Research Activities

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Highlights

Departments

Regular Features

Key symptoms can differentiate inhalation anthrax from flu

Researchers have identified key symptoms that may help distinguish inhalation anthrax from the flu and other common respiratory conditions in the event of a bioterrorist attack, according to a new study that was funded in part by the Agency for Healthcare Research and Quality (contract 290-00-0013) as part of AHRQ's bioterrorism preparedness research portfolio.

Results of the study are being used to create the first evidence-based prehospital screening protocol designed for use in response to future anthrax attacks. By helping emergency management and public health authorities rapidly and accurately identify both potential cases and likely non-cases, this protocol—once it has been fully tested—will help to preserve scarce hospital capacity while ensuring that patients receive appropriate advanced medical care.

Combining data from the 11 cases of inhalation anthrax from the 2001 attacks with historical case reports of 17 additional patients, researchers at Weill Medical College of Cornell University compared the features of anthrax-related illness with more than 4,000 cases of common viral respiratory tract infections such as the flu. Although symptoms such as fever and cough did not reliably discriminate between anthrax and flu or flu-like illnesses, others—most notably neurologic problems like dizziness and confusion, serious gastrointestinal symptoms like nausea and vomiting, and shortness of breath—were much more common in patients with inhalation anthrax.

Although sore throat and runny nose were present in some cases of anthrax infection, these flu-like symptoms never occurred without at least one of the other symptoms, according to lead author Nathaniel Hupert, M.D., M.P.H., an assistant professor of public health and medicine at Weill Medical College of Cornell University. Four of the 11 patients who

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Inhalation anthrax

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developed anthrax infection in 2001 were originally sent home with diagnoses of a viral syndrome, bronchitis, or gastroenteritis.

For more information, see "Accuracy of screening for inhalational anthrax after a bioterrorist attack," by Dr. Hupert, Gonzalo Bearman, M.D., M.P.H., Alvin I. Mushlin, M.D., Sc.M., and Mark A. Callahan, M.D., in the September 2, 2003 *Annals of Internal Medicine* 139(5, part 1), pp. 337-345. ■

Clinical Decisionmaking

Researchers focus on management of asthma in children

Asthma-related illnesses and deaths in children continue to rise, despite the availability of increasingly effective therapies to prevent and treat asthma episodes. Adequate treatment of childhood asthma depends on parental knowledge of symptoms and appropriate use of medications, as well as timely communication with the health care provider.

Three new studies that were supported in part by the Agency for Healthcare Research and Quality examine parental perceptions about asthma management, misunderstanding of appropriate medication use, and length of hospitalization of children with asthma (HS09983). They are briefly described here.

Peterson-Sweeney, K., McMullen, A., Yoos, L., and Kitzman, H. (2003, May). "Parental perceptions of their child's asthma: Management and medication use." (AHRQ grant HS10689). ***Journal of Pediatric Health Care*** **17, pp. 118-125.**

These researchers examined parental experiences with their children with asthma, specifically their beliefs, knowledge, and attitudes about asthma management, including medication use. They conducted one-on-one interviews with 18 parents of children 2 to 18 years of age who were from diverse racial and socioeconomic backgrounds and who represented the range of illness severity. The interviews focused on parental beliefs, knowledge, and attitudes about asthma management, including medication use.

Results showed that parents need to partner more with health care providers to manage their child's asthma, and they need more education about asthma. Parents were frustrated when health care providers ignored their input, since they felt they knew their child's symptoms and responses best. Parents who sought care from specialists were more comfortable with the doctor's treatment plan and received more information about asthma management.

Nearly half of the parents interviewed said they received minimal or no education when their child was first diagnosed with asthma. Most of them developed systems of care over time through "trial and error."

Half of the parents who were taught about their children's asthma medications could not remember the mechanism of action of the medications. More than half of the parents who had children with long-standing asthma didn't understand or were confused about how the medications worked. Many parents used other resources to learn how to manage their child's asthma, such as Web sites, asthma

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Asthma in children

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networks and newsletters, family members, and pharmacists.

Farber, H.J., Capra, A.M., Finkelstein, J.A., and others. (2003). "Misunderstanding of asthma controller medications: Association with nonadherence." (AHRQ grant HS09935). ***Journal of Asthma*** **40(1), pp. 17-25.**

Daily use of inhaled antiinflammatory medications (for example, inhaled corticosteroids) has been shown to improve the functioning of children with persistent asthma and to decrease the risk of asthma-related emergency room visits, hospitalization, and death. Yet, this study found that nearly one-fourth (23 percent) of parents misunderstood the role of their child's inhaled antiinflammatory medicine. They thought it should be used to treat the symptoms (for example, cough or wheeze) of persistent asthma instead of as a daily medication to prevent symptoms before they start. This misunderstanding was associated with 82 percent lower adherence to recommended daily use of these medications, even after adjusting for demographic and process of care factors.

The risk for misunderstanding was lowered if the patient had seen a specialist or the parent had completed some post-high school education. Medication education efforts should target parents with less formal education and those whose children have not seen an asthma specialist, suggest the researchers. They conducted telephone interviews with a sample of 1,663 parents of asthmatic children insured by Medicaid managed care programs in California, Washington, and Massachusetts. They focused on the 571 parents of children who had persistent asthma and reported their child's use of an inhaled antiinflammatory medication.

Silber, J.H., Rosenbaum, P.R., Even-Shoshan, O., and others. (2003, June). "Length of stay, conditional length of stay, and prolonged stay in pediatric asthma." (AHRQ grant HS09983). ***Health Services Research*** **38(3), p. 867-886.**

Hospitals appear more efficient in overall management of pediatric asthma admissions in Pennsylvania than in New York State. This is primarily due to the efficient treatment of less severely ill children who can be rapidly discharged and a lower readmission rate after discharge. However, once children stay in the hospital beyond 3 days, there appears to be little difference between the two States, suggesting that medical care for severely ill asthmatic children is similar across States, according to the authors of this study. They conclude that policy initiatives in New York and other States should focus on improving the care provided to less severe asthmatic children in order to help reduce overall length of hospital stay.

The researchers used claims data to study all pediatric asthma admissions to children's and general hospitals in Pennsylvania and New York for the years 1996 to 1998. They examined length of stay, the probability of prolonged stay (more than 3 days), conditional length of stay, and the probability of readmission, controlling for patient factors, State, location, and hospital type. Overall, one-third of children were treated in children's hospitals, and two-thirds were treated in general hospitals.

Discharge rates in children's hospitals and general hospitals in Pittsburgh/Philadelphia were 20 percent and 26 percent faster, respectively, than discharge rates in children's and general hospitals in New York City. The odds of prolonged length of stay were 27 percent and 64 percent higher, and the likelihood of being readmitted was 3.38 and 2.33 times higher in children's and general hospitals in New York City, respectively, than in Pittsburgh/Philadelphia children's and general hospitals. However, there were no State differences in the discharge rate after hospital day three in either type of hospital. ■

Also in this issue:

Rapid MRI costs more but offers little benefit over x-ray for diagnosing the cause of low back pain

Use of rapid magnetic resonance imaging (MRI) instead of x-rays for initial diagnostic imaging of patients who have low back pain has become more common. However, replacing lumbar spine x-rays with rapid MRI in primary care patients with low back pain results in no long-term differences in disability, pain, or general status, and rapid MRI costs more, according to a recent study supported in part by the Agency for Healthcare Research and Quality (HS09499).

Jeffrey G. Jarvik, M.D., M.P.H., of the University of Washington, and his colleagues randomly assigned 380 patients whose primary care doctors had ordered that their low back pain be evaluated by radiography to receive lumbar spine evaluation by rapid MRI or x-ray. The researchers examined back-related disability, health status, pain, preference, satisfaction, and costs.

A year later, the 170 x-ray patients had a mean back-related disability Roland score of 8.75 vs. 9.34 for the 167 rapid MRI patients, a clinically insignificant difference. Mean differences between patients in the two groups in how much the pain bothered them, pain frequency, bodily pain, and physical functioning were not significant. Ten patients in the rapid MRI group versus four in the x-ray group had lumbar spine operations.

The rapid MRI strategy had a mean cost of $2,380 versus $2,059 for the x-ray strategy, but MRI costs were higher overall due to the additional spine operations it prompted. Although patients and physicians preferred the rapid MRI for the reassurance it offered, it provided little benefit over x-ray.

See "Rapid magnetic resonance imaging vs. radiographs for patients with low back pain," by Dr. Jarvik, William Hollingworth, Ph.D., Brook Martin, B.S., and others, in the June 4, 2003 *Journal of the American Medical Association* 289(21), pp. 2810-2818. ■

Blood pressure control can be attained in a substantial number of primary care patients who have diabetes and hypertension

Many adults with diabetes also suffer from high blood pressure (hypertension), which increases their risk of cardiovascular and other diabetes-related complications. Blood pressure control plays an important part in preventing problems such as stroke and end-stage renal disease among diabetes patients. Multiple medications are generally required to achieve blood pressure control (less than 130/85 mm Hg) in these patients.

A recent article describes a case study in which one primary care practice was able to achieve blood pressure control in more than one-third (38 percent) of patients with diabetes without medications or with only one medication. The study was supported by the Agency for Healthcare Research and Quality (HS11132).

Steven M. Ornstein, M.D., of the Medical University of South Carolina, and colleagues used staff interviews and observations made during site visits to determine the primary care practice's approach to

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AHRQ policy on the inclusion of priority populations in research commences October 1st

On February 28, 2003, AHRQ published a notice in the *NIH Guide for Grants and Contracts* establishing a new Agency policy on the inclusion of priority populations in health services research. This policy was developed to implement a directive in the Healthcare Research and Quality Act of 1999, which reauthorized the Agency. The policy, which asks all AHRQ grant applicants to consider including subjects from one or more priority populations in their planned research projects, will begin with all grant applications submitted to AHRQ for the October 1, 2003 receipt date. The Agency intends to use this policy to help develop and maintain a broad portfolio of research inclusive of a diverse set of populations. Visit http://grants.nih.gov/grants/guide/notice-files/NOT-HS-03-010.html to read the notice. ■

Blood pressure control

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care for 469 patients with diabetes who had a blood pressure measurement during a 2001 practice visit. Fifty-three percent of the last blood pressures measured in 2001 were controlled. Of the patients who were not controlled, 44 percent had a blood pressure of less than 140/90 mm Hg, and 56 percent had a higher blood pressure.

The practice's self-described treatment approach for achieving blood pressure control was three-fold: attention to target blood pressure at each encounter, empowering patients to self-monitor with this target in mind, and primary use of angiotensin converting enzyme inhibitors. They followed medication guidelines, incorporated current guidelines and treatment goals into point-of-care templates, and involved the nursing staff in extensive case management activities, for example, to regularly contact patients who missed appointments or who were not at target blood pressure.

More details are in "Achieving blood pressure control in patients with diabetes: A case study in primary care," by Andrea M. Wessell, Pharm.D., B.C.P.S., Dr. Ornstein, Paul J. Nietert, Ph.D., and others, in the January 2003 *Topics in Health Information Management* 24(1), pp. 3-7. ■

Behavioral counseling for people with diabetes can decrease unhealthy lifestyles that may lead to cardiovascular disease

Cardiovascular disease (CVD) is the leading cause of death in people with diabetes. Physician counseling of adult diabetes patients is effective at decreasing unhealthy lifestyles that elevate their risk of CVD. However, several barriers prevent primary care physicians from counseling these patients, concludes Leonard E. Egede, M.D., M.S., of the Medical University of South Carolina. His work was supported by the Agency for Healthcare Research and Quality (K08 HS11418).

Dr. Egede reviewed research studies on modifiable CVD risk factors in people with diabetes, barriers to implementing behavioral counseling in primary care, and practical approaches to such counseling. About 34 trials showed that brief physician advice to quit smoking increased smoking quit rates by 3 percent over no advice. Advice to follow a low cholesterol diet (two studies) led to a 7.7 to 11.6 mg/dL drop in serum cholesterol and a 16 percent decreased risk of CVD events such as stroke or heart attack. Advice to lose weight for blood pressure (BP) control led to a decrease of 4 to 8 percent of body weight and a 3.5 mm Hg decrease in systolic BP without medications (decrease of 8.9 mm Hg with medications). Advice on sodium restriction for BP control led to a 1.9 to 6.3 Hg drop in systolic BP over 9 to 18 months. Finally, advice on diet and exercise for weight loss, with behavior modification counseling, led to a 4.4 to 13.2 pound weight loss sustained for up to 2 years.

Up to 50 percent of adults with diabetes may not be receiving appropriate advice on ways to decrease their risk of CVD, according to two studies. Physician pessimism about the willingness of patients to change negative health habits, doubts about the efficacy of advice or counseling, and skepticism about patient adherence to recommendations play important roles in lack of counseling by primary care physicians. Added barriers include limited time to provide counseling, limited training on effective counseling techniques, and low reimbursement rates for counseling in primary care.

More details are in "Implementing behavioral counseling interventions in primary care to modify cardiovascular disease risk in adults with diabetes," by Dr. Egede, in the June 2003 *Cardiovascular Reviews & Reports* 24, pp. 306-312. ■

Note: Only items marked with a single (*) or double (**) asterisk are available from AHRQ. Items marked with a single asterisk (*) are available from AHRQ's clearinghouse. Items with a double asterisk (**) are also available through AHRQ InstantFAX. Three asterisks (***) indicate NTIS availability. See the back cover of *Research Activities* for ordering information. Consult a reference librarian for information on obtaining copies of articles not marked with an asterisk.

Simple meal plans that emphasize healthy foods are effective in reducing blood sugar levels among blacks with diabetes

Teaching urban blacks with type 2 diabetes to follow a simple meal plan that emphasizes healthy food choices is as effective in reducing blood-sugar levels as a traditional meal plan that emphasizes smaller portions and weight loss. Also, the healthy food choice (HFC) approach may be easier to teach and easier for patients, especially low-literacy patients, to understand, according to a study supported in part by the Agency for Healthcare Research and Quality (HS09722).

A research team led by researchers from the Emory University School of Medicine randomly assigned 648 patients with type 2 diabetes to receive 6th-grade-level information about either an HFC meal plan or an exchange-based meal plan (EXCH) to compare the impact of these approaches on blood-sugar (glycemic) control, weight loss, serum lipids, and blood pressure 6 months later. The EXCH group was instructed in both food exchanges and portion sizes, and obese patients were assigned meal plans that were 500 kcal below their estimated daily energy requirements. The HFC group received the same educational materials, but all content related to quantity of food was removed. Inserted instead was the FDA's Food Guide Pyramid, which was modified to group high-starch and high-protein foods as recommended for people with diabetes. Patients were instructed to limit use of sweets and fats, particularly saturated fat. Portion sizes were not discussed, and weight loss was not emphasized.

Both groups had similar and significantly improved glycemic control over 6 months: HbA1c decreased from 9.7 to 7.8 percent in the HFC group and from 9.6 to 7.7 in the EXCH group (controlled blood sugar is HbA1c of 7 percent or less). Both groups similarly reduced their intake of fats and sugar-sweetened foods. Weight loss among obese patients was comparable for the two approaches. Improvements in HDL cholesterol and triglycerides were comparable in both groups, while other lipids and blood pressure were not altered.

See "A simple meal plan emphasizing healthy food choices is as effective as an exchange-based meal plan for urban African Americans with type 2 diabetes," by David C. Ziemer, M.D., Kathy J. Berkowitz, R.N., F.N.P., C.D.E., Rita M. Panayioto, R.D., L.D., D.C.E., and others, in the June 2003 *Diabetes Care* 26(6), pp. 1719-1724. ■

Inappropriate use of carotid endarterectomy to prevent stroke has declined over the past few years

The overuse of stroke prevention surgery to open blocked neck arteries (carotid endarterectomy) has dropped significantly over the past 20 years, according to a new study. However, one in ten of these surgeries is still considered inappropriate, that is, they are performed on patients for whom the risks of surgery outweigh the benefits.

Carotid endarterectomy is considered inappropriate for patients who have multiple cardiac risk factors—such as heart disease, heart failure, diabetes, or kidney disease—that actually increase the risk of stroke or death following surgery. Nearly 140,000 carotid endarterectomies are performed each year in the United States at an average total cost per patient for diagnostic tests, surgical procedures, hospitalization, and followup care related to the procedure of about $15,000. Based on the study, about 14,000 of these operations may be performed for inappropriate reasons, according to Ethan A. Halm, M.D., M.P.H., of the Mount Sinai School of Medicine.

In a study that was supported in part by the Agency for Healthcare Research and Quality (HS09754), Dr. Halm and his colleagues reviewed the patient records of carotid endarterectomies performed at six New York hospitals in 1997 and 1998 to see whether the number of inappropriate surgeries had changed since the 1980s, when clinical trials prompted an increase in use of the procedure. At the time, there was also a major shift toward operating on asymptomatic patients.

Although the number of cardiac endarterectomies has doubled since 1981, the proportion of inappropriate surgeries dropped from 32 percent in 1981 to 10.6 percent in 1998. Nearly three-quarters of patients undergoing carotid endarterectomies had no symptoms. Although overall complication rates were low, rates among asymptomatic patients with coexisting medical conditions exceeded recommended thresholds.

See "Revisiting the appropriateness of carotid endarterectomy," by Dr. Halm, Mark R. Chassin, M.D., M.P.P., M.P.H., Stanley Tuhrim, M.D., and others, in the June 2003 *Stroke* 34(6), pp. 1464-1471. ■

Computer-based telecolposcopy may offer superior diagnostic services to clinicians and patients in remote areas

Physicians typically use an instrument with a magnifying lens or camera on the end (colposcope) to aid in the diagnosis of cervical cancer or precancerous cervical lesions. In the future, a mere laptop and cell phone may enable doctors in rural or underserved areas to get the diagnostic opinion of distant experts, who view the colposcopic image on a distant computer screen. This enables more women in these areas to access expert cervical diagnoses. In fact, computer-based and network telecolposcopy detected more cervical neoplasia (abnormal, often premalignant cells) than cervicography, according to a study supported in part by the Agency for Healthcare Research and Quality (HS08814).

Cervicography produces two low-magnification slides of the cervix with a special 35-mm camera following 5 percent acetic acid application, and it generally takes several weeks to receive a diagnostic report. Computer-based telecolposcopy provides the remote expert with digitized images of a low- and high-power magnification view of the cervix, allows interaction between the on-site provider and remote expert, and can provide instantaneous consultation. The provision of a high-power cervical image may explain the better sensitivity of computer-based telecolposcopy, explain Daron G. Ferris, M.D., and colleagues at the Medical College of Georgia.

The researchers compared the diagnostic accuracy of on-site, network, and computer-based colposcopy with cervicography for cervical problems among 264 adult women who came to one of two rural clinics for a colposcopic examination due to a recent abnormal Pap smear or suspicious finding affecting the lower genital tract. Telecolposcopy was at least as effective as cervicography for detecting cervical cancer precursors. Although the difference was not significant, both network (real-time) and computer-based telecolposcopy systems detected a higher percentage of women with more advanced cervical neoplasia than cervicography. On-site colposcopy had the most sensitivity for disease detection due to the ability to manipulate the cervix, stereoscopic viewing, and other factors.

See "Remote diagnosis of cervical neoplasia: 2 types of telecolposcopy compared with cervicography," by Dr. Ferris, Mark S. Litaker, Ph.D., Michael S. Macfee, M.D., and Jill A. Miller, M.D., in the April 2003 *Journal of Family Practice* 52(4), pp. 298-304. ■

Newer treatments for hepatitis C infection appear to be cost effective, but results vary widely across different groups

Nearly 3 million people in the United States are chronically infected with the hepatitis C virus (HCV), which can lead to cirrhosis of the liver and liver cancer. However, aggressive screening is identifying more HCV-infected patients who are asymptomatic and otherwise healthy (no evidence of liver fibrosis). Since few of these individuals would progress to severe liver disease even in the absence of therapy, treatment benefits are largely for improved quality of life rather than survival gains. Treatment with newer pegylated interferon and ribavirin is more cost effective than standard interferon and ribavirin for these asymptomatic, healthy patients, according to a recent study. The researchers also found that this newer combination therapy offers substantially lower benefits for women than men, since women are much less likely to progress to cirrhosis and liver failure, even in the absence of treatment.

The study was conducted by researchers at Harvard University and the World Health Organization and supported in part by the Agency for Healthcare Research and Quality (National Research Service Award training grant T32 HS00055). The researchers developed a model that simulated HCV disease progression under a variety of different treatment scenarios in an asymptomatic group of 40-year-old HCV-infected individuals who had no evidence of liver fibrosis.

See "Cost-effectiveness of treatment for chronic hepatitis C infection in an evolving patient population," by Joshua A. Salomon, Ph.D., Milton C. Weinstein, Ph.D., James K. Hammitt, Ph.D., and Sue J. Goldie, M.D., M.P.H., in the July 9, 2003 *Journal of the American Medical Association* 290(2), pp. 228-237. ■

Long-term use of antibiotics to treat acne can lead to antibiotic-resistant strains of bacteria in patients' mouths

Individuals with acne are generally healthy patients who are often treated with long-term antibiotics to control and prevent acne outbreaks. This treatment can lead to antibiotic-resistant strains of bacteria in the oropharynx of these patients, according to a study supported by the Agency for Healthcare Research and Quality (HS10399).

Acne patients in this study who were undergoing topical or oral antibiotic therapy had more than a three-fold increase in the prevalence of *Streptococcus pyogenes* in their oropharynx when compared with those who were not using any antibiotics. In fact, its prevalence in 33 percent of patients on antibiotics was as high as that documented in patients with symptomatic pharyngitis. Topical antibiotics, like oral antibiotics, may selectively eliminate certain bacteria. This may cause shifts in the microbial equilibrium that allow species such as potentially pathogenic *S. pyogenes* to flourish when they otherwise would be held in check, suggest the researchers.

They compared the prevalence and patterns of resistance to tetracycline antibiotics of *S. pyogenes* and *Staphyloccocus aureus* in the oropharynx of 42 people with acne using oral or topical antibiotics and 63 acne patients not using antibiotics. A total of 85 percent of S. pyogenes cultures from antibiotic users were resistant to at least one tetracycline antibiotic compared with 20 percent from those not using antibiotics. Of those not using antibiotics, 29 percent had positive *S. aureus* cultures compared with 22 percent of those using antibiotics. There were no significant differences in resistance patterns of *S. aureus.*

For more information, see "Effect of antibiotics on the oropharyngeal flora in patients with acne," by Ross M. Levy, B.A., Eric Y. Huang, M.D., Ph.D., Daniel Roling, M.D., and others in the April 2003 *Archives of Dermatology* 139, pp. 467-471. ■

Misuse of an over-the-counter drug to treat urinary tract infection raises concern about reclassifying prescription drugs

A growing number of prescription medications, ranging from nicotine patches to nonsedating allergy medications, are being reclassified to over-the-counter (OTC) status. However, a new study shows that inappropriate use of an OTC drug to treat urinary tract infection (UTI), formerly available only by prescription, is common, as is substitution of the drug for a visit to the doctor. This finding bolsters the arguments of critics of drug reclassification, who are concerned that it will encourage improper self-diagnosis and self-medication. It also underscores the need to educate consumers about the proper use of these reclassified drugs, says Chih-Wen Shi, M.D., M.S.H.S., of the University of California, Los Angeles.

In a study supported by the Agency for Healthcare Research and Quality (National Research Service Award fellowship F32 HS11507), Dr. Shi and colleagues evaluated the use of an OTC urinary analgesic, phenazopyridine (pyridium), which is widely marketed for UTI via television commercials and women's magazines. They surveyed a random sample of 434 adult OTC pyridium purchasers in 31 Los Angeles pharmacies over a 5-month period. Survey questions addressed symptoms prompting use, prior history of UTI, prior prescription use of pyridium, concurrent therapy, medical contraindications, and other topics.

The researchers defined inappropriate use as having medical contraindications to pyridium or not having concurrent antibiotic and/or provider evaluation for urinary symptoms. Half (51 percent) of those surveyed used OTC pyridium inappropriately, and 38 percent substituted it for medical care. Inappropriate use was correlated with having little time to see a provider, receiving friend's or family's advice, having prior UTIs, having used prescription pyridium, and having back pain. Respondents with incorrect knowledge about pyridium's mode of action were twice as likely as those with correct knowledge to use it inappropriately or substitute it for medical care.

See "Usage patterns of over-the-counter phenazopyridine (pyridium)," by Dr. Shi, Steven M. Asch, M.D., M.P.H., Eve Fielder, Dr.P.H., and others, in the April 2003 *Journal of General Internal Medicine* 18, pp. 281-287. ■

Prescribing COX-2-selective NSAIDs over traditional NSAIDs is influenced by physician specialty and patient risk factors

Nonsteroidal antiinflammatory drugs (NSAIDs) are often used long-term by patients suffering from inflammatory illnesses such as rheumatoid arthritis. However, the safety of long-term NSAID use remains a concern, especially for patients at greater risk for toxicity, such as the elderly. More physicians are using the newer, potentially safer cyclooxygenase 2 (COX-2)-selective NSAIDs (coxibs) to treat inflammatory diseases. Patients treated by specialists and those who have a history of gastrointestinal (GI) problems, which may be worsened with traditional NSAIDs, are more likely to receive coxibs, according to a study supported in part by the Agency for Healthcare Research and Quality (HS10389).

Researchers from the Centers for Education and Research on Therapeutics (CERTs) at the University of Alabama at Birmingham linked medical record, pharmacy, and administrative data for 452 patients from a regional managed care organization who had three or more consecutive NSAID prescriptions from June 1998 to April 2001. They examined the association between patient and provider characteristics and coxib initiation and discontinuation. Patients seeing rheumatologists and internists were two or three times as likely to receive a coxib as patients seeing family or general practitioners. However, generalists were more likely than specialists to selectively use coxibs among their patients with a history of GI disease.

Patients with a history of osteoarthritis, GI disease, and congestive heart failure were more likely than other patients to receive a coxib. Coxibs were 40 percent less likely to be discontinued than were traditional NSAIDs, suggesting that they may be better tolerated. Compared with coxibs, traditional NSAIDs were significantly more likely to be discontinued because of a GI problem such as bleeding or a history of GI disease. In contrast, coxibs were more likely to be discontinued when the patient had a history of hypertension.

See "The effects of physician specialty and patient comorbidities on the use and discontinuation of coxibs," by Fausto G. Patino, M.D., Dr.P.H., Jeroan Allison, M.D., M.Sc., Jason Olivieri, M.P.H., and others, in the June 15, 2003 *Arthritis & Rheumatism* 49(3), pp. 293-299. ■

Quality of Care/Patient Safety

Physician-led, low-key quality improvement efforts can improve care for patients undergoing coronary bypass surgery

A new study found improved care for patients undergoing coronary artery bypass graft (CABG) surgery as a result of a continuous quality improvement (CQI) effort by cardiac surgeons at hospitals across the United States. Using the platform of their adult National Cardiac Database, the Society of Thoracic Surgeons invited cardiac surgeon leaders at these hospitals to lead the way for improving CABG care.

This effort was supported in part by the Agency for Healthcare Research and Quality (HS10403). T. Bruce Ferguson, Jr., M.D., and other Society leaders provided cardiac surgeons and their associates at hospitals randomized to CQI efforts with national benchmarks for CABG care and site-specific feedback.

Between January 2000 and July 2002, the researchers randomized 359 academic and non-academic hospitals (treating 267,917 patients using CABG surgery) to a control group or to one of two CQI groups: preoperative beta-blockade therapy or internal mammary artery (IMA) grafting in patients 75 years or older. Beta-blockade therapy is protective in most patients with cardiovascular disease, but the benefit of its use in CABG patients were unproven at the beginning of the trial. Some surgeons are reluctant to use it in CABG surgery because it can weaken the strength of cardiac muscle contractions. In addition, this therapy requires significant collaboration between the surgical team and cardiology and anesthesiology colleagues to make sure the CABG patients are on the

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medication. Use of IMA grafting improves survival, but its use in patients over age 75 years was controversial at the trial inception because of a presumption of increased procedural risk (prolonged ventilation, preoperative bleeding) and lack of long-term survival benefit in these elderly patients.

From January 2000 to July 2002, use of both care process measures increased nationally (beta-blockade from 60 to 66 percent and IMA grafting from 78 to 83 percent). Use of beta-blockade increased more significantly at beta-blockade intervention sites versus control sites (7.3 vs. 3.6 percent). Use of IMA grafting also increased more at IMA intervention sites versus control sites (8.7 vs. 5.4 percent). Importantly, both interventions had more impact at lower CABG volume sites, perhaps because the Society sponsorship helped to make CQI materials and leadership available to these smaller centers.

See "Use of continuous quality improvement to increase use of process measures in patients undergoing coronary artery bypass graft surgery: A randomized controlled trial," by Dr. Ferguson, Eric D. Peterson, M.D., M.P.H., Laura P. Coombs, Ph.D., and others, in the July 2, 2003 *Journal of the American Medical Association* 290(1), pp. 49-56. ■

Physician compliance with obstetric clinical pathways may protect against malpractice litigation

Clinical pathways, recommended step-by-step procedures for diagnosing or treating a particular medical problem, can improve care quality. Reduced malpractice litigation is another reason physicians and institutions should buy into these "best practices," concludes a new study. The researchers found that noncompliance with an obstetric clinical pathway was over three times more common for deliveries with associated malpractice claims than deliveries without such claims (43 vs. 12 percent). Furthermore, in 79 percent of the claims involving noncompliance with the clinical pathway, the main allegation in the suit related directly to departure from the pathway.

Adherence to clinical pathways might protect clinicians and institutions against malpractice litigation, concludes David M. Studdert, L.L.B., Sc.D., of Harvard Medical School. In the study, which was supported in part by the Agency for Healthcare Research and Quality (HS11285), Dr. Studdert and colleagues identified 290 delivery-related malpractice claims and 262 control deliveries (no related claims) at three hospitals. They identified clinical pathways implemented in 1998 as the standard of care for vaginal and cesarean deliveries. A nurse-reviewer examined the medical records to identify intrapartum care that did not adhere to the pathway.

Overall, 72 percent of deliveries adhered to the clinical pathway. Noncompliance with the clinical pathway was associated with a nearly six-fold increase in the odds of a malpractice claim. More than one-third (36 percent) of all obstetric claims were the result of noncompliant care. Failure to monitor the fetus was the most common type of departure from the clinical pathway among both claims (31 percent) and controls (32 percent). The other leading departures among claims were failure to complete prenatal records, failure to perform cesarean delivery according to the pathway, and failure to treat and diagnose group B streptococcus (9 percent for each one).

See "Reduced medicolegal risk by compliance with obstetric clinical pathways: A case-control study," by Scott B. Ransom, D.O., M.P.H., Dr. Studdert, Mitchell P. Dombrowski, M.D., and others, in the April 2003 *Obstetrics & Gynecology* 101, pp. 751-755. ■

Quality improvement initiatives can improve health care for minorities

Two recent studies supported by the Agency for Healthcare Research and Quality show improved care for minorities resulting from quality improvement (QI) initiatives. The first AHRQ-study (HS08349) demonstrated that QI interventions that made modest modifications in QI design for minority patients suffering from depression decreased their likelihood of continued depression. A second AHRQ-supported study (KO2 HS00006) revealed improved survival among frail elderly blacks who participated in a program that provided them with access to and coordination of comprehensive medical and long-term care services. The studies are briefly summarized here.

Miranda, J., Duan, N., Sherbourne, C., and others. (2003, April). "Improving care for minorities: Can quality improvement interventions improve care and outcomes for depressed minorities? Results of a randomized, controlled trial." ***Health Services Research*** **38(2), pp. 613-630.**

When depressed black and Hispanic patients in this study were provided with recommended medications or psychotherapy by culturally competent providers, as well as language translation when needed, they were substantially less likely than similar patients receiving usual care to still be depressed 6 or 12 months later. These researchers randomly assigned 398 Hispanics, 93 blacks, and 778 whites from 46 primary care practices in 6 U.S. managed care organizations to either usual care for depression or one of two QI programs. These programs were designed to increase access to and adherence to either antidepressants at recommended doses or psychotherapy (at least four specialty mental health visits focused on problem solving).

The programs trained local experts to educate clinicians about recommended depression treatment; train nurses to educate, assess, and followup with patients; and train psychotherapists to conduct culturally appropriate cognitive behavioral therapy. Patients and physicians selected treatments. The programs also provided language translation for patients and cultural training for clinicians. The researchers examined continued depression and retention in employment at 6 and 12 months.

At study enrollment, all groups had low to moderate rates of appropriate care. The QI programs significantly improved appropriate care at 6 months (8-20 percentage points) within each ethnic group. They also significantly decreased the likelihood that patients would report probable depression at 6- and 12-month followup. White patients in the QI programs did not differ from whites in the usual care group in reported probable depression at either followup point, while minorities in the QI programs had less depression at followup than their usual care counterparts. The QI programs significantly improved the employment rate for whites, but the same was not true for minorities.

Tan, E.J., Lui, L., Eng, C., and others. (2003, February). "Differences in mortality of black and white patients enrolled in the Program of All-Inclusive Care for the Elderly." ***Journal of the American Geriatric Society*** **51, pp. 246-251.**

The Program of All-Inclusive Care for the Elderly (PACE) was carried out at 12 demonstration sites around the country from 1990 to 1996 and involved 2,861 patients (859 blacks and 2,002 whites). PACE provides comprehensive medical and long-term care services—ranging from physical therapy and durable medical equipment to medications and transportation—for nursing home-eligible older people who live in the community. A greater proportion of black elders enrolled in PACE survived, compared with white elders, according to this study. Black patients were younger than white patients (mean age 77 vs. 80) but had worse functional status at enrollment, perhaps due to previous barriers to care.

Survival for black and white patients was 88 percent and 86 percent at 1 year, 67 percent and 61 percent at 3 years, and 51 percent and 42 percent at 5 years, respectively. After adjustment for coexisting medical conditions, functional status at study enrollment, and demographic characteristics such as income, elderly black PACE patients still had a 23 percent lower mortality rate than white patients. The survival advantage for black patients did not emerge until about 1 year after PACE enrollment. The researchers conclude that the survival advantage of black patients enrolled in PACE may be related to the comprehensive access to and coordination of services provided by the PACE program. ■

Study finds that overall use of DNR orders changed little after passage of the Patient Self-Determination Act

The 1990 Patient Self-Determination Act (PSDA) requires hospitals, skilled nursing facilities, and other health care settings to develop written policies concerning advance directives, including do-not-resuscitate (DNR) orders. They must include such directives in the patient's chart and inform patients about their right to prepare such documents.

The purpose of the PSDA was to increase patient involvement in decisions about life-sustaining treatments while they were still competent to do so. However, overall use of DNR orders in hospitals in Northeast Ohio has changed relatively little since passage of the PSDA, according to a study supported by the Agency for Healthcare Research and Quality (HS09969).

According to the researchers, there was an initial increase between 1991 and 1992 in the use of early DNR orders (first 2 hospital days), but this effect was counteracted by decreasing use of late DNR orders during the same period. Mortality rates 1 month after preparation of a DNR order remained stable for five conditions, after adjusting for risks of death. This suggests that there were no dramatic changes in quality of care or aggressiveness of care for patients with DNR orders. However, the 21 percent increased mortality for stroke patients with early DNR orders and 25 percent increase in mortality for those with late DNR orders warrants further examination, cautions lead investigator, David W. Baker, M.D., M.P.H., of Case Western Reserve University.

Dr. Baker and his colleagues analyzed early and late DNR orders abstracted from the medical charts of 91,539 Medicare patients hospitalized with heart attack, heart failure, gastrointestinal hemorrhage, chronic obstructive pulmonary disease, pneumonia, or stroke in 29 hospitals in Northeast Ohio. Risk-adjusted rates of early DNR orders increased by 34 to 66 percent between 1991 and 1992 for four of the six conditions and then remained flat or declined slightly between 1992 and 1997. Use of late DNR orders declined by 29 to 53 percent for four of the six conditions between 1991 and 1997. The declining rate of late DNR orders seen in this study and the increasing mortality rate among stroke patients with DNR orders should intensify concerns about possible quality-of-care problems for these patients, concludes Dr. Baker

See "Changes in the use of do-not-resuscitate orders after implementation of the Patient Self-Determination Act," by Dr. Baker, Doug Einstadter, M.D., M.P.H., Scott Husak, B.S., and Randall D. Cebul, M.D., in the May 2003 *Journal of General Internal Medicine* 18, pp. 343-349. ■

Factors that predict rehospitalization of home health care patients should be targeted by home health providers

A recent study (Agency for Healthcare Research and Quality grants HS11962 and HS13694) concludes that factors pertaining to living situation, clinical status, and daily functioning affect a home health care patient's risk of rehospitalization and should be targeted by home health providers to improve home care quality. Researchers from the Visiting Nurse Service of New York used outcomes assessment data from a large home health agency to identify 7,393 patients (average age of 70) who had been rehospitalized at least once. They considered the 5,227 patients who had two or fewer unplanned rehospitalizations as low-risk and the 2,166 with three or more as high-risk.

Home care patients at high risk for rehospitalization were white or Hispanic women, either received Medicaid or both Medicaid and Medicare benefits (dually eligible), and lacked informal care (by family and friends). Even though the high-risk group needed more help than the low-risk group with bathing, dressing, and other activities of daily living (ADLs), and with shopping, housekeeping, and other instrumental activities of daily living (IADLs), fewer of them received help with these activities from their primary caregivers.

Home health care patients in the high-risk group generally lived alone, were admitted into home care from inpatient settings, and had chronic conditions such as coronary heart failure, diabetes, HIV/AIDS, chronic skin ulcers, and chronic obstructive pulmonary disease, and they were more likely to have had more secondary

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Home health care patients

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diagnoses than the low-risk group (average of 3.82 vs. 3.43). Patients in the high-risk group also needed more help with taking medications compared with patients in the low-risk group.

These factors, which can predict the probability of rehospitalization, are evident at intake and should be used in developing home care plans that may prevent rehospitalizations, conclude the researchers.

See "Risk factors for repeated hospitalizations among home healthcare recipients," by Robert J. Rosati, Ph.D., Liping Huang, M.A., Maryam Navaie-Waliser, Dr.P.H., and Penny H. Feldman, Ph.D., in the March 2003 *Journal for Healthcare Quality* 25(2), pp. 4-10. ■

Information technology is one key to improving patient safety

Information technology (IT) can reduce medical errors in several ways, note David W. Bates, M.D., and Atul A. Gawande, M.D., M.P.H., of Brigham and Women's Hospital, in a recent article. Their work was supported in part by the Agency for Healthcare Research and Quality.

Communication failures, especially those during shift changes or "handoffs" between clinicians commonly cause errors. A new generation of technology—including computerized coverage systems for signing out, hand-held personal digital assistants, and wireless access to electronic medical records—may improve the exchange of information, especially if links between various applications and a common clinical database are in place.

Information systems can identify and rapidly communicate problems to clinicians automatically. For example, the combination of a hand-held device and a cellular phone can allow rapid communication from the hospital laboratory to the doctor about a dangerously low serum potassium in a patient and recommended immediate actions to correct it. This is much more efficient than the current system where the lab result goes to the ward clerk who may not recognize the importance of the result and needs to find a clinician. Also, hand-held computers provide point-of-care access to the National Library of Medicine's MEDLINE® database and to drug reference and other information.

One of the main benefits of using computers for clinical tasks is often overlooked. Using the computer makes it possible to implement "forcing functions." For example, prescriptions written on a computer can be "forced" to be legible and complete. Similarly, applications can require constraints on clinicians' choices regarding the dose or route of administration of a potentially dangerous medication. These forcing functions can reduce physician errors and serve as reminders. Technology-enabled remote monitoring of intensive care is an important benefit given the national shortage of intensivists. Computerized tools also can be used with electronic medical records to identify, intervene promptly, and track the frequency of adverse events, for example, hospital-induced infections or dangerous drug reactions.

Although these and other IT strategies hold great promise for improving the quality of health care and reducing medical errors, few have been widely implemented, note Drs. Bates and Gawande. The reasons they cite for slow adoption include uncertainty about the quality of clinical software applications, the absence of widely used standards for this technology application, and the failure of many health care organizations to view IT as a strategic resource rather than a commodity, like plumbing.

More details are in "Improving safety with information technology," by Drs. Bates and Gawande, in the June 19, 2003 *New England Journal of Medicine* 348, pp. 2526-2534. ■

Organizational culture and leadership, as well as medical informatics, play important roles in quality improvement

In a recent article introducing a journal issue on quality improvement, Carolyn M. Clancy, M.D., Director of the Agency for Healthcare Research and Quality, underscores the importance of organizational culture and leadership in improving quality of care. In a second paper, Dr. Clancy and Eduardo Ortiz, M.D., M.P.H., of AHRQ's Center for Primary Care Research, describe AHRQ's information technology initiatives to improve patient safety and promote quality improvement. A third AHRQ-supported study (HS06284) demonstrates that embedding clinical guidelines in an electronic medical record can improve documentation of care, quality of care, and patient satisfaction. These papers are briefly discussed here.

Clancy, C. (2003, April). "Quality improvement: Getting to how." *Health Services Research* 38(2), pp. 509-513.

In this introductory article, Dr. Clancy notes that public reports of clinical performance and patients' experiences of care have been developed and implemented widely. Several initiatives have begun or are on the horizon: mandatory reporting of nursing home performance, voluntary reporting for hospital performance, and products of the National Quality Forum's consensus development process. AHRQ and the Department of Health and Human Services will publish annual reports on the quality of health care and disparities in care starting in 2003.

However, transparency in the form of public performance reports is merely a first step in addressing the quality chasm. Research that clarifies how these reports can be used to generate widespread improvements is urgently needed, asserts Dr. Clancy. She addresses some key findings of four articles on this topic that appear in the same journal issue. These findings suggest that the path from hospital or nursing home report cards to improved care and outcomes involves multiple actors in addition to clinicians, and close attention to dimensions of organizational context, which have been challenging to elucidate. The findings also highlight the need to understand the balance between public reports, internal improvement, and the use of research skills and methods to motivate and understand change, not just describe it. Reprints (AHRQ Publication No. 03-R041) are available from AHRQ.**

Ortiz, E., and Clancy, C.M. (2003, April). "Use of information technology to improve the quality of health care in the United States." *Health Services Research* 38(2), pp. xi-xxii.

As early as 1969, AHRQ funded its first project in medical informatics. Since then, the Agency has continued to support information technology (IT) research and development projects to improve health care, awarding $250 million to fund more than 150 projects in medical informatics. Currently funded Clinical Informatics to Promote Patient Safety (CLIPS) projects range from use of a real-time, point-of-care, handheld computerized decision support module used in the treatment of attention-deficit/hyperactivity disorder in children to a project that explores the relationship between human, machine, and environmental factors associated with the operation of infusion devices (e.g., intravenous pumps) in clinical settings.

AHRQ's Integrated Delivery System Research Network comprises nine partners that provide health care services to more than 55 million people and is an ideal way to study how IT can improve health care in diverse settings. For example, two network partners are studying how automated electronic reminders affect compliance with recommended guidelines for managing patients with diabetes.

Many of AHRQ's 36 Primary Care Practice-Based Research Networks (PBRNs) received recent awards to support their IT infrastructure and to evaluate ways of using IT to improve patient safety, quality of care, and bioterrorism preparedness. For instance, one PBRN is testing an Internet-based communication, surveillance, and data management system to enhance linkages between community practices, State health departments, and the State Epidemiological and Bioterrorism Surveillance System.

In its 13 new projects, AHRQ's Translating Research into Practice (TRIP) program emphasizes the use of IT as a key strategy for translating research findings into practice and improving quality of care. For instance, one group of investigators is using an interactive, multimedia computer program to improve diabetes-related knowledge, attitudes, self-efficacy, and compliance with self-care recommendations in clinics serving predominantly black and Hispanic patients. The Agency is also developing a variety of strategic partnerships to develop IT solutions that improve medical care.

Reprints (AHRQ Publication No. 03-R044) are available from AHRQ.**

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Quality improvement

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Buller-Close, K., Schriger, D.L., Baraff, L.J., and others. (2003, May). "Heterogeneous effect of an emergency department expert charting system." ***Annals of Emergency Medicine*** **41(5), pp. 644-652.**

This study found that an electronic medical record, which provides real-time advice based on clinical guidelines embedded in the software, can improve emergency department (ED) care documentation, patient care, and patient satisfaction. The researchers compared the impact on documentation, patient care, and patient satisfaction of three different modules of the Emergency Department Expert Charting system: occupational exposure to blood and body fluids, low back pain, and fever in children younger than age 3 in a university hospital ED.

Documentation of care improved significantly for all three complaint areas with use of the expert charting system. The expert system consistently improved the appropriateness of diagnostic testing and treatment decisions for patients with occupational exposure to blood and body fluids, while decreasing median charges by $103. The low back pain and fever in children modules had less consistent improvements in appropriateness of testing and treatment and did not result in a decrease in charges.

Although 60 percent of physicians believed that the occupational exposure module surpassed standard care in ensuring that the correct tests and treatments were provided, only 31 percent felt that way for low back pain and 22 percent for fever in children. Physicians most used and were most satisfied with the occupational exposure module and least satisfied with the fever in children module. For all complaints, mean patient satisfaction was highest during use of the expert charting system.

In conclusion, the researchers note that the effect of the guideline/computer system varies with the complaint. They caution that "one size does not fit all" when it comes to modifying physician behavior. In other words, there is no one way to improve and/or standardize care. Instead, each clinical situation requires specific engineering that considers the clinical setting, the types of providers, and the clinical problem being addressed. ■

Outcomes/Effectiveness Research

Hospital type and experience affect outcomes of children who undergo tracheotomy

Pediatric tracheotomy is a relatively infrequent procedure performed most often on young children who have chronic airway obstruction caused by congenital anomalies or pulmonary disorders or on adolescents with injuries. Children who undergo tracheotomy in a children's hospital have half the risk of dying during their hospital stay compared with children who are cared for in a non-children's hospital, according to a study supported in part by the Agency for Healthcare Research and Quality (K08 HS00002). The study was conducted by researchers at the University of Washington, Seattle, and the Children's Hospital and Regional Medical Center, also in Seattle.

The researchers also found that children cared for in children's hospitals or in teaching hospitals were significantly less likely to be discharged to a long-term care facility, perhaps because these hospitals have more resources or place greater emphasis on discharge coordination and planning than other hospitals. Also, hospitals that performed more pediatric tracheotomies had significantly lower mortality rates than hospitals that performed fewer of these surgeries. The mean length of hospital stay for children undergoing tracheotomy was 50 days, with a mean total hospital charge exceeding $200,000.

Finally, more of these surgeries were performed in the Northeast (7.5 tracheotomy-related discharges per 100,000 child-years) than in other parts of the country. These regional differences suggest that factors aside from the children's health status may be affecting the surgery decision, according to the researchers. They examined tracheotomy rates and patient outcomes using hospital discharge records from all pediatric tracheotomy admissions in 22 States in 1997. The 2,065 tracheotomy procedures recorded in the Healthcare Cost and Utilization Project Kids' Inpatient Database yielded a national estimate of 4,861 tracheotomies performed that year.

See "Tracheotomy in pediatric patients: A national perspective," by Charlotte W. Lewis, M.D., M.P.H., Jeffrey D. Carron, M.D., Jonathan A. Perkins, D.O., and others, in the May 2003 *Archives of Otolaryngology and Head and Neck Surgery* 129, pp. 523-529. ■

Delaying the urge to push during second-stage labor offers no benefit for women who receive low-dose epidural analgesia

There is an ongoing debate about optimal management of the second stage of labor in women who are given epidural analgesia. Women who receive epidural analgesia and concomitant sensory blockade may not feel a strong urge to push upon reaching the second stage of labor. Thus, some doctors believe that these women should begin pushing immediately upon reaching complete cervical dilation to decrease the length of the second stage and the potential for infection. Other doctors argue that waiting for a strong urge to push maximizes the efficiency of pushing efforts and reduces the risk of maternal exhaustion and delivery by cesarean section.

According to a recent study supported by the Agency for Healthcare Research and Quality (National Research Service Award training grant T32 HS00078), women giving birth for the first time who receive low-concentration epidural analgesia do not benefit from delaying pushing efforts until there is a strong urge to push. Such a delay did not reduce the duration of pushing in the second stage of labor or increase maternal satisfaction, explains lead author, Beth A. Plunkett, M.D., of Northwestern University. Dr. Plunkett and her colleagues randomly assigned women at one hospital giving birth for the first time who received low-dose, continuous epidural analgesia (0.0625 percent bupivacaine with fentanyl 2 ng/mL) to either pushing immediately upon complete cervical dilation (85 women) or waiting for a strong urge to push (117 women).

Women who delayed pushing (typically by a clinically insignificant 10 minutes) had a strong urge to push and a longer second stage than women who pushed immediately, and they spent a similar amount of time pushing (median of 57 versus 62 minutes). There were no significant differences in median level of satisfaction or in the overall rates of cesarean delivery (6 vs. 12 percent), cesarean delivery during the second stage (2 percent in each group), spontaneous vaginal delivery (70 vs. 69 percent), or neonatal or maternal problems.

See "Management of the second stage of labor in nulliparas with continuous epidural analgesia," by Dr. Plunkett, Alex Lin, M.D., Cynthia A. Wong, M.D., and others, in the July 2003 *Obstetrics & Gynecology* 102(1), pp. 109-114. ■

Nearly one-third of hip fracture patients are readmitted to the hospital within 6 months, usually for nonsurgical problems

Coincident with shorter hospital stays, more patients who have undergone hip fracture repair surgery are discharged with active clinical problems that some are concerned may lead to hospital readmission. This concern may be well placed, suggest Kenneth S. Boockvar, M.D., M.S., and Ethan A. Halm, M.D., M.P.H., of the Mount Sinai School of Medicine.

In a recent study, they and their colleagues found that nearly one-third of hip fracture patients were readmitted to the hospital within 6 months after fracture. Most (89 percent) hospital readmissions were for nonsurgical problems, of which infections (21 percent), including pneumonia, and cardiac problems (12 percent) were the most common.

Patients who were readmitted were nearly three times as likely to require total assistance with walking at 6 months and four times as likely to die as hip fracture patients who did not have to be readmitted. Initial discharge location had no significant influence on risk of readmission. Patients discharged home had readmission rates similar to those of patients discharged to a nursing facility or rehabilitation hospital, even after adjusting for confounding factors.

Surgical complications caused 11 percent of readmissions during the 6-month period. Preventing medical and surgical problems that require hospital readmission can help prevent functional decline, long-term nursing home residence, and death after hip fracture, note the researchers. Their findings were based on a prospective study of 562 hip fracture patients aged 50 and older discharged from four hospitals in 1997 and 1998. They used hospital admission/discharge databases, medical record review, patient self-report, and functional measures to determine readmission and the reasons for it. Their work was supported in part by the Agency for Healthcare Research and Quality (HS09973 and HS09459).

See "Hospital readmissions after hospital discharge for hip fracture: Surgical and nonsurgical causes and effect on outcomes," by Drs. Boockvar and Halm, Ann Litke, M.A., and others, in the March 2003 *Journal of the American Geriatrics Society* 51, pp. 399-403. ■

Recommended medications are underused among elderly people with diabetes

Several medications reduce complications and death from diabetes, including statins to lower cholesterol, aspirin to prevent first-time or recurrent cardiovascular disease, and angiotensin-converting enzyme (ACE) inhibitors in those with diabetic nephropathy (diabetes-related kidney disease). However, these recommended medications are underused among elderly men and women who have diabetes, especially those with low incomes, according to Arleen F. Brown, M.D., Ph.D., of the University of California, Los Angeles.

In a study that was supported in part by the Agency for Healthcare Research and Quality (National Research Service Award fellowship F32 HS00132 and HS09424), Dr. Brown and her colleagues analyzed the influence of income on recommended medication use among a random sample of 301 community-dwelling elderly Medicare beneficiaries who had diabetes and were covered by the same managed prescription drug benefit. They used telephone interviews and clinical examinations to review medication use.

Annual household income (above or below $20,000) was the primary predictor of receipt of recommended therapies. After adjustment for other patient characteristics, statin use was observed in 57 percent of higher income versus 30 percent of lower income respondents with a history of high blood lipid levels (hyperlipidemia) and 66 percent of higher income versus 29 percent of lower income respondents with a history of heart attack.

There were no differences by income in the rates of aspirin or ACE inhibitor use. Thus, overall use of recommended medications among elderly people with diabetes was low. This, plus the even lower use of more expensive medications by poorer elders with diabetes underscores the need for additional prescription drug coverage for elders who have chronic conditions, particularly low-income individuals, conclude the researchers.

See "Income-related differences in the use of evidence-based therapies in older persons with diabetes mellitus in for-profit managed care," by Dr. Brown, Amy G. Gross, Peter R. Gutierrez, M.S., and others, in the May 2003 *Journal of the American Geriatrics Society* 51, pp. 665-670. ■

Depression and anxiety affect a substantial number of elderly people living in the community

One in five elderly people living in the community is prescribed an antidepressant, antianxiety agent, or other psychotropic medication, according to a study supported by the Agency for Healthcare Research and Quality (HS10813). A second AHRQ-supported study (K02 HS00006) found that depressive symptoms further increase the risk of death among elderly people who also have poor cognitive function. Both studies are summarized here.

Aparasu, R.R., Mort, J.R., and Brandt, H. (2003). "Psychotropic prescription use by community-dwelling elderly in the United States." *Journal of the American Geriatrics Society* 51, pp. 671-677.

This study found that 19 percent of community-dwelling elderly people used psychotropic medications in 1996, primarily antidepressants and antianxiety agents. Nearly one-fourth of those who were taking psychotropic medications were taking two or more of these drugs, most frequently antidepressants (9.1 percent) followed by antianxiety agents (7.5 percent), sedatives/hypnotics (4.8 percent), antipsychotics (1.8 percent), and stimulants (0.1 percent).

Several factors were associated with psychotropic prescription use in community-dwelling elderly. These included prescription insurance, health status, sex, race, region, and education. Among these factors, only sex was significantly associated with general psychotropic use and with the use of antidepressants and antianxiety agents in the elderly.

Elderly women were more likely to use psychotropic agents than elderly men and nearly one-and-a-half times as likely to use antidepressants and antianxiety agents as elderly men. This may be due to differences between men and women in disease prevalence, health care seeking behavior, and variations in physician prescribing.

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Depression and anxiety

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These findings are based on a retrospective analysis of data on elderly community-dwelling men and women from the 1996 Medical Expenditure Panel Survey, a nationally representative sample survey of the U.S. non-institutionalized population.

Mehta, K.M., Yaffe, K., Langa, K.M., and others. (2003). "Additive effects of cognitive function and depressive symptoms on mortality in elderly community-living adults." ***Journal of Gerontology: Medical Sciences*** **58A(5), pp. 461-467.**

Poor cognitive function and depressive symptoms are common in the elderly and frequently coexist. Each one independently increases mortality in the elderly, and their effects on mortality are additive, according to this study. The researchers studied 6,301 elderly community-dwelling adults enrolled in the Asset and Health Dynamics Among the Oldest Old (AHEAD) study conducted from 1993 to 1995. They measured cognitive function and depressive symptoms and divided participants into three groups representing the best, middle, and worst scores. They also assessed mortality rates.

After adjustment for confounding factors, elderly people with the worst function on both measures had three times greater risk of death than those with the best function on both measures. Among the elderly with the best cognitive function, mortality rates were 3, 5, and 9 percent in those with low, middle, and high depressive symptoms, respectively. The corresponding rates were 6, 7, and 12 percent for elderly with the middle level of cognitive function, and 10, 13, and 16 percent in participants with the worst level of cognitive function. This finding highlights the need to consider both of these measures of mental well being as important indicators of vulnerability in community-dwelling elderly people. ■

Researchers examine functional decline among the frail elderly

Physiological markers of illness, such as laboratory values and vital signs, generally improve and often normalize during hospitalization among elderly patients. However, functional measures often fail to improve and frequently worsen. Similarly, frail older people, whose end-of-life course is often complicated by multiple chronic diseases, may steadily decline in function. The following two studies, which were supported in part by the Agency for Healthcare Research and Quality (K02 HS00006), and led by Kenneth E. Covinsky, M.D., M.P.H., of the San Francisco VA Medical Center, examined functional decline among frail older people.

Covinsky, K.E., Palmer, R.M., Fortinsky, R.H., and others. (2003, April). "Loss of independence in activities of daily living in older adults hospitalized with medical illnesses: Increased vulnerability with age." ***Journal of the American Geriatrics Association*** **51, pp. 451-458.**

This study highlights the need for clinicians to closely monitor the functional status of hospitalized seniors, especially the oldest patients. More than half of elderly patients hospitalized for medical illnesses find it difficult to carry out activities of daily living (ADLs) such as bathing and dressing. In this study, by the time of discharge, more than one-third of elderly patients had worse ADL function than they did 2 weeks before hospital admission. This rate of functional decline had a striking relationship with age, with declining ADL functioning exceeding 50 percent among patients aged 85 and older. The oldest frail elderly were less likely to recover function lost before hospital admission and were more likely to develop new functional deficits during hospitalization.

More studies are needed to see if hospital functional decline can be reversed through rehabilitation and other interventions, suggest the researchers. For this study, they prospectively examined functional outcomes among 2,293 patients aged 70 and older. They interviewed the patients about their independence in five ADLs: bathing; dressing; eating; transferring, for example, from bed to chair; and toileting, 2 weeks before admission (baseline), at admission, and at discharge.

Overall, 35 percent of patients declined in their ability to perform these daily tasks between baseline and hospital discharge. The frequency of ADL decline between baseline and discharge varied markedly with age (23, 28, 38, 50, and 63 percent in patients aged 70-74, 75-79, 80-84, 85-89, and 90 and older, respectively). Among patients who declined in functioning before admission, those aged 90 years and older were twice as likely to fail to recover ADL function during hospitalization as those aged 70-74. Patients aged 90 and older who did not decline before admission were over three

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Functional decline

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times as likely to develop new losses of ADL function during hospitalization as those aged 70-74.

Covinsky, K.E., Eng, C., Lui, L., and others. (2003, April). "The last 2 years of life: Functional trajectories of frail older people." ***Journal of the American Geriatrics Society*** **51, pp. 492-498.**

According to this study, elderly patients with advanced frailty experience a slowly progressive functional decline during the year before death, with only a slight acceleration in functional loss as death approaches. There usually are no abrupt changes in function that signal the onset of a terminal phase among the frail elderly. Thus, end-of-life care systems such as the Medicare hospice benefit, are poorly suited to older people dying with progressive frailty. The Medicare hospice benefit requires physicians to certify that patients have an estimated prognosis of less than 6 months and, in practice, often requires patients to make an either/or choice between life-prolonging or comfort care.

Such a benefit is particularly suited to patients whose course clearly demarcates a point in time when death is nearing, for example, patients with lung cancer. It is less well suited for the majority of older people, whose cause of death is often related to the insidious progression of multiple illnesses and dementia, note the researchers. They examined the functional trajectories over the last 2 years of life of 917 patients who died while enrolled in the Program of All-inclusive Care (PACE) for the elderly. They collected data at PACE entry and every 3 months thereafter on the degree of dependence in bathing, eating, and walking and the degree of incontinence.

Rates of functional impairment were high in patients without cognitive impairment during the 3 months prior to death (93 percent for bathing, 40 percent for eating, 69 percent for mobility, and 49 percent for continence). Cognitively impaired patients were more likely than non-cognitively impaired patients to have the maximal level of dependence in the 0-3-month window before death (for example, 56 vs. 30 percent for mobility) and were more likely to decline in the 2 years before death (56 vs. 36 percent for mobility). ■

Unsteadiness and falls often lead to hip fracture and subsequent functional decline in the elderly

Weakened bones, gait imbalance, and use of multiple medications predispose many elderly people to unsteadiness, falls, and hip fracture. These individuals often end up in the hospital to undergo total hip replacement surgery, and many decline in functioning while in the hospital. Three recent studies on these issues that were supported in part by the Agency for Healthcare Research and Quality are described here.

Mahomed, N.N., Barrett, J.A., Katz, J.N., and others. (2003, January). "Rates and outcomes of primary and revision total hip replacement in the United States Medicare population." (AHRQ grant HS09775). ***Journal of Bone and Joint Surgery*** **85A, pp. 27-32.**

These investigators used 1995 and 1996 Medicare claims data to identify 61,568 patients who had total hip replacement for a reason other than a fracture and those who had revision total hip replacement (13,483 patients). They examined the association between patient characteristics and surgical rates with rate of occurrence of five complications within 90 days of surgery. They adjusted for hospital and surgeon volume, which have been shown to affect patient surgical outcomes.

The rates of primary total hip replacement were three to six times higher than the rates of revision total hip replacement. The rates of both primary and revision total hip replacement increased with age until the age of 75 to 79 years and then declined. Rates were higher for women, whites, and individuals with higher income than for men, blacks, and those with lower income. The overall rates of adverse outcomes were relatively low, but except for pulmonary embolism, they were at least twice as common after revision than after primary total hip replacement.

Ninety-day postoperative complication rates after primary total hip replacement versus revision surgery were 1 vs. 2.6 percent for mortality, 0.9 vs. 0.8 percent for pulmonary embolus, 0.2 vs. 0.95 percent for wound infection, 4.6 vs. 10 percent for hospital readmission, and 3.1 vs. 8.4 percent for hip dislocation. Elderly people who were older, male, black, or low-income, and those who had other medical conditions were at greater risk than other elderly patients of having adverse outcomes.

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Hip fractures in the elderly

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Morrison, R.S., Magaziner, J., Gilbert, M., and others. (2003). "Relationship between pain and opioid analgesics on the development of delirium following hip fracture." (AHRQ grant HS09459). *Journal of Gerontology* 58A, pp. 76-81.

From 13 to 61 percent of hip fracture patients develop delirium which, in turn, slows their recovery rate and reduces functioning after surgery. Undertreated pain and inadequate analgesia appear to be risk factors for delirium in frail older adults, concludes this study. The researchers found that avoiding opioids or using very low doses of opioids increased the risk of delirium among elderly hip fracture patients. Cognitively intact patients with undertreated pain were nine times more likely to develop delirium than patients whose pain was adequately treated.

A major barrier to the treatment of pain in older adults has been the fear that opioids cause delirium. But this study found that, with the exception of meperidine, opioids did not precipitate delirium in patients with acute pain. Patients at risk for developing delirium can be identified at hospital admission using a few risk factors, such as elevated blood pressure or congestive heart failure, note the researchers. They studied 542 patients from four hospitals with hip fracture and without delirium; 16 percent of the patients became delirious.

Lindenberger, E.C., Landefeld, C.S., Sands, L.P., and others. (2003). "Unsteadiness reported by older hospitalized patients predicts functional decline." (AHRQ grant K02 HS00006). *Journal of the American Geriatrics Society* 51, pp. 621-626.

Unsteadiness, a common complaint among older men and women with dizziness, has been associated with increased falls and restricted activity. Asking elderly patients a simple question about their steadiness when they are admitted to the hospital can identify those who are more likely to decline in their ability to carry out activities of daily living (ADLs), such as bathing and dressing, while in the hospital, according to this study. Targeting these at-risk patients early during hospitalization could lead to interventions aimed at improving functional outcomes, suggest the researchers. They studied 1,557 elderly hospitalized medical patients at two hospitals.

The researchers asked the patients to report their steadiness walking and whether they could independently perform each of five basic ADLS at two points in time—at baseline (2 weeks prior to admission) and at admission—to determine decline in ADL function prior to admission. Overall, 25 percent of patients were very unsteady at admission; 22 percent of very unsteady patients declined in ADL functioning during hospitalization compared with 17 percent, 18 percent, and 10 percent for slightly unsteady, slightly steady, and very steady patients, respectively.

After adjusting for other factors such as age and coexisting illness, unsteadiness remained significantly associated with ADL decline. Those who were very unsteady had 2.6 times the likelihood of functional decline during their hospital stay than the very steady. Also, 44 percent of very unsteady patients failed to recover preadmission functioning compared with 35 percent, 36 percent, and 33 percent for each successively higher level of steadiness, respectively. ■

Health Care Access/Use

Heavy users of the ER are usually socioeconomically disadvantaged and have significant health problems

Increased patient volume and more severely ill patients have led to overcrowding of U.S. emergency departments (EDs). A small group of patients account for a disproportionate number of ED visits (four or more visits). These heavy ED users are more likely to be socioeconomically disadvantaged, suffer from chronic illness, and have high use of other health services than other ED users, concludes a study by Helen R. Burstin, M.D., M.P.H., of the Agency for Healthcare Research and Quality, and colleagues.

The researchers analyzed ED intake surveys, medical charts, and telephone followup interviews with 2,333 patients with select chief complaints at five urban EDs during one month in 1995. Sociodemographic predictors of frequent ED use were being a single parent, being single or divorced, having a high school education or less, and earning less than $10,000 a year. Health predictors were hospitalization

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Heavy ER usage

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in the preceding 3 months, high ratings of psychological distress, and asthma. Predictors related to access to care included identifying an ED or a hospital clinic as the primary care site, having a primary care physician (PCP), and visiting a PCP in the past month. The sole health preference predictor was preferring the ED for free care.

Although frequent ED users were more severely ill than less frequent ED users, illness severity measures were not independently predictive of heavy ED use. Presence or type of health insurance was not a predictor of heavy ED use. Frequent visitors were no more willing to defer their ED visit for a clinic appointment or due to a required copayment than other patients. Thus, other approaches besides ED copayments and increased clinic availability will be needed to meet the unique needs of these patients in the emergency and primary care settings.

More details are in "Predictors and outcomes of frequent emergency department users," by Benjamin C. Sun, M.D., M.P.P., Dr. Burstin, and Troyen A. Brennan, M.D., J.D., M.P.H., in the April 2003 *Academic Emergency Medicine* 10, pp. 320-328. Reprints (AHRQ Publication No. 03-R038) are available from AHRQ.** ■

U.S. hospitals have become greatly overcrowded, resulting in overloaded ERs and diverted ambulances

The combination of hospital downsizing and greater emergency department (ED) use by sicker patients has led to overcrowded EDs that often have to divert ambulances to other hospitals. Several policy issues must be addressed to alleviate hospital and ED crowding over the long term, according to Robert W. Schafermeyer, M.D., F.A.C.E.P., of Carolinas Medical Center, and Brent R. Asplin, M.D., M.P.H., of the University of Minnesota School of Medicine, in a recent commentary. Dr. Asplin's work was supported by the Agency for Healthcare Research and Quality (K08 HS13007).

In response to reduced reimbursement from Medicare and Medicaid and other cost pressures, hospitals scrambled to reduce any excess supply of inpatient beds, and the number of hospitals with EDs shrunk from 6,000 to less than 4,000 over the period 1992 to 2000. Hospitals also struggled with the shortage of registered nurses (RNs), while the annual number of ED visits climbed from 90 to 108 million.

Although coastal areas have been more seriously affected than other areas, almost every State has reported problems with finding beds for patients admitted to the hospital from the ED. When an inpatient bed isn't available, or when the bed is available but there is no nurse to staff it, patients wait in the ED. This period of "boarding" in the ED can last from hours to days, and it is a major source of ED crowding.

An April 2002 American Hospital Association survey confirmed all of these trends. Overall, 62 percent of hospitals, 75 percent of urban hospitals, and 90 percent of Level I trauma centers believed they were at or over capacity. Also, one-third of hospitals had some period of time when they had to divert ambulances to other hospitals, primarily due to lack of available staffed critical care beds.

Reduced government and managed care payments, more uninsured patients, and the increased cost of malpractice insurance are all affecting access to emergency care. The authors suggest operational changes, for example, improved admission and discharge processes, and policy changes related to reimbursement and tort reform to alleviate capacity bottlenecks, reduce boarding in the ED, and eliminate ambulance diversion.

See "Hospital and emergency department crowding in the United States," by Drs. Schafermeyer and Asplin, in *Emergency Medicine* 15, pp. 22-27, 2003. ■

Factors that impede access to care and patient satisfaction are explored in three recent studies

Several new studies supported by the Agency for Healthcare Research and Quality examine issues that impede access to care or affect care satisfaction. The first AHRQ-supported study (HS11386) suggests that racial/ethnic minorities and people who have limited English proficiency face barriers to care other than financial barriers. The second AHRQ-supported study (HS10771 and HS10856) reveals that individuals who live in a community with a higher prevalence of gatekeeping—when a person must be referred to a specialist by their primary care provider—report less trust in their physicians, a factor essential to high quality health care, than individuals who live in communities with less gatekeeping activity independent of the individual's personal gatekeeping requirements. The third AHRQ-supported study (HS06167) suggests that patient satisfaction with primary care doctors is influenced by the sex of the doctor. The articles are summarized here.

Weech-Maldonado, R., Morales, L.S., Elliott, M., and others. (2003, June). "Race/ethnicity, language, and patients' assessments of care in Medicaid managed care." ***Health Services Research*** **38(3), pp. 789-808.**

These investigators examined the care assessments of 49,327 adults enrolled in Medicaid managed care plans in 14 States in 2000 using data derived from the national Consumer Assessment of Health Plans Study (CAHPS®) Benchmarking Database. Racial/ethnic minorities had lower reports of care than white English speakers, especially for timeliness of care (prompt receipt of urgent and routine care) and staff helpfulness (courtesy and respect). On the other hand, racial/ethnic minorities and those with limited English were similar to white English speakers in their ratings of health plan customer service. This pattern may have resulted from State Medicaid agency requirements that organizations address the service needs of these minority groups.

Language proficiency independently affected care experience. Among Asians, English speakers had care experiences similar to those of whites. Non-English speaking Asians had the lowest reports and ratings of care of all racial/ethnic groups studied. Similarly, among whites and Hispanics, non-English speakers had worse reports and ratings of care than either English or bilingual speakers.

These findings suggest the need to go beyond financial access to address nonfinancial barriers to care. Potential remedies include establishing interpreter services, providing staff training in cultural competency, using community health workers, and promoting culturally appropriate health care services.

Haas, J., Phillips, K.A., Baker, L.C., and others. (2003). "Is the prevalence of gatekeeping in a community associated with individual trust in medical care?" ***Medical Care*** **41, pp. 660-668.**

Many managed care plans require that the primary care doctor serve as a gatekeeper for referrals to specialists. Living in a community where there is a higher prevalence of this gatekeeping arrangement diminishes patients' trust in their primary care doctor independent of an individual's personal insurance coverage, according to this study. The researchers analyzed responses from two surveys: the Community Tracking Survey (CTS), a nationally representative survey of households in 60 communities; and the CTS Physician Survey of 10,881 direct patient care physicians in the same 60 communities. Physicians were asked about their gatekeeping role, if any. Individuals were asked about their experience with the health care system, insurance and health status, and sociodemographic characteristics.

Analysis of findings was confined to respondents with health insurance, a usual source of care, and at least one physician visit. Compared with individuals living in communities with the lowest prevalence of gatekeeping activity, those living in communities with the highest prevalence were 23 percent less likely to agree strongly that they trusted their doctor to put their medical needs above all other considerations.

A higher prevalence of gatekeeping in the community was also positively associated with the perception that a doctor was strongly influenced by insurance company rules when making decisions about medical care. Conversely, a higher prevalence of gatekeeping in the community was negatively associated with the perception that a doctor might perform an unnecessary test or procedure.

Bertakis, K.D., Franks, P., and Azari, R. (2003). "Effects of physician gender on patient satisfaction." ***Journal of the***

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Access to care

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***American Medical Women's Association* 58(2), pp. 69-75.**

Women now constitute nearly half of all first-year students entering medical school. In this study, patients of female physicians were more satisfied with their physician than patients of male physicians. This held true, even after adjusting for patient characteristics, visit length, and physician practice style behaviors. The psychosocial aspect of the physician-patient interaction may be different for male physicians. Women physicians tend to engage in more positive talk and more partnership building, provide more information, and are more psychosocially oriented. On the other hand, patients may presume female physicians are more gentle, empathetic, and nurturing and, consequently, respond with more self-disclosure and information, suggest the researchers.

They randomized 509 new adult patients to see either a male or female primary care physician at a university medical center outpatient facility. They measured the patients' health status and sociodemographic characteristics before the initial visit, and they measured satisfaction with the physician immediately following the videotaped visit. Overall, the sex of the physician was associated with a 27 percent change in satisfaction.

Female physicians spent substantially more time than male physicians on preventive services and counseling, while male physicians devoted more time to technical practice behaviors and discussions of substance abuse. The length of these initial visits did not differ significantly between male and female physicians. ■

Availability of computerized health information does not appear to affect use of medical care

The availability of computerized health information via the Internet apparently does not affect demand for medical care, according to a study supported in part by the Agency for Healthcare Research and Quality (HS09997). Todd H. Wagner, Ph.D., of the Stanford University School of Medicine, and Holly B. Jimison, Ph.D., of the Kaiser Permanente Center for Health Research, tested the effect of using computerized health information on physician visits. They determined computer information use by exposure to the Healthwise Communities Project, a community-wide health information intervention; computer ownership; and Internet access.

The researchers mailed questionnaires to random households in three cities before and after the Healthwise Communities Project. Based on the 5,909 surveys collected, use of computerized health information was not associated with self-reported entry into care or number of medical visits. More research is needed to determine whether computerized health information may affect location of care, timing of getting care, or the intensity of treatment.

See "Computerized health information and the demand for medical care," by Drs. Wagner and Jimison, in *Value in Health* 6(1), pp. 29-39, 2003. ■

Health Care Costs and Financing

Researchers examine drug expenditures and drug formularies

Prescription drug expenditures made up only 9.4 percent of total health care costs in 2000, yet spending on prescription drugs increased by more than 200 percent between 1990 and 2000, making it the most influential driver of health care spending increases. As drug costs have soared, employers have turned to pharmacy benefit management and drug formularies to try to control drug costs.

A recent study that was supported in part by the Agency for Healthcare Research and Quality (National Research Service Award training grant T32 HS00083) projected prescription drug expenditures for 2003. A second study (AHRQ grant HS10803) found that a national drug formulary can lead to sizable price and spending reductions, even for the elderly and disabled.

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Drug expenditures

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Summaries of the two studies follow.

Shah, N.D., Hoffman, J.M., Vermeulen, L.C., and others. (2003, January). "Projecting future drug expenditures, 2003." *American Journal of Health-Systems Pharmacy* 60, pp. 137-149.

These researchers forecast a 10 to 12 percent increase in hospital drug expenditures for 2003, 2 to 2.5 percent due to price inflation, 7 to 8.5 percent due to volume and patient mix factors, and 1 percent related to new drugs. They projected an increase of 13.5 to 15.5 percent in prescription drug expenditures in the outpatient setting, 3.5 to 4 percent due to price inflation, 9 to 10 percent due to volume and patient mix factors, and 1.5 percent related to new drugs.

Several factors are contributing to growing outpatient drug costs. More patients and diseases continue to be treated by medication administered at clinics. The majority of cancer treatment is performed on an outpatient basis, and high-cost antineoplastic agents are the primary reason for increased costs in this area. Although outpatient prescription drug use is expected to continue to grow, expenditure increases will be moderated by the approval of generic versions of several high-volume medications for which the patents have expired and the approval for over-the-counter dispensing of some prescription drugs, such as loratadine (Claritin, Schering-Plough).

While few blockbuster agents will be approved in 2003, the continued diffusion of extremely costly agents approved in previous years will make drug budgeting and drug expense management a challenge, note the researchers. Their projections were based on interpreting data from several large-scale studies on trends in prescription drug expenditures and cost drivers, which are published annually. The studies included prescription drug data from a sample of retail outlets, which were then weighted to reflect the entire U.S. retail market; prescription claims data on individuals in health plans served by one large group; and data on prescription drug sales in retail and nonretail settings.

Huskamp, H.A., Epstein, A.M., and Blumenthal, D. (2003, May). "The impact of a national prescription drug formulary on prices, market share, and spending: Lessons for Medicare?" *Health Affairs* 22(3), pp. 149-158.

Prescription drug formularies—a select list of covered drugs that an insurer usually obtains at discounted prices from the manufacturer—can reduce drug costs, concludes this study. The researchers found that implementation in 1997 of a national closed formulary by the Veterans Health Administration (VHA), the largest health care system in the country, effectively shifted patients toward the selected formulary drugs, achieved sizable price reductions from drug manufacturers, and greatly decreased drug spending.

Veterans and their families could obtain coverage for medications not listed on the closed formulary only if the doctor believed that the drug was clearly preferable and obtained a waiver. The researchers obtained monthly price data and aggregate spending data for each drug product in six drug classes from January 1995 through July 1999, 29 months before adoption of the formulary and 26 months after.

Overall, the VHA national formulary saved an estimated $82.4 million for the five drug classes that were closed at some point over this time period. Class closure was associated with a decrease in average spending per outpatient user of 25 percent for angiotensin converting-enzyme (ACE) inhibitors, 18 percent for alpha blockers, 8 percent for HMG-CoA reductase inhibitors, 7 percent for proton pump inhibitors, and 41 percent for H2 blockers, relative to what estimated spending per user would have been without the formulary. Calcium channel blockers, classified as preferred (their use was encouraged over other drugs in the same class) throughout the study period, were estimated to have had a spending increase associated with preferred status. ■

Managed care plans rarely deny reimbursement for hospital care

Publicized instances of managed care denials of reimbursement for hospital care generate fear and distrust when, in reality, few managed care patients ever experience a denial, according to a recent study that was supported in part by the Agency for Healthcare Research and Quality (HS10667). Researchers found that less than 1.5 percent of managed care patients hospitalized at a large teaching hospital were denied reimbursement of care. Managed care and other insurance plans use utilization review (UR) to contain care costs and improve quality.

Plan reviewers employed by insurance companies or by review companies determine if a given episode of hospital care meets the criteria of medical necessity and appropriateness and is allowable under the terms of the hospital/payer contract and the individual insurance policy. Care that meets these criteria is certified for reimbursement, explain Mary Ellen Murray, Ph.D., R.N., and Jeffrey B. Henriques, Ph.D., of the University of Wisconsin School of Nursing. They examined more than 50,000 concurrent utilization reviews completed over a 4-year period (1998-2001) at a large teaching hospital for patients enrolled in managed care plans. Throughout the study period, only 270 patients out of more than 80,000 admissions were denied reimbursement of their care.

Denial of hospital care reimbursement increased over the study period, from 0.67 percent of patients in year 1 to more than double that amount (1.43 percent) in year 4. Similarly, the number of patients with hospital days denied increased from 49 to 91. The most frequent reason given for reimbursement denial was a lack of acute-care criteria—either the patient's condition did not warrant hospitalization or care could have been given safely in another setting.

See "Denials of reimbursement for hospital care," by Drs. Murray and Henriques, in the April 2003 *Managed Care Interface*, pp. 22-27. ■

Some States with high Medicaid use of home care may be able to shift some of these visits to Medicare

Some States with high use of home care visits by Medicaid patients may have an opportunity to shift the costs of some of these visits to Medicare, according to a study supported by the Agency for Healthcare Research and Quality (HS11262 and National Research Service Award training grant T32 HS00032). Use of Medicare for home care nearly doubled between 1990 and 1996. Use of Medicaid for home care services also jumped dramatically during this period.

Instead of waiting for Medicare to pay or deny claims for home care services, as most States do, some States paid claims up front with Medicaid funds and then submitted the claims to Medicare for certain dual eligibles (patients eligible for both Medicaid and Medicare). Getting Medicare to pay for these visits has not reduced Medicaid fiscal liability to a significant extent. However, higher Medicaid home care spending was associated with a lower probability and amount of Medicare use, indicating that States may look for ways to decrease Medicaid home care use by shifting some of the burden to Medicare.

This approach might be particularly helpful when a State's overall Medicaid budget is high, and there is pressure to reduce outlays, explains Wayne L. Anderson, of the Research Triangle Institute, University of North Carolina. The researchers linked individual microlevel data from the Medicare Current Beneficiary Survey from 1992 to 1997 to State-level data on billing practices to identify the effects of those practices on Medicare home care use.

See "Medicare maximization by State Medicaid programs: Effects on Medicare home care utilization," by Wayne L. Anderson, Edward C. Norton, and William H. Dow, in the June 2003 *Medical Care Research and Review* 60(2), pp. 201-222. ■

Hospitals that increase their number of registered nurses increase their operating costs but do not decrease profits

Nursing personnel comprise about 30 to 40 percent of overall hospital full-time-equivalent (FTE) personnel and about 30 percent of a hospital's budget. It's not surprising that reducing nursing staff has been one approach used by financially strapped hospitals to improve financial performance. Yet a new study finds that increased staffing of registered nurses (RNs) does not significantly decrease a hospital's profit, even though it boosts the hospital's operating costs.

In the study supported by the Agency for Healthcare Research and Quality (HS10153), Barbara A. Mark, Ph.D., R.N. F.A.A.N., at the School of Nursing, University of North Carolina at Chapel Hill, and her colleagues analyzed data for the years 1990 through 1995 from the Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS) on 422 hospitals in 11 States. They also used data from several other sources, including the Centers for Medicare & Medicaid Services and the American Hospital Association. They used these data to develop a model to explore the impact of hospital operation and structural measures, market and population factors, hospital staffing, and quality of care, on hospital operating margin (profit) and operating expense.

A 1 percent increase in RN FTEs increased operating expenses by about 0.25 percent. However, there was no statistically significant effect of RN staffing on profit margins. At a minimum, these results call into question the idea that a route to greater profitability is through cuts in RN staffing. It may be that in hospitals with fewer RN FTEs, turnover is high, and overtime use is extensive—costs that are reduced when there are more RN FTEs. Hospitals located in markets with greater HMO penetration had decreased operating profits. Changes in quality of care had no significant effect on either costs or profits.

More details are in "Nurse staffing, quality, and financial performance," by Michael McCue, D.B.A., Dr. Mark, and David W. Harless, Ph.D., in the Summer 2003 *Journal of Health Care Finance* 29(4), pp. 54-76. ■

State and Federal health care financial policies can affect patient treatment and outcomes

Two recent studies demonstrate that State and Federal health care financial policies have an effect on the treatments patients receive and their outcomes. The studies, which are summarized here, were supported in part by the Agency for Healthcare Research and Quality.

The first study (AHRQ grant HS08395) demonstrates that Medicare physician fees influence the type of surgery offered to older women with localized breast cancer. The second study (AHRQ grant HS09325) suggests that certain New Jersey market reforms led to an increase in the mortality rate among that State's uninsured heart attack patients.

Hadley, J., Mandelblatt, J.S., Mitchell, J.M., and others. (2003, April). "Medicare breast surgery fees and treatment received by older women with localized breast cancer." ***Health Services Research*** **38(2), pp. 553-573.**

These investigators analyzed 1994 Medicare claims and physician survey data to study the impact of area-level Medicare physician fees for mastectomy (MST) and breast conserving surgery (BCS) on treatment of older women with newly diagnosed localized breast cancer. Both treatments are similarly effective. In 1994, average Medicare fees for MST and BCS were $904 and $305, respectively. Holding other fees and factors constant (for example, physician experience, region, and patient demographics), a 10 percent increase in the BCS fee increased the odds of BCS with radiation therapy (BCSRT) relative to MST by 34 percent. Similarly, a 10 percent decrease in the MST fee nearly doubled the odds of BCSRT.

These results suggest that physicians are responsive to financial incentives when the alternative procedures have clinically equivalent outcomes. However, the researchers caution that this study is nearly 10 years old, and there is growing evidence that women treated by BCS have better quality of life after surgery than those treated with MST. Also, full implementation of the Medicare fee schedule and administrative changes may affect the extent to which these estimates can be applied to current practice.

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Financial policies

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Volpp, K.G., Williams, S.V., Waldfogel, J., and others. (2003, April). "Market reform in New Jersey and the effect on mortality from acute myocardial infarction." *Health Services Research* 38(2), pp. 515-533.

The 1992 New Jersey Health Care Reform Act reduced subsidies for hospital care for the uninsured and changed hospital payment to price competition from a rate-setting system based on hospital cost. This financial policy was associated with increased mortality rates of uninsured heart attack patients in the State, according to this study.

The researchers examined patient discharge data from hospitals in New Jersey and New York from 1990 through 1996 and national data from the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS). They used these data to compare mortality and cardiac procedure rates over time between the two States for patients hospitalized for heart attack.

There were no significant differences in heart attack deaths among insured patients in New Jersey relative to New York or the national sample. However, there was a relative increase of 41 to 57 percent in heart attack deaths among uninsured patients in New Jersey after passage of New Jersey's Health Care Reform Act. The rates of expensive cardiac procedures for these patients decreased as well, which may partly explain this finding. ■

Physicians are likely to remain influential in certain areas of health policy reform

In the past, physicians set the American health care agenda, but the transformation of the U.S. health care system over the past decade has seen a decline in their influence. Insurers have gained a large control over health care, and their interests often are not the same as physicians. Also, physicians are more dependent on government reimbursement than they have ever been. Furthermore, with the proliferation of health interest groups, doctors often must fight hard to be heard.

The future role of physicians will be shaped by mastery over niches where they have the capacity and interest in leading change, assert Miriam J. Laugesen and Thomas Rice of the University of California, Los Angeles, in a recent commentary. These areas include payment policy, quality and clinical innovation, and medical education and training. For example, while the Centers for Medicare & Medicaid Services (CMS) sets the overall price for medical services, the American Medical Association has a large degree of influence over the value of the codes (multiplied by dollars to arrive at payments) listed in the Medicare Fee Schedule. The CMS has followed the AMA committee's recommendations over 90 percent of the time. The value of the codes, which has increased over time, is important because it represents about half of the final physician payment.

In the quality arena, physicians have taken the lead in the development of effectiveness research and clinical practice guidelines. Physician education and training represent another area where physicians clearly have an important role to play and which they are unlikely to cede to others. However, those who finance education (private payers and governments) are likely to extend their scrutiny of this area as a means of controlling expenditures.

See "Is the doctor in? The evolving role of organized medicine in health policy," by Miriam Laugesen and Thomas Rice, in the April 2003 *Journal of Health Politics, Policy and Law* 28, pp. 289-316. ■

Generalist physicians experienced in HIV/AIDS care can provide care comparable to that of HIV/AIDS specialists

Use of highly active antiretroviral therapy (HAART), which is recommended by national guidelines for the treatment of HIV infection and AIDS, has dramatically reduced the number of deaths from AIDS. However, these complex drug regimens require detailed knowledge of multiple side effects and drug interactions, as well as frequent monitoring and adjustments to achieve maximal benefit for the patient. The good news is that generalist physicians who develop expertise in HIV/AIDS care are able to provide care comparable to that of HIV/AIDS specialists, according to a recent study that was supported in part by the Agency for Healthcare Research and Quality (HS10227 and HS08578).

The researchers analyzed data on 1,820 patients with HIV or AIDS enrolled in the HIV Cost and Services Utilization Study (HCSUS), a nationally representative sample of people receiving care for HIV, and their 374 primary care physicians (PCPs). They examined the association of PCP specialty training and experience in the care of HIV disease with the adoption and use of HAART. They also looked at rates of HAART use at 12 months and 18 months after approval of the first HAART medication in January 1996.

Among the PCPs involved, 40 percent were formally trained in infectious diseases (ID), 38 percent were general medicine physicians with self-reported expertise in the care of HIV, and 22 percent were general medicine physicians without expertise in the care of HIV. The majority of physicians (69 percent) reported a current HIV caseload of 50 patients or more. Overall, nearly 40 percent of patients were taking HAART therapy by December 1996, and nearly 66 percent were taking it by June 1997.

After controlling for patient characteristics, there were no differences between generalist experts and ID physicians in rates of HAART use in December 1996. However, patients being treated by nonexpert general medicine physicians were less likely to be on HAART, compared with patients being treated by physicians with infectious diseases training. This difference had narrowed somewhat by June 1997, suggesting that over time, the broader physician community successfully adopted HAART therapy.

See "Physician specialization and antiretroviral therapy for HIV," by Bruce E. Landon, M.D., M.B.A., Ira B. Wilson, M.D., M.Sc., Susan E. Cohn, M.D., M.P.H., and others, in the April 2003 *Journal of General Internal Medicine* 18, pp. 233-241. ■

AHRQ focuses on translating research findings into improved patient outcomes

In a recent commentary, Carolyn M. Clancy, M.D., Director of the Agency for Healthcare Research and Quality, describes the Agency's many initiatives to translate research into practice to improve health care quality, enhance patient outcomes, and foster safe, effective, and cost-effective health care for all Americans. Dr. Clancy focuses on the continued maturation of AHRQ's mission and focus, recent achievements, new external factors that affect AHRQ's work, and emerging health care challenges that AHRQ is in a unique position to address.

AHRQ has made many investments in patient safety, including support for centers of excellence, evaluation of new applications of information technology, new knowledge regarding the organization and work processes that facilitate the best efforts of health care professionals, and assessment of unintended harms attributable to therapeutic and diagnostic interventions. Relevant research on patient safety is tested by involving individual consumers, health plans, hospitals, purchasers, and Federal partners at all stages of the research cycle, says Dr. Clancy. These

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AHRQ focus

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investments are critical to transforming health care delivery.

AHRQ's research is continuously informed by user input. For example, two research networks are made up of integrated delivery systems and primary care practitioners as a new type of "laboratory" to implement evidence-based improvements. Recent initiatives, such as AHRQ's Partnerships for Quality, build on and amplify the importance of ongoing customer involvement in research to assure rapid and broad uptake of successful efforts.

AHRQ continues to evolve through closer working relationships with other agencies in the Department of Health and Human Services and in other public sector departments, as well as professional associations, foundations, community-based organizations, and other private-sector groups. For example, AHRQ is working closely with the Centers for Medicare & Medicaid Services (CMS) to develop new modules of the Consumer Assessment of Health Plans Study (CAHPS®) to assess patients' perspectives of hospital and nursing home care.

For more details, see "Back to the future," by Dr. Clancy online in the June 25, 2003 Web issue of *Health Affairs* at www.healthaffairs.org. Reprints (AHRQ Publication No. 03-R045) are available from AHRQ.** ■

Announcements

AHRQ awards $2.1 million in grants to help clinicians promote healthy behaviors among their patients

The Robert Wood Johnson Foundation (RWJF) and the Agency for Healthcare Research and Quality have announced the first round of grants awarded through Prescription for Health, a research initiative supported by both organizations. The Robert Wood Johnson Foundation, based in Princeton, N.J., is the Nation's largest philanthropy devoted exclusively to health and health care.

The new multi-year initiative—which focuses on innovations carried out in primary care practices to tackle physical inactivity, smoking, poor diet, and risky drinking—is designed to develop effective, practical strategies that primary care providers can use to help Americans change their unhealthy behaviors.

Research shows that unhealthy behaviors account for 40 percent of premature deaths in this country. More than 46.5 million American adults continue to smoke, despite the well-known risks, while nearly 14 million adults drink too much alcohol, raising their risk for liver disease, accidents, and trauma. Over 60 percent of American adults are overweight, and nearly 40 percent are too sedentary, increasing their susceptibility to heart disease, diabetes, and high blood pressure.

In the first phase of the new program, 17 primary care practice-based research networks (PBRNs)—groups of medical practices that affiliate with each other to improve health care quality though research—received grants to design and test innovative projects to assist primary care providers (e.g., physicians, nurse practitioners, and physician assistants) in helping patients become more physically active, eat healthier foods, avoid or quit smoking, and moderate use of alcohol. Each project is expected to identify strategies that can be applied in routine primary care practice to address at least two risky behaviors.

Collaborating with RWJF on the Prescription for Health program, AHRQ and the National Institutes of Health's Office of Behavioral and Social Science Research have funded a Resource Center to expand the capacity of the PBRNs as they create the systems and infrastructure needed to develop and test new strategies. The resource center is directed by the Indiana University School of Medicine and the National Opinion Research Center.

Each of the 16-month innovation grants is funded for $125,000. A list of grantees can be found at www.prescriptionforhealth.org/grantees/index.html. The innovations include new tools, cues, and strategies that redesign primary care practice to focus on health-related behaviors. The target populations that the projects will affect are diverse with respect to age, sex, geography, race, ethnicity, socioeconomic status, and insurance status.

Examples of the innovations funded under this initiative include:

- Creation of new types of staff positions, such as community health advisors, who can link patients with specific local opportunities.

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Healthy behavior grants

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- Prescribed Web sites that give patients ways to access information, local resources, and assistance from their doctor.
- A hand-held computer (personal digital assistant, or PDA) to help clinicians tailor counseling to the particular patient they are seeing.
- Links to community resources that provide regularly scheduled counseling by phone matched to each patient's stage of adaptation.
- A PDA-based assessment of health risks for adolescents with e-mail followup.

Only PBRNs were eligible to apply for the grants, and the 17 grantees were selected from among 70 proposals. A subsequent call for proposals to be issued near the end of 2004 will solicit a second round of innovation grants, as well as further studies to test and refine promising first-round innovations.

For more information about the grant awards and the Prescription for Health program, please visit www.prescriptionforhealth.org. ■

Research Briefs

Harlow, S.D., Cohen, M. Ohmit, S.E. and others. (2003, April). "Substance use and psychotherapeutic medications: A likely contributor to menstrual disorders in women who are seropositive for human immunodeficiency virus." (Cosponsored by AHRQ, NIH, and CDC). ***American Journal of Obstetrics & Gynecology*** **188, pp. 881-886.**

Women with HIV disease commonly report irregular periods. These investigators previously reported that HIV infection per se, in the absence of advanced immunodeficiency, did not appear to have a substantial direct effect on the length of menstrual cycles in otherwise healthy women. The researchers prospectively collected the menstrual calendars for 1,075 women who were HIV seropositive or seronegative and enrolled in the Women's Interagency HIV Study (WIHS) or the HIV Epidemiology Research Study. Women who received methadone maintenance and who used injection drugs were substantially more likely to have a menstrual cycle of 90 days or longer. Women who used psychotherapeutic medications such as antidepressants nearly doubled the risk that they would have very short cycles (less than 18 days) or cycles of 90 or more days. Clinicians should consider the neuroendocrinologic effects of these medications as a potential cause of menstrual disruptions in women who have HIV infection.

Ioannidis, J.P., and Lau, J. (2003). "F-FDG PET for the diagnosis and grading of soft-tissue sarcoma: A meta-analysis." (AHRQ contract 290-97-0019) ***Journal of Nuclear Medicine*** **44(5), pp. 717-724.**

F-FDG positron emission tomography (PET) is considered a potential advance in clinical practice. It may offer information not only about the diagnosis and grading of tumors, but also the behavior of tumors, thus helping to guide therapeutic choices. This meta-analysis of studies of the diagnostic and grading performance of F-FDG PET for soft-tissue sarcoma concluded that it has very good discriminating ability in the evaluation of both primary and recurrent soft-tissue lesions. F-FDG PET may be helpful in tumor grading, but it offers inadequate discrimination between low-grade tumors and benign lesions. The meta-analysis included 15 studies with 441 soft-tissue lesions (227 malignant and 214 benign).

Kaushal, R., Shojania, K.G., and Bates, D.W. (2003, June). "Effects of computerized physician order entry and clinical decision support systems on medication safety." (AHRQ contract no. 290-97-0013) ***Archives of Internal Medicine*** **163, pp. 1409-1416.**

Computerized physician order entry (CPOE) and clinical decision support systems (CDSSs) can substantially reduce medication error rates. However, most studies have not been powered to detect differences in adverse drug events and have evaluated a small number of "homegrown" systems, concludes this study. After a thorough search of the research literature, the investigators identified five trials that met criteria for assessing CPOE and seven for assessing isolated CDSSs. Of the CPOE studies, two demonstrated a marked decrease in the serious medication error rate, one an improvement in corollary orders, one an improvement in five

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Research briefs

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prescribing behaviors, and one an improvement in nephrotoxic drug dose and frequency. Of the seven studies evaluating isolated CDSSs, three demonstrated significant improvements in antibiotic-associated medication errors or adverse drug events and one an improvement in theophylline-associated medication errors. The remaining three studies had nonsignificant results.

McCabe, M., Morgan, F., Smith, M., and others. (2003, June). "Challenges in interpreting diabetes concepts in the Navajo language." (AHRQ grant HS10637). *Diabetes Care* 26(6), pp. 1913-1914.

During development of a pamphlet on diabetes for Navajo Indians, these researchers found that they had to pay attention to cultural factors, regional language differences, and the possibility of a lack of word-for-word translation. Translators initially recorded an oral Navajo translation of the Michigan Diabetes Knowledge Test. A Navajo language expert translated the taped version back into written English and then prepared another Navajo version. The revised translation was verified with selected elderly community members, health care professionals, and others. By probing the linguistic, cultural, and regional language issues in translating an apparently simple questionnaire from English into Navajo, the translators were able to articulate approaches that can be used in explaining diabetes management in an appropriate cultural context.

Nemeth, L.S. (2003). "Implementing change for effective outcomes." (AHRQ grant HS11132). *Outcomes Management* 7(3), pp. 134-139.

This article analyzes the concept of change illustrated through a quality improvement intervention-based research project at six practice sites. The researcher disseminated clinical guidelines for cardiovascular disease and stroke prevention to various U.S. primary care practices. Ten intervention sites were offered education-related academic detailing and assistance with action planning to improve clinical practice adherence. The researcher assessed the change process underway at six practices and concluded that to implement change effectively, it is necessary to provide clear vision, leadership, and adequate time to develop followers. Coordination of activities and integration of changes in practice to promote positive outcomes are also needed for success.

Pathman, D.E., Konrad, T.R., and Agnew, C.R. (2003, Summer). "Predictive accuracy of rural physicians' stated retention plans." (AHRQ grants HS10654 and HS06544). *Journal of Rural Health* 19(3), pp. 236-244.

To test the predictive accuracy of rural physicians' stated plans to stay in a rural area, these investigators analyzed responses to a 1991 mail survey of rural physicians' retention plans and responses to a followup survey 5 to 6 years later to determine if and when respondents had moved. Predictions for individuals were moderately accurate: four of five physicians who predicted remaining at least 5 years did so; two of three who predicted remaining less than 5 years did leave before 5 years. Predictions of job changes in less than 2 years tended to be more accurate than predictions of 2 to 5 years. The researchers conclude that rural generalist physicians are moderately accurate when reporting how much longer they will remain in their jobs. This validates the use of anticipated retention in rural health workforce studies.

Terrin, N., Schmid, C.H., Lau, J., and Olkin, I. (2003). "Adjusting for publication bias in the presence of heterogeneity." (AHRQ grant HS10254). *Statistics in Medicine* 22, pp. 2113-2126.

The existence of publication bias can influence the conclusions of a meta-analysis. Some methods have been developed to deal with publication bias, but issues remain. One particular adjustment method called "trim and fill" is intuitively appealing and comprehensible by nonstatisticians. It is based on a simple and popular graphical tool called the funnel plot. These authors present a simulation study designed to evaluate the behavior of this method. They found that when the studies are heterogeneous (that is, when they estimate different effects), trim and fill may inappropriately adjust for publication bias where none exists. Thus, this approach is inappropriate for heterogeneous meta-analyses. ■

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