



RESEARCH ACTIVITIES

U.S. Department of Health and Human Services • No. 341, January 2009

Highlights

Departments

**Health Information
Technology 2**

Patient Safety and Quality . . 4

Child/Adolescent Health 6

Women's Health 7

Elderly/Long-Term Care 9

Emergency Medicine 10

Pharmaceutical Research . . 13

**Health Care Costs and
Financing 14**

Acute Care/Hospitalization . 16

Regular Features

Agency News and Notes . . . 17

Announcements 19

Research Briefs 23

**2008 Author and Subject
Index 28**

Doctor's use of e-prescribing systems linked to formulary data can boost drug cost savings

Electronic prescribing (e-prescribing) systems that allow doctors to select lower cost or generic medications could save \$845,000 per 100,000 patients per year and possibly more system-wide, according to findings from a new study. Complete use among physicians of e-prescribing system with formulary decision support could reduce prescription drug spending by up to \$3.9 million per 100,000 patients per year, according to the researchers.

Insurers, policymakers, and patients are seeking ways to control drug costs and, to encourage the use of lower cost or generic drugs, many insurers are now using lists of approved prescription drugs known as formularies. Under these arrangements, patients are often charged the lowest co-payment for generic medications (tier 1), a higher sum for preferred brand-name drugs (tier 2) and the highest amount for nonpreferred brand-name drugs (tier 3). However, a major challenge to doctors' widespread use of tiered systems is the lack of current data on insurers' prescription drug formularies at the time of prescribing. Providing doctors with current lists of approved medications is

challenging because the information changes frequently.

To test the cost-savings potential of an e-prescribing system that includes data on insurers' formularies, researchers at Brigham and Women's Hospital and Massachusetts General Hospital in Boston compared the change in prescriptions written in three formulary tiers before and after an e-prescribing system was launched. The study examined data collected over 18 months from two major Massachusetts health insurers covering 1.5 million patients.

Doctors using e-prescribing with formulary decision support, which accounted for more than 200,000 filled prescriptions in the study, increased their use of generic prescriptions by 3.3 percent. These changes were above and beyond the increased use of generics that occurred among all doctors and the already high rate of generic drug use in Massachusetts. Based on average costs for private insurers, study authors estimate that the use of e-prescribing could save \$845,000 per 100,000 patients per year and generate even higher savings with greater use.

continued on page 2

E-prescribing

continued from page 1

Researchers found that the doctors who wrote electronic prescriptions were slightly younger and more likely to be female than those who did not. In addition, internists, pediatricians, and family physicians made up nearly three-fourths of those who used e-prescribing. Of the 17.4 million prescriptions filled over the course of the study, about 212,000 were prescribed electronically. This study was funded in part by the Agency for Healthcare Research and Quality (AHRQ) (HS15175).

See “Effect of Electronic Prescribing with Formulary Decision Support on Medication Use and Cost,” by Michael A. Fischer, M.D., M.S., Christine Vogeli, Ph.D., Margaret Stedman, M.P.H., and others in the December 8, 2008 *Archives of Internal Medicine* 168(22), pp. 2433-2439.

Editor’s note: The health information technology (health IT) initiative at AHRQ is part of the Nation’s strategy to use health IT to work in health care. This strategy includes programs across the Department of Health and Human Services such as the Medicare Improvements for Patients and

Providers Act of 2008, which, beginning in January 2009, provides up to a 2 percent payment incentive for clinicians enrolled in Medicare to use electronic prescriptions. Since 2004, AHRQ has invested more than \$260 million in contracts and grants to more than 150 communities, hospitals, providers, and health care systems in 48 States to develop knowledge about and encourage adoption of health IT practices that improve quality. More information on AHRQ’s e-prescribing projects and reports can be found at <http://healthit.ahrq.gov>. ■

Health Information Technology

Community pharmacists and technicians are mostly satisfied with e-prescribing

Electronic prescribing, or e-prescribing, promises many potential benefits to physicians, pharmacists, and patients. It can reduce the incidence of prescribing errors by pointing out possible drug interactions, reduce time spent deciphering and

transcribing handwritten prescriptions into the pharmacy computer system, and allow prescriptions to be filled as patients are en route to the pharmacy.

Researchers analyzed responses from 1,094 surveys that pharmacy staff completed at 276 chain

pharmacies in six States between April and July 2006. Technicians (55.3 percent) most often completed the survey, and pharmacists (40.8 percent) were the second largest group of respondents. The researchers

continued on page 3

Research Activities is a digest of research findings that have been produced with support from the Agency for Healthcare Research and Quality. *Research Activities* is published by AHRQ’s Office of Communications and Knowledge Transfer. The information in *Research Activities* is intended to contribute to the policymaking process, not to make policy. The views expressed herein do not necessarily represent the views or policies of the Agency for Healthcare Research and Quality, the Public Health Service, or the Department of Health and Human Services. For further information, contact:

AHRQ
Office of Communications
and Knowledge Transfer
540 Gaither Road
Rockville, MD 20850
(301) 427-1360

Barbara L. Kass, MPH, CHES
Managing Editor

Gail Makulowich
Assistant Managing Editor
Mark Stanton, Karen Fleming-Michael,
David Lewin
Contributing Editors
Joel Boches
Design and Production
Karen Migdail
Media Inquiries

Also in this issue:

Safety culture and intensive care units, see page 5

Antibiotic recommendations and consumer Web sites, see page 7

Flu and pneumonia vaccines rates among the elderly, see page 10

Emergency surgery and retained surgical sponges, see page 15

Reducing medical fatigue-related errors, see page 19

Community pharmacists

continued from page 2

conclude that pharmacists were generally satisfied with their e-prescribing systems and preferred them to hand-written prescriptions that can lead to pharmacists misinterpreting physicians' intent. Pharmacy staff also indicated they preferred e-prescribing's efficiency compared to more time-consuming hand-written or telephone prescriptions.

Pharmacists typically rated e-prescribing slightly more favorably than pharmacy technicians on a five-point scale for categories such as the effect e-prescribing has on patient safety (pharmacists' score 3.92 versus technicians' score 3.71)

and its efficiency (3.91 versus 3.66). However, pharmacists gave lower scores, ranging from 3.33 to 3.43, for e-prescribing's effect on communication and relationships with both patients and physicians.

Those surveyed also provided 2,235 written comments, of which 57 percent addressed challenging features to e-prescribing. These included prescribing errors, in which the clinician prescribed the wrong drug or gave incorrect directions, and patients arriving at the pharmacy before the pharmacy received or filled their prescription. Positive written comments remarked on improved legibility and speed to process the prescription.

The researchers provide best-practice recommendations for e-prescribing. These include having physicians personally enter the data or check their staff members' work before sending prescriptions and ensuring physicians have the error-checking features of their software enabled to prevent medication errors. This study was funded by the Agency for Healthcare Research and Quality (HS16394).

See "Evaluation of e-prescribing in chain community pharmacy: Best-practice recommendations," by Michael T. Rupp, Ph.D., B.Pharm., and Terri L. Warholak, Ph.D., B.Pharm., in the May/June 2008 *Journal of the American Pharmacists Association* 48(3), pp. 364-370. ■

New clinical decision support system eliminates many grievances about their usefulness

When clinical decision support systems (CDSS) are coupled with electronic medical records, they are supposed to help clinicians make decisions about how to best treat patients. Complaints about current CDSS are numerous, however. For example, CDSS are not thoughtfully integrated with clinicians' workflow and reminders can be interruptive, for example, by using pop-up messages. When a laboratory test is recommended, CDSS often do not link the recommendation to an order for that test, necessitating that the clinician take additional steps to complete the order.

Researchers helped create a documentation-based CDSS, called "Smart Form," to address these shortfalls. Conducting focus groups before and during system development, the team hoped to increase documentation of coded information for patient encounters and raise compliance with evidence-based care management goals for two chronic diseases, coronary artery disease and diabetes mellitus.

The Smart Form is presented as an alternative way to document a visit note. It uses rule-based logic to integrate clinical and patient data to generate guidelines for care. The system suggests medications and laboratory tests, makes appointments and referrals, and prints patient education materials. If the clinician

accepts a recommendation for a medication or lab test, the system puts the order in the system (e.g., prints the prescription), updates the medical record, and allows the action to be documented in the visit note with one mouse-click. The Smart Form uses suggested orders, not interruptions, to make recommendations during the clinician's work flow. It documents outpatient visit notes, whether or not all the patient's problems are part of the CDSS logic, and it provides decision support for multiple problems.

At first glance, the Smart Form system appears complicated. Users require training and practice to use it effectively. However, because of its benefits, the authors report that users have found the system to be a worthwhile asset. And for some users, the time of writing a note may be the best time to receive and act on decision support. This work was funded in part by the Agency for Healthcare Research and Quality (HS15169 and HS14563).

See "'Smart Forms' in an electronic medical record: Documentation-based clinical decision support to improve disease management," by Jeffery L. Schnipper, M.D., M.P.H., Jeffery A. Linder, M.D., M.P.H., Matvey B. Palchuk, M.D., M.S., and others in the July/August 2008 *Journal of the American Medical Informatics Association* 15(4), pp. 513-523. ■

Rates of adverse medical events and motor vehicle incidents are unchanged among U.S. resident pediatric physicians despite duty hour limit standards

A new study comparing medical errors, motor vehicle crashes, and other problems associated with sleep deprivation among pediatric residents found little change in these problems after implementation of new limits on duty hours issued in 2003 by the Accreditation Council for Graduate Medical Education (ACGME). Christopher P. Landrigan, M.D., M.P.H., of Harvard Medical School, and colleagues, conducted the study in three major teaching hospitals and conclude that stricter limitations on duty hours, similar to those in place in Europe (where shifts are limited to 13 consecutive hours and a total of 48 to 56 hours per week) are needed to improve both patient and resident safety.

The ACGME duty hour standards limit extended duty shifts for resident physicians to no more than 30 hours and no more than 80 to 88 hours per week, averaged over 4 weeks. Before implementation of the standards, residents frequently worked more than 30 hours in a row and more than 80 hours per week on rotations at the

participating hospitals. However, the researchers found that the mean duration of extended work shifts decreased by only 3 percent, from 29.3 hours before implementation of the standards to 28.5 hours afterwards. Prior to implementing the ACGME standards, 81 percent of residents reported working shifts exceeding 30 consecutive hours. After implementation, over half (56 percent) continued to work shifts of more than 30 hours.

The researchers found no significant change in total medication error rates, from 1.29 errors per 100 orders before implementing the new work limits to 1.50 errors per 100 orders afterwards. The total rate of adverse events did not change (from 0.16 adverse events per 100 orders before the new rules to 0.17 afterwards). Rates of near-miss motor vehicle collisions, actual motor vehicle collisions, direct exposure to blood or another bodily fluid (often due to fatigue-related errors), and self-reported medical errors did not differ significantly before and after the implementation

of the guidelines. Finally, rates of depression on a validated survey did not differ before and after the change in duty hour rules, but rates of burnout dropped significantly, from 75 percent to 57 percent. The study was funded in part by the Agency for Healthcare Research and Quality (HS13333).

More details are in “Effects of the Accreditation Council for Graduate Medical Education duty hour limits on sleep, work hours and safety,” by Dr. Landrigan, Amy M. Fahrenkopf, M.D., M.P.H., Daniel Lewin, Ph.D., and others in the August 2008 *Pediatrics* 122(2), pp. 250-258.

Editor’s note: The Institute of Medicine recently released *Resident Duty Hours: Enhancing Sleep, Supervision, and Safety*, which confirms that acute and chronically fatigued residents are more likely to make mistakes and recommends changes to the existing work-hour limits. The report is the result of a 15-month study funded by AHRQ. For additional details, see page 19. ■

Visit the AHRQ Patient Safety Network Web Site

AHRQ’s national Web site—the AHRQ Patient Safety Network, or AHRQ PSNet—continues to be a valuable gateway to resources for improving patient safety and preventing medical errors and is the first comprehensive effort to help health care providers, administrators, and consumers learn about all aspects of patient safety. The Web site includes summaries of tools and findings related to patient safety research, information on upcoming meetings and conferences, and annotated links to articles, books, and reports. Readers can customize the site around their unique interests and needs through the Web site’s unique “My PSNet” feature. To visit the AHRQ PSNet Web site, go to <http://psnet.ahrq.gov/>.

Statewide collaborative effort to improve patient safety in intensive care units greatly enhanced unit safety culture

A collaborative quality improvement (QI) project, the Keystone Intensive Care Unit (ICU) Project, implemented in ICUs in Michigan hospitals, substantially enhanced ICU safety culture in that State, according to a new study. Of 99 ICUs, 72 participated in baseline (2004) and followup (2005) data. These ICUs had to assemble a QI team, and ensure that the ICU physician and nurse would commit 20 percent of their time to the project. Each team committed to implementing specific evidence-based patient safety interventions to reduce catheter-related blood stream infections (CRBSIs) and ventilator-associated pneumonia (VAP) among patients on artificial ventilation. Also, each ICU was to improve teamwork climate scores by at least 10 points on a 100-point scale or maintain a score of at least 60 percent of ICU caregivers reporting good teamwork.

Peter J. Pronovost, M.D., Ph.D., F.C.C.M., of Johns Hopkins University, and colleagues at the Michigan Health & Hospital Association found that teamwork climate varied significantly among ICUs at baseline from 16 to 92 percent of caregivers in an ICU reporting

good teamwork climate. Good teamwork was reported by 17 percent of ICUs in 2004, but rose to 46 percent in 2005. All teamwork climate scores were significantly higher in the ICUs that increased 10 points. Nurse input, conflict resolution, and nurse-physician teamwork scores were significantly lower in ICUs that decreased by 10 points.

In the 44 ICUs that collected data on use of several evidence-based interventions in ventilated patients, adherence to the interventions ranged from a mean of 25 percent for maintaining glucose at 110mg/dL or less to 89 percent for stress ulcer prophylaxis. Use of the antiseptic chlorhexadine, routinely available in ICU central line kits, increased from 20 percent at project launch to 60 percent after a letter was mailed to ICU leaders. The study was funded in part by the Agency for Healthcare Research and Quality (HS14246).

More details are in “Improving patient safety in intensive care units in Michigan,” by Dr. Pronovost, Sean M. Berenholtz, M.D., M.H.S., Christine Goeschel, R.N., M.P.A., M.P.S., and others, in the *Journal of Critical Care* 23, pp. 207-221, 2008. ■

Patients reveal adverse events in the hospital that are not documented in the medical records

Hospitalized patients report many adverse events—some serious and preventable—that are not documented in the medical record, reveals a new study. A team of researchers randomly surveyed adults who were hospitalized in 2003 in Massachusetts hospitals about their experience of adverse events during hospitalization. The team also examined adverse events documented in the patients’ medical records. They looked at 18 types of events ranging from hospital-acquired infections to surgical complications and adverse drug events.

Among 998 study patients, 23 percent mentioned at least 1 adverse event during their

interview, but only 11 percent had an adverse event based on medical record review. Thus, the patients revealed twice the number of adverse events as the medical records did. Agreement between medical records and interviews was somewhat better for life-threatening or serious events. Medical record review identified 11 serious preventable events (1.1 percent of patients).

Interviews identified an additional 21 serious and preventable events that were not documented in the medical records, including 12 postdischarge events and 9 postdischarge events in which symptoms occurred after the patient left the hospital. The authors

conclude that postdischarge patient surveys and medical record review are complementary ways to detect adverse hospital events that jeopardize patient safety. The study was supported by the Agency for Healthcare Research and Quality (HS11928).

See “Comparing patient-reported hospital adverse events with medical record review: Do patients know something that hospitals do not?” by Joel S. Weissman, Ph.D., Eric C. Schneider, M.D., M.Sc., Saul N. Weingart, M.D., Ph.D., and others, in the July 2008 *Annals of Internal Medicine* 149(2), pp. 100-108. ■

Immunization of infants with pneumococcal conjugate vaccine has wide preventive effects

The introduction of a seven-valent pneumococcal conjugate vaccine (PCV7), a vaccine against seven serotypes of the bacterium *S. pneumoniae*, has had dramatic effects on a variety of diseases caused by this bacterium, according to a new literature review by researchers at Vanderbilt University School of Medicine. *S. pneumoniae* is a frequent cause of dangerous blood infections, meningitis, pneumonia, and otitis media worldwide.

Administration of PCV7 to young children began in the United States in the year 2000, after the vaccine was licensed by the Food and Drug Administration (FDA). The uptake of the vaccine was fast and by the end of 2005, approximately 87 percent of U.S. children between aged 19 to 35 months had received three or more doses of PCV7.

From 1998 to 2003, rates of invasive pneumococcal diseases in children less than 5 years old declined 75 percent. Furthermore, a 42 percent reduction in rates of invasive disease among infants under 2 months old (too young to be immunized), suggested indirect protection or “herd immunity” derived from immunization of older children. Similar declines in rates of invasive pneumococcal disease have been consistently observed in older age groups for whom PCV7 was not recommended. Most serotypes covered by PCV7 were antibiotic resistant and after introduction of PCV7, there was a substantial decline in invasive disease due to nonsusceptible pneumococcal strains.

In addition, declines in rates of hospitalizations for pneumonia among children under 2 years of age (the target population of the immunization program) also declined. By the end of 2004, rates of all-cause pneumonia hospitalizations among children less 2 years old had declined by 39 percent from what would be expected based on pre-PCV7 trends. Moreover, rates of pneumonia hospitalizations declined significantly among young adults aged 18 to 39 years, suggesting indirect protection given that this age group includes parents of vaccinated young children.

Although invasive disease caused by serotypes included in PCV7 declined substantially, there was an increase in disease caused by serotypes not covered in the vaccine. However, in the general population of the United States, this increase has only modestly eroded the gains made by the vaccine. Some nonvaccine serotypes have become important pathogens and monitoring of the changes in the epidemiology of pneumococcal diseases is necessary. New pneumococcal conjugate vaccines with wider coverage are in development and are expected to further reduce the burden of pneumococcal diseases. The study was funded in part by the Agency for Healthcare Research and Quality (HS16784).

More details are in “Population-based impact of routine infant immunization with pneumococcal conjugate vaccine in the USA,” by Carlos G. Grijalva, M.D., M.P.H., and Marie R. Griffin, M.D., M.P.H., in *Expert Review of Vaccines* 7(1), pp. 83-95, 2008. ■

Doctors tend to overprescribe antibiotics for children with upper respiratory infections

Studies of antibiotic overuse often rely on physicians’ reports of patients’ diagnoses. However, physicians tend to overdiagnose children’s upper respiratory infections (URIs) caused by bacteria, reveals a new study. It found that, given clinical criteria for bacterial URIs, antibiotic overuse occurred three times more often than suggested by physician diagnosis, and was particularly obvious for

sinus infections. Targeting physician overdiagnosis may reduce antibiotic overuse, suggest Elizabeth D. Cox, M.D., Ph.D., and Saurabh Saluja, B.A., of the University of Wisconsin School of Medicine and Public Health.

They analyzed the videotapes of 66 visits for upper respiratory symptoms to determine children’s diagnoses based on clinical criteria (symptoms, physician description

of physical examination findings, and diagnostic tests), physician diagnosis, and prescribing. They then looked for agreement between the physician’s diagnosis and the criteria-based diagnosis.

The criteria-based diagnoses agreed with 100 percent of physicians’ diagnoses of streptococcal pharyngitis and 73 percent of physicians’ acute otitis

continued on page 7

Antibiotic overuse

continued from page 6

media (ear infection) diagnoses, but with only 17 percent of physicians' sinusitis diagnoses. Antibiotic overuse occurred in 11 percent of visits based on physicians' diagnoses of nonbacterial infections

(viral infections are not treatable with antibiotics), but in three times as many (32 percent) visits when criteria-based diagnoses were considered. Thus, relying on physician-reported diagnoses may mask many instances of antibiotic overuse, especially for sinusitis diagnoses, conclude the

researchers. Their study was funded by the Agency for Healthcare Research and Quality (HS13183).

See "Criteria-based diagnosis and antibiotic overuse for upper respiratory infections," by Dr. Cox and Mr. Saurabh Saluja in the July-August 2008 *Ambulatory Pediatrics* 8, pp. 250-254. ■

Less than half of consumer Web sites are updated to reflect new recommendations on antibiotic use for ear infections

Ear infections (acute otitis media, AOM) are the leading cause of antibiotic use among children in the United States. Updated recommendations for treating AOM include a "watch and wait" strategy for certain patients before prescribing antibiotics as well as a recommendation to finish the full course of antibiotics. The goal of the updates was to reduce unnecessary use of antibiotics, which has contributed to the rise in antibiotic-resistant infections. However, only 31 percent of relevant Web sites searched by the authors of this study explained the new "watch and wait" recommendation, and only 41 percent included the need to finish the full course of prescribed antibiotics; 14 percent of Web sites included both recommendations.

Doctors should be aware that patients may have unrealistic expectations about antibiotic prescriptions based on visits to Web sites and should educate them about where they can find reliable online information, recommend the study authors. They reviewed 105 relevant Web sites out of 400 found that were through search engines to determine if

consumers were likely to find the recent recommendations about use of antibiotics for AOM.

Overall, fewer than one-third of the relevant Web sites were appropriately updated in the 32 months after the new recommendations for a watch and wait option were published. Only half of these included the additional recommendation to finish the full course of antibiotics. The Web sites with the appropriate recommendations were two to three times more likely to have a listed update, to have been written or reviewed by a physician, to cite the source of the recommendation, to have a non-profit-type domain, to have an easier reading score, or to have been updated within the past year. The study was supported by the Agency for Healthcare Research and Quality (T32 HS00044).

See "Appropriate antibiotic use for acute otitis media: What consumers find using Web searches," by Margaret L. Holland, M.S., and Maria Fagnano, B.A., in the June 2008 *Clinical Pediatrics* 47(5), pp. 452-456. ■

Women's Health

Some pregnancy-related complications are minimized for women who have had weight-loss surgery

Women who undergo weight-loss surgery, known as bariatric surgery, and later become pregnant after losing weight may be at lower risk for pregnancy-related diabetes and high blood pressure—complications that can seriously affect the mother or her baby—than pregnant women

who are obese. The findings are part of an evidence review that was led by Melinda A. Maggard, M.D., M.S.H.S., of the University of California at Los Angeles, and the RAND Corporation in Santa Monica, California, and performed by the Agency for Healthcare Research and Quality's (AHRQ) Southern

California Evidence-based Practice Center at RAND (contract no. 290-02-0003). The review was based on findings from 75 studies, including 3 that compared pregnancies of nonobese women with those of obese women as well as with pregnancies of women who lost weight surgically.

continued on page 8

Weight-loss surgery

continued from page 7

In one study of laparoscopic gastric banding, a type of bariatric surgery, the authors found that none of the women who underwent surgery developed gestational diabetes or high blood pressure during their pregnancies. By comparison, 22 percent of obese pregnant women developed diabetes and 3 percent developed high blood pressure in the same study. Thirteen other studies supported these findings. Neonatal outcomes, like preterm delivery, low birth weight, and high birth weight, were also likely to be better in pregnancies of women following bariatric surgery than in pregnancies of obese women.

The evidence report also found that:

- Nutritional problems during pregnancy following two types of bariatric surgeries, gastric bypass and laparoscopic gastric band procedures, appear to be uncommon and may result from not following instructions for taking supplements. Nutritional problems appear to be more frequent and severe in mothers who undergo another bariatric

surgical procedure, biliopancreatic diversion surgery.

- There is not enough evidence to determine if having bariatric surgery affects the likelihood of needing a cesarean section to give birth.
- There is some evidence to guide a woman's decision as to how long she should wait after having bariatric surgery to become pregnant. The typical recommended time period is 1 year, which usually coincides with the period of most rapid weight loss.
- The effects of bariatric surgery on a woman's fertility have not been well studied. Studies including a small number of patients report possible improvement in the ability to conceive and deliver a child following bariatric surgery. These results, along with reports of normalization of sex hormones and menstrual irregularities, as well as improvement in polycystic ovary syndrome—a health problem that can affect a woman's ability to have children—following surgery suggest that fertility may improve.

Some pregnancy-related complications are minimized for women who have had weight-loss surgery. Adverse events following bariatric surgery are probably uncommon; their true incidence is not known and case reports tend to be the main source to date capturing such events. Bowel obstruction, which is most commonly due to internal hernia, is the more frequently reported surgical complication in pregnant women following bariatric surgery procedures. Deaths of mothers and fetuses have been reported in some of these cases. Of note, bowel obstruction also occurs in bariatric surgery patients who do not become pregnant.

Details are in “Pregnancy and fertility following bariatric surgery: A systematic review,” by Dr. Maggard, Irina Yermilov, M.D., M.P.H., Zhaoping Li, M.D., Ph.D., and others, in the November 19, 2008 *JAMA*, 300(19), pp. 2286-2296. The evidence report, *Bariatric Surgery in Women of Reproductive Age: Special Concerns for Pregnancy*, AHRQ publication no. 08-E013, is available online at www.ahrq.gov/clinic/tp/barireptp.htm. Printed copies of the report are also available from AHRQ.* ■

More women than men are hospitalized for chest pain with no known cause

Women are more likely than men to be hospitalized for chest pain for which doctors cannot find a cause, according to data from the Agency for Healthcare Research and Quality (AHRQ). In 2006, there were 477,000 admissions of women to U.S. community hospitals for unspecified chest pain compared with 379,000 admissions for men. Unspecified chest pain is usually characterized by a feeling of pressure, burning, or numbness. Although it is not clear why women receive this diagnosis more than men, there is some evidence that heart disease develops differently in women than men and that symptoms may be different. Medical experts believe

that physicians may not always be aware of this gender difference.

The data also indicate that men were more likely to be hospitalized for heart disease or heart attacks than were women in 2006. Specifically:

- Women made up 56 percent of all admissions for unspecified chest pain, but only 38 percent of all admissions for coronary artery disease.
- Roughly 451,000 women, compared with 747,000 men, were hospitalized for coronary artery disease. This disease results in narrowing of the arteries.

continued on page 9

Chest pain

continued from page 8

- Heart attacks, which are usually caused by heart disease, sent 269,000 women to hospitals, compared with 406,000 men. Women made up 40 percent of all admissions for heart attacks.
- Hospitalizations for congestive heart failure were roughly the same for women (565,000) and men (534,000).

- Hospitalizations for irregular heartbeat were also similar for women (379,000) and men (369,000).

For more information, see *HCUP Facts and Figures, 2006* (www.hcup-us.ahrq.gov/), which provides highlights of the latest data from the 2006 Nationwide Inpatient Sample, a part of AHRQ's Healthcare Cost and Utilization Project. The report provides data on leading reasons for hospitalization, such as arthritis, asthma, childbirth, cancer, diabetes, depression, and heart conditions, on procedures performed on hospital patients, and on related topics. ■

Elderly/Long-Term Care

Inpatient treatment for elderly nondementia psychiatric illnesses is shifting into less expensive settings

The elderly account for more than half of Medicare expenditures for inpatient mental health care, including nondementia psychiatric illnesses (NDPI) such as major depression, schizophrenia, and bipolar disorder. Inpatient care for NDPI is shifting into less expensive settings, notably skilled nursing facilities (SNFs), according to this study. This may reflect Medicare cost-cutting strategies, preferences for less restrictive settings, and outpatient treatment advances, suggest the researchers. Medicare pays for NDPI inpatient care in general hospital units, general hospital psychiatric units, specialized long-stay hospitals treating patients with psychiatric disorders, and SNFs.

A research team at the Center for Education and Research on Mental Health Therapeutics at Rutgers University examined length of stay and expenditures by facility type for NDPI among the elderly in 1992

and 2002. During that period, overall mean Medicare expenditures per elderly NDPI inpatient stay declined by \$2,254 (from \$8,461 to \$6,207) and covered days per stay declined by 2.8 (from 14.9 to 12.1). The number of inpatient stays with a primary NDPI diagnosis declined from 193,962 in 1992 to 183,505 in 2002, a time when use of SNF facilities for NDPI care increased.

Large portions of all inpatient NDPI stays were in psychiatric units of general hospitals, rising from 41.7 percent to 51.7 percent between 1992 and 2002. During the 10-year period, the portion of all elderly NDPI stays in general hospital beds declined from 34.5 to 27.4 percent and in long-stay units declined from 19.5 to 11.3 percent. During the same time, the number of annual elderly NDPI stays rose from 8,542 to 17,312 in SNFs, where stays are typically longer but are reimbursed at lower rates. In contrast to a decline in Medicare

reimbursement at the other three facility types, mean Medicare reimbursements to SNFs per elderly NDPI stay jumped by about \$2,000 from 1992 to 2002.

The study was supported in part by a grant from the Agency for Healthcare Research and Quality (HS16097) to the Center for Education and Research on Mental Health Therapeutics at Rutgers University. For more information on the Center for Education and Research on Therapeutics (CERTs) program, please visit <http://www.ahrq.gov/clinic/certsovr.htm>.

See "Medicare inpatient treatment of elderly non-dementia psychiatric illnesses 1992-2002; length of stay and expenditures by facility type," by Donald R. Hoover, Ph.D., Ayse Akincigil, Ph.D., Jonathan D. Prince, Ph.D., and others, in *Administration and Policy in Mental Health* 35, pp. 231-240, 2008. ■

Note: Only items marked with a single (*) asterisk are available from the AHRQ Clearinghouse. Items with a double asterisk (**) are available from the National Technical Information Service. 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.

Culturally appropriate interventions raise flu and pneumonia vaccine rates at inner-city health centers

Annual influenza vaccination of 90 percent of the elderly is a main goal of the Government's Healthy People 2010 initiative. Hispanics and blacks over age 65 receive influenza vaccine at a lower rate (45 percent and 48 percent, respectively) than do whites in the same age group (69 percent). To reduce the racial disparities and find ways to increase overall annual flu vaccination, researchers at the University of Pittsburgh undertook a 4-year trial of patients over age 50 years using proven, culturally appropriate interventions at four inner-city health centers. They compared these centers with another center that received no intervention (the control center).

The intervention centers all served predominantly minority and economically disadvantaged populations. The menu of evidence-based interventions included educational sessions for all clinical staff; standing orders for nurses to screen adults for needed vaccinations; vaccination reminders on the front of charts; hanging immunization posters in each examination room and the waiting room; playing immunization videos in the waiting room; mailing reminders to all eligible adults; establishing walk-in flu vaccine clinic hours; and a vaccination promotion contest.

Over the course of the study there were significant increases in the percentage of patients seen at the intervention centers who received annual influenza

vaccination, when compared with the control site. Over the 4-year trial, annual flu vaccination rates increased from 27 percent to 49 percent at the intervention sites, while the control site patients continued to have low rates of vaccination (20 percent). Intervention health care centers also increased their use of pneumonia vaccine from 48 percent to 81 percent in patients over the age of 65 years. No racial disparities were observed at health centers using the interventions, and increases in vaccination rates were observed among white and Hispanic patients.

Among the factors contributing to the rise in vaccination rates was input from staff and welcoming multiple viewpoints, including from minority staff on the feasibility of various strategies. The researchers note that only patients seen at the health centers for the entire period of the study were included, so the impact on transient patients could not be determined. The study was funded in part by the Agency for Healthcare Research and Quality (HS10864).

More details are in "Raising adult vaccination rates over 4 years among racially diverse patients at inner-city health centers," by Mary Patricia Nowalk, Ph.D., R.D., Richard K. Zimmerman, M.D., M.P.H., Chyongchiou Jeng Lin, Ph.D., and others, in the July 2008 *Journal of the American Geriatrics Society*, pp. 1177-1182. ■

Emergency Medicine

Emergency medicine consensus conference examines the role of health care simulation in developing clinical expertise

Simulation of medical procedures is one way to develop and improve clinical expertise. In fact, a bill is now before Congress that is designed to enhance Federal support of medical simulation initiatives nationwide. In May 2008, a conference was held in Washington, D.C., to help define future directions in simulation-based research in emergency medicine and across health care. The November 2008

issue of *Academic Emergency Medicine* 15(11) published proceedings of the 2008 Academic Emergency Medicine Consensus Conference, "The Science of Simulation in Healthcare: Defining and Developing Clinical Expertise," which was partially supported by the Agency for Healthcare Research and Quality (HS17656). The journal is available online at www3.interscience.wiley.com/

[journal/121498292/issue](http://www3.interscience.wiley.com/journal/121498292/issue). A limited number of copies of the journal (AHRQ publication no. OM-09-0021) are also available from AHRQ.*

The special issue was edited by Amy Kaji, M.D., Ph.D., of Harbor University of California Los Angeles Medical Center, and David C. Cone, M.D., of Yale University. The structure of the conference is

continued on page 11

Health care simulation

continued from page 10

outlined by the conference co-chairs, James A. Gordon, M.D. M.P.A., of Massachusetts General Hospital, and John A. Vozenilek, M.D., of Northwestern University, in the first paper of the issue, which carries the conference title. They describe the four conference consensus discussion groups, which examined individual/cognitive expertise (global provider competency), group expertise (effective teamwork and communication), technical expertise (procedural and surgical skill), and systems expertise (effective simulation at the organizational level). Following is a brief summary of the proceeding papers included in this special issue.

Vozenilek, J.A., and Gordon, J.A., “Future directions: A simulation-based continuing medical education network in emergency medicine,” pp. 978-981.

In this paper, the conference co-chairs assert that emergency medicine is uniquely positioned to pioneer simulation-based training as one component of ongoing continuing medical education (CME). They outline a program for a simulation-based CME network in emergency medicine that would provide practicing emergency physicians with an individualized opportunity to engage in a supportive training environment, to receive feedback, and to evaluate their own skills.

Weiss, K.B., “Introductory remarks by the president of the American Board of Medical Specialties,” pp. 982-983.

The author notes the rapidly growing interest among numerous medical specialty boards in using

simulation for physician training. He asserts that the science of simulation will need to demonstrate the validity and reliability of these techniques and demonstrate how competency using simulation relates to clinical outcomes. Also, simulation tools and techniques will need to be built that can be easily adopted and scalable to large numbers of users at a reasonable cost.

Ericsson, K.A., “Deliberate practice and acquisition of expert performance: A general overview,” pp. 988-994.

Expert performance can be traced to active engagement in deliberate practice (DP), where training is focused on improving particular tasks. DP also involves provision of immediate feedback, time for problem solving and evaluation, and opportunities for repeated performance to refine behavior. In this paper, the author draws upon the principles of DP established in other fields such as sports to provide insight into developing expert performance in medicine.

McGaghie, W.C., “Research opportunities in simulation-based medical education using deliberate practice,” pp. 995-1001.

This article describes six lessons about simulation-based medical education (SBME) using DP and the mastery learning model. For example, DP helps engage learners with a well-defined learning task at an appropriate level of difficulty. It also provides focused repetitive practice and allows trainees to monitor their learning experiences and correct errors. The mastery learning model provides a minimum passing standard of mastery and continued practice until that standard is reached.

Salas, E., DiazGranados, D., Weaver, S.J., and King, H., “Does team training work? Principles for health care,” pp. 1002-1009.

The authors analyzed studies on team training specific to health care and identified eight key principles for effective team training. These included identifying critical teamwork competencies; emphasizing teamwork over task work; ensuring simulation training relevance to the transfer environment; evaluating clinical outcomes, learning, and behaviors on the job; and reinforcing desired teamwork behaviors, for example, through coaching and performance evaluation.

Rudolph, J.W., Simon, R., Raemer, D.B., and Eppich, W.J., “Debriefing as formative assessment: Closing performance gaps in medical education,” pp. 1010-1016.

These authors describe a four-step model they propose for postsimulation debriefings, which can also be applied to bedside teaching in the emergency department (ED) and other clinical settings. The steps are to note salient performance gaps related to predetermined objectives; provide feedback describing the gap; investigate the bases for the gap by examining the frames and emotions contributing to the current performance level; and close the performance gap through discussion or targeted instruction on principles and skills relevant to performance.

Fernandez, R., Vozenilek, J.A., Hegarty, C.B., and others, “Developing expert medical teams: Toward an evidence-based approach,” pp. 1025-1036.

These authors recommend further research on developing

continued on page 12

Health care simulation

continued from page 11

expert emergency medical teams in six key areas. The first three areas are developing and refining core competencies for emergency medicine teams; leadership training for emergency physicians; and conducting comprehensive needs analysis at the organizational, personnel, and task levels. The second three areas are development of training platforms to maximize knowledge transfer; debriefing and provision of feedback; and proper implementation of simulation technology.

Bond, W., Kuhn, G., Binstadt, E., and others, “The use of simulation in the development of individual cognitive expertise in emergency medicine,” pp. 1037-1045.

The authors of this paper discuss the use of medical simulation for the development of individual expertise in emergency medicine. They examine such issues as whether simulation can be combined with other strategies (like interviews) to effectively identify expert behavior; the influence of simulation on the learning curve; and the optimal teaching strategy for simulation cases. They note that collaboration between medicine, cognitive psychology, and educational academic communities will be needed to answer these questions.

Wang, E.E., Quinones, J., Fitch, M.T., and others, “Developing technical expertise in emergency medicine—the role of simulation in procedural skill acquisition,” pp. 1046-1057.

The emergency physician has to perform a diverse array of procedures, including airway management, minor surgery, orthopedic manipulation, and team

management. The authors of this paper reviewed simulation studies on procedures germane to emergency medicine training, virtual reality training, and instructional learning theory as it pertains to procedural skill acquisition and skills decay. They discuss the role of simulation in teaching technical expertise, identify training conditions that lead to effective learning, and recommend future research.

Boulet, J.R., “Summative assessment in medicine: The promise of simulation for high-stakes evaluation,” pp. 1017-1024.

In the past 10 years, simulations have been successfully incorporated in a number of high-stakes physician certification and licensure exams. As simulation technology expands, this groundbreaking work can serve as a basis for organizations to build or expand their summative assessment activities. The author concludes that simulation, whether it involves standardized patients, computerized case management scenarios, part-task trainers, electromechanical mannequins, or a combination of these methods, holds great promise for high-stakes assessment.

Kobayashi, L., Overly, F.L., Fairbanks, R.J., and others, “Advanced medical simulation applications for emergency medicine microsystems evaluation and training,” pp. 1058-1070.

These authors evaluated the best applications of simulation techniques and technologies to small-scale systems in emergency medicine. They describe relevant theories and terminology for discussion of health care systems and medical simulation. The authors also review prior and

ongoing efforts in medical simulation programs. In addition, they develop a framework for discussing systems thinking for emergency medicine and explore the application of advanced medical simulation methods to a defined framework of emergency medicine microsystems to promote a “quality-by-design” approach.

Spillane, L., Hayden, E., Fernandez, R., and others, “The assessment of individual cognitive expertise and clinical competency: A research agenda,” pp. 1071-1078.

This group asked five questions critical to simulation-based assessment (SBA) of emergency physicians: What cognitive skills/core competencies are crucial to the competent practice of emergency medicine that should be assessed using mannequins or other types of simulation? Are all types of simulation technology suitable for physician assessment? What are the characteristics of a “criterion standard” measurement tool? Do better outcomes in the simulated environment predict better outcomes for real patients? Finally, how often should practicing physicians be evaluated, and does SBA have a role in continuing assessment and credentialing for practicing physicians?

Lammers, R.L., Davenport, M., Korley, F., and others, “Teaching and assessing procedural skills using simulation: Metrics and methodology,” pp. 1079-1087.

Teaching and testing technical skills require methods and assessment instruments that are different than those used for cognitive or team skills. Based on work published in other medical disciplines and education, behavioral, and human factors

continued on page 13

Health care simulation

continued from page 12

research, these authors explored questions in six research areas. These included measurement of procedural skills; development of performance standards; assessment and validation of training methods, simulator models, and assessment tools; optimization of training methods; transfer of skills learned on simulator models to patients; and prevention of skill decay over time.

Shapiro, M.J., Gardner, R., Godwin, S.A., and others, “Defining team performance for simulation-based training: Methodology, metrics, and opportunities for emergency medicine,” pp. 1088-1097.

About 40 percent of emergency department lawsuits involve teamwork errors that could have been mitigated or prevented. To assist emergency medicine and health care in the design and delivery of simulation-based

training (SBT) for training and evaluating teamwork, these authors propose a scientifically based method for SBT design and evaluation. They review existing team performance metrics in health care along with recommendations. Finally, they focus on leadership as a target for SBT, because it has a high likelihood of improving many team processes and ultimately performance.

Kaji, A.H., Bair, A., Okuda, Y, and others, “Defining systems expertise: Effective simulation at the organizational level—implications for patient safety, disaster surge capacity, and facilitating the systems interface,” pp. 1098-1103.

The authors of this paper combined an online discussion group of emergency physicians, an extensive review of the literature, and a public hearing of questions at the consensus conference to identify six key research questions that would inform understanding of

simulation’s impact at the organizational level. For example, they recommend research areas they believe will improve understanding of how simulation affects patient safety, disaster surge capacity, and intersystem and interagency communication.

Fernandez, R., Kozlowski, S.W., Shapiro, M.J., and Salas, E., “Toward a definition of teamwork in emergency medicine,” pp. 1104-1112.

Simulation has been used within aviation, the military, and now health care to effectively teach and assess teamwork skills. These authors identify evidence-based recommendations for an emergency medicine team taxonomy and performance model. They present a well-defined, well-described taxonomy that will help guide design, implementation, and assessment of simulation-based team training programs in health care. ■

Pharmaceutical Research

Researchers identify possible genetic component of penicillin allergy

A new study of clinical and genetic factors associated with penicillin allergy found that several variants in the gene for interleukin-4 (IL-4), a protein that stimulates the immune system, significantly increased the risk of this allergy beyond the presence of two clinical risk factors. Penicillin allergy is a clinical diagnosis, typically based on self-report by the patient, because accurate skin tests for this allergy are not commercially available. A tenth of hospitalized patients report being allergic to penicillin and allergic events occur in 2 percent of penicillin treatments, but deaths from this allergy are rare (estimated at 1-2 deaths per 100,000 courses of penicillin treatment).

Researchers at the University of Pennsylvania Center for Education and Research on Therapeutics (CERT) and colleagues used data from a case-control study

comparing 23 adults with and 39 without a history of clinical penicillin allergy. They identified several clinical and genetic factors that were associated with self-reported penicillin allergy. The significant clinical factors were a history of penicillin allergy among close relatives, a personal history of having other adverse drug reactions, and a history of developing allergies to common environmental allergens (such as allergic rhinitis or bronchial asthma). The researchers selected candidate genes (IL4, IL4R, and IL10) that code for proteins involved in allergic reactions, and a gene (LACTB) for an enzyme that governs penicillin metabolism. Comparisons between cases and controls suggested that penicillin allergy was significantly associated with the presence of three variants in the IL4

continued on page 14

Penicillin allergy

continued from page 13

gene, but not IL4R or IL10, and marginally associated with a variant in LACTB.

The researchers note that penicillin sensitivity appears to be influenced by multiple genetic and environmental factors that can make the allergic response vary over time. Future research may determine if the influences of genetic and environmental factors similarly play a role in other

immediate allergic reactions such as bee- and wasp-sting allergy. The study was funded in part by the Agency for Healthcare Research and Quality (HS10399) to the University of Pennsylvania CERT. For more information on the CERTs program, please visit <http://www.ahrq.gov/clinic/certsovr.htm>.

More details are in “Clinical and genetic risk factors of self-reported penicillin allergy,” by Andrea J. Apter, M.D., M.Sc., Heidi Schelleman, Ph.D., Amy Walker, B.S., and others, in the July 2008 *Journal of Allergy and Clinical Immunology* 122(1), pp. 152–158. ■

Health Care Costs and Financing

Cost-effectiveness of pertussis vaccine in adults confirmed in U.S. and German studies

Pertussis, a bacterial infection also known as whooping cough, has been partially controlled in children through early vaccination. However, the disease is a growing problem for adolescents and adults, who now account for 60 percent of all cases in the United States. Adults can suffer significant illness from pertussis and its complications, such as pneumonia, rib fractures due to the violent coughing caused by the disease, and fainting. This resurgence of pertussis, which is spread through the air, may represent individuals who have lost their vaccine-induced immunity against its bacterial cause. Two new studies, led by Grace M. Lee, M.D., M.P.H., of Harvard Medical School, and supported by the Agency for Healthcare Research and Quality (AHRQ), recently looked at the impact of adult vaccination against the disease. The first study (HS13908 and T32 HS00063) found that the tetanus-diphtheria-acellular pertussis (Tdap) vaccine was cost-effective for U.S. adults. The second study (HS13908) showed routine vaccination of German adults with Tdap to be cost-effective. Both studies are described here.

Gidengil, C.A., Sandora, T.J., and Lee, G.M. (May 2008) “Tetanus-diphtheria-acellular pertussis vaccination of adults in the USA,” *Expert Reviews of Vaccines* 7(5), pp. 621–634.

Childhood pertussis immunization has been routine since the 1940s, and all of the currently available vaccines in the U.S. are acellular, using inactivated bacterial toxin and other bacterial proteins rather than killed pertussis cells to foster immunity. Since June 2005, the U.S. Advisory Committee on Immunization Practices has recommended that all adolescents routinely receive a single dose of Tdap instead of the previous booster of tetanus and diphtheria (Td) vaccine. The researchers noted that, in a randomized study of vaccine efficacy among 2,781 patients followed for 2.5 years, only 1 of 10 pertussis cases occurred among those given Tdap—for an overall vaccine efficacy of 92 percent.

A previous study by Dr. Lee and coworkers found that the economic costs per case of pertussis in adolescents and adults in Massachusetts were \$326 in medical costs and \$447 in nonmedical

costs were substantially higher in adults than adolescents, presumably because of lost time from work. Based on several studies, the researchers estimate that one-time vaccination of adults with Tdap would be cost-effective at an annual incidence of 120 cases or more per 100,000 population. They conclude that priority populations for vaccination should include health care personnel, close contacts of infants aged 12 months or younger, and women of child-bearing age who expect to become pregnant.

Lee, G.M., Riffelmann, M., and Wirsing von Konig, C. H. (2008). “Cost-effectiveness of adult pertussis vaccination in Germany,” *Vaccine* 26, pp. 3673–3679.

Adult vaccination for pertussis would be cost-effective in Germany, where the disease remains widespread despite the availability of childhood vaccination, concluded Dr. Lee and colleagues in Krefeld, Germany. They modeled the likely impact of one-time and every-10-year adult vaccination for pertussis with Tdap, based on the current incidence of the disease in Germany. The researchers projected

continued on page 15

Pertussis vaccine

continued from page 14

health outcomes for a German population of 79 million children and adults, including 50 million adults age 20–64 years old, with a disease incidence of 165 per 100,000 for adults (similar to recent public health reports for Germany).

The model predicted that 4.4 million cases of pertussis would occur over the population's lifetime, but that one-time Tdap vaccination of adults would potentially prevent 498,000 cases. An adult vaccination

strategy with boosters every 10 years would potentially prevent 1 million cases. The one-time vaccination strategies would reduce adult-to-child transmission of pertussis, preventing an estimated 178 infant cases, including 109 hospitalizations and 1 death. The adult strategy with a booster every 10 years would have nearly ten times the impact on infant disease and death.

The researchers calculated that at the incidence rate chosen, the vaccination programs would be

cost-effective: the one-time adult vaccination would save 160 Euros per case prevented and the 10-year booster plan would save 200 Euros per case prevented. The cost per quality-adjusted life year (QALY) for adults for each strategy would be 5,800 and 7,200 Euros per QALY. However, the vaccination strategies would not be cost-saving unless the disease incidence was greater than 200 per 100,000 population. ■

X-ray of patients undergoing emergency surgery is cost-effective in preventing retained surgical sponges

For patients undergoing emergency open-cavity surgery, it is cost-effective for the hospital to require routine x-rays before the patient leaves the surgical suite to detect retained surgical sponges, rather than relying on sponge counts by operating room staff, concludes a new study. Authors of the study simulated decision analysis to compare radiography with surgical sponge counts while the patient is still in the surgical suite. They took into account the cost of the radiologist, as well as legal and other costs relevant to a hospital being sued for a retained surgical sponge. The analysis was not extended to patients undergoing elective open-cavity surgery, because the working conditions for elective surgery are less hurried and quite different, the researchers noted.

A few studies have reported that emergency surgery is associated with a 5- to 9-fold higher risk of retained instruments or foreign bodies than are elective

operations. Other factors that increase the risk of retained sponges, such as massive blood loss (that requires use of many sponges) or hurried sponge counts, are commonly present during emergency surgery. Retained sponges have been associated with a variety of clinical problems and, over time, mortality as high as 11 to 35 percent.

To develop a model that would compare surgical sponge counts and radiography, the researchers surveyed 34 trauma and emergency department surgeons anonymously for estimates of the sensitivity and specificity of surgical sponge counts and intra-operative radiography (IOR). Institutional estimates were obtained for the cost of the radiograph, the extra operating room time to permit IOR, and the institutional cost of an undiscovered, retained surgical sponge. The sensitivity and specificity of x-rays were higher

than for a sponge count, and sponge counts suffer from the possibility of false-negative results (miscounting that misses a retained sponge). The researchers calculated a cost-effectiveness ratio for IOR of \$705 per emergency operation compared to \$1,155 for the sponge count strategy. The researchers conclude that, in the use of IOR, hospitals must spend money to save money. The cost of implementing the IOR strategy is incurred immediately, but the cost savings of prevented retained surgical sponges are realized over time. The study was funded in part by the Agency for Healthcare Research and Quality (T32 HS13833).

More details are in “Cost-effectiveness of routine radiographs after emergent open cavity operations,” by Lesly A. Dossett, M.D., Robert S. Dittus, M.D., M.P.H., Theodore Speroff, Ph.D., and others in the August 2008 *Surgery* 144, pp. 317-321. ■

Repeated immunoassays are not helpful in diagnosing an infectious form of colitis and diarrhea

Enzyme immunoassay (EIA) is the widely used technique to diagnose *Clostridium difficile*-associated disease (CDAD), an infectious form of colitis and diarrhea. Clinicians often repeat EIAs three times to definitely rule out CDAD, but a new study finds that repeating the newest version of the *C. difficile* EIA rarely aids in diagnosing the disease.

The researchers, all affiliated with Tufts–New England Medical Center, reviewed all *C. difficile* EIAs performed by their institution’s microbiology laboratory during 2005. The EIA used at the medical center has been shown to be nearly as good in ruling out CDAD as the “gold standard” cellular cytotoxin assay (negative predictive values [NPVs] of 98.8–99.8 percent). Because the researchers were primarily interested in comparing a single EIA with repeated EIAs, they calculated a NPV relative to a single immunoassay. They found that of the 2,938 *C. difficile* EIAs performed in 2005, 91 percent were negative for the bacterium (which is ubiquitous in air, soil, water, feces, and on most surfaces) and 9 percent

were positive. Patients were diagnosed with CDAD on the first test in 85 percent of the confirmed cases. Only 15 patients had a positive second or third test within 7 days of a negative previous EIA, giving a relative NPV of 97 percent for just 1 test.

Based on their findings, the researchers conclude that, when using the most modern version of the *C. difficile* EIA, repeated diagnostic testing is only warranted when there is high suspicion of CDAD based on clinical observations. In addition, they recommend that no more than two EIAs should be performed for this bacterium within a 7-day period. The study was funded in part by a training grant from the Agency for Healthcare Research and Quality (T32 HS00060).

More details are in “Repeated enzyme immunoassays have limited utility in diagnosing *Clostridium difficile*,” by Marci Drees, M.D., David R. Snyderman, M.D., and C.E. O’Sullivan in *European Journal of Clinical Microbiology and Infectious Diseases* 27, pp. 397–399, 2008. ■

Daily hemodialysis is cost-effective for intensive care patients with acute kidney injury

Intensive care patients with acute kidney problems live up to 2 years longer when toxins are removed from their blood with hemodialysis daily instead of every other day. Daily hemodialysis is also more cost-effective, concludes a new economic study that draws on findings from a 2002 clinical trial to compare costs and effectiveness of the two dialysis regimens. Patients receiving daily hemodialysis for acute kidney injury (AKI) were projected to live longer with good quality of life than patients treated every other day. The additional cost for the more intensive treatment was \$10,924, or \$5,084 per quality-adjusted life year.

The frequency of AKI is rising for patients in intensive care units (ICUs), straining the health care system’s allocation of resources for dialysis. Intensive care unit patients often develop AKI due to trauma, surgery, or illness. Optimal timing, modality, dose, and frequency of hemodialysis has not yet been established. The researchers used data from the clinical trial to develop a model for comparing the cost of quality-adjusted life years for patients treated with each regimen in the hospital ICU. The model used in the study assumed that the advantage of daily dialysis only lasted for the period of hospitalization. The overall costs could increase greatly if the

additional patients who survived because of daily inpatient hemodialysis went on to develop chronic kidney disease requiring outpatient treatment, they note.

Future studies that divide the ICU patients according to the severity of their AKI may help identify a particular subgroup of patients to whom daily hemodialysis should be targeted, according to the researchers. They conclude that daily hemodialysis provides a cost-effective option for managing AKI in critically ill patients—an option that can be readily implemented in most hospitals that already provide inpatient hemodialysis services. The

continued on page 17

Acute kidney injury

continued from page 16

study was funded in part by the Agency for Healthcare Research and Quality training grant (T32 HS00028).

More details are in “Management of acute kidney injury in the intensive care unit: a cost-effectiveness analysis of daily vs. alternate-day hemodialysis,” by Amar A. Desai, M.D., M.P.H.,

Jacqueline Baras, B.A., Benjamin B. Berk, M.D., M.S., and others in the September 8, 2008 *Archives of Internal Medicine* 168(16), pp. 1761-1767. ■

Use of mesh for repair of an incisional hernia varies with the surgeon’s style, not the patient’s condition

The use of a specifically positioned plastic mesh to repair a protrusion at the site of a previous incision (incisional hernia repair, or IHR) is not typically related to the patient’s medical situation or demographics, according to a new study. Despite prior evidence that systematic placement of mesh can reduce the risk of hernia recurrence by half (from 43 percent for suture-only repair to 23 percent for repair with mesh), the study of IHRs done at 16 hospitals run by the Department of Veterans Affairs (VA) did not find consistent use of this procedure by surgeons.

The researchers gathered data on all patients undergoing IHR at the VA hospitals over a 4-year period. Of the 1,123 procedures available for analysis, mesh was used in 781 cases (70 percent). However, the mesh and suture-only cases did not differ in patient characteristics, including the presence of co-existing conditions before surgery. The percentage of mesh use

in IHR depended primarily on the VA medical center involved, varying from 40 percent to 91 percent among the centers. IHR at a high performing facility was associated with a nearly four-fold increase in mesh use.

The variation in mesh use for IHR suggests opportunity for improvement in IHR outcomes, especially if additional research identifies specific populations that consistently benefit from mesh use, note the researchers. The study was funded in part by the Agency for Healthcare Research and Quality (HS13852).

More details are in “Variations in mesh placement for ventral hernia repair: An opportunity for process improvement?” by Stephen H. Gray, M.D., Catherine C. Vick, M.S., Laura A. Graham M.P.H., and others in the August 2008 *The American Journal of Surgery* 196(2), pp. 201-206. ■

Agency News and Notes

Integrated mental and physical health services may help people with depression

A new evidence report—*Integration of Mental Health/Substance Abuse and Primary Care*—released by the Agency for Healthcare Research and Quality (AHRQ) found evidence that people treated for depression in primary care clinics that provide a coordinated set of services for mental and physical health do better and have fewer symptoms than patients who are treated at sites that just provide health services. However, the report’s authors could not identify the mechanism by which this improvement occurred; nor could

they determine whether any level of traditional beliefs about integrating mental and physical health services, or simply systematic practice, produced the benefit.

The report, which was cofunded by the Health Resources and Services Administration, Substance Abuse and Mental Health Services Administration, Office of Women’s Health, and Office of Minority Health, also found that patients treated in specialty mental health centers appear to benefit when the facilities offer general medical care, but the number of studies was too limited to draw firm conclusions.

Prepared by the AHRQ-supported University of Minnesota Evidence-based Research Center in Minneapolis (contract no. 290-02-0009), the report did not find sufficient evidence to draw conclusions about the impact of integrating mental health and physical medicine services on patients with anxiety disorders, alcohol use disorders, or other mental or behavioral health problems. The authors, led by Mary Butler, Ph.D., found that there are financial barriers to combining mental health and physical health

continued from page 17

Depression

continued from page 17

services, including a lack of reimbursement for consultations and communication activities between providers, telephone conversations with patients, and other care management functions, such as payment to care coordinators. Other barriers include staff resistance to change and lack of strong leadership committed to integration.

Experts have called for integration because persons with mental health problems often do not receive treatment for their physical disorders. Also, primary care physicians may be in a good position to recognize underlying mental problems in patients who come to them regularly for treatment of chronic illnesses. In addition, patients with mental disorders are more likely to see a primary care physician during the year than a mental health specialist.

Combined treatment also may reduce overall health care costs because mental disorders can worsen disability associated with chronic illnesses.

For details, see *Integration of Mental Health/Substance Abuse and Primary Care*, (AHRQ publication no. 09-E003), at www.ahrq.gov/clinic/epcindex.htm. Print copies are also available from AHRQ.* ■

Pressure ulcers are increasing among hospital patients

Hospitalizations involving patients with pressure ulcers developed either before or after admission increased by nearly 80 percent between 1993 and 2006, according to data from the Agency for Healthcare Research and Quality (AHRQ). Pressure ulcers, also called bed sores, typically occur among patients who can't move or have lost sensation. Prolonged periods of immobility put pressure on the skin, soft tissue, muscle, or bone, causing ulcers to develop. Older patients, stroke victims, people who are paralyzed, or those with diabetes or dementia are particularly vulnerable. Pressure ulcers may indicate poor quality of care at home, in a nursing home, or in a hospital. Severe cases can lead to life-threatening infections.

AHRQ's analysis found 503,300 pressure ulcer-related hospitalizations in 2006. In addition:

- Pressure ulcers were the primary diagnosis in about 45,500 hospital admissions – up from 35,800 in 1993.
- Pressure ulcers were a secondary diagnosis in 457,800 hospital admissions – up from 245,600 in 1993. These patients, admitted primarily for pneumonia, infections, or other medical problems, either developed pressure ulcers before or after admission.
- Among hospitalizations involving pressure ulcers as a primary diagnosis, about 1 in 25 admissions

ended in death. The death rate was higher when pressure ulcers were a secondary diagnosis – about 1 in 8.

- Pressure ulcer-related hospitalizations are longer and more expensive than many other hospitalizations. While the overall average hospital stay is 5 days and costs about \$10,000, the average pressure ulcer-related stay extends to between 13 and 14 days and costs between \$16,755 and \$20,430, depending on medical circumstances.

For more information, see *Hospitalizations Related to Pressure Ulcers Among Adults 18 Years and Older, 2006*, HCUP Statistical Brief #64. The report uses statistics from the 2006 Nationwide Inpatient Sample, a database of hospital inpatient stays that is nationally representative of inpatient stays in all short-term, non-Federal hospitals. The data are drawn from hospitals that comprise 90 percent of all discharges in the United States and include all patients, regardless of insurance type, as well as the uninsured.

Editor's note: AHRQ has developed a program for pressure ulcer prevention in nursing homes and is funding research on pressure ulcer prevention in hospitals. For more information about the nursing home program, go to www.ahrq.gov/research/ontime.htm. ■

Final rule issued for Patient Safety Organizations

The U.S. Department of Health and Human Services (HHS) has issued a final rule for Patient Safety Organizations (PSOs). The rule becomes effective on January 19, 2009. It provides final requirements and procedures for PSOs, new entities that clinicians and health care providers can work with to collect, aggregate, and analyze data within a legally secure environment of privilege and confidentiality protections to identify and reduce patient care risks and hazards.

Under interim guidance issued on October 8, 2008, the Agency for Healthcare Research and Quality (AHRQ) has already listed 15 PSOs. During the remainder of the interim period, these organizations will maintain their status as PSOs. However, these and other PSOs listed throughout the interim period are expected to comply with the final rule once it takes effect.

The listing of PSOs is authorized by the Patient Safety and Quality Improvement Act of 2005 (Patient Safety Act). The Patient Safety Act is intended to encourage voluntary, provider-driven initiatives to improve the safety of health care through the establishment of legal protections to ensure that providers

who report patient safety information do not incur new legal liability; to promote rapid learning about the underlying causes of risks and harms in the delivery of health care; and to share those findings widely, thus speeding the pace of improvement.

The final rule is consistent with many of the provisions of the proposed rule issued on February 12, 2008. However, it also includes new requirements for PSOs, such as:

- The requirement that a PSO notify providers if the patient safety work product it submits is inappropriately disclosed or its security is breached.
- Changes to the requirements for how a component PSO maintains separation between itself and its parent organization(s), making it more flexible.

The final rule also includes several important changes from the proposed rule regarding the listing and delisting of PSOs and the ways in which PSOs must comply with statutory requirements, including:

- Expansion in the types of entities and organizations excluded from listing as PSOs.

- Revisions to how PSOs should disclose certain relationships with health care providers.
- Increased flexibility in how PSOs can store patient safety work products.
- Automatic expiration of departmental listing after 3 years unless a PSO's listing is continued by the Secretary.
- An expedited delisting process for PSOs in a limited number of serious circumstances.

AHRQ administers provisions dealing with PSO operations, and the HHS Office for Civil Rights enforces confidentiality provisions. The final rule addresses concerns regarding how providers may efficiently collect and analyze patient safety event information with privilege and confidentiality protections while complying with existing reporting requirements that seek similar information. To read the final rule and access more information about PSOs, including background on the rulemaking process, visit AHRQ's PSO Web site at www.pso.ahrq.gov. ■

New report recommends strategies to reduce medical resident fatigue-related errors and improve training

Fatigued medical residents need protected sleep periods and increased supervision of work hour limits to improve patient safety and the training environment, according to a new Institute of Medicine (IOM) report funded by the Agency for Healthcare Research and Quality (AHRQ). The report is the result of a 15-month study by an IOM committee that reviewed the relationship between residents' work schedules, their

performance, and the quality of care they provide. The study confirms that scientific evidence shows acute and chronically fatigued residents are more likely to make mistakes.

The IOM committee recommends several changes to the existing 80-hour-per-week limit on work hours, including protected sleep periods for residents. The

continued on page 20

Medical residents

continued from page 14

current rules from the Accreditation Council for Graduate Medical Education (ACGME) allow residents to work a maximum 30-hour shift. During this time, they may treat patients for 24 hours and engage in training or transition activities for the other 6 hours.

The IOM recommends a change to require residents who complete a 30-hour shift to only treat patients for up to 16 hours. They must then have a 5-hour protected sleep period between 10 p.m. and 8 a.m., during which time other nonsleeping residents or additional staff members could take over patient care. Other recommendations in the report, *Resident Duty Hours: Enhancing Sleep, Supervision, and Safety* (available at www.iom.edu), include:

- Increased supervision of work hours. Lack of adherence to limits is common and often underreported. The IOM report recommends periodic independent reviews and strengthened protections for residents and others who report a lack of adherence to current work hour restrictions.
 - Stronger moonlighting restrictions. Current ACGME rules only count internal moonlighting (additional paid health care work at the same health care facility) against the 80-hour weekly limit. The IOM report recommends internal and external moonlighting count against the 80-hour weekly limit, because moonlighting outside residency training affects strategically designed periods for rest and sleep, which could reduce residents' readiness for their primary duties.
 - Guaranteed days off to permit adequate recovery after working long shifts. The IOM committee said residents should receive a 24-hour break from duty each week, with one 48-hour break per month, for a total of 5 days off per month.
 - Reasonable on-call periods. The IOM committee said residents should be on call in the hospital no more than every third night.
 - Safe transportation provided by hospitals to residents who are too fatigued to drive home. AHRQ-funded research shows that residents more than double their risk of driving accidents when they drive home after working extended shifts.
- Increased resident training on better communication during handovers. Handovers, when clinicians transition care responsibility to other health care providers, are likely to increase with shorter resident shifts. In some cases, multiple handovers could add to the risk for adverse events unless a structured team approach is used.
 - Increased involvement of residents in patient safety activities and adverse event reporting. IOM committee members suggest such involvement could greatly increase the resident's educational experience.

Editor's note: AHRQ has a number of free resources to help residents and other health care providers implement recommendations related to patient safety training and adverse event reporting, including:

- TeamSTEPPS (<http://teamstepps.ahrq.gov/index.htm>) was developed by AHRQ and the U.S. Department of Defense. TeamSTEPPS is an evidence-based teamwork system that aims to improve communication among health care professionals through use of a comprehensive set of training curricula.
- Patient Safety Organizations (www.pso.ahrq.gov) are new entities with which clinicians and health care providers can work to collect, aggregate, and analyze data—within a legally secure environment of privilege and confidentiality protections—to identify and reduce patient care risks and hazards.
- Patient Safety Culture Surveys (www.ahrq.gov/qual/hospculture) are tools that may be used by hospitals, nursing homes, and medical offices to assess their patient safety culture, track changes in patient safety over time, and evaluate the impact of patient safety interventions.
- AHRQ Patient Safety Network (www.psnet.ahrq.gov) and AHRQ Morbidity and Mortality Rounds on the Web (<http://webmm.ahrq.gov>) are Web-based resources, including weekly updates of patient safety literature, research, news, tools, meetings, and an online forum that features expert analysis of medical errors reported anonymously by readers. ■

Improved healthfinder.gov makes health information quicker to find and easier to use

An improved and more accessible version of healthfinder.gov, (www.healthfinder.gov) a Federal Web site designed to help people stay healthy, is now available. Supported by the U.S. Department of Health and Human Services (HHS), the Web site's new design and interactive health management tools make information resources more accessible and easier to use for consumers and professionals.

Features on healthfinder.gov include links to over 6,000 government and nonprofit health information resources on hundreds of health topics. Information is in English and Spanish. The improvements will help users find what they want on those sites. For instance, the Quick Guide to Healthy Living uses everyday language and examples to:

- Tell users how taking small steps to improve health can lead to big benefits.
- Motivate users by showing them the benefits of incorporating

healthy behaviors into their lives.

- Provide tools and encouragement, such as personal health calculators, menu planners and recipes, tips for caregivers, and printable lists of questions to take to the doctor.

Another new tool offered on the site is myhealthfinder, which provides personalized recommendations for clinical preventive services specific to the user's age, gender, and pregnancy status. Based on their profiles, users may receive anywhere from 5 to 15 recommendations. This feature was developed through a joint effort between HHS' Office of Disease Prevention and Health Promotion and the Agency for Healthcare Research and Quality (AHRQ). The feature provides evidence-based recommendations from the AHRQ-sponsored U.S. Preventive Services Task Force, an independent panel of experts in prevention and primary care.

The redesign of healthfinder.gov was based on proven clear communication practices. In addition, several possible versions of the Web site and the new prevention content were consumer tested to ensure that the site is user friendly and that people can find what they are looking for. As a result, healthfinder.gov is easy to understand and navigate, especially for consumers with limited health literacy.

Since 1997, healthfinder.gov has been recognized as a key resource for finding the best government and nonprofit health information on the Internet. It has been certified by HONcode, the oldest and most used ethical and trustworthy code for medical and health related information available on Internet. It has also been recognized by the Medical Library Association as one of the top 10 most useful Web sites for consumers. ■

New inventory of HHS quality measures to improve public- and private-sector performance measurement efforts have been released

The Department of Health and Human Services (HHS) has released the first-ever inventory of quality measures that are used for reporting, payment, or quality improvement by its agencies and operating divisions. The HHS measure inventory, which is available on the National Quality Measures Clearinghouse, a Web site of the Agency for Healthcare Research and Quality (AHRQ), is designed to advance collaboration within the

quality measurement community and to synchronize measurement. The inventory is available on the clearinghouse Web site at www.qualitymeasures.ahrq.gov.

Measures for this inventory were contributed by: Administration on Aging, AHRQ, Centers for Disease Control and Prevention, Centers for Medicare & Medicaid Services, Health Resources and Services Administration, Indian Health Service, Office of Public Health and

Science, National Institutes of Health, Substance Abuse and Mental Health Services Administration, and Office of the National Coordinator for Health Information Technology. The measures currently can be sorted by agency or operating division and can be downloaded in their entirety. In the next several months, the inventory will be enhanced so the measure can be sorted by condition, setting, or measure domain. ■

New Web resource aims to connect primary care, public health providers, and patients

The Agency for Health Care Research and Quality (AHRQ) has developed a new page on the AHRQ Health Care Innovations Exchange Web site, Linking Clinical Practices and the Community for Health Promotion. The page is designed to help health care professionals find new ways to work together to support patients in adopting healthy behaviors and managing their health, to create new ways to connect patients with services in primary care offices and community settings, and to increase accessibility to these services.

Visitors to the new page can find profiles of innovations that have successfully integrated clinical, public health, and community health services. Also available are tools to assist in developing partnerships and referral linkages. Visitors are invited to share their experiences and lessons learned through a commenting

feature that is provided from each innovation profile page.

This effort to build relationships between these sectors of health care resulted from a conference held earlier this year. The 2008 Linking Clinical Practice and the Community for Health Promotion Summit was hosted by AHRQ, the Association for State and Territorial Health Officers, and the American Medical Association. Summit participants examined successful partnerships that have been developed in health systems, communities, and States. Strategies were identified to overcome the barriers that often block the collaboration, coordination, and integration necessary for successful partnerships.

To view the new page, go to the Health Care Innovations Exchange Web site at www.innovations.ahrq.gov/. ■

New Spanish-language guide explains safe and effective use of the blood clot prevention drug, Coumadin®/warfarin

The Agency for Healthcare Research and Quality (AHRQ) released a new pamphlet, *Su guía para el tratamiento con Coumadin/warfarina (Your Guide to Coumadin®/Warfarin Therapy)*, to help Spanish-speaking patients know what to expect and watch out for while using the blood thinner Coumadin®/warfarin. Warfarin can be a life-saver, but taking too high a dose can cause major and sometimes fatal problems because of uncontrolled bleeding. Warfarin is the second most common drug—after insulin—implicated in emergency room visits for adverse drug events, according to the Food and Drug Administration. Conversely, taking low a dose of warfarin will not protect a patient against the formation of blood clots.

A simple blood test can quickly tell whether a patient is taking too much or too little warfarin. This 13-page, easy-to-read brochure educates patients about their medication therapy and potentially dangerous side effects, explains how to communicate effectively with their health care providers and provides tips for lifestyle modifications. It also provides information on remembering when to take the medicine, learning how to stay safe while taking the medicine, maintaining a consistent diet and alerting health care providers to concurrent drugs and/or supplements patients are taking to avoid any potential adverse interactions.

In 2005, more than 3.8 million Americans used warfarin at an estimated cost of nearly \$963 million, according to the latest data from AHRQ. Warfarin helps prevent blood clots. The drug is often prescribed for patients subject to atrial fibrillation (irregular heart beat) or who have had past heart attacks. It is also prescribed for patients to prevent or treat thromboembolism (blood clots deep inside the legs) and for treating pulmonary embolism, a highly dangerous condition that occurs when a blood clot breaks off and lodges in the lungs. The drug is also given often to patients with mechanical heart valves.

Su guía para el tratamiento con Coumadin/warfarina (publication no. 08-0028-B) and the English-language *Your Guide to Coumadin®/Warfarin Therapy* (publication no. 08-0028-A) can be found online at www.ahrq.gov/consumer/coumadinsp.htm and www.ahrq.gov/consumer/coumadin.htm, respectively. Printed copies are also available from AHRQ.*

Editor's note: AHRQ also offers guides in Spanish and English to help patients prevent deep vein thrombosis. *Su guía para evitar y tratar la formación de coágulos* (publication no. 08-0058-B) and *Your Guide to Preventing and Treating Blood Clots* (publication no. 08-0058-A) are available online at <http://www.ahrq.gov/consumer/spblclots.htm> and <http://www.ahrq.gov/consumer/bloodclots.htm>, respectively, and also from the AHRQ Publications Clearinghouse.* ■

Castel, L.D., Williams, K.A., Bosworth, H.B., and others. (2008). "Content validity in the PROMIS social-health domain: A qualitative analysis of focus-group data." (AHRQ grant T32 HS00032). *Quality of Life Research* 17, pp. 737-749.

In order to contribute to the process of improving health-related quality-of-life measures, the researchers assessed the content validity of the Patient-Reported Outcomes Measurement Information System (PROMIS) by comparing a prespecified conceptual model with concepts that focus on what group participants identified as important social-health-related outcomes. The researchers convened a panel of experts on patient-reported outcomes to achieve a consensus on social health constructs to measure. They then conducted 4 focus groups consisting of 25 persons with chronic health conditions to examine whether the focus group discussions would provide qualitative information that would either support or refute the concepts of the social-health domain as it was defined. This included performance and satisfaction with social roles in the context of family/friends, work/school, and leisure activities. Fulfilling family and work responsibilities was important, with performance and satisfaction overlapping. However, volunteerism and pets, which were not included in the researchers' original definition of social health, were also found to be important.

Clancy, C. (2008). "New patient safety organizations lower roadblocks to medical error reporting." *American Journal of Medical Quality* 23, pp. 318-321.

The most notable roadblock to sustained quality improvement is the lack of uniform Federal standards for confidentiality of information about events that jeopardize patient safety. Patient safety organizations (PSOs) authorized by Federal legislation in 2005 will diminish the fear of legal liability and sanctions among physicians and health care organizations, according to Carolyn M. Clancy, M.D., Director of the Agency for Healthcare Research and Quality (AHRQ). For the first time, clinicians and health care organizations throughout the United States will be able to share information about medical errors and near misses within a protected legal environment, without the threat of the information being used against them. Health care providers will decide whether to work with PSOs, and if so, which PSO can best meet their needs. The information developed by the PSOs can help providers more effectively target their patient safety and error prevention strategies. Working together, PSOs and health providers have a new opportunity to translate our aspiration for a safer medical system into reality. Reprints (AHRQ publication no. 09-R002) are available from AHRQ.*

Deshefy-Longhi, T., Schwartz, M.K., and Grey, M. (2008, May). "Characterizing nurse practitioner practice by sampling patient encounters: An APRNet study." (AHRQ grant HS11196). *Journal of the American Academy of Nurse Practitioners* 20, pp. 281-287.

Patients seen by nurse practitioners (NPs) are more likely to receive health counseling as part of a primary care visit than those

seen by physicians, according to this study. Researchers analyzed information collected on both NP and physician practices by a group of Practice-based Research Networks (PBRNs). A southern New England-based network of NPs, the Advanced Practice Registered Nurse Network (APRNet), and 19 PBRNs of physician-led primary care practices provided demographic and practice information, as well as data on 30 patient encounters during a 2-4 week period as part of a survey. Acute health problems accounted for 45 percent of the visits, followed by chronic illness (30 percent), or nonillness care (24 percent), including health promotion and annual exams. Prescription of contraceptive medication was among the top 20 reasons for a primary care visit to an NP, but ranked much lower among reasons for visits to a physician-led practice. Both APRNet and the combined networks were comparable in providing diagnostic or screening services and prescribing medication. However, NPs reported providing therapeutic and preventive services (nutrition, physical exercise, family planning, prenatal instructions, tobacco cessation, and growth and development counseling) in 84 percent of patient visits in contrast to 61 percent of visits for all networks combined.

Dilworth-Anderson, P., Hendrie, H.C., Manly, J.J., et al. (2008). "Diagnosis and assessment of Alzheimer's disease in diverse populations." (AHRQ grant HS10884). *Alzheimer's and Dementia* 4, pp. 305-309.

continued on page 24

Research briefs

continued from page 23

The Alzheimer's Association convened a think tank meeting on the "Diagnosis and Assessment of Alzheimer's Disease in Diverse Populations" in 2007 in Chicago. Thirty clinicians and researchers met to discuss how Alzheimer's disease (AD) affects various communities differently and how its diagnosis and treatment present challenges specific to certain population groups. A number of major points emerged from the meeting. Researchers need to deconstruct racial and ethnic variables into more meaningful variables, given that the acknowledged research shows that black and Hispanic communities suffer a greater incidence of AD than do white Americans. Better ways must be developed to get at-risk adults, especially those from ethnic minorities, to participate in memory screenings. Clinics need to provide comfortable, culturally sensitive environments for the families they serve in order to keep patients in the screening program. Finally, investigators must learn more about how chronic diseases such as hypertension and diabetes interact with AD pathology, especially among ethnic minorities, who suffer disproportionately from these conditions.

Duterte, E.E., Bonomi, A.E., Kernic, M.A., and others. (2008, January). "Correlates of medical and legal help seeking among women reporting intimate partner violence." (AHRQ grant HS10909). *Journal of Women's Health* 17(1), pp. 85-95.

The duration and severity of domestic abuse that women endure serve as a predictor of whether they will seek medical and legal help, a new study finds. Researchers in Seattle conducted telephone

interviews with 1,509 women who participated in a health plan covering Washington and Northern Idaho and said they had experienced physical, sexual, or psychological abuse since reaching the age of 18. Women who were sexually or physically abused were more likely to seek medical care and legal assistance than women who reported only psychological abuse. For example, sexually abused women were 1.3 times as likely to seek medical care as women who were psychologically abused. The longer the abuse continued, the more likely the woman was to obtain legal help. For example, compared with women who were abused for 0 to 2 years, women who were physically abused for 3 to 10 years were 1.4 times more likely to seek legal services. Those who suffered physical abuse for more than 10 years were 1.9 times as likely to get legal help. Women who were psychologically abused were more inclined to obtain legal than medical services.

Edwards, P.J., Scott, T., Richardson, P., and others. (2008, June). "Using staff perceptions on patient safety as a tool for improving safety culture in a pediatric hospital system." (AHRQ grant HS15326). *Journal of Patient Safety* 4(2), pp. 113-118.

Researchers used the Hospital Survey on Patient Safety developed by the Agency for Healthcare Research and Quality (AHRQ) to examine safety culture perceptions of clinical staff at two hospitals (one academic, one community-based) that are part of Children's Healthcare of Atlanta. Overall, 394 staff members at the system's 2 hospitals completed the baseline survey and 428 completed the followup survey 18 months later. Results from the baseline survey

showed three low-scoring areas needing improvement: nonpunitive response to error, patient handoffs and transitions, and teamwork across hospital units. These findings were in the same range as those reported in AHRQ's benchmark national survey of 382 hospitals. Following the baseline survey, several patient safety initiatives were implemented to address nonpunitive responses to error and handoffs and transitions. The followup survey indicated a 5 percent improvement in the nonpunitive response to error following the implementation of monthly and ad hoc safety rounds and the release of an enhanced self-reporting system. The significant improvements in feedback and communication regarding error, frequency of event reporting, and supervisor/manager expectations resulted in scores that were on par with the national benchmarks. However, there was a decline in safety scores related to handoffs and transitions possibly due to workflow changes related to implementing an electronic medical record.

Fields, W., Tedeschi, C., Foltz, J., and others. (2008, March/April). "Reducing preventable medication safety events by recognizing renal risk." (AHRQ grant HS13131). *Clinical Nurse Specialist* 22(2), pp. 73-78.

Researchers collected information on 1,052 medication safety events (both actual and potential adverse drug events) including 318 medication errors reported on 17 clinical units at 2 urban, nonteaching community hospitals before the implementation of a commercial computerized physician order entry (CPOE) system. The researchers estimated creatinine clearance and used

continued on page 25

Research briefs

continued from page 24

laboratory measurement of serum creatinine to classify each patient as being at high (144 patients), hidden (81 patients), or low (93 patients) risk of kidney-related medication events. High-risk patients had high levels of serum creatinine and low clearance rates, low-risk patients had low serum creatinine and high clearance rates, while hidden-risk patients had a combination of low serum creatinine and low clearance rates. Age and sex were each significantly associated with renal risk groups: patients over 80 years old formed the largest group for hidden risk, while men were the largest group at high risk and more women than men had hidden risk. Medication errors among patients with high or hidden risk of renal insufficiency primarily occurred during ordering or transcription of the order, and most often involved a wrong dose rather than wrong drug choice or frequency of administration. The researchers found that antibiotics accounted for a fourth and diabetes drugs accounted for a sixth of medication errors. Antibiotics accounted for more than a third of the errors in the high-risk group and less than a fifth of errors for the hidden-risk and normal-risk groups.

Gessert, C.E., and Haller, I.V. (2008, Spring). “Medicare hospital charges in the last year of life: Distribution by quarter for rural and urban nursing home decedents with cognitive impairment.” (AHRQ grant HS13022). *Journal of Rural Health* 24(2), pp. 154-160.

Medicare hospital charges in the last year of life for urban nursing home residents with cognitive impairment are higher than those of their rural counterparts. These charges tend to be concentrated in

the last 90 days of life for urban residents. Researchers analyzed rural-urban differences in Medicare hospital charges in the last year of life for 3,703 nursing home residents with severe cognitive impairment in Minnesota and Texas who died in 2000-2001. During the last year of life, unadjusted charges averaged \$31,780 for urban residents and \$12,448 for rural residents. Overall, 15 to 20 percent of these charges were incurred in each of the first three quarters, and 47 percent (rural) and 52 percent (urban) in the last quarter of life. A larger proportion of urban (43 percent) than rural (37 percent) residents were hospitalized in the last 3 months of life.

Ghods, B.K., Roter, D.L., Ford, D.E., and others. (2008, May). “Patient-physician communication in the primary care visits of African Americans and whites with depression.” (AHRQ grant HS13645). *Journal of General Internal Medicine* 23(5), pp. 600-606.

Researchers studied primary care visits of 46 white and 62 black, nonelderly adults with depressive symptoms, who were receiving care from 1 of 54 physicians in urban community-based practices. Communication about depression only occurred in one-third (34 percent) of visits (43 percent of white vs. 27 percent of black patient visits). Black patients were less likely to express their depression than white patients (10.8 vs. 38.4 statements). Also, physicians uttered fewer rapport-building statements during visits with black patients than white patients (20.7 vs. 29.7 statements), and made fewer depression-related statements during visits with black patients (4.3 vs. 13.4 statements). Yet, even in visits where communication about depression

occurred, physicians considered fewer black than white patients as suffering significant emotional distress (67 vs. 93 percent). There were no differences in depression communication by concordance of physician-patient race or gender. The exceptions were rapport-building exchanges, which were higher in race-concordant visits, and more biomedical information exchanges in gender-concordant visits.

Graham, D.G., Harris, D.M., Elder, N.C., and others. (2008, June). “Mitigation of patient harm from testing errors in family medicine offices: A report from the American Academy of Family Physicians National Research Network.” (AHRQ grant HS13554). *Quality and Safety in Health Care* 17, pp. 201-208.

Nearly one-fourth of diagnostic testing errors from eight practice groups reported by clinicians and their staff were mitigated—that is, action was taken to prevent or reduce harm to patients from these errors, according to this study. Also, mitigated events were significantly less likely to be associated with patient harm and negative consequences (time or financial loss, delay in care, pain/suffering, or impact on clinical outcome). The researchers determined how often reported errors were mitigated, what conditions were associated with greater or lesser chance of error mitigation, and the impact of mitigation on patient outcomes. Mitigation occurred in 123 (21 percent) of 597 testing process events that were reported. Most of the persons identified as mitigators of harm (79 percent) were part of the practice that reported the error, 13 percent were laboratory or pharmacy staff, and 7 percent were

continued on page 26

Research briefs

continued from page 25

patients or their family members. Patients aged 65 years or older were significantly more likely than 18 to 44-year-olds to have a testing error mitigated. Events involving test implementation were less likely to be mitigated than events containing reporting or ordering errors. The greater the number of errors in a reported event, the less likely the event would be mitigated.

Hickner, J., Graham, D.G., Elder, N.C., and others. (2008, June). "Testing process errors and their harms and consequences reported from family medicine practices: A study of the American Academy of Family Physicians National Research Network." (AHRQ grants HS13554 and HS11584). *Quality and Safety in Health Care* 17, pp. 194-200.

A new study of testing process errors in a group of family practice offices classifies the errors, their potential harm to the patient, and consequences of the errors. The study involved 243 clinicians and office staff at 8 family practice offices in 7 States across the United States (4 private practices and 4 family medicine residency clinics). Errors in testing most often involve the implementation of the tests (18 percent) and reporting of the results to physicians (25 percent). Charting or filing errors account for more than 14 percent of the errors, while notifying patients of results and response of clinicians to results each accounted for close to 7 percent of the errors. There was a significant association between the type of error and type of person reporting it (clinician or office staff), the number of labs used by the practice, absence of a results followup system, and patient race or ethnicity. Significant physical

harm was rare as a result of a testing error, but patients often suffered adverse consequences. Negative consequences included time lost by the patient and other financial impacts (22 percent), delays in care (24 percent), pain and suffering (11 percent), and clinical consequences (2 percent). No harm occurred to patients in 54 percent of the testing errors, some harm resulted from 18 percent of the errors, and whether harm occurred was unknown in 28 percent. Adverse consequences were more common for errors reported by clinicians, involved middle-aged patients (ages 45–64 years), and were associated with test implementation errors.

Hlatky, M.A., and Bravata, D.M. (2008). "Stents or surgery? New data on the comparative outcomes of percutaneous coronary intervention and coronary artery bypass graft surgery [Editorial]." (AHRQ contract 290-02-0017). *Circulation* 118, pp. 325-327.

Patients with several blocked coronary arteries survive equally well with angioplasty or coronary artery bypass graft surgery (CABG) according to combined findings from the 6-year followup report from the Stent or Surgery (SoS) trial and the findings of nine other randomized clinical trials that followed patients receiving treatment with either angioplasty with stents or CABG for 5 or more years. The new report from the SoS trial reported significantly more deaths among angioplasty patients than CABG patients at a median of 6 years followup (53 deaths vs. 34 deaths). However, combining the findings with those from the other long-term followup trials, the researchers found no significant difference in deaths. The researchers noted that the risk of

failure associated with CABG was higher than that of angioplasty, but CABG patients were more likely to have greater and longer-lasting relief of chest pain (angina).

Huey, S.J., and Polo, A.J. (2008, January). "Evidence-based psychosocial treatments for ethnic minority youth." (AHRQ grant HS10870). *Journal of Clinical Child and Adolescent Psychology* 37(1), pp. 262-301.

A review of studies found that psychotherapy is moderately effective for many mental health problems experienced by minority youth, although the researchers uncovered no well-established treatments for this group. Cognitive behavioral therapy (CBT) or individual psychotherapy (IPT) may be preferable to untested alternative therapies when treating depressed Latino adolescents. CBT uses self-control training, contingency management and contracting, peer modeling, feedback, and other strategies. CBTs are generally superior to insight-oriented treatments for youth and ethnic minority youth respond best to treatments that are highly structured, time-limited, pragmatic, and goal-oriented. IPT is possibly efficacious for clinically depressed Puerto Rican youth and may also work with U.S. Latino adolescents. Also, the studies supported the efficacy of family systems treatments, such as brief strategic family therapy (BSFT), for minority youth with conduct problems and drug-related disorders. BSFT adopts strategies such as joining, reframing, and boundary shifting to restructure problematic family interactions of these youth and their parents. MST (multisystemic therapy) is perhaps the only treatment shown to reduce criminal offending among black

continued on page 27

Research briefs

continued from page 26

delinquent youth. MST is delivered in the youth's home or school by therapists trained in techniques such as contingency contracting, behavioral parent training, and communication training.

Kroll, T. (2008, February). "Rehabilitative needs of individuals with spinal cord injury resulting from gun violence: The perspective of nursing and rehabilitation professionals." (AHRQ grant HS13039). *Applied Nursing Research* 21, pp. 45-49.

Young urban, mostly minority, men who have suffered violence-associated spinal cord injury (VASCI) due to a gunshot wound (the third leading cause of SCI in the U.S.) have more barriers to rehabilitation and social integration than other victims of SCI, according to this study. As a result, these individuals are more likely than those with non-violence-associated SCI (NVASCI due, for example, to motor vehicle accident or fall) to end up in a nursing home. Thilo Kroll, Ph.D., of the National Rehabilitation Center for Health and Disability Research in Washington, D.C., interviewed 11 rehabilitation professionals at the Center about barriers to rehabilitation of this vulnerable group. The professionals saw no difference in treatment between the VASCI and NVASCI group. However, a complex interplay of physical, social, and economic barriers after hospital discharge—which include housing, transportation, insurance, and family and social support—limits the social participation of VASCI survivors. Many VASCI survivors

and their families do not have the financial resources to make their homes wheelchair-accessible or to pay for attendant care, or they live in public housing that is not wheelchair-accessible. Thus, many individuals with VASCI are discharged to or moved into nursing homes ill-equipped to meet the needs of these young people.

Mauksch, L.B., Dugdale, D.C., Dodson, S., and Epstein, R. (2008, July). "Relationship, communication, and efficiency in the medical encounter." (AHRQ grant HS13172). *Archives of Internal Medicine* 168(13), pp. 1387-1395.

Little is known about how physicians can combine effective relationship development and communications skills with time management to maximize efficiency in the medical encounter with the patient. The authors conducted a literature search to find studies reporting original data on the use of communication or relationship skills and their effects on time use or visit length. Based on their findings from nine studies, they created a clinical model to better understand how to assist physicians in communicating effectively without lengthening the visit. They singled out four skill sets providing ongoing influence: relationship development and maintenance, mindful practice, topic tracking, and acknowledgment of patient clues. Also, they identified three skill sets occurring in sequence: upfront collaborative agenda setting, understanding the patient perspective, and reaching mutual agreement on a plan. The main part of the article defines each of these skills, offers examples, shows pitfalls, and discusses how to avoid them.

Orzano, A. J., Ohman-Strickland, P.A., and Patel, M. (2008, July-September). "What can family medicine practices do to facilitate knowledge management?" (AHRQ grant HS14018). *Health Care Management Review* 33(3), pp. 216-224.

Creating an environment that allows members of a family practice to find, share, and develop information and knowledge across the practice may offer a framework to improve workplace satisfaction, productivity, and the quality of care, concludes this study. As a practitioner- and organizational-management-derived framework, knowledge management (KM) can enhance an organization's performance by improving workplace relationships. After developing a preliminary social-technical model of KM, the researchers had clinical and nonclinical staff of 13 practices fill out a Practice Staff Questionnaire that asked questions about KM and the extent to which it is facilitated by leadership promoting participatory decisionmaking, effective communications, and human resource processes. Practices that had greater participatory decisionmaking, human resource processes, and effective communications had greater odds of reporting satisfactory KM, even when practice members perceived their practice environment as being more chaotic. Efforts to improve these facilitators of KM should not require an infusion of additional or sophisticated resources into family practices. ■

Research Activities – 2008 Author Index

The following is an alphabetical listing of the first authors of journal articles, book chapters, and reports summarized in *Research Activities* during 2008. Month and page number(s) are given.

- Akincigil A, May, 25; Sep, 16
Alexander CG, Oct, 14; Nov, 26
Alonso EM, Dec, 19
Ammar KA, Feb, 17
Anderson BO, Jan, 6
Ani C, Jul, 14; Dec, 14
Anthony M, Nov, 17
Anzai Y, Apr, 14
Arbogast PG, Jul, 27
Argo JL, Nov, 11
Arora VM, Apr, 10; Nov, 26
Arozullah AM, Sep, 27
Atkins D, Jan, 14
Auerbach AD, Apr, 14
Austin EL, Jul, 27
Ay H, Apr, 23; Oct, 28
Bader JD, Oct, 28
Badrick E, Oct, 29
Bahensky JA, Oct, 16
Bailit JL, May, 26
Banthin JS, Jul, 18
Bao Y, Apr, 23
Barlow SE, May, 7, 8
Barry LC, Feb, 17
Basu J, Feb, 13; Sep, 11
Bayliss EA, May, 13
Bazargan M, Nov, 13
Bazargan-Hejazi S, Nov, 13
Beeber AS, Sep, 27
Bell JF, Dec, 9
Benedetti NJ, Oct, 16
Bennett AV, Dec, 11
Bertakis KD, Mar, 19
Bickell NA, Jan, 5
Bijur PE, Oct, 13
Bisson GP, Oct, 22, 23
Bito S, Jan, 22
Bolen SD, Oct, 21
Bonomi AE, Aug, 7; Sep, 4; Oct, 10
Boord JB, Jan, 8
Boratgis G, Jun, 5
Borders AE, Jan, 19
Bowen ME, Aug, 7
Boyce PS, Jun, 20
Boyington JE, Sep, 7
Brach C, Jul, 21
Bracken ME, Jan, 22
Brady J, Nov, 26
Bravata DM, Nov, 26
Brickhouse TH, Sep, 20
Brooks JM, Nov, 19
Brown HL, Jan, 6
Brown JF, Jul, 15
Brown SE, Mar, 19
Buckley J, May, 26
Bussey CG, Feb, 8
Calderon JL, Oct, 29
Callahan LF, Nov, 20
Calvocoressi L, Jul, 12
Camargo EC, May, 10
Cao CG, Oct, 18
Carey EC, Jun, 9
Carey K, Dec, 6
Carney PA, Feb, 17
Carpenter LR, Nov, 18
Carroll JM, Mar, 6; May, 26
Carroll KN, May, 26; Nov, 5
Castel LD, May, 5
Castle NG, Nov, 7
Caughey AB, Aug, 28
Cawley J, Apr, 2
Chan EC, Nov, 15
Chander G, Aug, 24
Chen RC, Aug, 10
Cheung K, Oct, 17
Chi C, May, 27
Cho YI, Sep, 11
Chou AF, Mar, 20
Chu M, Apr, 3
Clabaugh G, Jun, 18
Clancy CM, Mar, 20, 21; Apr, 23, 24; May, 27; Jul, 27; Aug, 28; Nov, 27
Clancy DE, Feb, 17, 21
Clark DE, Feb, 18
Clark LG, Aug, 16
Clement JP, Aug, 28
Coben J, Jul, 15
Cohen LA, Apr, 24
Cohen SB, Aug, 29
Cohn F, May, 27
Col NF, Aug, 29
Colmenero F, May, 27
Colon-Emeric CS, May, 9
Concannon TW, Jun, 19
Conrad D, Dec, 7
Conway PH, Jan, 2
Cook RI, Jul, 28
Cooper WO, Jan, 7; Oct, 3, 29
Coopey M, Apr, 24; May, 28
Corser W, Sep, 27
Cosby KS, Aug, 29
Cox ED, Jul, 28
Crane PK, Mar, 22
Crosson JC, Aug, 12
Crystal S, Jan, 15
Culler SD, Apr, 13
Curns AT, Dec, 24
Curtis JR, Feb, 18; Jun, 17; Jul, 28
Curtis LH, Jan, 15; Sep, 9
Cutler LJ, Apr, 12
Dailey AB, Oct, 10
Dalby DM, Nov, 27
Dansinger ML, May, 28
Davenport DL, May, 9
Davis RL, May, 6
Decker C, Jan, 19
DesHarnais S, Apr, 6
Devine S, Oct, 29
DeVoe JE, May, 19; Jul, 16, 17; Sep, 22; Dec, 1
Dickerson SS, Feb, 6
Dillard D, Feb, 18
Dobalian A, Mar, 22
Dohan D, Mar, 22
Dollarhide AW, Aug, 13
Donaldson N, Jun, 5
Dosssett LA, Sep, 22
Dougherty D, Aug, 29; Nov, 28
Drees M, Aug, 5
Du XL, Aug, 3; Nov, 5
Edwards J, Jun, 5; Nov, 28
Edwards RR, May, 28
Egede LE, Dec, 14
Egorova NN, Jul, 3
Elder NC, Jul, 4
Elkin EB, Dec, 12
Ellenbecker CH, Sep, 27
Elmore JG, Aug, 30
Encinosa WE, Sep, 1
Enriquez R, Apr, 6
Ensign J, Nov, 28
Epstein RM, Aug, 19
Fahrenkopf AM, Aug, 3
Fairbanks RJ, Mar, 11, 12
Fanjiang G, Apr, 16
Farquhar M, Jan, 23
Farwell WR, Apr, 8
Feifer C, May, 29
Feinstein JA, Jun, 7
Feldstein AC, Sep, 28
Ferranti J, Sep, 3
Filardo G, Mar, 23
Finkelstein JA, Jun, 8
Fiscella K, Apr, 17; May, 11; Nov, 28

continued on page 29

Author index

continued from page 28

- Fischer MA, Aug, 12
Flynn KE, Apr, 7
Fordwood SR, Sep, 17
Friedman AL, Jan, 23
Frueh C, May, 21; Jun, 14
Fry RB, Jul, 5
Fuhlbrigge A, Nov, 29
Galliher JM, Oct, 29
Garbutt J, Feb, 1; Jul, 2
Garrett B, Nov, 18
Geisinger KR, Jul, 29
Gelberg L, Jul, 29
Gibbons RD, Sep, 28; Oct, 30
Glance LG, May, 29; Jul, 29; Aug, 5
Glasgow RE, Dec, 24
Go AS, Apr, 24
Goff SL, Sep, 12
Goins WP, May, 17
Goldman LE, Feb, 12; Apr, 25
Goldstein RB, Jun, 25
Gonzales R, Nov, 16
Gonzalez JS, Mar, 10
Gorman JR, Oct, 30
Gozalo PL, Aug, 10
Grabowski DC, Nov, 18
Graham J, Feb, 19
Gray SH, Nov, 11
Green NS, Jul, 29
Greenstein AJ, Jun, 11
Gregory KD, Oct, 11
Grijalva CG, Jan, 15
Grizzle AJ, Apr, 13
Grossman E, Oct, 8
Grossman JM, Feb, 19
Gruber-Baldini AL, Jun, 9
Gupta R, Feb, 19
Haas JS, Jan, 7
Hall BL, Apr, 25
Han H-R, Feb, 20; Sep, 28
Handrigan M, Apr, 25
Hanmer J, May, 29
Harris CB, Feb, 20
Harrison MI, Apr, 26
Hartzema AG, Jun, 25
Hawes C, Apr, 11
Hawley ST, Nov, 14
Hawn MT, Nov, 10
Hazlehurst B, Nov, 29
Hearld LR, Oct, 30
Hellinger F, Jul, 16
Henderson G, Nov, 29
Heritage J, Aug, 19
Hernandez M, Apr, 12
Hicks LS, Aug, 13
Hill SC, Jun, 7; Jul, 30
Hirth RA, Aug, 23
Ho K, Nov, 3
Ho P-S, Aug, 18
Hobgood C, Jul, 3
Hodgkin D, Nov, 19
Hoff TJ, Nov, 2
Hohenhaus MH, Aug, 30
Hollingworth W, Aug, 14
Holmes WC, May, 14
Holmes-Rovner M, Mar, 23
Hoover DR, Nov, 6
Horn SD, Jan, 14
Houchens RL, Oct, 8
Howell EA, Sep, 5
Hsia RY, Jul, 19; Oct, 17
Hsieh M, Jul, 30
Hsu J, Dec, 25
Huang ES, Jun, 19; Oct, 18
Huang SS, Jan, 3
Hudak S, Nov, 7
Hudson JL, Apr, 3
Hughes MC, Apr, 15
Hughes RG, Apr, 26, 27; Jul, 30
Huskamp HA, Feb, 11
Hyle EP, Jul, 30
Jasti H, Dec, 25
Jensen PM, Sep, 28
Jerant A, Aug, 18
Jiang HJ, Jul, 6
Jodlowski D, Jan, 23
Jones M, May, 14
Joo MJ, Mar, 15
Kagen J, Jan, 4
Kaji AH, Dec, 21, 22
Kane RA, Apr, 12
Kane RL, May, 30
Kao LS, Aug, 30; Oct, 30
Kash BA, Feb, 7
Katz DA, Oct, 19
Kaushal R, Feb, 2
Kelly PJ, Jul, 31
Kent DM, May, 30; Jul, 31
Keohane CA, Jul, 31
Kern LM, Aug, 12
Keyhani S, Jun, 25
Kilbridge PM, Dec, 25
Kim E-Y, Sep, 29
Kim JY, Aug, 6
Kim MT, Oct, 6
Kim SE, Sep, 6
Klabunde CN, Nov, 14
Konetzka T, Apr, 9
Koppel R, Dec, 3, 8
Korthuis PT, Aug, 24
Kovac SH, Jul, 5
Koya DL, Sep, 14
Kraus S, Jul, 32
Krauss MJ, Feb, 3; Dec, 3
Kroll TL, May, 30
Kuhlthau K, Nov, 9
Kuo GM, Dec, 9
Kuppermann M, May, 6
Kurian BT, Jan, 4
Kushel M, Mar, 14
Labarere J, Feb, 20
Lafata JE, Jan, 16; May, 4
Lakshminarayan K, May, 31
Lambert MC, Apr, 27
Landon BE, Jan, 24; Jul, 14; Dec, 4
Lane DS, Nov, 15
Langfitt JT, Jan, 10; May, 31
Lanier D, Nov, 15
Lannon C, Jun, 5
Lanoue E, Nov, 30
Lapane KL, Aug, 13, 31; Sep, 29
LaPointe NM, May, 18; Oct, 19
Law MR, Sep, 18
Lee I, Nov, 30
Lee SJ, Apr, 10
Leonard CE, Nov, 29
Leppert PC, Apr, 27
Leverence RR, Feb, 21
Levin CA, May, 21
Levine SR, Jan, 24
Levy BT, Aug, 16
Li P, Jun, 2; Sep, 12
Liang H, Apr, 27
Liang L, Jul, 10
Lieberthal RD, Nov, 30
Lieu TA, Jan, 15
Lightdale JR, Dec, 11
Limbos MA, Jan, 5
Lin K, Jul, 12
Lindenauer PK, May, 11
Linder JA, Mar, 5
Lindrooth RC, Nov, 18
Ling BS, Nov, 14
Linkin DR, Jul, 32
Linnau KF, Mar, 16
Lipkus IM, Jul, 32
Lipowski EE, Aug, 31
Liu H, Sep, 14, 15
Liu L, Nov, 10
Lobach DF, May, 31
Lockley SW, Aug, 31
Longo DR, Apr, 28
Lopez-Olivo MA, Jun, 13
Lorch SA, Aug, 32
Lorh KN, Jan, 13
Love TE, Aug, 12
Lu CY, Oct, 14
Luo Z, Jun, 13
Ma CT, Jul, 10
Ma J, Sep, 29
Machtinger EL, May, 4
Mack JW, Mar, 6
Mackenzie CF, Feb, 11
Maclure M, Jan, 14
Madden JM, Dec, 12
Maddox TM, Apr, 15
Malone DC, Jan, 9
Manber R, Dec, 10

continued on page 30

Author index

continued from page 29

- Manski RJ, Sep, 20
Marcin JP, Mar, 12
Mark BA, Feb, 6, 7
Matheny ME, Apr, 28; Dec, 26
Maviglia SM, Jan, 9
Mazor KM, Jan, 14
McAuley WJ, Sep, 19
McCloskey LA, Aug, 32
McCormick DP, Jun, 25
McCormick MC, Nov, 3
McDaniel SH, Jun, 26
McGlynn EA, Aug, 25
McGowan JJ, Oct, 31
McWilliams JM, May, 20
Mechaber HF, Aug, 4
Mehta RH, Jan, 10
Melnyk BM, Jul, 32
Meropol SB, Aug, 21; Sep, 30; Oct, 4
Metjian Ta, Aug, 22
Metlay JP, Aug, 22
Meyerhoefer C, Apr, 2; Aug, 17; Sep, 6
Meyers D, Jul, 13
Miglioretti DL, Jun, 12
Miller CA, Apr, 4
Miller EK, Jul, 8
Miller G, Sep, 23
Minkovitz CS, Sep, 30
Mistry KB, Sep, 30
Mojtabai R, Dec, 17
Mongelluzzo J, Oct, 3
Mora PA, Jun, 26
Moreno C, Jun, 15
Morgan PA, Dec, 7
Morgan TM, Dec, 20
Mosdol A, Apr, 28
Moy E, Jul, 7, 33
Mugavero MJ, Apr, 18
Mullican C, Jun, 4
Murray DJ, Jul, 33
Nallamotheu BK, Apr, 18
Nease DE, Nov, 14
Nebeker JR, Jan, 15
Nelson H, Sep, 8
Nemeth LS, May, 16
Ness RB, Aug, 32; Nov, 31
Neuman HB, Dec, 18, 26
Neumann PJ, Oct, 31
Nguyen-Oghalai TU, Dec, 15
Nishisaki A, Mar, 9
Noe TD, Feb, 19
Noel PH, May, 13
Norlin C, Mar, 7
Nuckols TK, Mar, 2
Nutting PA, Jan, 24
O'Connor PJ, Jun, 10
Ohl ME, Oct, 24
Oken A, Jul 33
O'Leary JF, Apr, 29
Olfson M, Jun, 17; Oct, 2
Olson JR, Dec, 5
Olson MK, Oct, 9
O'Malley AJ, Apr, 29
Onega T, Sep, 21
Ornstein S, Dec, 5
Orom H, Jul, 8
Orzano, AJ, May, 16; Jun, 26
Osborn CY, May, 15
Osler T, Nov, 31
Owens PL, Dec, 16
Paez KA, Aug, 2
Panopalis P, Jun, 10
Parchman ML, May, 17
Parker CS, Feb, 10
Payne CH, Feb, 21
Pence BW, Apr, 17
Perry M, Jul, 34
Perry TT, Oct, 5
Persell SD, May, 15
Pfoh E, Jul, 9
Pierre-Jacques M, Oct, 31
Plantina LC, Jan, 24
Pletcher MJ, Feb, 4
Plomondon ME, Jun, 11
Politi MC, Apr, 7
Poon EG, Apr, 29
Popescu I, Dec, 19
Powell CK, Feb, 21
Powers BJ, Oct, 12
Pylypchuk Y, Oct, 31
Quigley DD, Nov, 31
Raab S, Dec, 26
Rabbani A, Dec, 21
Raebel MA, Feb, 22
Raji MA, Jun, 26
Ralston JD, Aug, 14
Raman G, Jan, 8
Ray WA, May, 19; Jun, 16
Reed PL, Mar, 23
Regenbogen SE, Mar, 3
Resnick B, Jun, 27; Aug, 11, 32
Reyes Ortiz, CA, Jan, 25
Rhodes KV, Sep, 18, 31
Richards KM, Sep, 31
Riegel B, Jul, 34
Rivara FP, Sep, 5
Rivard PE, Jun, 4
Rivera AJ, Oct, 32
Roberts LL, Feb, 8
Rodriguez HP, Jun, 27
Rodriguez MA, Sep, 3
Rogers AE, Sep, 2
Rose J, Jun, 27
Rose JS, Sep, 31
Rosen AK, Oct, 32
Rosenthal MB, Mar, 4
Rosko MD, Apr, 29
Rubenstein LV, Mar, 23
Rumptz MH, Jan, 25
Russell RB, Mar, 24
Rust G, Oct, 20
Saag KG, Dec, 17
Sabin JA, Nov, 9
Samore MH, Jan, 16
Sampson M, Dec, 26, 27
Sanne S, Jul, 13; Dec, 15
Sarkar U, Aug, 13
Savitz LA, Jun, 4
Sawchuk CN, Oct, 5
Scanlon DP, Dec, 6
Schneeweiss S, Jan, 16, 18
Schneider EC, Nov, 15
Schneider ES, Aug, 33
Schneider JA, Oct, 24
Schootman M, Aug, 23; Oct, 32
Schroy PC, Aug, 15
Schuster CR, Feb, 4
Scott-Cawiezell J, Feb, 22
Sedrakyan A, Jan, 14
Segal JB, Jan, 16
Selden TM, Oct, 15
Setoguchi S, Aug, 33
Shahinian VB, Aug, 33
Shamliyan TA, Aug, 8
Sharek P, Jun, 5
Shea AM, Jan, 11
Shen JJ, Mar, 24
Sherbourne CD, Aug, 20
Shone LP, Apr, 5
Silenas R, Oct, 33
Simon K, Nov, 19
Simon SR, Aug, 15
Singer S, Mar, 24
Singh H, Mar, 3
Singh-Manoux A, Oct, 33
Sinopoli D, Jun, 3
Skinner AC, Jul, 11; Sep, 7
Slonim AD, Jul, 20
Slora EJ, Aug, 6
Smith DH, Sep, 13
Smith RB, Jul, 20
Smith S, Jan, 13
Smith SR, Mar, 24
Srivastava R, Mar, 15
Stahl JE, Dec, 27
Starks H, Jun, 27
Stevenson DG, Feb, 9
Stewart AL, Feb, 22
Stewart KA, Apr, 30
Stille CJ, Nov, 16
Stitzenberg KB, Jan, 12
Stone PW, Feb, 23
Street RL, Apr, 8; Oct, 7, 22
Strom BL, Jan, 13
Strunin L, Apr, 19
Stukenborg GJ, Jul, 34
Stulberg J, Jun, 28
Suba EJ, Apr, 9

continued on page 31

Author index

continued from page 30

Subramanian S, Feb, 10
Sulkowski MS, Jul, 34
Sullivan AF, Jun, 28
Sussman AL, Dec, 27
Swanson KA, Apr, 16
Talbot TR, Jun, 28
Tan A, Mar, 25
Tanabe P, Sep, 16
Tang Z, Aug, 33
Taplin S, Nov, 6
Tate JE, Dec, 28
Taylor BB, Jul, 5
Teplin V, Feb, 23
Thomas JC, Sep, 23, 24
Thompson JS, May, 10
Tobias C, Jan, 25
Tolomeo P, Oct, 33
Trentham-Dietz A, Dec, 28
Trivedi AN, Aug, 34
Tucker AL, Dec, 6
Uding N, Jun, 28
Uronis HE, Dec, 28
Uy J, Aug, 25

Valdmanis VG, Dec, 6
Vanderbilt SK, Jul, 7
Van der Steen JT, Jan, 26
Vanderweil SG, Dec, 16
Van Pelt DC, Jan, 11
Vargas PA, Feb, 5
Vartak S, Jun, 29
Vistnes JP, Jul, 18
Vogelsmeier AA, May, 8
Volk RJ, Aug, 9
Wackerbarth SB, Mar, 25
Wagner L, Sep, 10
Wakefield DS, Jun, 29
Wall RJ, Jan, 17
Walsh KE, Dec, 8
Wang HE, Mar, 13
Wang PS, Nov, 8
Wang Y, Oct, 21
Waterman AD, Mar, 5
Weber V, Aug, 12
Weech-Maldonado R, Dec, 28
Weingart SN, Oct, 7
Werner RM, Dec, 29
Wells KB, Aug, 20
Wessell AM, Jun, 14

White AA, Dec, 2
Whitney SN, Jan, 26; Oct, 33
Wiegman R, May, 3
Wineman NV, Nov, 20
Winter L, Jun, 18
Wilson KB, Apr, 11
Wilt TJ, Aug, 8
Wisnivesky JP, Mar, 10
Wolfstadt JI, Jun, 29; Aug, 13
Wren TA, Jul, 35
Wright RM, Mar, 8
Wu AC, Dec, 29
Wyrich KW, Jun, 30
Xie X-J, Dec, 29
Yazdany J, Jun, 30
Yin W, Jul, 19
Yorita KL, Aug, 34
Yu F, May, 18
Zandieh SO, Jul, 9
Zapka J, May, 12
Zatzick DF, Oct, 34
Zaydfudim V, Dec, 30
Zhan C, May, 24; Jun, 6
Zhou X, Dec, 30
Zinn JS, Dec, 13 ■

Research Activities – 2008 Subject Index

The following is an alphabetical listing of research topics featured in *Research Activities* in 2008. Month of publication and page number(s) are given.

Abuse/Violence, Jan, 5; May, 23; Jun, 21; Aug, 7, 32; Sep, 3, 4, 5; Oct, 1

Access/Barriers to care, Jan, 12; Mar, 14, 22; Apr, 12; May, 15, 19, 22; Jul, 10, 11, 22; Aug, 18, 23; Sep, 21, 22; Nov, 30; Dec, 1, 7, 14, 20

Acupuncture (see complementary and alternative medicine)

Adolescent health, Apr, 2, 4; Jun, 15, 25; Sep, 7, 17; Oct, 2

Advance directives (see end-of-life treatment/issues)

Adverse events (see also medication errors), Jan, 15, 16; Feb, 2, 6; Jun, 29; Jul, 33; Aug, 13; Sep, 3; Oct, 7, 9; Nov, 30

AIDS/HIV, Jan, 19, 21, 25; Feb, 19; Apr, 17; May, 14, 15; Jun, 27; Jul, 16, 34; Aug, 24, 25; Sep, 23; Oct, 22, 23, 24

Alcoholism (see substance abuse)

Allergies, Mar, 10; Aug, 26; Oct, 5

Alternative medicine (see complementary and alternative medicine)

Arthritis/Osteoarthritis, Jan, 15, 20; Feb, 18; Jul, 28; Nov, 20, 22; Dec, 15, 17, 22

Asthma (see respiratory care/disease)

Attention deficit hyperactivity disorder, Apr, 3; Jun, 5

Back injury/pain/therapy, Mar, 22; May, 28

Bariatric surgery (see surgery)

Bioterrorism preparedness (see also public health preparedness), Mar, 22; Aug, 21

Breast cancer (see women's health)

Cancer, general (see also specific cancers), Jan, 7; Apr, 23; Jul, 8; Sep, 21; Oct, 7; Dec, 12, 28

Cardiovascular disease, Jan, 10; Mar, 20; Jul, 27

Care innovations/tools, Jun, 24

Caregiver stress, Jan, 11

Carotid endarterectomy (see surgery)

Centers for Education and Research on Therapeutics (CERTs), Jan, 2; Sep, 12; Oct, 14; Nov, 17; Dec, 17

Children's health (see infant/child health)

Cholesterol problems, Apr, 28; Aug, 27

Chronic conditions, Jan, 11, 24; Feb, 19; Mar, 10; May, 12, 13, 17, 31; Jun, 10; Jul, 13, 23, 25; Sep, 27; Oct, 20, 21; Dec, 14, 15

Clinical decisionmaking, Jan, 26; Mar, 23, 25; Apr, 7, 8; May, 12, 24, 30; Jun, 12, 13; Jul, 31; Aug, 9, 29; Nov, 27

Clinical decision support systems (see health information technology)

Clinical practice guidelines, Jan, 10, 11; Feb, 17; Apr, 24; Jun, 13

Cognitive function/impairment, Jan, 8, 26; May, 31; Jun, 9, 10, 26; Oct, 33

Collaborative care, Oct, 8, 17

Colon/colorectal cancer, Feb, 14; Mar, 25; Aug, 15, 16; Nov, 14, 15, 24

Community health centers, Oct, 8, 17; Nov, 20

continued on page 32

Subject index

continued from page 31

Complementary and alternative medicine, Jan, 8, 19; Nov, 13

Consumer education/views (see also patient counseling/education), Mar, 18; May, 5; Jul, 1; Aug, 1, 17; Sep, 6, 12; Oct, 16

Continuity/Coordination of care, Apr, 27; Jul, 5; Oct, 21

Convulsions, Mar, 17

Cost/Cost-effectiveness and financing of health care, Jan, 10; Feb, 11, 12, 13; Mar, 18; Apr, 1, 14, 20, 30; May, 14, 19; Jun, 13, 18, 19, 22; Jul, 16, 17, 18, 19; Aug, 10, 20, 26; Oct, 14, 15, 16, 17, 18, 25, 31; Nov, 18, 19, 21; Dec, 14

Deep vein thrombosis, Nov, 25

Delivery of health care (see also organization/staffing of health care), Mar, 15; Apr, 23, 27; May, 1, 24, 28, 29; Jun, 4; Aug, 11, 29; Nov, 28; Dec, 8

Dementia (see cognitive function/impairment)

Dental care/dentists, Apr, 24; May, 14; Sep, 20; Oct, 28; Nov, 23

Depression (see mental health)

Diabetes, Jan, 16, 21, 24; Feb, 17, 21; Mar, 10; Apr, 28; May, 17, 23; Jun, 10, 19; Aug, 1, 12, 13; Sep, 7; Oct, 20, 21; Nov, 21; Dec, 14, 24

Dialysis (see renal dialysis/disease)

Diarrhea, Nov, 17

Diet/nutrition, May, 28

Disability, Mar, 22; Apr, 27, 29; Jul, 23; Aug, 18

Disparities in care/health (see also minority and women's health), Feb, 4; Mar, 20; Apr, 1, 23, 24; May, 30; Jun, 21; Jul, 7, 33, 34; Aug, 2, 3; Sep, 6; Oct, 10, 13, 17; Nov, 22, 26, 27; Dec, 14

Drug alerts, Apr, 13; Aug, 13

Drug abuse (see substance abuse)

Drug costs (see medication costs)

Drug coverage/formularies/policies, Oct, 14; Nov, 19

Drug errors (see errors in medicine and medication errors)

Drug interactions, Jan, 16; Jul, 9

Effective health care, Mar, 21; May, 28

Elderly health/care, Jan, 7, 8, 16, 26; Feb, 11; Mar, 8; Apr, 9, 29; May, 8, 9, 12, 21; Jun, 9; Jul, 7, 23; Aug, 10, 11, 12; Sep, 9, 10, 11, 27, 28; Nov, 6, 7, 8; Dec, 12

Electronic health records (see health information technology)

Emergency/Urgent care, Jan, 2; Feb, 4, 11; Mar, 11, 12, 13; Apr, 20; Jun, 28; Jul, 15, 22; Aug, 22, 28, 29; Sep, 16, 18, 22; Oct, 17, 19; Nov, 13, 20, 27; Dec, 16

End-of-life treatment/issues, Jan, 7, 22; Mar, 6; Apr, 6; May, 12, 18; Aug, 10

Endotracheal intubation, Feb, 11; Mar, 13

Epilepsy, Jan, 10; Mar, 17; May, 31

Errors in medicine (see also patient safety), Jan, 1, 9; Feb, 1; Mar, 2, 3; Apr, 9; Jun, 6; Jul, 2, 3, 30; Sep, 1, 2; Oct, 9; Dec, 2, 3

Ethics, May, 27; Nov, 26, 28

Evidence-based medicine/practice centers, Mar, 8; Apr, 24; May, 27; Jul, 26, 32

Exercise, Apr, 2; Oct, 5

Falls, Feb, 3, Aug, 12; Sep, 10; Dec, 3

Fibromyalgia, Nov, 20

Fractures, Feb, 16; Mar, 16; May, 9

Gastrointestinal problems/procedures, May, 19

Genetics/Genetics testing, Jul, 24, 29; Aug, 28; Oct, 29; Nov, 25, 29; Dec, 20

Health care-associated infections, Jun, 22; Aug, 5; Nov, 1

Health care marketplace (see market forces)

Health care workforce, Feb, 6, 7, 23; Mar, 21, 24; May, 17; Jul, 30

Health care workplace, Jan, 9; Feb, 23; Mar, 21; Apr, 26; Oct, 18

Health/functional status, Aug, 11

Health information technology, Jan, 8, 9; Feb, 10, 19; Mar, 5, 23; Apr, 13, 16;

May, 8, 16, 18, 24, 27, 31; Jun, 25, 29; Jul, 32; Aug, 6, 11, 12, 13, 14, 15, 29; Sep, 12; Oct, 7, 16, 30; Nov, 25, 29; Dec, 7, 8, 9, 25, 30

Health insurance plans/status (see also managed care)

Enrollment, Apr, 5; Jul, 16, 30; Oct, 26; Nov, 23; Dec, 1

Evaluation of, Mar, 4, 18

General, May, 19; Jun, 22

Impact on care/health, Feb, 11;

May, 20; Jul, 11, 16; Sep, 20, 22; Oct, 16

Prescription/treatment coverage, Feb, 11; Jul, 17; Aug, 23, 29

State children's health

insurance programs, Apr, 5;

Jul, 11, 17, 18; Sep, 9, 20, 22

Health literacy, Feb, 21; May, 14, 15; Jul, 21, 24; Sep, 11, 27; Dec, 15

Heart disease

Angina, Jan, 19; Apr, 15, 20; Jun, 11; Dec, 20

Arrhythmia, May, 24

Atrial fibrillation, May, 18; Oct, 19

Congenital heart disease, Jul, 14

Defibrillators, May, 24

General, Jun, 30

Heart attack, Jan, 18, 19; Feb, 17;

Apr, 15, 18, 20; May, 11, 30;

Jun, 11, 19; Jul, 31, 34; Sep, 16;

Oct, 19; Dec, 19, 20

Heart failure, Mar, 24; Apr, 18, 24;

May, 12; Jun, 17; Jul, 30, 34;

Aug, 33; Sep, 9; Dec, 19

Pacemakers, May, 24

Pulmonary heart disease, Feb, 15

Hepatitis/liver disease, Mar, 24; Jul, 34; Sep, 14; Nov, 11; Dec, 27

Hernias, May, 10; Nov, 11, 12

Hip fracture/repair, May, 9

HIV/AIDS (see AIDS/HIV)

Home health care, Jun, 20; Sep, 19, 27; Nov, 27

Homeless population, Jul, 27, 29; Nov, 28

Hospice care (see end-of-life treatment/issues)

Hospitalists, Mar, 15; May, 11

continued on page 33

Subject index

continued from page 32

Hospitals

Cost/management, Feb, 12, 13; Mar, 15, 24; Apr, 9, 14; May, 11, 23; Jun, 2; Jul, 19; Sep, 12; Dec, 24
Discharge planning/problems, May, 11
Emergency preparedness, Oct, 1; Dec, 21, 22
General, Apr, 19
Length of stay, Feb, 7; Mar, 15; Apr, 14; May, 11; Aug, 32; Oct, 28
Quality of care, Mar, 6; Apr, 18, 25; May, 27; Jun, 29; Jul, 29, 34; Oct, 24, 30; Nov, 30; Dec, 19, 29
Safety, Feb, 3; May, 27; Jun, 2, 3, 4; Jul, 20; Dec, 6
Safety-net, Feb, 12
Staffing, Feb, 6, 7
Use of, Feb, 15; Jun, 19; Nov, 22

Hyperglycemia, Jan, 8

Hyperthermia, Sep, 25

Hypertension, May, 31; Jul, 13; Aug, 7, 13; Sep, 16, 28, 29; Oct, 6, 12, 21; Dec, 15

Imaging technology, May, 10; Jun, 12

Immunization (see also vaccines/vaccination)

Infant/child health

Abuse, Sep, 30
Asthma, Feb, 5; Mar, 15; Jul, 8; Oct, 3, 25; Dec, 10, 29
Behavior, Apr, 27
Birth defects, Oct, 29
Cerebral palsy, Jul, 35
Chronic illness, Mar, 6
Circumcision, Mar, 17
Dental care, Apr, 3; Jun, 21; Sep, 20; Nov, 23
Depression, Oct, 2
Ear infections (otitis media), Jun, 25; Sep, 30; Oct, 4
Family influences, May, 8; Jun, 7, 28; Jul, 10
Hearing loss, Sep, 8
Influenza, Jul, 8
Injury, Dec, 16
Low birthweight, Mar, 24; Apr, 6
Medication problems, Jan, 4; Feb, 2, 21; Mar, 12; Jun, 8; Jul, 9
Meningitis, Oct, 3
Neonatal/pediatric intensive care, Nov, 3

Newborn screening, Sep, 8
Obesity/weight problems, Feb, 5; May, 7; Nov, 4
Palliative care, Mar, 6
Preterm birth, Mar, 24; May, 6
Quality of care, Mar, 12; Dec, 7
Respiratory illness, Jun, 7; Nov, 5
Rotavirus infection, Dec, 28
Skin infections, Sep, 24
Special health care needs, Feb, 4; Mar, 7; Jun, 28
Strep throat, Jul, 9
Surgery, Jan, 4; Feb, 21; Mar, 3; Jun, 29
Terminal illness, Jun, 7
Urinary tract infections, Jan, 2
Video/computer game use, Sep, 30
Violence, Jan, 5

Infection control/isolation, May, 17; Jun, 28; Aug, 5

Influenza (see respiratory care/disease)

Injury, Feb, 3, 18

Insurance (see health insurance plans/status)

Intensive care (see also neonatal/pediatric intensive care under infant/child health), Jan, 8; Feb, 20, 23; May, 27; Jun, 3; Jul, 4; Aug, 33; Nov, 29

Kidney disease (see renal dialysis/disease)

Knee problems/replacement, May, 30

Long-term care

Costs, Feb, 7, 9
General, Feb, 10; Apr, 29; Jun, 27
Quality of care, Feb, 22; Mar, 8; Apr, 11, 12; May, 8, 9, 21; Jun, 9; Aug, 11; Sep, 10; Dec, 13
Staffing, Feb, 7, 22

Lung cancer, Jan, 17; Dec, 23

Lupus, Jun, 10, 30; Dec, 15

Malpractice/medical liability, Mar, 3; Jul, 3

Managed care (see also health insurance plans/status)
General, Feb, 4, 13; Mar, 20; Aug, 23; Oct, 14; Dec, 12, 28
Health maintenance organizations, Aug, 23; Dec, 4

Market forces, Nov, 18, 19

Medicaid, Jan, 3; Feb, 4; Apr, 25, 29; Jul, 16, 17, 18, 20; Aug, 10; Nov, 5

Medical devices/equipment, Mar, 11

Medical errors (see errors in medicine)

Medicare, Feb, 9, 13; Apr, 29; May, 20; Jul, 7; Aug, 10; Dec, 28

Medicare Part D Drug Plan, Feb, 9; Jul, 19; Dec, 12, 25

Medication

Adherence, Sep, 12, 13, 29; Oct, 31; Dec, 12
Anesthesia, Dec, 11
Angiotensin-converting enzyme inhibitors, Feb, 22
Antibiotics, Jan, 2; Jun, 8; Jul, 30; Aug, 6, 21, 22; Sep, 30; Oct, 3, 4; Nov, 10, 16; Dec, 16
Anticoagulant/antiplatelet agents, Feb, 10; May, 4, 18, 30; Jul, 1
Antidepressants, Jan, 4, 7; May, 6, 25; Jun, 13, 17; Aug, 17; Sep, 26, 28; Oct, 2, 30; Nov, 8, 19; Dec, 17
Antihypertensives, Aug, 7; Sep, 29; Oct, 21; Dec, 21
Antipsychotics, Sep, 18
Antirheumatic drugs, Jan, 15, 20; Feb, 18; Dec, 17
Asthma-related drugs, May, 29
Barcode scanning systems, Dec, 8
Cardiac-related drugs, Jan, 18; Apr, 24; Sep, 13, 16
Cardiovascular drugs, Jan, 18
Costs, Feb, 11; Mar, 18; Apr, 20; Oct, 14; Nov, 8; Dec, 21
COX-2 inhibitors, May, 19
Diabetes-related, Jan, 21; Mar, 18; Aug, 1
Errors, Jan, 9, 15, 23; Feb, 21; Mar, 2; Jun, 29; Jul, 32; Dec, 3, 8, 9
Growth hormone therapy, Sep, 14
HIV-related therapies, Feb, 19; May, 14, 15; Aug, 25; Oct, 22, 23
Hormone replacement therapy, Aug, 30
Lipid-lowering drugs, Feb, 19; Mar, 18; Aug, 27
Monitoring, Feb, 22; May, 4; Dec, 26
Nonsteroidal antiinflammatory drugs, Jan, 17; May, 19; Jul, 5
Opioids, Feb, 4; Oct, 13
Osteoporosis-related, Feb, 16; Mar, 8
Safety, Jan, 1, 9, 13, 14, 16, 21; Feb, 18; May, 4, 8, 27, 29; Jun, 17, 29; Jul, 23, 32; Aug, 21, 28, 31

continued on page 34

Subject index

continued from page 33

- Stimulants, Apr, 3
- Tumor necrosis factor alpha antagonists, Feb, 18; Jun, 17; Jul, 28
- Use, Jan, 3; Oct, 14
- Melanoma, Jan, 12, 25; Dec, 18
- Meningitis, Oct, 3, 26
- Men's health, Mar, 8; Apr, 8, 9; Jun, 1; Aug, 8, 9, 10, 33; Sep, 15; Oct, 12; Nov, 10, 31
- Mental health
 - Anxiety, Sep, 16
 - Bipolar disorder, Jun, 15, 16
 - Depression, Jan, 4, 7, 11; Mar, 10, 23; Apr, 16; May, 21, 25; Jun, 13, 16, 25, 26; Jul, 14; Aug, 3, 17, 18, 20, 21; Sep, 17, 18; Nov, 13; Dec, 14, 17
 - General, Apr, 21; Jun, 26; Jul, 15; Oct, 24; Nov, 6; Dec, 23
 - Post-traumatic stress disorder/stress, Feb, 18; May, 21; Jun, 14; Sep, 3
 - Psychiatric emergency, Sep, 18
 - Schizophrenia, Sep, 18
 - Suicide, Sep, 17, 28; Oct, 30
- Metabolic syndrome, Apr, 27
- Minority health
 - American Indians/Alaskan Natives, Feb, 18; May, 3; Sep, 21; Oct, 5
 - Asians/Pacific Islanders, Jan, 22; Feb, 20; Jul, 7, 21; Sep, 28, 29; Oct, 6
 - Blacks, Jan, 6, 7; Feb, 4; Apr, 3, 10; May, 15; Jun, 16; Jul, 5; Sep, 5, 7; Nov, 5, 13; Dec, 14
 - Children, Apr, 3; Oct, 31; Nov, 9
 - Disparities in care/health/insurance, Jan, 7; Feb, 4; Mar, 24; Apr, 17; May, 22, 26, 30; Jun, 16; Jul, 5; Aug, 2, 3; Sep, 11; Oct, 31; Nov, 9
 - Ethnic attitudes/differences, Mar, 22; Apr, 23, 26; Jul, 8, 34; Oct, 7; Dec, 29
 - Hispanics/Latinos, Jan, 6, 7; Feb, 4; Apr, 3; May, 2, 22, 23; Jun, 26; Oct, 30; Nov, 13, 22; Dec, 14, 28
 - Language barriers, Feb, 20; Mar, 22; May, 22
 - Women, Jan, 5, 6; Feb, 22; May, 26; Jul, 27, 33; Aug, 3; Sep, 5; Oct, 30; Nov, 5
- Musculoskeletal disorders, Jun, 13
- Neonatal intensive care (see infant/child health)
- Nurses/Nursing care, Jan, 23; Feb, 6, 24; May, 16; Jul, 4, 30, 31; Aug, 32; Sep, 2, 27; Nov, 3
- Nursing homes (see long-term care)
- Obesity (see also weight loss/management), Feb, 21; Oct, 21
- Organ donation/transplantation, Jul, 28; Dec, 19, 27
- Organization/staffing of health care, Aug, 32; Nov, 2; Dec, 7
- Osteoporosis, Feb, 16; Mar, 8; Aug, 30; Sep, 15
- Pain/pain management, Aug, 16; Sep, 31; Oct, 13
- Pancreatic problems, Nov, 11
- Patient counseling/education, Feb, 21; Mar, 19; Apr, 6, 7, 8; May, 3, 28; Aug, 16; Sep, 13; Oct, 6
- Patient participation, Apr, 16, 29; May, 2; Aug, 11
- Patient preference/satisfaction, Apr, 16, 28; Jun, 11, 18; Jul, 5; Aug, 14
- Patient safety (see also errors in medicine), Jan, 1, 13, 14, 15, 16, 22, 23; Feb, 1, 2, 3, 20, 23; Mar, 1, 2, 3, 4, 5, 20; Apr, 28; May, 4, 5; Jun, 2, 3, 4, 5, 6; Jul, 2, 3, 4, 5, 6, 20, 30; Aug, 3, 4, 5, 30, 31; Sep, 2, 3; Oct, 7, 8, 9, 18, 30, 32; Nov, 1, 2, 3, 30; Dec, 2, 3, 7
- Patient safety organizations, Mar, 1; Nov, 23
- Pay for performance, Feb, 12; Jun, 27, 28; Nov, 10
- Pertussis, May, 17
- Pharmaceutical research (see also medication and prescribing practices), Jan, 13, 14, 15, 16; Feb, 10, 11; May, 18, 19; Jun, 17; Aug, 21, 21, 31; Sep, 12, 13, 14; Oct, 13, 14; Nov, 17; Dec, 17
- Pharmacies/Pharmacists, Jan, 2, 9; Mar, 12; Jun, 25; Aug, 22, 28, 31; Nov, 27
- Physicians
 - Factors affecting practice, Jan, 22; Mar, 5; Jul, 7; Aug, 4
 - Performance, Mar, 21
 - Practice/Communication style, Mar, 7, 21; Apr, 6, 7, 8; May, 12; Jun, 26; Aug, 19; Nov, 10
 - Relationship to patient/community, Mar, 5, 7; Apr, 6, 7, 8; May, 26; Jul, 3; Aug, 19; Oct, 7, 22; Nov, 9; Dec, 2
 - Satisfaction, Aug, 4
 - Specialists/specialty, Mar, 7; Aug, 5; Nov, 9; Dec, 11
 - Training, Jan, 22; Mar, 3, 9, 21; May, 18; Jul, 33; Aug, 3; Oct, 18; Dec, 2
- Pneumonia (see respiratory care/disease)
- Practice-based research networks, Jun, 14; Aug, 31
- Pregnancy/childbirth (see women's health)
- Prescribing practices, Mar, 2; Jun, 17; Aug, 22; Dec, 16, 17
- Pressure ulcers, Nov, 7
- Preventive care/screening programs, Feb, 14; Apr, 4; Apr, 8, 9, 17, 23; Jun, 1; Jul, 12, 13; Aug, 9, 15, 16; Sep, 6, 8, 15; Oct, 12; Nov, 14, 15, 24; Dec, 3
- Primary care, Jan, 11, 24, 25; Feb, 21; Mar, 23; Apr, 14, 16, 17; May, 16, 17; Jun, 13, 14, 19, 26; Jul, 14; Aug, 16, 19, 20, 21; Oct, 21, 22; Nov, 14, 15; Dec, 5, 7
- Prostate cancer/problems, Mar, 8; Apr, 8, 9; Aug, 8, 9, 10, 33; Oct, 12; Nov, 10
- Public health preparedness, Mar, 22; Sep, 19, 23; Oct, 1, 33; Nov, 7, 20; Dec, 21, 22
- Quality improvement, Mar, 19, 23; Apr, 1; May, 1, 4; May, 16; Jun, 4, 5, 20; Jul, 6, 25; Aug, 20, 21; Oct, 18; Nov, 3, 26; Dec, 5
- Quality of care, Mar, 5, 20, 21, 25; Apr, 1, 10, 25, 29; May, 28; Jun, 4, 5; Jul, 14; Aug, 12, 30; Oct, 8; Nov, 26, 27; Dec, 4, 5, 6; Dec, 24
- Quality of life, Apr, 11; May, 6, 13, 29, 31; Jun, 30; Jul, 34; Dec, 19, 28
- Radiology (see imaging technology)
- Referral patterns, May, 26
- Renal dialysis/disease, Jan, 24; Feb, 19

continued on page 35

Subject index

continued from page 34

Research methods/issues, Jan, 25; Feb, 20; Mar, 20, 22; Apr, 25, 26, 29; May, 29; Jun, 27; Jul, 28, 32; Oct, 29, 33; Nov, 28, 29, 31; Dec, 26, 27

Respiratory care/disease

Asthma, Mar, 10, 23; Apr, 6, 23; May, 29; Aug, 26; Nov, 29; Dec, 16
Chronic obstructive pulmonary disease, Mar, 15; Apr, 21; Jul, 12
Influenza, Sep, 19, 23
Pneumonia, Feb, 20; Sep, 25; Dec, 25

Rural health/practice, Mar, 11, 22, 23; Apr, 28; May, 3; Jun, 2; Aug, 12; Oct, 16

Safety culture, Mar, 24

Satisfaction with care (see patient preference/satisfaction)

Sepsis, Mar, 13

Sexually transmitted disease, Apr, 4; Jul, 13; Aug, 32; Sep, 23, 24

Shingles, Feb, 15

Sinusitis, Apr, 14

Smoking/smoking cessation, Mar, 19; May, 26; Jul, 26; Sep, 31

Specialists (see physicians)

State snap shots, May, 1; Jun, 23

Stroke, Apr, 23; May, 10, 31; Jun, 11; Jul, 15, 22, 31; Oct, 12, 28; Dec, 15

Substance abuse, Jan, 22, 23; Mar, 19; Jun, 25; Jul, 10; Aug, 24; Oct, 24, 29; Nov, 13

Surgery

Bariatric, Jul, 27
Cardiac, Aug, 5
Carotid endarterectomy, Jun, 11
Endoscopic, Dec, 11
Errors, Sep, 1
General, Jan, 8; Mar, 21; Apr, 14; May, 9, 10; Jul, 3; Aug, 5, 28, 30; Nov, 10
Neurologic, May, 31
Pancreatic, Nov, 11
Prostate, Mar, 8

Telemedicine, May, 21; Jun, 14

Thyroid cancer/problems, Dec, 30

Translating research into practice, Apr, 25; Aug, 29; Sep, 28

Trauma, Jan, 22; Feb, 11; Mar, 16; Apr, 27; Sep, 22; Oct, 34; Nov, 31

Vaccines/Vaccination, Jan, 15; May, 17; Aug, 6; Sep, 14, 19, 23; Nov, 30

Value of health care, Mar, 18; Dec, 6

Venous Thromboembolism, Jan, 2

Weight loss/management, Apr, 15; May, 28; Sep, 6, 7

Workflow/workarounds, May, 8; Jul, 31; Aug, 14, 33; Dec, 8

Women's health

Breast cancer, Jan, 5; May, 5; Aug, 3; Sep, 6; Oct, 32; Nov, 25; Dec, 26, 28
Cervical cancer, Jul, 29; Sep, 6; Dec, 26
Cesarean delivery, Apr, 21; May, 26; Oct, 11
Chlamydia, Apr, 4; Aug, 32
Depression, Apr, 27; May, 6; Sep, 3; Dec, 10
Domestic violence, Aug, 32; Sep, 3, 4, 5, 31; Oct, 10
General, Sep, 15; Nov, 17
Hormone replacement therapy, Aug, 30
Hysterectomy, Feb, 23; Apr, 27
Mammograms, Feb, 17; Apr, 30; May, 12; Jul, 12; Aug, 23, 30, 34; Oct, 10; Nov, 6
Menopause, Aug, 29, 30
Ovarian cancer, Nov, 5
Pelvic inflammatory disease, May, 6; Aug, 32
Pregnancy/childbirth, Jan, 7, 19; Feb, 8, 22; Mar, 24; Apr, 6; May, 6, 26; Jul, 29; Aug, 7, 28; Sep, 3, 5; Oct, 11, 30; Dec, 9, 10
Urinary incontinence, Aug, 8 ■

Ordering Information

Most AHRQ documents are available free of charge and may be ordered online or through the Agency's Clearinghouse. Other documents are available from the National Technical Information Service (NTIS). To order AHRQ documents:

(*) Available from the AHRQ Clearinghouse:

Call or write:

AHRQ Publications Clearinghouse

Attn: (publication number)

P.O. Box 8547

Silver Spring, MD 20907

800-358-9295

703-437-2078 (callers outside the

United States only)

888-586-6340 (toll-free TDD service;

hearing impaired only)

To order online, send an e-mail to:

ahrqpubs@ahrq.hhs.gov

() Available from NTIS:**

Some documents can be downloaded from the NTIS Web site free or for a nominal charge. Go to www.ntis.gov for more information.

To purchase documents from NTIS, call or write:

National Technical Information Service (NTIS)

Springfield, VA 22161

703-605-6000, local calls

800-553-6847

Note: Please use publication numbers when ordering

To subscribe to *Research Activities*:

Send an e-mail to ahrqpubs@ahrq.hhs.gov with "Subscribe to *Research Activities*" in the subject line. Be sure to include your mailing address in the body of the e-mail.

Access *Research Activities* online at www.ahrq.gov/research/resact.htm

U.S. Department of Health and Human Services

Public Health Service

Agency for Healthcare Research and Quality

P.O. Box 8547

Silver Spring, MD 20907-8547

Official Business

Penalty for Private Use \$300



AHRQ Pub. No. 09-RA004

January 2009

ISSN 1537-0224