

PROGRAM BRIEF

Child Health Research: Identifying Quality Problems and Improving Care

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

The mission of the Agency for Healthcare Research and Quality is to improve the safety, quality, efficiency, and effectiveness of health care for all Americans, including children. Finding ways to measure and improve care for the Nation's 73 million children and adolescents is a continuing priority for AHRQ.

This program brief summarizes recent findings (2006 through 2010) from selected AHRQ-supported projects focused on improving 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. Ordering information appears on the last page 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 "Children" to find updates on child health initiatives at AHRQ and information about current projects.

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Identifying Health Care Quality Problems

- *Pediatricians appear less likely than other physicians to exhibit race bias or harbor stereotypes.*

Researchers surveyed academic pediatricians about their implicit and explicit racial attitudes and stereotypes using a specially designed test. To measure quality of care, subjects were asked how they would treat patients using four pediatric vignettes (pain control, urinary tract infection, ADHD, and asthma). Each participant was given two black and two white patients; most of the pediatricians were white, and 93 percent were American-born. The majority of pediatricians reported no difference in feelings toward racial groups; there was a much smaller implicit preference for whites relative to blacks than found with other physicians. Sabin, Rivara, and Greenwald, *Med Care* 46(7):678-685, 2008 (AHRQ grant HS15760).

Infectious Disease

- *Prior to 2006, rotavirus was implicated in one-fourth of diarrhea-related ER visits for young children.*

Researchers examined the number of diarrhea-related emergency department (ED) and clinic visits for diarrhea-related illness in children younger than age 5 and found that the rate of outpatient visits and ED visits remained essentially stable over 1995-1996 and 2003-2004. Black children with diarrhea-related illnesses were more likely than white children to be seen in the ER, even when both groups had insurance. These data will help determine the impact of the new rotavirus vaccine introduced in 2006 on reducing diarrhea-related clinic and ED visits, note the researchers. Pont,

Grijalva, Griffin, et al., *J Pediatr* 155(1):56-61, 2009 (AHRQ grant HS13833).

- *Frequency and severity of invasive fungal infections in immunocompromised children have increased.*

Factors such as cancer chemotherapy and medications used to suppress rejection following organ or stem cell transplant weaken a child's immune system, making him or her vulnerable to invasive fungal infections that can be fatal. According to this study of data from 25 U.S. children's hospitals, there has been a rise in the use of antifungal therapy for hospitalized children and a shift to new antifungal agents. Overall, 62,842 children received antifungal therapy—including 5,839 neonates—with prescriptions increasing significantly during the 7-year study period (2000-2006). The researchers call for more studies to determine the optimal dosing, efficacy, and safety of these newer agents in children. Prasad, Coffin, Leckerman, et al., *Pediatr Infect Dis J* 27(12):1083-1088, 2008 (AHRQ grant HS10399).

- *Blood cultures taken from children show drug resistance to a class of antibiotics usually used for adults.*

Children usually are not given the broad-spectrum antibiotics called fluoroquinolones because they cause joint toxicity. Nevertheless, two common bacteria—*Escherichia coli* and *Klebsiella*—showed fluoroquinolone resistance in 217 blood cultures taken from children at the Children's Hospital of Philadelphia. Eight of the cultures (2.9 percent) were resistant to two common fluoroquinolones, ciprofloxacin and levofloxacin. These drugs are commonly used in adults, and ciprofloxacin was recently approved for children to treat inhalation anthrax and

problematic urinary tract infections. Kim, Lautenbach, Chu, et al., *Am J Infect Control* 36(1):70-73, 2008 (AHRQ grant HS10399).

- *Strategies are needed to improve immunization rates among adolescents.*

According to two recent studies, opportunities to vaccinate adolescents are often missed during health care visits. In their early years, children routinely receive immunizations during regular health checkups. However, when they become adolescents, vaccination rates tend to wane as checkups become less frequent. The first study found that vaccination rates among 13-year-olds for hepatitis and measles-mumps-rubella were lower than the national estimate. The second study found that influenza vaccination rates for adolescents with chronic conditions improved over a 10-year period, but rates are still too low. Lee, Lorick, Pfoh, et al., *Pediatrics* 122(4):711-717, 2008 and Nakamura and Lee, *Pediatrics* 122(5):920-928, 2008 (AHRQ grants HS13908 and T32 HS00063).

- *Many underinsured children are not getting needed vaccines due to current U.S. vaccine financing system.*

The number of newly recommended vaccines for children and adolescents has nearly doubled in the past 5 years, boosting the cost to fully vaccinate a child in the public sector from \$155 in 1995 to \$1,170 in 2007. Childhood vaccines in the United States are financed by a patchwork of public and private sources, resulting in many underinsured children being unable to receive publicly purchased vaccines in either private practices or public health clinics, according to this study. The researchers conducted a national survey of State immunization program managers in 2006 and found that only 34 percent of States had a health

insurance mandate requiring insurers to cover currently recommended vaccines for children and adolescents. Lee, Santoli, Hannan, et al., *JAMA* 298(6):638-643, 2007 (AHRQ grant HS13908).

Mental and Behavioral Health

- *Only one-third of adolescents are screened for emotional health during routine physicals.*

Even though most mental health problems begin in adolescence, only about one-third of youths aged 13 to 17 represented in this study reported discussing their emotional health during well-care visits with their primary care providers. The researchers assessed providers' rates of screening for emotional distress among a clinic-based sample (1,089) and a population-based sample (899) of adolescents. In both groups, significantly higher screening rates were reported by females. Ozer, Zahnd, Adams, et al., *J Adolesc Health* 44:520-527, 2009 (AHRQ grant HS11095).

Emergency Care

- *Black children are more likely than white children to be hospitalized for a ruptured appendix.*

An analysis of data presented in the 2009 *National Healthcare Disparities Report* revealed that black children were about 33 percent more likely than white children to be hospitalized for a ruptured appendix in 2006. Hispanic children had the second highest rate at 344.5 per 1,000 admissions (compared with 276 per 1,000 admissions for white children), followed by Asian/Pacific Island children at 329 per 1,000 admissions. Poverty played a role for all children, regardless of race or ethnicity. Children from poor families were 26 percent more likely to be hospitalized for a ruptured appendix

than those from higher income families (337 vs. 268.5 per 1,000 admissions, respectively). *National Healthcare Disparities Report, 2009*; available at www.ahrq.gov/qual/nhdr09/nhdr09.pdf. (AHRQ Publication No. 10-0004)* (Intramural).

Chronic Illness

- *Primary care doctors often don't know that a child has received ER care for asthma.*

Researchers reviewed medical records of 350 children who regularly received care at community health centers but ended up in an emergency department (ED) after experiencing an asthma flareup. Nearly 63 percent of patient records at the community health center contained faxed discharge summaries or a note from the ED provider, but the remaining 37 percent had no mention of the child's ED visit. Also, almost two-thirds of patients did not follow up with their usual provider after an asthma-related ED visit. The researchers stress the importance of notifying primary care providers when a child visits the ED so they are aware of the treatment provided and changes to medications and can avoid medical errors. Hsiao and Shiffman, *Jt Comm J Qual Patient Saf* 35(9):467-474, 2009 (AHRQ grant HS15420).

- *Poor asthma control is linked to family and insurance factors.*

Researchers surveyed parents of 362 children about asthma-related impairment (symptoms, activity limitations, and use of albuterol for acute asthma episodes) and the number of asthma exacerbations in a 1-year period. Based on parental reports, 76 percent of children took daily controller medications, yet asthma was well controlled for only 24 percent of children, partially controlled for 20

percent, and poorly controlled for 56 percent. Medicaid insurance, presence of another family member with asthma, and maternal employment outside the home were significant factors associated with poor asthma control. Bloomberg, Banister, Sterkel, et al., *Pediatrics* 123(3):829-835, 2009 (AHRQ HS15378).

- *Study finds link between differences in health care coverage and higher readmission rates for pediatric asthma.*

The researcher analyzed Rhode Island hospital discharge data from 2001 to 2005 to identify 2,919 children at the time of their first asthma hospitalization. During the study period, 15 percent of those children were readmitted to the hospital for asthma. Although factors such as crowded housing conditions, proportion of minority residents in a neighborhood, and poverty did not affect rehospitalization rates, Medicaid coverage did. Children insured by Medicaid at the time of their initial admission had readmission rates that were 33 percent higher than those of children with private insurance. Liu, *Public Health Rep* 124:65-78, 2009 (AHRQ cooperative agreement with CDC).

- *Hospitals vary widely in use of corticosteroids to treat acute chest syndrome in children with sickle cell disease.*

Researchers reviewed records on more than 5,200 hospital admissions for acute chest syndrome (ACS) at 32 pediatric hospitals in the United States. ACS is a frequent cause of sickness and death in patients with sickle cell disease, and corticosteroids are used to fight inflammation in children with ACS and sickle cell disease. The researchers found that use of these drugs varied dramatically between hospitals, ranging

from 10 to 86 percent for all patients with ACS and 18 to 92 percent for those who had both ACS and asthma. Sobota, Graham, Heeney, et al., *Am J Hematol* 85(1):24-28, 2010 (AHRQ grant T32 HS00063).

- *Treatment of children with Crohn's disease varies widely.*

Clinicians vary in their care for children with Crohn's disease (CD)—a chronic inflammatory bowel disease—mostly because there are few clinical guidelines and many treatments. These variations in care can result in differences in health care costs, quality, and outcomes, according to these researchers. They reviewed data on drugs given to 311 children newly diagnosed with CD at 10 U.S. and Canadian gastroenterology centers from January 2002 to August 2005 and found that physicians used several types of drugs to reduce children's symptoms. The drugs that offer the most benefit (immunomodulators) also carry the greatest risk, which may explain the variation in treatment. Other drugs used included steroids, antibiotics, anti-inflammatory medications, and an antibody that reduces inflammation. Kappelman, Bousvaros, Hyams, et al., *Inflamm Bowel Dis* 13(7):890-895, 2007 (AHRQ grant T32 HS00063).

Inpatient Care

- *Parents of hospitalized children vary in their rating of inpatient care.*

Researchers surveyed 12,562 parents of children receiving care at 39 hospitals from 1997 through 1999, to gather information about coordination of care, physical comfort, confidence and trust, care continuity, and other aspects of care. They found that even though 51 percent of parents reported that their child had a chronic health problem, most of the parents rated their child's

inpatient care as excellent (47 percent) or very good (32 percent). Parents of children in fair or poor health with nonchronic conditions reported the lowest quality of care. Mack, Co, Goldmann, et al., *Arch Pediatr Adolesc Med* 161(9):828-834, 2007 (AHRQ grant T32 HS00063).

- *High hospital occupancy rates can affect the care children receive.*

Researchers studied claims data (1996-1998) on over 69,000 respiratory and 49,000 non-respiratory pediatric admissions in Pennsylvania and New York to investigate the association between hospital occupancy and admission workload on length of stay for common pediatric diagnoses. They found the effect of admission day occupancy on length of stay was apparent only for children with respiratory conditions and was greatest when the occupancy rate was higher than 60 percent. Lorch, Millman, Zhang, et al., *Pediatrics* 121, 2008; online at www.pediatrics.org (AHRQ grant HS09983).

- *Management of postoperative pain in newborns found suboptimal in some NICUs.*

Researchers found that while management of postoperative pain in neonates is well accepted, the practice is highly variable. They found deficiencies in the assessment and management of postoperative pain in neonates treated at NICUs in 10 hospitals. Physician pain assessment (not postnatal age or surgery type) was the only significant predictor of postsurgical analgesic use. Taylor, Robbins, Gold, et al., *Pediatrics* 118(4):992-1000, 2006 (AHRQ grant HS13698).

- *Drugs to reduce complications of prematurity are not given as often as they should be.*

When given to women during preterm labor, antenatal corticosteroids have been shown to reduce the incidence of respiratory distress syndrome and other complications associated with prematurity. This study included 515 women eligible for antenatal corticosteroids; 70 percent of the women were black or Hispanic, and most had Medicaid coverage. One-fifth of the women studied did not receive the drugs. The researchers cite problems with language in the NIH consensus statement for much of the disparity in use of these drugs, particularly some ambiguity over who should and should not receive the drugs and when during labor they should be administered. Howell, Stone, Kleinman, et al., *Matern Child Health J* 14:430-436, 2010 (AHRQ HS10859).

- *Study identifies problems with pediatric quality indicators.*

Low event rates and inadequate numbers of relevant pediatric inpatients at many hospitals limit the usefulness of AHRQ's inpatient pediatric quality indicators (PDIs), according to this study. Researchers used 2005-2007 data on pediatric hospital discharges in California to calculate statewide rates for nine PDIs and found that none of the 401 hospitals had sufficient patient volume to detect a doubling of the statewide average event rate for one of the measures, and only one-quarter of the hospitals doing pediatric heart surgery had sufficient volume to detect doubling of the statewide measure for mortality related to heart surgery. Bardach, Chien, and Dudley, *Acad Pediatr* 10(4):266-273, 2010 (AHRQ grant HS17146).

- *Most pediatric hospitals do not respond appropriately to overcrowding.*

Researchers used midnight census data during 2006 from 39 children's hospitals to examine occupancy levels and overcrowding. They found that overall, the hospitals reported 70 percent of midnights with at least 85 percent occupancy, including 42 percent with at least 95 percent occupancy. Only a few of the hospitals took active steps to reduce crowding through admissions cutoff or transfers out. The researchers note that crowding has been shown to be associated with increases in patient safety events, including medical errors. Fieldston, Hall, Sills, et al., *Pediatrics* 125(5):974-981, 2010 (AHRQ grant HS16418).

Specialty Care

- *Minority children are much less likely than white children to receive specialized therapies.*

Researchers used Medical Expenditure Panel Survey data to examine therapy use for children and found that 3.8 percent of children who are age 18 or younger obtain specialized therapies from the health care system, including physical, occupational, and speech therapy or home health services. Children most likely to use specialized therapies tended to be males (60 percent), white children (81 percent), and children with a chronic condition (39 percent). Kuhlthau, Hill, Fluet, et al., *Dev Neurorehabil* 11(2):115-123, 2008 (AHRQ grant HS13757).

- *Children with private insurance have better access to specialty care than other children.*

Researchers reviewed 30 studies on the relationship between access to specialty care and insurance coverage and found that children with private insurance

have better access to such care than those who have public coverage or no insurance. Although children insured by Medicaid or SCHIP have better access to specialty care than uninsured children, their access to specialists is worse and their specialists are less likely to be board-certified compared with privately insured children. Skinner and Mayer, *BMC Health Serv Res* 7, 2007; online at www.biomedcentral.com (AHRQ grant T32 HS00032).

- *Children with special health care needs benefit from Medicaid managed care programs.*

According to this study, children with special health care needs who have disabilities and are enrolled in Medicaid programs that have a managed care option, including case management services, have better access to care and receipt of occupational and physical therapy at school, compared with those in Medicaid fee-for-service (FFS) plans. The researchers evaluated use of speech, occupational, and physical therapy by children with special health care needs who were enrolled in the managed care or FFS plans of the District of Columbia Medicaid program that serviced only children with disabilities. Schuster, Mitchell, and Gaskin, *Health Care Financ Rev* 28(4):109-123, 2007 (AHRQ grant HS10912).

Dental 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 fully 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).

Patient Safety

- *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).

- *Outpatient advice on pediatric medication safety is often inadequate.*

According to this study, little advice is being given to parents on medication safety in the outpatient setting, and when advice is given, it often is inadequate. Researchers examined data from charts and prescription reviews on 1,685 children from six medical practices in Boston. They also interviewed parents at 10 days after their child's first visit and again 2 months later to find out what kind of information, if any, they received on medication safety and whether there had been any medication errors or "near misses." Although 91 percent of

providers had given information on why a medication was being prescribed, they only mentioned side effects 28 percent of the time, and they provided written information on medication safety just 14 percent of the time. Lemer, Bates, Yoon, et al., *J Patient Saf* 5(3):168-175, 2009 (AHRQ grant HS11534).

- *Most vaccination errors involve vaccines with similar names.*

After studying 607 vaccine error reports, these researchers found that the wrong vaccines, incorrect times, and wrong doses were at the heart of most vaccine-related errors, but wrong route of administration and wrong patient errors were rare. Vaccine names were implicated in many of the wrong vaccine errors. For example, tetanus group vaccines, which accounted for more than one-third of wrong vaccine errors, not only look alike, they also have brand names that sound alike. Wrong time errors most often occurred with scheduled vaccines being given earlier or later than recommended for a child's age. Bundy, Shore, Morlock, and Miller, *Vaccine* 27(29):3890-3896, 2009 (AHRQ grant HS16774).

- *Children are often harmed by adverse events in pediatric ICUs.*

Researchers analyzed data on safety incidents that took place in pediatric intensive care units (ICUs) around the country over a 2-year period. During that time, 23 of the ICUs reported 464 incidents. Physical injuries harmed children in 35 percent of the incidents, and three incident-related patient deaths were reported. To improve safety in pediatric ICUs, the researchers recommend developing protocols for high-risk procedures, improved monitoring, and staffing, training, and communication initiatives. Skapik, Pronovost, Miller, et al., *J Patient Saf*

5(2):95-101, 2009 (AHRQ grant HS11902).

- *Incidence of pediatric medication errors is significant for treatment of ADHD.*

According to this study of reports involving medications used in the treatment of attention-deficit/hyperactivity disorder (ADHD) in children, the incidence of medication errors between 2003 and 2005 was significant. Of 361 error reports, 329 involved medications used only in the treatment of ADHD, and 32 involved medications used for ADHD and other conditions. Improper dose, wrong dosage form, and prescribing errors were the three most common errors. Bundy, Rinke, Shore, et al., *Jt Comm J Qual Patient Saf* 34(9):552-560, 2008. See also Winterstein, Gerhard, Shuster, and Saidi, *Pediatrics* 124(1):e75-e80, 2009 (AHRQ grant HS16774).

- *Medication error rates are high in children receiving outpatient chemotherapy for cancer.*

Researchers reviewed the medical records of patients receiving treatment from one pediatric and three adult oncology clinics involving 117 pediatric visits (913 medications) and 1,262 adult visits (10,995 medications). They identified 112 medication errors for an overall rate of 8.1 errors per 100 clinic visits. More than half of the errors had the potential to cause patient injury, and only 4 percent of the errors were stopped before they reached the patient. Most involved medication administration and prescribing. The medication error rate was much higher in children than in adults: 18.8 errors per 100 visits compared with 7.1 errors per 100 visits. More than half of the pediatric errors that had the potential for patient harm occurred when

medications were given in the home. Walsh, Dodd, Seetharaman, et al., *J Clin Oncol* 27(6):891-896, 2009 (AHRQ grant HS10391).

Efficiency

- *Children receive ear tubes more frequently than experts recommend.*

The researchers reviewed the cases of 682 children who had ear tubes surgically inserted in five New York City hospitals in 2002 and compared the children's clinical characteristics with the recommendations of an expert panel. They found that just 7 percent of the surgeries (48 cases) were deemed appropriate by the panel's criteria, while nearly 70 percent (475 cases) were deemed inappropriate. The authors conclude that this widespread deviation from recommended practice suggests ear tube insertion is overused and performed too quickly, exposing children to risk and using resources that could be otherwise spent improving children's health. Keyhani, Kleinman, Rothschild, et al., *Br Med J* 337:a1607, 2008; available at www.bmj.com/content/337/bmj.a1607 (AHRQ grant HS10302).

Access to Care

- *Children with insurance may not receive needed services if their parents are uninsured.*

According to this study, insured children living with at least one parent in families where the children were insured but the parents were not were more than twice as likely as children with insured parents not to have a usual source of care. They also were 11 percent more likely to have unmet health needs and 20 percent more likely to have never received any preventive counseling services. The researchers examined 2002-2006 data from AHRQ's Medical Expenditure Panel Survey (MEPS) on 43,509

individuals. These findings suggest that the long-term improvement of health care for children cannot be met by covering children alone, note the researchers. DeVoe, Tillotson, and Wallace, *Ann Fam Med* 7(5):406-413, 2009 (AHRQ grant HS16181).

- *Even modest increases in cost-sharing in Medicaid and CHIP are burdensome for poor families.*

These researchers examined the effects of increased cost-sharing arrangements in Medicaid and CHIP that were instituted by many States in 2007. They found that parents would struggle with high out-of-pocket costs and financial burdens if premiums or copayments were increased for their children covered by CHIP, forcing many families to choose between getting medical care for their children and financial hardship. The researchers suggest that implementing caps on out-of-pocket spending could help address the burden for low-income families without reducing potential budgetary savings. Selden, Kenney, Pantell, and Ruher, *Health Aff* 28(4):w607-w619, 2009 (AHRQ Publication No. 09-R072)* (Intramural).

- *Children in rural areas must travel far distances to receive specialty care.*

Children who need care from pediatricians specializing in areas such as cardiology, rheumatology, or endocrinology may not have ready access to these doctors if they are from low-income families and live in isolated regions of the United States, according to this study. It showed that children from low-income families in the Mountain States or West North Central regions of the United States had to travel the farthest for pediatric specialty care. These geographic barriers may limit the children's access to needed care and lead to poor outcomes, notes the

author. She suggests the use of novel approaches, such as telemedicine, be considered in these areas so that children have access to quality care without traveling long distances. Mayer, *Matern Child Health J* 12(5):624-632, 2008 (AHRQ grant HS13309).

- *Access to primary care is linked to fewer ER visits by Medicaid-insured children.*

Quality pediatric primary care can reduce both urgent and nonurgent emergency department (ED) visits, according to this study involving visits by 5,468 children insured by the Wisconsin Medicaid program. Researchers linked the visits to parents' scores in three domains of their child's primary care: family centeredness, timeliness, and access to care. Overall, 28 percent of the children visited the ED during the followup year, and 59 percent of those ED visits were nonurgent. A high quality score on family centeredness was associated with 27 percent fewer nonurgent ED visits, but no change in urgent visits. High-quality timeliness was associated with 18 percent fewer nonurgent and urgent visits, and high-quality access was associated with 27 percent fewer nonurgent visits and 33 percent fewer urgent visits. Brousseau, Gorelick, Hoffman, et al., *Acad Pediatr* 9:33-39, 2009 (AHRQ grant HS15482).

- *Uncertainty about insurance coverage may put children at risk for unmet medical needs.*

When parents are uncertain whether or not their child is insured, the child's risk of having unmet health care needs is increased, according to this study. Researchers identified children whose parents were uncertain about their coverage from data on nearly 2,700 low income families in Oregon. In 13.2 percent of the families, parents were

uncertain about their child's public health insurance coverage. Their children were at increased risk for having unmet medical needs compared with children whose parents were sure of their child's coverage. DeVoe, Ray, Krois, and Carlson, *Fam Med* 42(2):121-132, 2010 (AHRQ grant HS16181).

- *Gaps in coverage are linked to unmet health care needs.*

Researchers analyzed survey results from 2,681 families with children enrolled in Oregon's food stamp program at the end of January 2005 and found that one-fourth of the children had coverage gaps during the 12 months preceding the survey. The gaps were less than 6 months (17.5 percent), 6 to 12 months (1.5 percent), and more than 12 months (3.1 percent); nearly 4 percent of the children never had health insurance. Study results showed that the longer the insurance gap, the higher the chance of a child having an unmet need for care, including medical or dental care, prescriptions, not having a regular provider, and delays in urgent care. DeVoe, Graham, Krois, et al., *Ambul Pediatr* 8(2):129-134, 2008 (AHRQ grants HS14645, HS16181).

Improving Health Care Quality for Children and Adolescents

Preventive Care

- *Stewardship program improves antimicrobial use among hospitalized children.*

Use of an antimicrobial stewardship program (ASP)—in which an infectious disease consultant controls use of antimicrobials (antibiotics, antifungals, and antivirals) by hospital staff—can improve the appropriate use of these agents, according to this study. During

the 4-month study period, physicians placed 652 calls to the ASP at one children's hospital. Nearly half of the calls required an intervention by the ASP to resolve drug-bug mismatches, minimize unnecessary use of broad spectrum antibiotics, prevent duplicate therapy, and improve dosing. Metjian, Prasad, Kogon, et al., *Pediatr Infect Dis J* 27(2):106-111, 2008 (AHRQ grant HS10399).

- *Routine screening is the best way to detect the majority of Chlamydia infections in adolescent girls.*

Untreated *Chlamydia trachomatis* (CT) infections can lead to pelvic inflammatory disease, ectopic pregnancy, and infertility. Despite recommendations for annual screening, screening rates remain low among all sexually active adolescents and young adults under age 26. Since there usually are no symptoms with these infections, screening is the only way to detect them. These researchers describe an intervention in a California HMO that improved CT screening during urgent care. As a result of the intervention, the change in the proportion of adolescent girls screened for CT increased by almost 16 percent in the five intervention clinics compared with a decrease of 2 percent in the comparison clinics. Tebb, Wibbelsman, Neuhaus, and Shafer, *Arch Pediatr Adolesc Med* 163(6):559-564, 2009 (AHRQ grant HS10537).

- *Hospital rates for intussusception declined 25 percent from 1993 to 2004.*

Rotavirus is the most common cause of severe gastroenteritis in young children, and a new rotavirus vaccine was introduced in 2006. A previous vaccine was withdrawn in 1999 after it was associated with intussusception in infants. Researchers compared annual

intussusception hospitalization rates before and after introduction of the new vaccine, and found that the rates have remained stable since 2000, with about 35 cases per 100,000 infants. They note that the downward trend might reflect a true reduction in the incidence of severe intussusceptions, but it also could reflect changes in medical management that do not require hospitalization. Tate, Simonsen, Viboud, et al., *Pediatrics* 121, 2008; online at www.pediatrics.org (AHRQ Publication No. 08-R071)* (Intramural).

- *Parental visits to preventive health Web sites may enhance preventive care provided to children.*

Due to time and other constraints, pediatricians spend less than 10 minutes of well-child visits discussing preventive care. This study found that access to a prevention-focused Web site can prompt parents to bring up prevention topics with their child's provider during well-child visits and also can increase parental and physician adoption of preventive measures. Christakis, Zimmerman, Rivara, and Ebel, *Pediatrics* 118(3):1157-1166, 2006 (AHRQ grant HS13302).

- *Distance-based quality improvement approach shows promise for improving pediatric immunization rates.*

Researchers randomly assigned 29 pediatric research network-based practices into year-long paper-based education or distance-based QI groups to examine differences in immunization rates at the end of the year. Baseline immunization rates of 88 percent or less for children aged 8 to 15 months were similar for the two groups. Practices in the paper-based group received only mailed educational materials. Those in the distance-based group participated in monthly conference calls, logged into e-mail discussion groups, and made use of

a Web site that shares best practices and other information. Pediatricians in the QI group boosted their immunization rates by 4.9 percent compared with 0.8 percent for the paper-based education group. Slora, Steffes, Harris, et al., *Clin Pediatr* 47(1):25-36, 2008 (AHRQ grant HS13512).

Clinical Guidelines/Recommendations

- *Adherence to evidence-based guidelines for catheter management is key to reducing blood stream infections in pediatric patients.*

According to these authors, many caregivers in pediatric intensive care units (ICUs) view central venous catheter (CVC)-associated blood stream infections as unavoidable effects of providing care to critically ill or injured children. In a study that was conducted in 26 hospitals, they found a 32 percent reduction in CVC-associated blood stream infections when care providers followed evidence-based guidelines for inserting and maintaining CVCs in pediatric ICUs. These guidelines indicate that providers should prepare the patient's skin with antiseptic, wash their hands thoroughly, and don protective barriers, such as gloves, gowns, and masks to prevent infections. After implementing the guidelines for 9 months, the hospitals saw a median reduction in CVC-associated blood stream infections from 6.3 to 4.3 per 1,000 CVC days. Also, the intervention prevented an estimated 69 CVC-associated blood stream infections for a cost savings of nearly \$3 million. Jeffries, Mason, Brewer, et al., *Infect Control Hosp Epidemiol* 30(7):645-651, 2009 (AHRQ grant HS13698).

- *Use of a medical home managed care model can reduce ED use among children with special health care needs.*

According to this study, a managed care model that emphasizes care coordination and does not include strong financial incentives to limit care use can reduce the use of emergency department care among children with special health care needs. The researchers compared ED use before and after the children joined a managed care plan specially designed for them and found an association between managed care enrollment and a nearly one-fourth drop in ED use. The plan features a medical home approach to create an environment for the more effective management of chronic health problems and facilitate early intervention when those problems become acute, thereby reducing ED use. Pollack, Wheeler, Cowan, and Freed, *Med Care* 45(2):139-145, 2007 (AHRQ grant HS10441).

- *Use of decision analysis may lead to better evaluation of pediatric clinical guidelines.*

Decision analysis synthesizes information and focuses on estimating the consequences of alternative health measures. These authors discuss the use of decision analysis to examine interventions intended for children. They note that frequently there is a paucity of direct evidence for pediatric interventions, which highlights a key advantage of decision analysis: its focus on quantifying outcomes of interest to the decisionmaker, regardless of the availability of direct evidence. Cohen and Neumann, *Health Aff* 27(5):1467-1475, 2008 (AHRQ grant HS16760).



Health Insurance/Coverage

- *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. Szilagyi, Dick, Klein, et al., *Pediatrics* 117(2):486-496, 2006 (AHRQ grant HS10450).

Interventions

- *Interventions show promise for reducing adverse drug events related to narcotics in children's hospitals.*

Hospitalized children are harmed more often by prescribed narcotics than any other type of medication, and finding a way to reduce these narcotics-related adverse drug events (ADEs) could greatly reduce overall ADEs at children's hospitals. Researchers analyzed data from 13 children's hospitals for 3 months before and 3 months after a 6-month implantation phase for at least one of four narcotics-related interventions: limiting opportunities to override automated medication dispensing devices, use of laxatives and stool softeners, weaning children off extended narcotic use, and specific steps to prevent ADEs during transfer of children from one unit to another or discharge to home. Overall the program was associated with a significant 67 percent reduction in narcotic-related ADEs at the hospitals during the 3 months after the interventions were

fully implemented. Sharek, McClead, Taketomo, et al., *Pediatrics* 122(4):e861-e866, 2008 (AHRQ grant HS13698).

Care Management

- *Chronic care model does not improve safety practices among caregivers of young children in a primary care practice.*

Researchers examined the effectiveness of a chronic care model (CCM) approach to injury prevention among caregivers of children aged 0-5 in primary care settings compared with standard anticipatory guidance. Six months later, there was no difference between the two groups in the number of medically attended injuries. Sangvai, Cipriani, Colborn, and Wald, *Clin Pediatr* 46(3):228-235, 2007 (AHRQ grant HS13523).

- *Intervention programs that focus on already violent youth found to be most effective.*

Tertiary intervention programs are more likely to report effectiveness than primary and secondary programs for reducing violent behaviors among adolescents, according to this study. Tertiary programs focus on youths who have already engaged in violent behavior, while primary programs focus on reducing risky behaviors (e.g., substance abuse) and secondary programs focus on at-risk youths (e.g., those living in poor neighborhoods). Overall, nearly half of interventions evaluated were effective; two of six primary interventions, three of seven secondary interventions, and both tertiary interventions were effective. Limbos, Chan, Warf, et al., *Am J Prev Med* 33(1):65-74, 2007 (AHRQ contracts 290-97-0001 and 290-02-0003).

- *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).

- *Gait assessment before surgery may offset the need for repeat surgery in children with cerebral palsy.*

Children with cerebral palsy who have problems walking often undergo several rounds of surgery to correct their gait. According to this study of 313 children who received gait assessment prior to their initial surgery and 149 children who did not, only 11 percent of those who had gait assessment needed additional surgery, compared with 32 percent of the children who did not have gait assessment. Although the cost of the initial surgical session was higher in the children who had gait assessment,

the additional total cost per person-year was nonsignificant (\$20,448 vs. \$19,535 for those with and without gait assessment, respectively). Wren, Kalisvaart, Ghatan, et al., *J Pediatr Orthop* 29(6):558-563, 2009 (AHRQ grant HS14169).

- *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).

Practice Organization

- *Care setting affects the likelihood that children with persistent asthma will receive inhaled steroids.*

According to this study of 563 children with persistent asthma, those receiving care in community health centers or hospital clinics were significantly less likely than children seen in multispecialty practices to have received inhaled steroids for their asthma. These differences were not seen for receipt of influenza vaccinations and asthma care plans. Key components of quality care for children with asthma include prescribing inhaled steroids, vaccinating children against influenza, and discussing an asthma action plan with parents. Galbraith, Smith, Bokhour, et al., *Arch Pediatr Adolesc Med* 164(1):38-43, 2010 (AHRQ grant T32 HS00063).

Health IT

- *Telemedicine appears effective for evaluating acute childhood illnesses.*

Researchers randomly assigned 253 children to in-person evaluation of acute illness by study physicians and 239 children to evaluation by study physicians via telemedicine. Children were seen in a pediatric primary care practice or pediatric emergency department of a university-affiliated medical center. Results were comparable for the two groups: study physicians made a diagnosis in 74.1 percent of telemedicine visits compared with 76.7 percent of in-person visits.

McConnochie, Conners, Brayer, et al., *Telemed J E Health* 12(3):308-316, 2006 (AHRQ grant HS10753).

- *Children do not benefit as much as adults from hospital computer order entry systems.*

Researchers collected data on 627 children hospitalized in a pediatric surgical or medical unit, pediatric intensive care unit, or a neonatal intensive care unit either before or after implementation of a commercial computerized physician order entry system (CPOE). Medication error rates were not significantly different after implementation of CPOE, even though studies have shown reductions of up to 55 percent in serious medication errors in adults following introduction of CPOE. The researchers note that the system they evaluated was not optimally designed to prevent common pediatric medication errors, such as mistakes in the use of weight-based dosing calculations. Walsh, Landrigan, Adams, et al., *Pediatrics* 121(3), 2008; online at www.pediatrics.org (AHRQ grant HS13333).

- *Decision support in an electronic health record improves asthma care for children.*

This project was conducted in 12 primary care sites in both urban and suburban locations where children with asthma were seen on a regular basis. Before the start of the study, staff at all of the sites participated in an educational program on asthma management, and all sites received an asthma control tool as part of their electronic health record (EHR) system. A clinical decision support (CDS) component based on Federal guidelines for asthma care was added to the EHR at six of the sites. Use of controller medications, asthma care plans, and spirometry increased significantly in practices with the CDS in their EHRs. Bell, Grundmeier, Localio, et al., *Pediatrics* 125(4):e770-e777, 2010 (AHRQ grant HS14873).

Tools/Models

- *Some minority youths benefit more than others from evidence-based mental health interventions.*

The researchers examined the impact of a quality improvement intervention designed to improve access to evidence-based depression care for minority youths and found a significant reduction in depression symptoms among blacks, significant improvement in care satisfaction among Hispanics, and no intervention effects among white youths. They examined outcomes among 344 youths who completed a 6-month followup assessment. Ngo, Asarnow, Lange, et al., *Psychiatr Serv* 60(10):1357-1364, 2009 (AHRQ grant HS09908).

- *Community-wide interventions have some success in reducing antibiotic use among children.*

The rapid increase in antibiotic-resistant bacteria is widely believed to result from the high use of antibiotics, especially by young children. The research team tested an antibiotic education intervention in 16 small and large towns during three successive cold and flu seasons (2000-2003) in collaboration with three private insurers and a State Medicaid program. The intervention was aimed primarily at parents of children age 6 and younger and their physicians. The program was responsible for a 4.2 percent decrease in antibiotic prescribing for children 24 to 48 months of age and a 6 percent decline among those 48 to 72 months of age. Finkelstein, Huang, Kleinman, et al., *Pediatrics* 121(1):15-23, 2008 (AHRQ grant HS10247).

- *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).

- *Results from the Healthy Steps for Young Children program appear promising.*

Even though the Healthy Steps for Young Children (HS) program ended at 3 years, its impact was sustained among 5-year-old children, according to this study. A smaller percentage of HS parents slapped their child in the face or spanked their child with an object, compared with parents in a non-HS group. Also, HS parents were more likely to negotiate with their child, ignore misbehavior, and encourage children to read and use car seat restraints than parents in the non-HS group. Minkovitz, Strobino, Mistry, et al., *Pediatrics* 120(3), 2007; online at www.pediatrics.org (AHRQ grant HS13086).

For More Information

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