported that they would be satisfied if their doctor recommended watchful waiting, 26 percent said they would be neutral, and 40 percent said they would be somewhat or extremely dissatisfied. Finkelstein, Stille, Rifas-Shiman, and Goldmann, *Pediatrics* 115(6):1466-1473, 2005 (AHRQ grant HS10247).

- *Use of broad-spectrum antibiotics to treat childhood infections has increased.*

Despite recent downward trends in antibiotic use to treat infections in children, use of certain broad-spectrum antibiotics (second-generation macrolides) to treat children has increased. According to the researchers, use of these drugs has increased because they are effective against a broad spectrum of bacteria, require less frequent dosing, and have fewer gastrointestinal side effects than other antibiotics. Nevertheless, experts generally do not recommend second-generation macrolides for initial

treatment of infections in younger children, in part because of growing bacterial resistance to antibiotics. Instead, they support the use of narrower spectrum agents whenever appropriate. Stille, Andrade, Huang, et al., *Pediatrics* 114(5):1206-1211, 2004 (AHRQ grant HS10391).

- *Use of alcohol-based hand gel may reduce transmission of respiratory illnesses in homes with young children who attend day care.*

The researchers analyzed transmission rates for respiratory and gastrointestinal (GI) illnesses among 208 ethnically diverse families with children enrolled in child care who were treated at five suburban practices in the Boston area. A survey of the families revealed that a total of 1,545 respiratory and 360 GI illnesses occurred in the families from November 2000 to May 2001. Of these, 54 percent of the illnesses were brought into the home by children younger than 5. Twenty-two percent of respondents reported use of alcohol-based hand gels, and 33 percent reported always washing their hands after blowing or wiping a nose. After adjusting for education, insurance status, and other factors, the researchers concluded that hand gels had a protective effect against respiratory illness transmission in the home. Lee, Salomon, Friedman, et al., *Pediatrics* 115(4):852-860, 2005 (AHRQ grant T32 HS00063).

- *Otitis media may not substantially increase the risk of delayed speech development in most children.*

Half of children who have an episode of otitis media with effusion (OME) suffer mild hearing loss, while about 5 to 10 percent have moderate hearing loss. However, for normally developing children, OME may not be a substantial risk for delayed speech and language development or poorer academic achievement. Antibiotic therapy, tympanostomy tubes, and adenoidectomy increase short-term resolution of OME or reduce its occurrence, yet in the long term, hearing levels are equal in treated and untreated ears. Roberts, Hunter, Gravel, et al., *J Dev Behav Pediatr* 25(2):110-122, 2004 (AHRQ grant HS12072).

- *Patterns of care and outcomes of pneumonia in children vary by ethnicity and race.*

This study found that compared with white children, minority children are hospitalized for pneumonia at younger ages, are more likely to be admitted through the emergency department, and are less likely to receive bronchoscopy or mechanical ventilation. These findings are based on an analysis of data from the 1998, 1999, and 2000 Nationwide Inpatient Sample, which contains data on 20 percent of total U.S. hospital discharges. Washington, Shen, Bell, et al., *J Health Care Poor Underserved* 15:462-473, 2004 (AHRQ grant HS13056).

- *Young children in disadvantaged communities may be at increased risk for Streptococcus pneumoniae.*

Certain community characteristics —poverty, low educational attainment, low owner occupancy, high density of children, limited household plumbing, and others—increase the odds of carriage of disease-causing strains of *S. pneumoniae* two- to three-fold. The presence of these characteristics could be used to identify communities that should be targeted for interventions to decrease carriage, according to this study. Huang, Finkelstein, Rifas-Shiman, et al., *Am J Epidemiol* 159(7):645-654, 2004 (AHRQ grant HS10247).

- *Misconceptions are common among child care center staff about common childhood infections.*

The researchers surveyed staff at randomly selected child care centers in Massachusetts to assess knowledge regarding common infections. Overall, more than 80 percent of staff members incorrectly believed that antibiotics were indicated for bronchitis and for green nasal discharge in children. More than one-quarter of staff surveyed believed that antibiotics speed recovery from colds and flu and are helpful in treating viral infections. Friedman, Lee, Kleinman, and Finkelstein, *Ambulatory Pediatr* 4(5):455-460, 2004 (AHRQ grants T32 HS00063, HS10247). See also Kuzujanakis, Kleinman, Rifas-Shiman, and Finkelstein, *Ambulatory Pediatr* 3(4):203-210, 2003 (AHRQ grant HS10247).

- *Pneumatic otoscopy is cost effective for accurately diagnosing middle ear effusion in children.*

Using a pneumatic otoscope—an instrument fitted with a light and magnifying lens—a clinician can look directly in a child's middle ear and view the transparency, position, and other qualities of the ear drum. According to this review of the evidence, pneumatic otoscopy had the best performance compared with seven other commonly used diagnostic methods. Also, after training, most clinicians should find it easier to use than other diagnostic methods. Takata, Chan, Morphew, et al., *Pediatrics* 112(6):1379-1387, 2003 (contract 290-97-0001).

- *Premature birth increases infants' risk of hospitalization and complications from respiratory syncytial virus.*

Premature infants are at much greater risk than term infants for severe respiratory syncytial virus (RSV) outcomes, including bronchiolitis and

pneumonia. Complications are common in infants hospitalized for these conditions, particularly infants born prematurely, and are associated with longer stays and higher costs. Horn and Smout, *J Pediatr* 143:S133-S141 and Willson, Landrigan, Horn, and Smout, 143:S142-S149, 2003 (contract 290-95-0042). See also Sinha, Madden, Ross-Degnan, et al., *Pediatrics* 112(4), 2003; online at www.pediatrics.org (HS10060).

- *Fewer antibiotics are being prescribed for U.S. children.*

After decades of being on the rise, antibiotic use by U.S. children aged 3 months to 3 years fell by almost 25 percent from 1996 to 2000, according to this study. More than half of the decrease came from a drop in the number of antibiotics prescribed for childhood ear infections. There also were fewer prescriptions for children 3 months to 18 years for cold/upper respiratory infections, pharyngitis, sinusitis, and bronchitis. Finkelstein, Stille, Nordin, et al., *Pediatrics* 112(3):620-627, 2003 (AHRQ grant HS10391).

- *Chronic middle-ear disease up to age 3 may not impair later development.*

In this study of otherwise healthy children who had persistent middle-ear effusion (MEE, fluid buildup) during the first 3 years of life, prompt insertion of tympanostomy tubes did not affect the children's language or other developmental outcomes at age 4. The study involved 429 children who had persistent MEE and underwent tube insertion either promptly or after an extended period. Paradise, Dollaghan, Campbell, et al., *Pediatrics* 112(2):265-277, 2003 and Paradise, Feldman, Campbell, et al., *Pediatr Infect Dis J* 22:309-314, 2003 (AHRQ/NICHD grant HD26026).

- *New vaccine reduces strains of bacteria most likely to cause severe infections.*

This study of 16 Massachusetts communities found that 8 percent of children under age 7 carry antibiotic-resistant *Streptococcus pneumoniae*, a major cause of meningitis, bloodstream infections. When rare but dangerous infections develop, antibiotic-resistant strains make the illness harder to treat. This study examined the effectiveness of a new vaccine to protect children from the most dangerous strains of the bacteria. Results showed that immunized children were less likely to carry one of the seven more invasive strains, and thus they were at lower risk of contracting a serious illness. Finkelstein, Huang, Daniel, et al., *Pediatrics* 112(4):862-869, 2003 (AHRQ grant HS10391).

- *More than half of parents believe that antibiotics are needed to treat a common cold.*

In this study, 66 percent of parents believed that colds are caused by bacteria; 53 percent of the parents believed that antibiotics are needed to treat colds. Also, 23 percent said they would take their child to the ED if they had a cold, and 60 percent said that a cold would warrant a doctor's visit. Lee, Friedman, Ross-Degnan, et al., *Pediatrics* 111(2):231-236, 2003 (AHRQ grant T32 HS00063).

- *Study associates maternal education with child's language skills.*

This study examined the degree of association between parent-reported language scores and the cumulative duration of MEE during the first 3 years of life in 621 children. Scores increased as the level of maternal education increased, and within each maternal-education subgroup, scores decreased as the duration of MEE increased. Feldman, Dollaghan, Campbell, et al., *J Speech, Lang Hear Res* 46:273-287, 2003 (AHRQ and NICHHD grant HD26026).

- *Accumulation of risk factors delays speech.*

Researchers compared 100 3-year-olds with speech delay of unknown origin and 539 same-age peers, and examined abnormal hearing in a subset of 279 children. Low maternal education, male sex, and a family history of developmental communication disorder increased the likelihood of speech delay. A child with all three factors was nearly eight times as likely to have speech delay as a child without any of the factors. Campbell, Dollaghan, Rockette, et al., *Child Dev* 74(2):346-357, 2003 (AHRQ/NICHHD grant HD26026).

- *Middle ear status, age, and test influence audiometric results.*

Researchers tested 1,055 children with MEE; unilateral MEE; or bilateral MEE for age-specific hearing threshold levels. Thresholds were highest in the youngest children and lowest in the oldest children. Thresholds were lowest in children with normal middle ear status, intermediate in children with unilateral MEE, and highest in children with bilateral MEE. Sabo, Paradise, Kurs-Lasky, et al., *Ear Hear* 24(1):38-47, 2003 (AHRQ and NICHHD grant HD26026).

- *Parents may influence pediatricians' treatment decisions.*

An analysis of audiotapes and videotapes of 295 acute care visits reveals that parents often pressure pediatricians to prescribe antibiotics for their children. The doctors prescribed antibiotics in 15 of the 31 cases involving overt pressure. When parents only discussed their children's symptoms, pediatricians perceived parents wanted a medical evaluation and complied. When parents offered a candidate diagnosis (in 16

percent of cases), 82 percent of the cases were treated with antibiotics. Stivers, *Soc Sci Med* 54(7):1111-1130, 2002; Stivers, *Health Commun* 14(3):299-338, 2002; and Stivers, Mangione-Smith, Elliott, et al., *J Fam Pract* 52(2):140-148, 2003 (AHRQ grant HS10577).

- *Misconceptions lead to parental demand for antibiotics.*

Thirty-six day care centers and 398 parents were surveyed about their beliefs and the centers' policies for excluding children, requiring physician clearance, or enforcing their policies regarding symptoms of upper respiratory tract infection. Responses revealed that only 4 percent of parents felt pressured by staff to see a doctor or obtain an antibiotic (2 percent). However, 20 percent believed most colds and flu illnesses are caused by bacteria and get better faster with antibiotics. Friedman, Lee, Kleinman, et al., *Arch Pediatr Adolesc Med* 157:369-374, 2003 (AHRQ grant HS00063).

Preventive and Developmental Services

The majority of injuries and deaths in children and adolescents are preventable. Although the importance of preventive services has been demonstrated, there still are barriers, flaws, and disparities in the content and delivery of clinical preventive services.

- *Use of stimulants to treat ADHD has leveled off in recent years.*

Stimulants, such as methylphenidate (Ritalin) and amphetamines, are commonly prescribed to treat children with attention deficit hyperactivity disorder (ADHD). Use of these medications increased four-fold from 1987 (0.6 percent) to 1996 (2.4 percent) among U.S. children aged 18 and younger, but this trend seems to have abated. According to this study, the prevalence in use of stimulants among children aged 18 or younger was 2.7 percent in 1997 and 2.9 percent in 2002, with no statistically significant change during these 6 years. Use was highest among children aged 6-12 (4.8 percent in 2002), compared with 3.2 percent among those aged 13-19, and 0.3 percent for children younger than age 6. Zuvekas, Vitiello, and Norquist, *Am J Psychiatr*163:579-585, 2006 (AHRQ Publication No. 06-R063)* (Intramural).

- *Two studies find low levels of preventive care and suboptimal provision of anticipatory guidance.*

Researchers studied 44 private pediatric and family medicine practices in North Carolina and found low levels of preventive care, with substantial variation among practices. Only 39 percent of children received three of four recommended preventive services: immunizations, testing for anemia, tuberculosis testing, and lead screening by age 2. The range among clinics was 2 to 88 percent. On average, physicians spent less than 2.5 minutes of each well-child visit on anticipatory guidance (i.e., counseling parents about child development, injury prevention, nutrition, and other topics). Rosenthal, Lannon, Stuart, et al., *Arch Pediatr Adolesc Med* 159:456-463, 2005 (AHRQ grant HS08509).

- *Pneumococcal carriage seems to be more prevalent in communities that have more children in day care.*

Children often carry the pneumococcal bacteria that can cause pneumonia, ear infections, and other illnesses, but carriage rates differ from one community to another. Factors such as age and number of siblings account for some of the differences, but other factors—such as the proportion of children in a community who attend child care centers—also play a role. In this study, the researchers examined data on asymptomatic children in 16 Massachusetts communities and found that the odds of carriage were two to three times as high for youngsters attending child care centers compared with those were not in child care. Huang, Finkelstein, and Lipsitch, *Clin Infect Dis* 40:1215-1222, 2005 (AHRQ grant HS10247).

- *Routine vaccination of adolescents for whooping cough would be cost effective.*

Although nearly all young children are vaccinated against pertussis, their immunity wanes by the mid-teens. This has resulted in sharply increased rates of whooping cough among adolescents and young adults in recent years. This study found that a one-time adolescent pertussis vaccination would cost $15 and be both beneficial to health and cost effective. Lee, LeBaron, Murphy, et al., *Pediatrics* 115(6):1675-1684, 2005 (AHRQ grants T32 HS00063 and HS13908). See also Lee, Lett, Schauer, et al., *Clin Infect Dis* 39:1572-1580, 2004 (AHRQ grant T32 HS00063).

- *Altering the vaccination schedule for RotaShield could greatly lower the risk of intussusception.*

RotaShield, a vaccine intended to prevent severe rotavirus diarrhea among infants and children, was withdrawn in July 1999 because of a link between the vaccine and intussusception (intestinal obstruction) in vaccinated infants. These researchers found that the incidence of intussusception associated with the first dose of RotaShield increases with age (infants 90 days and older accounted for 80 percent of cases), and that altering the vaccination schedule could markedly reduce the risk. They calculated that a two-dose neonatal vaccination schedule administered at 0-29 days and 30-59 days of age would lead to, at most, a 7 percent increase in the incidence of intussusception above the annual

background incidence. Simonsen, Viboud, Elixhauser, et al., *J Infect Dis* 192:S36-S43, 2005 (AHRQ Publication No. 06-R002)* (Intramural).

- *Evidence is limited to support recommendations for preventive care during well-child visits.*

These researchers sought evidence of effectiveness for a total of 42 preventive interventions (not including immunizations) in three categories: behavioral counseling to reduce risky behavior or increase healthy behavior, screening, and prophylaxis. They found limited evidence that counseling can change some health risk behaviors (such as seat belt and car seat use), and that repeated intensive counseling is likely to be most effective. Evidence in support screening was very limited, as was evidence to support prophylactic approaches (e.g., vitamin supplements). Moyer and Butler, *Pediatrics* 114(6):1511-1521, 2004 (AHRQ contract 02-R00012801D).

- *Only limited evidence supports many recommendations for preventive care during well-child visits.*

Professional organizations, government agencies, and other groups have made many and sometimes conflicting recommendations about what should be included in well-child visits. Yet, according to this study, there is limited direct evidence to support 42 commonly recommended preventive interventions, including oral fluoride treatment, counseling to increase healthy behaviors, and scoliosis screening. Moyer and Butler, *Pediatrics* 114(6):1511-1521, 2004 (AHRQ contract 02-R00012801D).

- *Task Force recommends vision screening for children younger than 5.*

Visual impairment affects 5 to 10 percent of preschool age children, according to the U.S. Preventive Services Task Force. They recommend that children younger than 5 be screened in the primary care setting for vision problems, including lazy eye, crossed eyes, and near- and far-sightedness. Gresenz and Studdert, *Ann Emerg Med* 43(2):155-162, 2004 (contract 290-97-0018).

- *Staff education and improved processes in physicians' offices can enhance preventive care for children.*

A practice-based, team approach involving education and coaching of medical office staff in quality improvement can enhance the delivery of preventive care for children, according to this 30-month study of 44 practices that were randomly divided into intervention and control groups. The researchers compared change over time in the proportion of children aged 24-30 months who received age-appropriate care for four preventive services: immunizations and screening for tuberculosis, anemia, and lead. After 1 year, delivery of all preventive services had improved from 7 to 34 percent in intervention practices and from 9 to 10 percent in control practices. Margolis, Lannon, Stuart, et al., *Br Med J* 328:388-394, 2004 (AHRQ grant HS08509).

Quality of Care/Patient Safety

To improve quality of care and patient safety, researchers are developing quality measures, analyzing medical injuries, and assessing the usefulness of diverse strategies to enhance care.

- *Researchers examine ways to improve the quality of pediatric critical care.*

The Institute of Medicine's six aims for improving quality of care provide a useful framework to advance quality of care in pediatric intensive care. In this article, the authors discuss the relevance of the six aims, which are: safety, effectiveness, equity, timeliness, patient-centeredness, and efficiency. Slonim and Pollack, *Pediatr Crit Care Med* 6(3):264-269, 2005 (AHRQ grant HS14009).

- *Potential medication dosing errors occur often during outpatient pediatric care.*

According to these researchers, medication doses were incorrectly cited in about one in seven (15 percent) new prescriptions written during children's outpatient visits. Slightly more than half of these incorrect dosages involved potential overdoses. Young and medically complex children, who are most vulnerable to potentially serious adverse drug events, were most likely to be prescribed potential drug overdoses. These findings were based on an analysis of pharmacy data from three HMOs for 1,933 children. McPhillips, Stille, Smith, et al., *J Pediatr* 147:761-767, 2005 (AHRQ grants HS10391 and HS11843; AHRQ contract 290-00-0015).

- *Real-time safety audits can detect a broad range of errors in neonatal intensive care units.*

The researchers implemented a real-time audit system, including a 36-item patient safety checklist, in a 20-bed NICU in Vermont. The checklist included errors associated with delays in care, equipment failure, diagnostic lab and radiology exams, information transfer, and noncompliance with hospital policy. A research nurse used the checklist to perform safety audits

during and after morning work rounds three times a week. The audits detected 338 errors during the 5-week study period, including unlabeled medication at the patient's bedside, missing or inappropriately placed ID bands, improper alarm settings on pulse oximeters, ineffective communication, and delays in care. Errors usually were detected at the patient's bedside, permitting immediate notification of clinical staff. Ursprung, Gray, Edwards, et al., *Qual Safety Health Care* 14:284-289, 2005 (AHRQ grant HS11583).

- *Treatment recommendations published during physicians' residencies impact their future clinical practice.*

Using clinical vignettes, researchers found that pediatricians recommended sepsis workups 82 percent of the time, and family physicians recommended them 68 percent of the time, for febrile infants less than 3 months of age. These recommendations were more common among pediatricians who completed residency from 1975 to 1980 and family physicians who completed residency from 1981 to 1987, when specialty-specific journals published recommendations for sepsis workups of febrile infants. Cox, Smith, and Bartell, *Eval Health Prof* 28(3):328-348, 2005 (AHRQ grant HS13183).

- *Nurses have an important role in preventing medication errors in hospitalized children.*

These researchers suggest several practical steps that nurses should take to improve pediatric medication safety in the hospital. Examples include: reporting medication errors, double-checking drugs prescribed for off-label use, confirming patient information, minimizing distractions during medication administration, communicating with parents and involving them in patient care, and many others. Hughes and Edgerton, *Am J Nurs* 105(5):36-42, 2005 (AHRQ Publication No. 05-R052)* (Intramural).

- *National reports focus on health care quality and disparities.*

AHRQ has released the 2005 national reports on health care quality and disparities. These reports, which are prepared by AHRQ annually, provide measures of quality and disparities for the U.S. population, including children and adolescents. The reports cover four key areas of health care—effectiveness, safety, timeliness, and patient centeredness—and present data on several clinical conditions, including cancer and respiratory diseases. *National Healthcare Quality Report* (AHRQ Publication No. 06-0018) and *National Healthcare Disparities Report* (AHRQ Publication No. 06-0017)* (Intramural).

- *Failure to report medical errors affecting children is a significant problem.*

The majority of medical errors committed by doctors and nurses during the care of pediatric patients go unreported, according to this study. Fewer than half of the 140 randomly selected doctors and nurses surveyed for this study said that they had completed incident reports on the majority of errors that they committed. About one-third said they had reported less than 20 percent of their errors. Taylor, Brownstein, Christakis, et al., *Pediatrics* 114(3):729-735, 2004 (AHRQ grant HS11590).

- *Experts examine quality improvement in children's health care.*

This article describes challenges encountered by the Child Business Case Working Group in its attempt to make "a business case" for improving the quality of children's health care. AHRQ's Senior Advisor on Child

Health and Quality Improvement is a member of the group. The group recommends creating a less fragmented system of financing and delivery of health care services, expanding the emphasis on clinical research, and educating the public concerning the importance of high quality health care for children. *Health Affairs* 23(4):159-166, 2004 (AHRQ Publication No. 04-R062)* (Intramural).

- *Hospitalized children often experience adverse events.*

Researchers used AHRQ's Patient Safety Indicators (PSIs) to focus on children under age 19 cared for in hospitals in 27 States in 2000. The data were from 5.7 million pediatric hospital discharge records. In total, the PSIs identified 51,615 patient safety events involving hospitalized children in 2000. The most common errors involved obstetric trauma, postoperative respiratory failure, and infections resulting from medical care. The errors were related to increased costs, extended hospital stays, and death for some patients. Miller and Zhan, *Pediatrics* 113(6):1741-1746, 2004 (AHRQ Publication No. 04-R047).* (Intramural). See also Suresh, Horbar, Plesk, et al., *Pediatrics* 113(6):1609-1618, 2004 (AHRQ grant HS11583).

- *Five IT innovations hold promise for improving pediatric patient safety.*

Five emerging information technologies have great potential to improve patient safety for children: care provider order entry, guideline-based documentation of care, Internet-based disease management resources, teleconsultation, and electronic health records. Johnson and Davison, *Ambulatory Pediatr* 4(1):64-72, 2004 (AHRQ grant HS11868). See also Bakken, Cimino, and Hripcsak, *Med Care* 42(2 suppl):1149-1156, 2004 (AHRQ grant HS11806).

- *Research agenda focuses on pediatric outpatient safety.*

At a May 2003 conference, participants developed a research agenda to promote safety in outpatient child and adolescent health care. Five themes were given special attention: communication lapses, technological solutions to safety problems, identification of safety as a priority, more effective approaches for improving safety, and establishment of priorities for improving pediatric patient safety. Perrin and Bloom, *Ambulatory Pediatr* 4(1):43-46, 2003 (AHRQ grant HS13883); see also Miller, Pronovost, and Burstin, *Ambulatory Pediatr* 4(1):47-54, 2004 (AHRQ Publication No. 04-R031) (Intramural).

- *Quality of care measures are lacking for many aspects of children's health care.*

Based on recommendations stemming from a meeting of QI experts, the authors suggest that a minimum of four activities be identified as national priorities. They are: creating an information infrastructure for collection and use of data, building support for quality improvement in children's health care, improving the reliability and validity of existing measures, and developing the evidence base for measures development and quality improvement. Dougherty and Simpson, *Pediatrics* 113(1):185-198, 2004 (AHRQ Publication No. 04-R026)* (Intramural). See also in the same journal, Beal, Co, and Dougherty, pp. 199-209; Kuhlthau, Ferris, and Iezzoni, pp. 210-216; and Shaller, pp. 217-227.

- *Medical errors affect two to three of every 100 hospitalized children.*

Researchers used HCUP data to calculate hospital-reported medical errors among non-newborn pediatric inpatients up to 18 years of age. Results

show the national medical error rate in hospitalized children ranged from 1.81 to 2.96 per 100 discharges. The error rate increased from 1988 to 1991 but remained stable from 1991 to 1997. Slonim, LaFleur, Ahmed, et al., *Pediatrics* 111(3):617-621, 2003 (AHRQ grant HS11022).

- *Researchers evaluated in-hospital safety problems.*

Using hospital discharge data, researchers identified patient safety problems involving inpatient procedures. Rates of problems ranged from 0.2 (foreign body left during procedure) to 154.0 (birth trauma) problems per 10,000 discharge records. Miller, Elixhauser, Zhan, et al., *Pediatrics* 111:1358-1366, 2003 (AHRQ Publication No. 03-R042)* (Intramural).

- *Managed care organizational characteristics affect health care use for children with special needs.*

The goal of this project was to examine the relationship between features of managed care organizations (MCOs) and children's health care use patterns. The study used telephone survey data collected from 2,223 parents of children with special health care needs, managed care organization administrator interview data, and data on health care claims. Results indicate that the child's age, sex, and condition were consistent variables related to health care use and charges. Shenkman, Wu, Nackashi, and Sherman, *Health Serv Res* 38(6 Pt 1):1599-1624, 2003 (AHRQ grant HS09949).

- *Parent reports of pediatric primary care quality vary by race and ethnicity.*

Researchers surveyed parents of elementary school students in a large California urban school district during the 1999-2000 school year. They found that Asian and Latino parents were less satisfied than black and white parents with their children's health care in terms of continuity of care, access to care, communication with the physician, and other important aspects of primary care. Seid, Stevens, and Varni, *Health Serv Res* 38(4):1009-1031, 2003 (AHRQ grant HS10317).

- *Parents provide views of inpatient care quality.*

Responding to the Pediatric Inpatient Survey, 6,030 parents of children treated for a medical condition at one of 38 hospitals rated their child's care, on average, as very good. They also reported problems associated with 27 percent of the survey's hospital process measures. They had the most problems with poor information to the child and coordination of care. Co, Ferris, Marino, et al., *Pediatrics* 111(2):308-314, 2003 (AHRQ grant T32 HS00063).

- *Severity model uncovers source of errors at admission.*

Using a nationally applicable model to control for severity of illness in the ED, investigators examined 11,664 hospital records to determine the factors associated with quality of pediatric care. Total errors were strongly associated with residents; there was no association with other care factors. Murray M. Pollack, PI (AHRQ grant HS10238), *Pediatric Emergency Care: Severity and Quality* (Final Report, NTIS Accession No. PB2003-101524).**

- *AHRQ's evidence-based practice program reviews scientific evidence to improve quality of care.*

Under this program, contracts are awarded to institutions in the United States and Canada to serve as evidence-based practice centers (EPCs). These centers review the scientific literature on assigned topics and produce evidence reports and assessments that can be used by public and private organizations as the basis for quality improvement tools and activities. Visit the AHRQ Web site at www.ahrq.gov and select "Evidence-based Practice" to find evidence reports and summaries on topics relevant to children.

Research Priorities and Capacity-Building

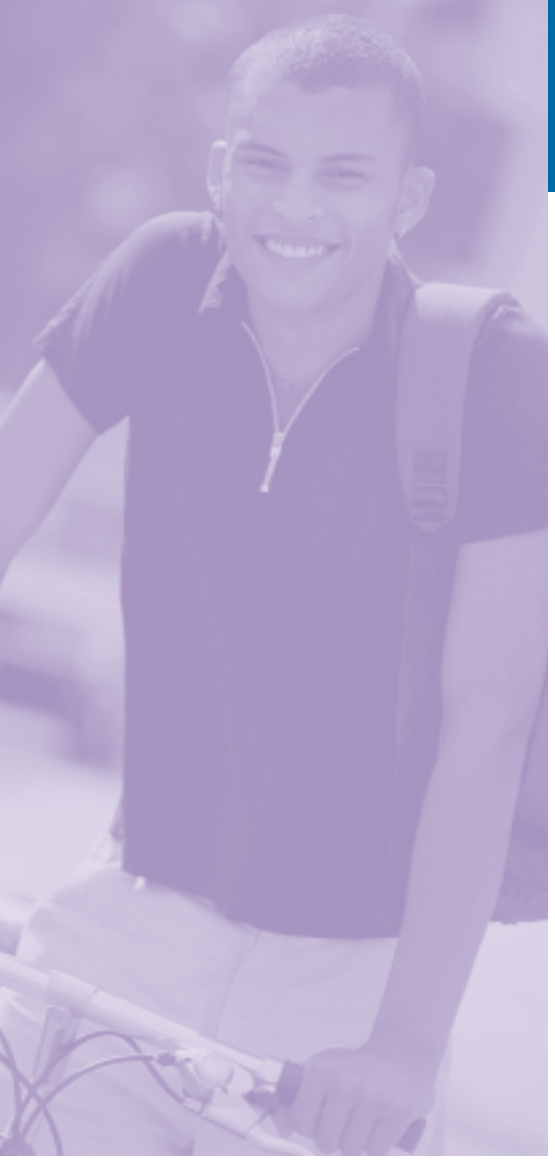
High-quality research in children's health care can only come from having a pool of talented researchers and a strong infrastructure to support analytic projects. AHRQ is committed to the development and support of health services researchers, particularly minority researchers and those who are new to the field.

- *Specially focused research is needed for children and adolescents.*

This researcher proposes priorities for studies focused on child health care outcomes that take into account the special characteristics of childhood. These include developmental change, dependency on adults, differences in disease epidemiology from adults, and unique demographic characteristics. Forrest, *Med Care* 42(4 Suppl):19-23, 2004 (AHRQ grant K02 HS00003).

- *AHRQ's KID database facilitates child health services research.*

In August 2001, AHRQ unveiled the Kids' Inpatient Database (KID), the Nation's first all-children's hospital care research database. It was developed for use in making national and regional estimates of children's treatment, including surgery and other procedures, and for estimating treatment outcomes and hospital charges. The database includes information on the hospital care of children from birth through age 18, regardless of insurance status. The KID contains information on the inpatient stays of about 1.9 million



children at over 2,500 hospitals across the country in 2000. KID is a component of AHRQ's Healthcare Cost and Utilization Project (HCUP). For more information, go to the AHRQ Web site at www.ahrq.gov and click on "HCUP." (Intramural)

Other Research

- *New pediatric disaster preparedness resource now available.*

Children have increased vulnerability to injury from catastrophic events because of their unique anatomic, physiologic, immunologic, and developmental characteristics. This new resource, which was prepared for AHRQ by the American Academy of Pediatrics, can assist in the development of local, State, regional, and Federal emergency response plans that recognize and address these differences. The resource is intended to increase awareness of the unique needs of children and encourage collaboration among pediatricians, State and local emergency response planners, health care systems, and others involved in planning and response efforts for natural disasters and terrorism. *Pediatric Terrorism and Disaster Preparedness: A Resource for Pediatricians* (AHRQ Publication Nos. 06-0056, full report, and 06-0048, summary).* Also available online at www.ahrq.gov/research/pedprep/resource.htm (Purchase order 05R000190).

- *Long-term outpatient use of central venous catheters in children with bone infections often results in complications.*

Children who are diagnosed with acute hematogenous osteomyelitis (AHO), bone infection, usually receive several days of IV antibiotic treatment in the hospital, followed by placement of a central venous catheter in a vein that leads directly to the heart for 4 to 6 weeks of IV antibiotic therapy at home. In this study, 41 percent of children who received more than 2 weeks of IV treatment at home had one or more central venous catheter-associated complications. Many of these complications were serious enough to warrant a visit to the emergency department or readmission to the hospital. Twenty-three percent of the children had a catheter-related malfunction or displacement, 11 percent had a catheter-associated bloodstream infection, and 5 percent had a local skin infection at the site of catheter insertion. Ruebner, Keren, Coffin, et al., *Pediatrics* 117(4):1210-1215, 2006 (AHRQ grant HS10399).

- *Children's use of motor vehicle restraints may be linked to parental use of seat belts and mother's psychological distress.*

Researchers analyzed data on more than 6,200 children aged infant to 17 years and found that children whose mothers have emotional problems and/or don't use seat belts are less likely than other children to be restrained by car seats or seat belts themselves. Older children were especially likely to forgo seat belts if their mothers did. More than 35 percent of children were low users of restraints if their mothers also reported low use, compared with 6.1 percent of children whose mothers buckled-up every time or most of the time. Children were less likely to be restrained if their mother was older, black, or less educated or if they lived with a single parent, in a family of four or more members, in poverty, or in a rural area. Witt, Fortuna, Wu, et al., *Ambulatory Pediatr* 6:145-151, 2006 (AHRQ grant T32 HS00063).

- *U.S. children use electronic media an average of more than 4 hours a day.*

Researchers conducted a survey of parents during well-child office visits to assess children's media use and parental oversight and control of media use. Children in this study were using electronic media (e.g., TV, video games, and computers) an average of 4 hours a day, or twice the recommended limit of 2 hours. More than half of parents used some type of strategy to control and inform their children's use of electronic media. About 23 percent used a restrictive approach, and 22 percent used an instructive approach, while some parents used multiple approaches. Only 7 percent of parents allowed unlimited media use and engaged in no mediation strategy. Barkin, Ip, Richardson, et al., *Arch Pediatr Adolesc Med* 160:395-401, 2006 (AHRQ grant HS10913).

- *Anthrax in children is difficult to detect and treat.*

According to an AHRQ evidence report, difficulties in diagnosing anthrax in children may lead to dangerous delays in treatment for this often deadly infection. Symptoms of pediatric anthrax infection can be easily confused with those of more common illnesses. For example, the symptoms of inhalational anthrax are similar to those of influenza. Also, there is little evidence about the effectiveness in children of interventions currently recommended for adults. *Pediatric Anthrax: Implications for Bioterrorism Preparedness*, Evidence Report/Technology Assessment No. 141 (AHRQ Publication No. 06-E013)* (contract 290-02-0017).

- *DNRs for terminally ill children may not be honored by public schools.*

Researchers surveyed personnel from school districts in 81 U.S. cities about written policies or procedures for student DNRs and compared school policies with relevant State laws from all 50 States and the District of Columbia. Most (80 percent) of the school districts surveyed did not have policies for dealing with student DNRs. Also, 76 percent of those surveyed indicated they either would not honor student DNRs or were uncertain about whether they could honor them. Nineteen school districts reported that they honor student DNRs, but 13 of them have no laws to protect school personnel from civil or criminal liability for withholding CPR. Kimberly, Forte, Carroll, and Feudtner, *Am J Bioeth* 5(1):59-65, 2005 (AHRQ grant HS00002).

- *Age is a better marker than height and weight for assessing the risk of air bag deployment.*

The government requires warnings on motor vehicles that children aged 12 and younger can be seriously injured or killed by an air bag. However, this study found that the risk of serious air-bag-related injury may extend to age 14 when children are seated in the right front passenger seat in vehicles equipped with air bags. Researchers analyzed data for nearly 3,800 children aged 1 month to 18 years and found that children aged 15 to 18 years who were involved in frontal collisions were 81 percent less likely than younger children to be injured when an air bag deployed. Changes in body composition and bone mass associated with the onset of puberty (typically age 11 for girls and age 13 for boys) may play a role in susceptibility to injury from air bags, note the researchers. Newgard and Lewis, *Pediatrics* 115(6):1579-1585, 2005 (AHRQ grant F32 HS00148).

- *Home routines in minority families may impede the development and future school success of children.*

According to this study, black and Hispanic children younger than age 3 experience multiple disparities in home

routines, safety measures, and educational practices/resources that could impede their healthy development and future school success. For example, minority parents were less likely than white parents to install stair gates or cabinet safety locks or to lower the temperature setting on hot water heaters to prevent scalding. Minority parents also were much less likely than white parents to read to their children daily, and they had fewer children's books in the home. The researchers suggest that pediatric providers should educate minority parents of young children about more effective home routines. Flores, Tomany-Korman, and Olson, *Arch Pediatr Adolesc Med* 159:158-165, 2005 (AHRQ grant HS11305).

- *TV viewing and use of computers and video games may have negative effects for young children.*

Children under 11 years of age currently spend more time watching videos and playing computer games than watching TV, according to this study. But, 30 percent of parents reported that their child had eaten breakfast or dinner in front of the TV in the preceding week, 26 percent said their child had a TV in his or her bedroom, and 22 percent of parents were concerned about the amount of TV that their child watched. TV viewing, video games, and computer use have been associated with problems ranging from obesity to attention deficits and aggressive behavior. Christakis, Ebel, Rivara, and Zimmerman, *J Pediatr* 145:652-656, 2004 (AHRQ grant HS13302).

- *More frequent placements of foster children increase their reliance on the ER for outpatient care.*

This analysis of Medicaid claims data and foster care administrative data found that 38 percent of children in foster care experienced two or more placement changes in 1995. Foster children of all ages showed increasing reliance on the ER for outpatient care services as the number of placements increased. These findings underscore the need for better health care management for foster children, particularly in the period after a placement change. Rubin, Alessandrini, Feudtner, et al., *Pediatrics* 114(3), 2004; online at www.pediatrics.org (AHRQ grant K08 HS00002).

- *Health and access to care problems vary between street and shelter-based youths.*

For this study, researchers interviewed 45 homeless youths aged 15 to 23 who visited a free clinic (clinic-based youths) or mobile medical vans in two street settings (street-based youths). Compared with clinic-based youths, street-based youths reported longer and more entrenched homelessness, more illness related to drug use, increased reliance on the ER for health care, and less use of emergency shelters. Street-based youths also tended to come from backgrounds of more poverty and disruption and to have traveled further from their hometowns. Ensign and Bell, *Qual Health Res* 14(9):1239:1254, 2004 (AHRQ grant HS11414).

- *New video shows clinicians how to care for children exposed to chemicals used in bioterrorism.*

This 27-minute training video provides a step-by-step demonstration of the decontamination process and instructs clinicians about the nuances of treating infants and children. A short clip from the video is online at www.ahrq.gov/browse/bioterbr.htm. A free, single copy of the video, *The Decontamination of Children*, is available in DVD (AHRQ Product No. 05-0036-DVD) or VHS (AHRQ Product No. 05-0036-VHS) format (AHRQ contract 290-00-0020).

- *National advisory committee makes recommendations on preparedness for children.*

The National Advisory Committee on Children and Terrorism recently issued recommendations for disaster planning affecting children. The recommendations address the particular vulnerabilities of children to terrorist attacks and disasters and represent a first step in improving planning that affects children. They focus on the following major areas: emergency and prehospital care, hospital care, terrorism preparedness, physical protection, decontamination, and the Strategic National Stockpile. Markenson and Redlener, *Biosecur Bioterror* 2(4):301-319, 2004 (AHRQ grant HS13855).

- *Pediatricians will have an important role in in the event of a bioterrorist attack.*

Pediatricians need to participate in disaster planning to ensure that the unique health needs of children are addressed in the event of a bioterrorist attack. They also must be knowledgeable about the signs of possible exposure to a weapon of terror and understand the role of first-line responders to such attacks, including the chain of command and organization of resources that can be tapped. Redlener and Markenson, *Adv Pediatr* 50:1-37, 2003 (AHRQ grant HS13855).

- *Pediatricians should encourage parents to read daily to their children.*

According to this study of more than 2,000 parents of young children, only 52 percent of children aged 3 or younger are read to every day by a parent, and about 27 percent of children are read to three to six times per week. Children were about twice as

likely to be read to each day if they were older (19 to 35 months) or their mother had more than a high school education, and they were 1.66 times more likely to be read to if a pediatric provider discussed with parents the importance of reading to children. Kuo, Franke, Regalado, and Halfon, *Pediatrics* 113(6):1944-1951, 2004 (cofunded by AHRQ and HRSA, contract 240-97-0043).

- *Most children with short stature function within the normal range.*

On average, children with short stature (2 to 3 deviations below the mean for height) score lower than their peers on tests of mental and physical functioning. However, few short children score outside the normal range, and there is no evidence that treatment of short stature improves function. Nevertheless, this review of the evidence indicates that growth hormone treatment may be warranted for children with severe short stature (4 to 5 standard deviations below the mean for height) to relieve everyday restrictions, such as being able to use school bathrooms or reach elevator buttons. Wheeler, Bresnahan, Shephard, et al., *Arch Pediatr Adolesc Med* 158:236-243, 2004 (contract 290-97-0019).

- *Doctors vary in their management of young children with developmental delays.*

More than half of the estimated 17 percent of U.S. children who have developmental delays are not diagnosed before they enter school. A survey of pediatricians and family physicians found substantial varations in how they manage delays (e.g., instruments used to measure development and timing of specialty referrals for children with suspected delays). Avoidant behavior (e.g., not looking at parents/grandparents) rather than disruptive behavior was associated with an increased probability of referral, perhaps because doctors recognized a potential autism spectrum disorder. Sices, Feudtner, McLaughlin, et al., *J Dev Behav Pediatr* 24:409-417, 2004 (AHRQ grant K08 HS00002).

- *Family and community violence and risky behaviors affect millions of U.S. children.*

Young people living in impoverished neighborhoods often are the victims of community violence, and sometimes they are the perpetrators. For example, an estimated 10 million U.S. children witness the punching, kicking, and beating of a parent, usually their mother, each year. A recent study of 258 abused mothers of children 18 months to 18 years found that these children had far more behavior problems, anxiety, depression, and withdrawal than other children. Sixty-nine percent of the children were Hispanic, and nearly half came from impoverished households. McFarlane, Groff, O'Brien, and Watson, *Pediatrics* 112(3), 2003 online at www.pediatrics.org (AHRQ grant HS11079). See also Howard, Kaljee, Rachuba, and Cross, *Am J Health Behav* 27(5):483-492, 2003; and Rai, Stanton, Wu, et al., *J Adolesc Health* 35(2):108-118, 2003 (AHRQ grant HS07392).

- *Health status measures must consider the effects of race, income, and other factors on children's health.*

These researchers discuss the challenges inherent in designing health status measures for children that take into account the effects on health of race, ethnicity, income, and other socioeconomic factors. Olson, Lara, and Frintner, *Ambul Pediatr* 4:377-386, 2004 (AHRQ grant HS12078, K08 HS00008).

- *Survey data can be obtained from Medicaid-insured families.*

These authors describe the strategies they used to locate families and complete telephone and mail surveys with parents of Medicaid-insured children. The authors analyzed the proportion of completed interviews contributed by each strategy, stratified findings by five health plans, and reported labor and other costs per completed interview. Jensvold, Lieu, Chi, et al., *J Health Care Poor Underserved* 14(1):17-22, 2003 (AHRQ grant HS09935).

- *Pediatric and adolescent outcomes research is described.*

A systematic review of the literature (published from 1994 to 1999) on pediatric outcomes research was conducted. Reviewers report that the number of articles doubled in the 6-year period. They identify hospitals and primary care practices as the most common service sectors and note that the common clinical categories include neonatal conditions, asthma, psychosocial problems, and injuries. Forrest, Shipman, Dougherty, et al., *Pediatrics* 111(1):171-178, 2003 (AHRQ Publication No. 03-R018)* (Intramural).

- *Study assesses parents' source and quality of advice.*

Using a self-administered survey of 1,108 subjects, researchers determined sources and quality of medical advice and information used by parents. Half of the respondents reported using the Internet for medical information, 30 percent used it to obtain information about a specific acute or chronic medical illness, and 15 percent had communicated with a physician by e-mail. Respondents also rated physician advice by phone or visit and

information obtained via the Internet as very good or excellent (76 and 47 percent, respectively). Baraff, Wall, Lee, and Guzy, *Clin Pediatr* 42(6):557-560, 2003; Lee, Baraff, Guzy, et al., *Arch Pediatr Adolesc Med* 157:635-641, 2003; and Lee, Baraff, Wall, et al., *Clinical Pediatr* 42(7):613-619, 2003 (AHRQ grant HS10604).

For More Information

AHRQ's World Wide Web site (www.ahrq.gov) provides information on the Agency's children's health services research agenda and funding opportunities. Also, www.ahrq.gov/child includes a State-by-State map of AHRQ-funded research projects by State and county and other child health services research information. AHRQ also offers a child and adolescent health LISTSERV™ (AHRQkid-L) to which users may subscribe via e-mail (Address: Listserv@list.ahrq.gov; in the message box, type: subscribe AHRQkid-L Your Full Name).

Further details on AHRQ's programs and priorities in child health services research are available from:

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