Research Activities

U.S. Department of Health and Human Services • No. 329, January 2008

Agency for Healthcare Research and Quality

Highlights

Departments

Regular Features

AHRQ releases toolkits to help providers and patients implement safer health care practices

The Agency for Healthcare Research and Quality (AHRQ) has released an array of toolkits designed to help doctors, nurses, hospital managers, patients, and others reduce medical errors. The 17 toolkits, developed by AHRQ-funded experts who specialize in patient safety research, are free, publicly available, and can be adapted to most health care settings. The toolkits range from checklists to help reconcile medications when patients are discharged from the hospital to processes to enhance effective communication among caregivers and with patients to toolkits to help patients taking medications.

The toolkits were developed through AHRQ's Partnerships in Implementing Patient Safety (PIPS) program. Researchers who developed the toolkits examined best practices in a variety of health care settings, including small rural facilities, large urban hospitals, health clinics, and hospital emergency departments. They also studied patient safety interventions among diverse populations, including children and older patients.

While some of the toolkits focus on identifying high-risk practices, others are designed to help health professionals reduce medication errors or other patient harms. Examples of the kinds of interventions that the toolkits promote include:

- The Re-Engineered Hospital Discharge "Project RED" toolkit standardizes the hospital discharge process through a set of manuals and software designed to improve communication between patients and clinicians.
- The Medications at Transitions and Clinical Handoffs "MATCH" toolkit focuses on identifying patient risk factors frequently responsible for inaccurate medication reconciliation, including limited English proficiency and low health literacy,

continued on page 2

Safer health care practices

continued from page 1

complex medication histories, or impaired mental status.

- The Preventing Venous Thromboembolisms in the Hospital and the Interactive Venous Thromboembolism Safety Toolkit for Providers and Patients toolkits focus on multidisciplinary approaches to the elimination of preventable hospital-acquired blood clots.
- The ED Pharmacist as a Safety Measure in Emergency Medicine toolkit focuses on improving medication safety and reconciliation through the implementation of a program that places pharmacists in hospital emergency departments.

In addition, the 17 PIPS toolkits correlate with the Joint Commission's National Patient Safety Goals, which promote system wide improvements in patient safety. For more information and a complete listing of the 17 toolkits, visit http://www.ahrq.gov/qual/pips. ■

Child/Adolescent Health

Antibiotics to prevent children's recurrent urinary tract infections have unclear benefits and potential risks

The American Academy of Pediatrics (AAP) recommends an imaging study after a child's first urinary tract infection (UTI) to detect vesicoureteral reflux (VUR). In VUR, which affects 30 to 40 percent of children with UTI, urine flows backwards from the bladder back up into the kidneys. If the child has VUR, the AAP recommends daily antibiotic prophylaxis to prevent recurrent UTIs. However, recent clinical trials have not shown a protective effect of this approach for preventing recurrent UTI and kidney scarring. Moreover, a new study raises concerns about the potential of this approach to breed antibiotic-resistant bacteria that can cause recurrent UTIs.

A team led by Patrick H. Conway, M.D., M.Sc., of the University of Pennsylvania and funded by the Center for Education and Research on Therapeutics, studied children (age 6 years and under) in a network of 27 primary care pediatric practices spanning 3 States. Of 74,974 children within the network, 611 had a first UTI and 83 had a recurrent UTI during the study period. The researchers examined risk factors for recurrent UTI and the association between antibiotic prophylaxis and recurrent UTI.

Prophylactic use of antibiotics was not associated with decreased risk of recurrent UTI, but was associated with increased risk of antibiotic resistance among children with recurrent UTI. White race correlated with double the risk of recurrent UTI, age 3 to 4 years nearly triple the risk, and age 4 to 5 years correlated with 2.5 times the risk of recurrent UTI. Mild VUR (grade 1-3) was not associated with increased recurrence risk but severe VUR (grade 4-5) was. The researchers concluded that the unclear benefits and potential risks of prophylaxis should be discussed with families and that more studies are needed to better understand this issue. Their study was supported in part by the Agency for Healthcare Research and Quality (HS10399).

More details are in "Recurrent urinary tract infections in children: Risk factors and association with prophylactic antimicrobials," by Dr. Conway, Avital Cnaan, Ph.D., Theoklis Zaoutis, M.D., M.S.C.E., and others, in the July 11, 2007 *Journal of the American Medical Association* 298(2), pp. 179-186. ■

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
Joel Boches, Design and Production
Karen Migdail, Media Inquiries

Contributing Editors: Mark Stanton, Karen Fleming-Michael, Janet Howard

Medicaid-insured parents could benefit from educational programs to promote more judicious use of antibiotics

Inappropriate use of antibiotics contributes to the growing problem of antibiotic-resistant infections. Yet some parents pressure doctors into prescribing antibiotics for children when they don't need it, for example, for viral infections that cannot be treated with antibiotics. Knowledge about appropriate use of antibiotics seems to be improving, but appears to be doing so more quickly among more socially advantaged populations. Parents of Medicaid-insured children may need more educational interventions to improve judicious antibiotic use, according to a new study.

Researchers conducted a 3-year, multicommunity educational intervention directed at parents of children under 6 years of age in 16 Massachusetts communities (8 intervention and 8 control communities). Parents in the eight intervention communities were mailed educational newsletters and exposed to educational materials during visits to local pediatric providers, pharmacies, and child care centers. The researchers compared responses from mailed parent surveys in 2000 (before the intervention) with those in 2003 (after the intervention) for both intervention and control communities.

Parental knowledge about antibiotics improved with time in both intervention and control communities. The educational campaign in intervention communities did not improve overall community-level parental knowledge about antibiotics beyond the general secular trend, except for the parents of Medicaid-insured children, whose knowledge increased as a result of the campaign. Also, there was evidence of a smaller secular trend of increased knowledge among this group compared with more socioeconomically advantaged groups. These two findings may indicate limited access of parents of Medicaid-insured children to health-related information from other sources. For example, the direct-to-consumer mailing in this study might have provided some Medicaid families with their first exposure to information related to the proper indications for antibiotics, as well as clarification of common parental misconceptions. In contrast, other more advantaged families might have received these messages through other channels. The study was supported by the Agency for Healthcare Research and Quality (HS10247).

More details are in "Parental knowledge about antibiotic use: Results of a cluster-randomized, multicommunity intervention," by Susan S. Huang, M.D., M.P.H., Sheryl L. Rifas-Shiman, M.P.H., Ken Kleinman, Sc.D., and others, in the April 2007 *Pediatrics* 119, pp. 698-706. ■

Free and fast—Subscribe to AHRQ's Electronic Newsletter!

If you want the latest information from AHRQ on new RFAs, research findings, conferences, and more, just subscribe to AHRQ's Electronic Newsletter. All you need is a computer and an e-mail address. Here's how:

1. Send an e-mail message to: listserv@list.ahrq.gov
2. In the subject line type: Subscribe
3. In the body of the message type: sub public_list-L your full name
4. That's it. You will receive an e-mail confirmation.

Questions? Please send an e-mail to Nancy Comfort in AHRQ's public affairs office at nancy.comfort@ahrq.hhs.gov

Also in this issue:

Researchers determine risk factors for deadly infection after open-chest surgeries in children

Children who require repairs to their hearts or lungs often undergo a surgical procedure called median sternotomy. The procedure provides surgeons access to those organs after they make an incision along the breast bone and then crack the bone. One rare complication of the surgery is mediastinitis, a potentially fatal infection of the mediastinum. This is the area between the lungs that includes the heart, large blood vessels, windpipe, esophagus, thymus gland, and connective tissues.

Researchers from the University of Pennsylvania Center for Education and Research on Therapeutics and Children's Hospital of Philadelphia studied medical records for 224 children, who underwent median sternotomies at the pediatric hospital to determine the risk factors for mediastinitis. The 43 children who developed the infection shared common characteristics, which may be used to determine who is at risk. First, the children frequently had underlying genetic syndromes or chromosomal abnormalities. These conditions may be associated with illnesses in addition to the cardiac condition, a weakened immune system, and more complex problems that required longer or more difficult surgeries.

The researchers also found that a score of four or more on the American Society of Anesthesiologists (ASA) classification scale was also a potential risk factor for mediastinitis. The ASA score places patients into six categories based on their health before surgery. A score of four indicates the patient has a severe systemic disease that is a constant threat to life.

The final risk factor was use of epicardial pacing wires for more than 3 days. Those wires are routinely inserted in the chest to manage irregular heart rhythms. The combination of the severity of the child's illness requiring the wires to be in place for a prolonged period and the presence of a foreign body may explain why the infection develops. This study was funded in part by the Agency for Healthcare Research and Quality (HS10399).

See "Risk factors for mediastinitis following median sternotomy in children," by Jessica Kagen, B.A., Ebbing Lautenbach, M.D., M.P.H., M.S.C.E., Warren B. Bilker, Ph.D., and others in the July 2007 *Pediatric Infectious Disease Journal* 26(7), pp. 613-618. ■

Regulatory warnings led to decreased use of antidepressants in children and adolescents in 2004 and 2005

According to a new study, regulatory warnings which cautioned that initiating antidepressants could potentially increase suicidal thoughts and behavior in children and adolescents led to fewer new pediatric prescriptions of antidepressants in 2004 and 2005. Two regulatory agencies, the United Kingdom (UK) Committee on Safety of Medicines (CSM) and the U.S. Food and Drug Administration issued the warnings in late 2003 and 2004. The CSM warning excluded fluoxetine (Prozac®), the one antidepressant whose efficacy has been established in children; however, it was included in the FDA warnings. The FDA warnings did not suggest avoiding antidepressants in pediatric patients, rather they recommended more intense therapeutic monitoring, note Wayne A. Ray, Ph.D., and colleagues at the Vanderbilt Center for Education and Research on Therapeutics.

Dr. Ray and colleagues studied antidepressant prescribing among children insured by TennCare, Tennessee's Medicaid program, during the period before the CSM warning (January 1, 2002 through December 31, 2003) and after the warning (January 1, 2004 through September 30, 2005). During the 2 years preceding the UK warning, the trend for new antidepressant users remained the same, with about 23 new users per 10,000 persons per month.

However, new users of all antidepressants decreased by 33 percent among both children and adolescents by 21 months after the UK warning. This was most pronounced among new prescriptions for the most common nonfluoxetine antidepressants, which decreased by 54 percent. In contrast, new users of fluoxetine, which was not included in the UK warning, increased 60 percent. There was no increase in discontinuations of antidepressants, and there was no evidence of substitution of other psychotropic drugs. Whether these prescribing changes are desirable is uncertain. The authors conclude there is an urgent need for better safety and efficacy data to guide pediatric antidepressant practice. This study was supported in part by the Agency for Healthcare Research and Quality (HS10384).

See "Effect of regulatory warnings on antidepressant prescribing for children and adolescents," by Benji T. Kurian, M.D., M.P.H., Dr. Ray, Patrick G. Arbogast, Ph.D., and others, in the July 2007 *Archives of Pediatric and Adolescent Medicine* 161(7), pp. 690-696. ■

Intervention programs that focus on already violent youth are more effective than other programs for reducing violent behavior

Tertiary intervention programs are more likely to report effectiveness than primary and secondary programs for reducing youth violent behaviors, concludes a systematic review of studies on the topic. Primary prevention programs aim to reduce risk behaviors associated with subsequent violence, such as substance abuse. Secondary programs focus on youth at increased risk for violence, such as those in impoverished neighborhoods. Tertiary programs focus on youth who have already engaged in violent behavior, explain researchers at the Southern California Evidence-based Practice Center. Researchers included 41 studies for review, 15 of which were randomized control trials (RCTs).

Overall, nearly half (49 percent) of interventions were effective. Of the RCTs, two of six (33 percent) primary interventions, three of seven (43 percent) secondary interventions, and two of two (100 percent) tertiary interventions were effective. One primary intervention, "Responding in Peaceful and Positive Ways," a skills building and conflict resolution program for 7th graders, reduced violent behavior 1 year later to 11.2 per 100 students compared with 23.1 for the control group. One of the three effective secondary intervention programs was the "Moving To Opportunity (MTO) Project." This demonstration project to relocate families from high- to low-poverty neighborhoods significantly lowered arrests for violent crimes among MTO teens compared with teens on the MTO waiting list.

One tertiary intervention program, "Turning Point: Rethinking Violence," educated male first-time violent crime offenders and their parents about the consequences of violence. The rate of second violent offenses was 0.05 for that group compared with 0.33 for the control group. The second tertiary intervention program was a multisystemic therapy program for juvenile offenders who met criteria for substance abuse and dependence. The mean 4-year conviction rate for aggressive crimes, such as assaults and strong-armed robbery, was 0.61 compared with 1.36 for the control group. The study was supported in part by the Agency for Healthcare Research and Quality (Contract No. 290-97-0001 and No. 290-02-0003).

See "Effectiveness of interventions to prevent youth violence: A systematic review," by Mary Ann Limbos, M.D., M.P.H., Linda S. Chan, Ph.D., Curren Warf, M.D., and others, in the July 2007 *American Journal of Preventive Medicine* 33(1), pp. 65-74. ■

Women's Health

Some women with breast cancer do not receive adjuvant treatments recommended by guidelines

Women with breast cancer do not consistently receive adjuvant treatments that have been shown to increase survival. Such treatments include radiotherapy after breast-conserving surgery, adjuvant chemotherapy for estrogen receptor-negative tumors, and hormonal therapies for estrogen receptor-positive tumors larger than 1 cm. A survey of surgeons at 6 New York hospitals treating 119 women, who did not receive guideline-recommended adjuvant therapy, points out some contributing factors contributing to this. In one-third (34 percent) of cases, surgeons did not recommend adjuvant treatment, most often because they perceived the risks exceeded the benefits (for example, due to patient frailty or age). Among the two-thirds of cases for whom surgeons did recommend therapy, 31 percent of the women declined treatment and in 34 percent of cases, the women didn't refuse, but care did not ensue and the physicians could not explain why care failed to happen.

Such system failures occurred more commonly among minority than white women (73 vs. 54 percent), and more commonly in women who were insured by Medicaid or were uninsured than

continued on page 6

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.

Breast cancer treatments

continued from page 5

those with Medicare or commercial insurance (54 vs. 19 percent). Women treated by a surgeon who worked closely with oncologists were less likely to experience a system failure (84 vs. 68 percent) than those treated by other surgeons.

These findings underscore the need for simultaneous development of different strategies to improve breast cancer treatments, conclude the researchers. They interviewed surgeons because surgeons typically perform the initial treatment for breast cancer, determine tumor stage, and review the findings with the patient. Their recommendations for subsequent referral to either radiation or medical oncology or willingness to prescribe hormonal therapy are pivotal. Yet, in many cases, surgeons were unaware whether their patient was resistant to taking adjuvant therapy (56 percent of patients), understood the risks and benefits of adjuvant treatment (54 percent), or could not tolerate adjuvant treatment (52 percent). The study was supported in part by the Agency for Healthcare Research and Quality (HS10859).

More details are in "Lost opportunities: Physicians' reasons and disparities in breast cancer treatment," by Nina A. Bickell, M.D., M.P.H., Felice LePar, M.D., Jason J. Wang, Ph.D., and Howard Leventhal, Ph.D., in the June 20, 2007 *Journal of Clinical Oncology* 25(18), pp. 2516-2521.

Editor's note: Another AHRQ-supported study on breast cancer (HS15756) describes the Breast Global Health Initiative to create an international health alliance to develop evidence-based guidelines for countries with limited resources to improve health outcomes. For more details, see: Anderson, B.O. and Carlson, R.W. (2007, March). "Guidelines for improving breast health care in limited resource countries: The breast health global initiative." *Journal of the National Comprehensive Cancer Network* 5(3), pp. 349-356. ■

Disadvantaged newly immigrant Hispanic women have much better birth outcomes than disadvantaged U.S. black women

Minority race and socioeconomic disadvantage for Hispanic women in the United States have not translated into rates of low birthweight and other poor pregnancy outcomes that afflict black women in this country. Rather, birth outcomes for Hispanic women are similar to or better than those for white women. This "Hispanic paradox" may be due to some protective factors of newly arrived immigrants, which may wane over time, suggest the authors of a new study.

The researchers analyzed the pregnancy outcomes of 10,755 Medicaid-insured women, who gave birth at the Duke University Medical Center between 1994 and 2004. Black women, who were younger, were more likely to have another medical condition while pregnant, to remain in the hospital for more than 4 days, and to have hospital charges over $7,500. Black women also had higher rates of preterm birth, small-for-gestational-age (SGA) infants, preeclampsia, and stillbirths. There were no racial differences in rates of gestational diabetes mellitus (GDM).

Compared with white women, Hispanic women were 34 percent less likely to have preterm births, and black women had 30 percent higher odds of preeclampsia and 74 percent higher odds of SGA infants. Since all the women were poor, Medicaid-insured patients, poverty, and insurance status did not explain these differences. Maternal overweight, GDM, and impaired glucose tolerance, common among Mexican-Americans, may provide some protection against low birthweight that might be anticipated as a result of poverty and reduced access to care. Future studies will determine whether acculturation will lead to loss of this perinatal advantage in the underprivileged Hispanic community. The study was supported in part by the Agency for Healthcare Research and Quality (HS13353).

More details are in "The 'Hispanic paradox': An investigation of racial disparity in pregnancy outcomes at a tertiary care medical center," by Haywood L. Brown, M.D., Monique V. Chireau, M.D., M.P.H., Yhenneko Jallah, M.S., and Daniel Howard, Ph.D., in the August 2007 *American Journal of Obstetrics & Gynecology* 197, pp. e1-e9. ■

Use of antidepressants by low-income pregnant women has jumped more than twofold, raising questions about fetal risks

A new study, supported in part by the Agency for Healthcare Research and Quality (HS10384), reveals a more than twofold jump in use of antidepressants among low-income pregnant women who were insured by Tennessee Medicaid (TennCare). The rise was mostly due to use of the new selective serotonin reuptake inhibitors (SSRIs), which were used by 10 percent of the women studied by 2003. The use of SSRIs during both early and late pregnancy has been linked to neonatal problems such as neurological and cardiovascular abnormalities. Thus, increased use of SSRIs among pregnant women raises concerns about fetal risks. It also underscores the urgent need for studies on these risks, explain researchers at the Vanderbilt Center for Education and Research on Therapeutics.

Researchers linked the pharmacy records of 105,335 pregnant women enrolled in TennCare from 1999-2003 to birth certificates. The proportion of pregnant women using antidepressants increased from 5.7 percent of pregnancies in 1999 to 13.4 percent in 2003, after adjustment for maternal age, race, parity, and other factors. This was largely due to greater use of SSRIs, which more than tripled from 2.9 percent of pregnancies in 1999 to 10.2 percent in 2003. Use of non-SSRIs increased as well, but to a lesser extent.

Overall, the 13.3 percent of pregnant women taking antidepressants in 2003 would translate nationally to about 180,000 fetuses exposed to antidepressants in the United States that year. For women giving birth in 2003, 10 percent took antidepressants during the first trimester, 6.4 percent during the second, and 5.9 percent during the third. Women older than 25 years, who were white, and had more than a high school education, were more likely to take an antidepressant during pregnancy. The most commonly prescribed antidepressants included sertraline (2.1 percent of pregnancies), paroxetine (1.9 percent), and fluoxetine (1.9 percent). This study may not be generalizable to other populations, given that the women studied were low-income, urban, young, and often teenage mothers.

See "Increasing use of antidepressants in pregnancy," by William O. Cooper, M.D., M.P.H., Mary E. Willy, Ph.D., Stephen J. Pont, M.D., and Wayne A. Ray, Ph.D., in the June 2007 American *Journal of Obstetrics & Gynecology* 196(6), pp. 544e1-544e5. ■

Elderly/Long-Term Care

Elderly cancer patients who live in minority communities use hospice care less than their counterparts in white communities

Hospice care can alleviate suffering at the end of life for patients with cancer. However, it remains underused, especially by blacks and Hispanics. Medicare-insured elderly patients with cancer who live in communities with a greater percentage of minorities are less likely to use hospice care than those who live in areas with fewer minorities, regardless of individual socioeconomic and clinical characteristics. A recent study suggests that there may be inadequate resources and services to provide hospice care in minority neighborhoods. For instance, pharmacies may not stock quantities of opioids needed to treat the severe pain that is often experienced by cancer patients at the end of life.

Researchers analyzed Surveillance, Epidemiology, and End Results (SEER) Medicare files for individuals dying from breast, colorectal, lung, or prostate cancer. They examined whether the racial composition of the census tract where an individual resided was associated with hospice use. Nearly half (47 percent) of individuals who lived in areas with fewer black and Hispanic residents used hospice compared with only one-third (35 percent) of those who lived in areas with a higher percentage of black and Hispanic residents.

Hispanics and blacks were 49 percent and 44 percent, respectively, less likely to use hospice if they lived in a census tract with a high percentage of both blacks and Hispanics than if they lived in a low minority tract. Blacks and whites were less likely to receive hospice care if they lived in a census tract with a high percentage of Hispanics than if they lived in a low minority area. These differences in hospice use may contribute to disparities in suffering at the end of life and

continued on page 8

Hospice care

continued from page 7

caregiver burden in high minority neighborhoods. Interventions to improve resources as well as the social acceptance of hospice care in minority communities may improve use of hospice care in the United States. The study was supported in part by the Agency for Healthcare Research and Quality (HS10856).

See "Lower use of hospice by cancer patients who live in minority versus white areas," by Jennifer S. Haas, M.D., M.S.P.H., Craig C. Earle, M.D., John E. Orav, Ph.D., and others, in the March 2007 *Journal of General Internal Medicine* 22, pp. 396-399. ■

The link between vitamin B levels and subsequent cognitive function remains unclear

Minimal data support an association between low blood levels of vitamins B-6 and B-12, and cognitive function in the elderly, according to a recent meta-analysis of studies on the topic. Although low baseline blood folate levels predicted poorer cognitive function at follow-up in the majority of studies, the poor quality and diverse methodology of studies diminished the validity of the finding reported. Thus, the link between vitamin B status and subsequent cognitive function remains unclear, conclude researchers at the Tufts New England Medical Center Evidence-Based Practice Center.

The researchers systematically reviewed studies that evaluated the link between folate, vitamin B-6, vitamin B-12, and cognitive function in the elderly. Of the 24 studies included in analysis, 16 were rated as only fair in quality. The majority of studies failed to report definitions of normal vitamin B ranges for the elderly and varied in their definition of low vitamin B status. The studies varied widely in the methods used to assess the same cognitive domains, making cross comparisons among studies unreliable.

Six of 10 folate studies reported a significant association between low baseline blood folate concentrations and subsequent poor global cognitive test performance; 4 of 9 folate studies found associations between low blood folate concentrations and increased prevalence of Alzheimer's disease. However, data supporting these associations was weak due to the use of diverse methods of assessing cognition and lack of standardized cut-points for categorizing low vitamin B status. The study was supported in part by the Agency for Healthcare Research and Quality (contract no. 290-02-0023).

See "Heterogeneity and lack of good quality studies limit association between folate, vitamins B-6 and B-12, and cognitive function," by Gowri Raman, Athina Tatsioni, Mei Chung, and others, in the July 2007 *Journal of Nutrition* 137(7), pp. 1789-1794. ■

Health Information Technology

A computer-based intravenous protocol can improve glycemic control in surgical ICU patients

Hyperglycemia (excessively high blood sugar levels) increases the risk of surgical site infections, leading to longer hospital stays and other problems. Therefore, precise glycemic control is recommended in surgical intensive care unit (SICU) patients. However, intravenous insulin protocols for strict glycemic control are complex, requiring frequent bedside glucose monitoring and repeated intricate calculations to titrate insulin doses. Standardized, nurse-managed, paper-based intravenous insulin protocols do not always produce optimal results.

A computer-based insulin infusion protocol improves glycemic control in SICU patients over a manual protocol, according to a new study. Researchers compared this manual approach with computer-based protocols that were integrated into a computerized provider order entry (CPOE) system, which was already being used by clinicians to manage their patients. The researchers reviewed glycemic control of adult patients admitted to an SICU during a 32-day manual protocol period, and later, during a 49-day computer-based protocol period. They found that the computer-based protocol reduced time from first glucose measurement to initiation of insulin protocol, improved the percentage of all SICU glucose readings in the

continued on page 9

Hyperglycemia

continued from page 8

ideal range, and improved control in patients on intravenous insulin for 24 hours or more. Hypoglycemia (excessively low blood sugar levels, less than 40 mg/dl) was rare in both groups. The study was supported in part by the Agency for Healthcare Research and Quality (HS10384).

See "Computer-based insulin infusion protocol improves glycemia control over manual protocol," by Jeffrey B. Boord, M.D., M.P.H., Mona Sharifi, Robert A. Greevy, Ph.D., and others, in the May/June 2007 *Journal of the American Medical Informatics Association* 14, pp. 278-287. ■

Studies examine pharmacy workload and medication errors and cost savings of hospital barcode medication systems

The more medications that community pharmacists dispense each day, the greater the likelihood of medication errors. Aside from the sheer volume of prescriptions they need to fill, community pharmacists are often interrupted by telephone calls from doctors or patients and questions from pharmacy support personnel or in-store customers, which may also influence medication errors. Indeed, higher pharmacist and pharmacy workload at community pharmacies does increase the risk of dispensing medications with the potential for drug-drug interactions (DDIs), concludes a study supported by the Agency for Healthcare Research and Quality (HS10385). Hospitals incur $2,200 in additional costs per adverse drug event, including DDIs, at a cost nationally of $2 billion per year. Implementing a barcode-assisted medication dispensing system in hospital pharmacies can result in a positive financial return on investment for the hospital, concludes a second AHRQ-supported study (HS14053). Both studies are briefly discussed here.

Malone, D.C., Abarca, J., Skrepnek, G.H., and others. (2007, May). "Pharmacist workload and pharmacy characteristics associated with the dispensing of potentially clinically important drug-drug interactions."*Medical Care* 45(5), pp. 456-462.

Community pharmacies and pharmacists with a greater workload are more likely to dispense medications with potential DDIs (such as coprescribing the anticoagulant warfarin with nonsteroidal anti-inflammatory drugs), according to this study. The researchers analyzed the association between pharmacist workload and pharmacy characteristics of 672 community pharmacies with dispensing of medications with potential DDIs over a 3-month period.

Pharmacies were typically fairly busy. They filled an average of 1,375 prescriptions per week and submitted 17,948 pharmacy claims to participating pharmacy benefit managers. They had 1.2 full-time-equivalent pharmacists per hour the pharmacy was open, and pharmacists processed a mean of 14 prescriptions per hour.
The relative risk for dispensing a potential DDI increased by just over 3 percent for each additional prescription processed per pharmacist hour and by 10 percent for each additional prescription per pharmacy staff hour.

These results suggest that as pharmacists become busier, they have less time to evaluate DDI warnings or to act on those warnings. Pharmacies with automated telephone systems for prescription orders were also significantly more likely to dispense medications with potential DDIs. Pharmacies with higher rates of dispensed potential DDIs were also more likely to have computer systems that provided DDI alerts and clinical information.

Maviglia, S.M., Yoo, J.Y., Franz, C., and others. (2007, April). "Cost-benefit analysis of a hospital pharmacy bar code solution." *Archives of Internal Medicine* 167, pp. 788-794.

Barcoding of medications can reduce hospital pharmacy dispensing errors that typically involve the incorrect medication, strength, or dosage form. For example, after implementing a barcode-assisted dispensing system, one hospital pharmacy reduced the rate of potential adverse drug events (ADEs) from dispensing errors by 63 percent (from 0.19 to 0.07 percent). In addition, implementation of this system resulted in a positive financial return on investment for the hospital, according to this study.

The authors performed a cost-benefit analysis of the medication barcode system within a large hospital pharmacy. They examined the net financial cost and benefit of implementing the system over a 5-year period. In inflation- and time-value-adjusted 2005 dollars, total costs during 5 years were $2.24 million ($1.31 million in one-time

continued on page 10

Hospital barcode medication systems

continued from page 9

costs during the initial 3.5 years and $342,000 per year in recurring costs starting in year 3).

The primary benefit was a decrease in ADEs from dispensing errors (517 ADEs averted annually), resulting in an annual savings of $2.2 million. The net benefit after 5 years was $3.49 million. The break-even point for the hospital's investment occurred within 1 year after the system became fully operational. ■

Outcomes/Effectiveness Research

Successful epilepsy surgery reduces health care costs

About 20 to 30 percent of epilepsy patients in the United States have continued seizures despite medication (medically intractable epilepsy, MIE). These intractable cases account for 42 percent of the estimated $1.7 billion in epilepsy's annual direct medical costs. Surgery is increasingly being used to treat refractory epilepsy, with the number of surgical epilepsy centers having increased substantially in the last 15 years. Not only is surgery effective for many patients, but a new study found that health care costs decline after successful epilepsy surgery.

John T. Langfitt, Ph.D., of the University of Rochester, and colleagues examined the medical records of 68 patients with temporal lobe epilepsy (TLE) at multiple clinical centers. They examined health care costs for the 2 years prior to and 2 years after surgical evaluation. Antiepileptic drugs (AEDs) accounted for more than half of the costs of care in the pre-evaluation period. Total costs for seizure-free patients had declined 32 percent by 2 years following surgery due to less use of AEDs and inpatient care.

Costs did not change in patients whose seizures persisted, whether they had surgery or not. In the 18 to 24 months after evaluation, epilepsy-related costs were $2,068 to $2,094 in patients with persistent seizures versus $582 in seizure-free patients. Thus, epilepsy surgery that completely controlled seizures resulted in a substantial reduction in health care costs by 2 years after surgery. Further cost reductions in seizure-free patients can be expected as the patient is able to stop taking antiepileptic drugs. The frequency and intensity of outpatient care can also be expected to decline. If epilepsy surgery is to be cost-effective from a public health perspective, it is important to select patients for surgery evaluation who are most likely to become seizure-free after surgery, conclude the researchers. Their study was support in part by the Agency for Healthcare Research and Quality (HS09986).

More details are in "Health care costs decline after successful epilepsy surgery," by Dr. Langfitt, R.G. Holloway, M.D., M.P. McDermott, Ph.D., and others, in the April 17, 2007 *Neurology* 68, pp. 1290-1298. ■

Following recommended guidelines to manage cardiovascular disease improves patient outcomes

Much progress has been made in the treatment of cardiovascular disease (CVD). Despite this, CVD has remained the leading cause of death and disability in the United States due to the aging population and combined epidemics of obesity and diabetes. The more recommended clinical guideline practices that physicians follow to manage cardiovascular disease, the better their patient outcomes, concludes a new study. The researchers conducted a comprehensive analysis of studies of the use of clinical performance measures derived from clinical practice guidelines and CVD outcomes.

Mortality rates were lower among CVD patients who received evidence-based medications at optimal doses compared with patients who were not given evidence-based medications or who took them at suboptimal doses. Also, decreased mortality was proportional to the number of appropriate therapies received (of all possible indicated therapies). Patients who received all indicated treatments were likely to have lower mortality rates than those who received few or no such therapies.

Furthermore, a change in compliance with guideline recommendations was associated inversely with a change in mortality. This review offers

continued on page 11

Cardiovascular disease

continued from page 10

evidence that higher quality of care, as documented by clinical guideline-based performance measures, improves survival in patients with CVD. However, many patients still do not receive optimal care resulting in deaths that could be prevented, conclude the researchers. Their study was supported in part by the Agency for Healthcare Research and Quality (HS10548).

See "Performance measures have a major effect on cardiovascular outcomes: A review," by Rajendra H. Mehta, M.D., M.S., Eric D. Peterson, M.D., M.P.H, and Robert M. Califf, M.D., in the May 2007 *American Journal of Medicine* 120, pp. 398-402. ■

Informal caregiving for survivors of critical illness takes a toll on the health and lifestyle of caregivers

Previous studies of post-intensive care unit (post-ICU) informal caregivers have demonstrated that burden is common, and can be manifested in many ways including depression and reduced employment. It is unclear, however, whether caregiver burden occurs as a direct result of the patient's critical illness, when, in fact, the measured burden may be due to conditions that preceded the patient's illness. University of Pittsburgh researchers examined whether informal caregiver burden occurs as a direct result of critical illness. They compared those caring for patients who were previously healthy (59 percent), with those caring for patients who were physically disabled (41 percent) before their episode of critical illness. The researchers measured patient and caregiver outcomes at 2, 6, and 12 months after the patient's mechanical ventilation. Most patients were men in their midfifties and most caregivers were women about the same age.

Over the course of the 1-year study, the proportion of functionally dependent survivors decreased from 91.2 percent at 2 months to 78.1 percent at 6 months to 69.6 percent at 1 year. The respective proportion of patients living at home increased from 49.6 percent at 2 months to 77.4 percent at 6 months to 88.0 percent at 1 year. Caregivers reported spending nearly 6 hours per day providing assistance for most the study period, most often helping with problem solving, shopping, laundry, housekeeping, and finance management.

At 2 months, one-third of caregivers were at risk of depression, only 29 percent of caregivers were employed, and 13 percent indicated that they had stopped working in order to provide care. Caregivers reported moderate or great restriction in a mean of 3.5 lifestyle activities. The prevalence of caregiver depression risk was high at 2, 6, and 12 months (33.9, 30.8, and 22.8 percent, respectively), and did not vary by patient pre-ICU functional status. This suggests that the burden observed among these informal caregivers occurs as a direct result of the patient's critical illness. Lifestyle disruption and reduced employment were also common and persistent.

The study was supported in part by the Agency for Healthcare Research and Quality (HS11620).

See "Informal caregiver burden among survivors of prolonged mechanical ventilation," by David C. Van Pelt, M.D., Eric B. Milbrandt, M.D., M.P.H., Li Qin, Ph.D., and others, in the January 15, 2007 *American Journal of Respiratory and Critical Care Medicine* 175(2), pp. 167-173. ■

Primary Care Research

Internal medicine physicians find it more difficult to apply clinical guidelines to patients with multiple medical conditions

According to a Web-based survey of 201 internal medicine physicians, 75 percent feel that disease-specific clinical guidelines were suitable and able to be implemented for at least half of their patient population. However, many physicians cited document length and format more often than institutional or system-level variables (for example, policies and resources) as factors that interfered with guideline implementation. Doctors often have difficulty finding enough time to review full-text guideline documents and may prefer summary or "pocket" versions, suggest the researchers.

continued on page 12

Clinical guidelines

continued from page 11

A majority (71 percent) of internal medicine physicians believed that guideline committee member participation in industry-funded research introduced bias into guideline content. Less than half the doctors thought that conflicts of interest were successfully managed in the guideline development process. Three-fourths of physicians agreed that guideline-based performance measures encouraged evidence-based practice. Yet, many still had reservations about being measured against such tools.

With regard to the treatment of patients with cardiovascular disease, internal medicine physicians rated their individual guideline compliance as equal to that of their cardiology colleagues. Determining the best way to provide guidance regarding treatment of patients with multiple medical conditions and developing guidelines that are perceived as insulated against industry influence will make guidelines appear more practical and trustworthy, conclude the researchers. Their study was supported by the Agency for Healthcare Research and Quality (HS10548).

See "Use and perceptions of clinical practice guidelines by internal medicine physicians," by Alisa M. Shea, M.P.H., Venita DePuy, M.Stat., Joseph M. Allen, M.A., and Kevin P. Weinfurt, Ph.D., in the May 2007 *American Journal of Medical Quality* 22(3), pp. 170-176. ■

For patients with melanoma, longer distance to a provider means later stage of diagnosis

Melanoma is a potentially deadly form of skin cancer, and early diagnosis is critical to survival. For example, if diagnosed when the melanoma is less than 1 mm thick (Breslow thickness), the 5-year survival rate is over 85 percent compared with less than 50 percent for 4 mm melanomas. Longer travel distance to a provider who can diagnose melanoma means the cancer is diagnosed at a later stage, suggests a new study. Researchers found that each 10-mile increase in distance corresponded to a 6 percent increase in Breslow thickness. Also, patients who traveled more than 15 miles had 20 percent thicker tumors on average than patients who traveled 15 miles or less.

Researchers geocoded the street addresses of patients with at least 1 invasive melanoma and providers from 42 North Carolina counties. They examined the association between Breslow thickness and sociodemographic factors, provider supply, and distance to a diagnosing provider. Within a given region, some patients traveled short distances while others traveled much longer distances to their providers.

The median Breslow thickness of 643 eligible cases was 0.6 mm. The median distance to a diagnosing provider was 9 miles, with a range of 0 to 386 miles. For each 1 mile increase in distance, Breslow thickness increased by 0.6 percent. Breslow thickness was also associated with age. It was 19 percent greater for patients aged 51 to 80 years than for those aged 0 to 50 years. Patient sex, rurality of location, and supply of dermatologists were not associated with Breslow thickness. However, the median Breslow thickness for cases diagnosed by dermatologists (0.5 mm) was significantly less than that diagnosed by surgeons (1.04 mm) or by other providers (0.62 mm). The study was supported in part by the Agency for Healthcare Research and Quality (T32 HS00032).

See "Distance to diagnosing provider as a measure of access for patients with melanoma," by Karyn B. Stitzenberg, M.D., M.P.H., Nancy E. Thomas, M.D., Ph.D., Kathleen Dalton, Ph.D., and others, in the August 2007 *Archives of Dermatology* 143(8), pp. 991-998. ■

Journal supplement explores alternative research approaches to test drug safety and effectiveness

Though the prescription drug benefit (Part D) received a large amount of media attention when Congress passed the Medicare Modernization Act of 2003, Section 1013 of the act has important health implications as well. Because the Federal government became a major payer for prescription drugs, that section called upon the skill sets of the Agency for Healthcare Research and Quality (AHRQ). As the lead Federal agency for improving the quality, safety, and effectiveness of health care, the Agency was asked to conduct research to increase knowledge about the risks and benefits of drug therapies to improve health care decisions.

To implement Section 1013, AHRQ sponsored a 2-day symposium in June 2006 for researchers to present approaches to designing studies, identifying data sources, and developing methods for studying outcomes, safety, and effectiveness. In October 2007, the journal *Medical Care* 45(10) published the symposium proceedings as a supplement. The supplement is a resource for scientists studying the safety and effectiveness of treatments. It brings together national experts in the field to spark a national discussion on how science can provide information on improving health outcomes and public health. The papers written by AHRQ and AHRQ-supported researchers are briefly summarized here.

Smith, S., "Preface," pp. S1-S2.

AHRQ created the Effective Health Care program to meet the requirements of Section 1013. The author of the supplement's preface, who works for AHRQ's Center for Outcomes and Evidence, explains how the program's three components work together to compile, evaluate, develop, and disseminate scientific evidence on the effectiveness of treatments. Evidence-Based Practice Centers review scientific evidence about the effectiveness of treatments and pinpoint gaps in the evidence. Filling those gaps with new research and new methods falls to the DEcIDE (Developing Evidence to Inform Decisions about Effectiveness) research network and the Centers for Education and Research on Therapeutics. Finally, the John M. Eisenberg Clinical Decisions and Communications Science Center takes scientific findings and puts them into lay language to share with diverse audiences.

Lorh, K.N., "Emerging methods in comparative effectiveness and safety: Symposium overview and summary," (AHRQ contract 290-05-0036-1), pp. S5-S8.

In this symposium summary, the author explains that current methods for collecting safety and effectiveness data are lacking, because they either limit generalizability or are based on subjective observations. Cluster randomized trials, which can be employed in different regions or health care settings and systems, are valuable for evaluating outcomes from actual use. Databases can also be mined to look at the pros and cons of medications when they are prescribed, and if they are taken. With more drugs being pulled from formularies because of their negative health effects, surveillance systems for monitoring adverse events can serve as sentinels for safety problems. Finally, using research approaches that reduce bias (error caused by encouraging one outcome over another) and confounding (interference by a variable that affects the study's conclusions) can allow researchers to make recommendations on the safest, most effective therapies.

Strom, B.L., "Methodologic challenges to studying patient safety and comparative effectiveness," (AHRQ contract 290-05-0036-1), pp. S13-S15.

Study methodologies that address patient safety and drug effectiveness can encounter many difficulties. The author explains the issues of selection bias, misclassification of exposure or outcomes, confounding, and logistical challenges. Data access, in particular, continues to be a logistical problem. For example, researchers like the idea of having access to data collected for Medicare Part D (the prescription drug benefit) and Medicare claims data, because they contain numerous variables and cover a large, stable population. However, no access has been granted to the Federal data, nor is there any indication that it will be. Other logistical challenges include obtaining Institutional Review Board approval and convincing people that studies on patient safety and comparative effectiveness need to be conducted.

continued on page 14

Drug safety and effectiveness

continued from page 13

Atkins, D., "Creating and synthesizing evidence with decision makers in mind: Integrating evidence from clinical trials and other study designs," pp. S16-S22.

Just as bacteria cultures have been the gold standard for laboratories, randomized controlled trials (RCTs) remain the gold standard for testing the efficacy of new drugs and medical procedures. However, the RCT format cannot provide physicians complete information on risks and benefits for patients or help assess the repercussions of adopting policies on certain medical therapies. The author, who works in AHRQ's Center for Outcomes and Evidence, demonstrates the limitations of RCTs. The researcher sifted through the results of multiple RCTs to determine what would seem to be simple answers. He posed the question of whether low-dose daily aspirin would help a 60-year-old woman with mildly high blood pressure. (Answer: It wouldn't.) He also looked at RCT results to determine if the risks of performing carotid artery surgery outweighed the benefit of preventing a stroke if the patient had no symptoms. (Answer: It depends on the patient.) He suggests that improvements in care would occur if cohort and case-control designs, disease and intervention registries, outcomes studies using administrative databases, and quality improvement methods were used. Reprints (AHRQ Publication No. 08-R012) are available from AHRQ.*

Sedrakyan, A. and Shih, C., "Improving depiction of benefits and harms: Analyses of studies of well-known therapeutics and review of high-impact medical journals," pp S23-S28.

Researchers presenting their findings on therapeutics in medical journals would better serve their readers by consistently presenting clear proof of the benefits and harms the therapy offers. During a literature review, the authors from AHRQ's Center for Outcomes and Evidence found that one in three studies that reports this information does not use the same measurement tools. This hampers clinicians' ability to accurately communicate with patients. The authors look at well-known therapeutics and side effects, such as hormone replacement therapy and stroke, to show that relative risk estimates (high risk and low risk) are not helpful in communicating to patients the chances of having an adverse event. Reprints (AHRQ Publication No. 08-R013) are available from AHRQ.*

Mazor, K.M., Sabin, J.E., Boudreau, D., and others, "Cluster randomized trials: Opportunities and barriers identified by leaders of eight health plans," (AHRQ grant HS10391), pp. S29-S37.

When researchers test therapeutics for safety and efficacy, they commonly conduct randomized controlled clinical trials and use observational methodologies. Cluster randomized trials (CRTs) have been offered as an alternative to these traditional methods. This is because they evaluate outcomes by studying actual use in clusters of study subjects who can be dispersed, for example, throughout a region or among different care settings. The authors interviewed 34 health plan leaders from 8 health plans and learned that these individuals agree on the need to study the effectiveness of therapeutics in real-world situations. However, they also zeroed in on barriers to conducting these studies, including costs, perceptions of these trials, physician prescribing habits, and formulary changes.

Maclure, M., Carleton, B., and Schneeweiss, S., "Designed delays versus rigorous pragmatic trials: Lower carat gold standards can produce relevant drug evaluations," (AHRQ contract 290-05-0016), S44-S49.

The authors discuss the merits of designed delayed pragmatic randomized trials (PRTs). These trials allow policymakers to have a large say in how trials are conducted. For example, the trials are conducted with patients in real-world settings and let factors, such as the stop and start dates, fluctuate after negotiation with policymakers. After conducting these types of trials, the researchers found that policymakers are receptive to design delay trials because they are simple and don't cost as much as traditional trials. Issues surrounding this kind of trial include ethics concerns, timing, and the actual policies being tested in the trial. Further, research results on drug safety and effectiveness may be less generalizable because they are not conducted with selected patients in purer settings.

Horn, S.D. and Gassaway, J., "Practice-based evidence study design for comparative effectiveness research," (AHRQ grant HS15350), pp. S50-S57.

In keeping with this issue's theme of offering alternatives to traditional clinical studies, the author describes a study method called practice-based evidence for clinical practice improvement (PBE-CPI). This approach captures real-world variation in clinical practice using data documented by

continued on page 15

Drug safety and effectiveness

continued from page 14

medical providers. Data are able to show the effectiveness of combinations of interventions in various patients, something traditional trials do not test. The low cost of using existing data and point-of-care documentation makes PBE-CPI less expensive than traditional studies. For example, PBE-CPI studies to date have had sample sizes ranging from 1,000 to 2,500 patients and have cost between $1 and $5 million. Traditional randomized controlled trials with similar sample sizes can cost more than 20 times as much and answer fewer questions.

Crystal, S., Akincigil, A., Bilder, S., and Walkup, J., "Studying prescription drug use and outcomes with Medicaid claims data: Strengths, limitations, and strategies," (AHRQ grants HS16097 and HS11825), pp. S58-S65.

Data housed in Medicaid databases offer abundant information on prescription drug use among low-income, minority, elderly, and disabled populations that often is not captured by randomized clinical trials. After reviewing studies that relied on Medicaid data, the researchers developed a list of "best practices" for using the data and checking its validity, for choosing statistical models, and for improving Medicaid datasets. The researchers propose a program that links multiple databases that house claims data, disease registries, surveys, electronic medical record data, and birth and death records to provide researchers a national research database on prescription drug use and safety.

Grijalva, C.G., Chung, C.P., Arbogast, P.G., and others, "Assessment of adherence to and persistence on disease-modifying antirheumatic drugs (DMARDS) in patients with rheumatoid arthritis," (AHRQ contract 290-05-0042-1), pp. S66-S76.

Disease-modifying antirheumatic drugs (DMARDs) are expensive alternatives that help patients whose rheumatoid arthritis does not respond to common drugs. Though randomized clinical trials have shown these drugs to be effective, no studies have examined their effectiveness in a clinical setting. These researchers, providing an example of how researchers can exploit the information stored in Medicaid databases, located 6,018 patients who were prescribed DMARDS for their rheumatoid arthritis. They studied the information in a Tennessee Medicaid database to determine if the drugs were used consistently once they were prescribed. Patients seemed to consistently use the DMARD methotrexate; however, fewer patients consistently used the DMARD sulfasalazine.

Nebeker, J.R., Yarnold, P.R., Soltysik, R.C., and others, "Developing indicators of inpatient adverse drug events through nonlinear analysis using administrative data," (AHRQ grant HS11885), pp. S81-S88.

Adverse drug events are among the most costly of patient safety problems. The researchers used a method called hierarchically optimal classification tree analysis (HOCTA), which has demonstrated an ability to create predictive models that are more accurate than traditional linear models. The researchers used HOCTA to develop an accurate model to predict the rate of adverse drug events involving bleeding and clotting problems caused by medication.

Lieu, T.A., Kulldorff, M., Davis, R.L., and others, "Real-time vaccine safety surveillance for the early detection of adverse events," (AHRQ contract 290-05-0036), pp. S89-S95.

Keeping in the theme of adverse event reporting, the authors of this article set out to create and test a surveillance system for early detection of adverse events once a new vaccine enters the marketplace. The Vaccine Safety Datalink Project, sponsored by the Centers for Disease Control and Prevention, examined data files from eight health plans every week to detect adverse events involving a new meningococcal vaccine for adolescents. Resources used to track adverse events included dynamic data files, aggregation of data, and sequential analysis methods. The researchers determined that this method of surveillance offers a useful, adaptable approach to detecting adverse events early.

Curtis, L.H., Hammill, B.G., Eisenstein, E.L., and others, "Using inverse probability-weighted estimators in comparative effectiveness analyses with observational databases," (AHRQ grant HS10548), pp. S103-S107.

When researchers conduct drug or treatment trials, they want to gather as much information as they possibly can. Often, they seem to reach for the impossible: to know what would happen if the same person had been exposed to both treatments being tested. The researchers show how the tool of inverse probability-weighted estimation can complement observational data to provide answers on the effectiveness of two

continued on page 16

Drug safety and effectiveness

continued from page 15

or more treatments. A major drawback to using the method is the lack of statistical software. However, because the method yields useful information and is flexible, the authors expect to see more inverse probability-weighted estimators in medical and epidemiology literature.

Samore, M.H., Shen, S., Greene, T., and others, "A simulation-based evaluation of methods to estimate the impact of an adverse event on hospital length of stay," (AHRQ contract 290-05-0036-1), pp. S108-S115.

The authors of this paper compared conventional analytic methods with inverse probability weighting (IPW) to study the problem of time-varying confounding. This problem occurs when an outcome and exposure are both influenced by a third variable that changes over time, for example, when disease severity influences the decision to start drug therapy. The researchers compared conventional analytic methods with IPW in a simulated group of hospitalized patients to determine the effect an adverse event has on the length of stay in a hospital. They found that, unlike conventional regression methods, IPW had less bias.

Schneeweiss, S., Patrick, A.R., Stürmer, T., and others, "Increasing levels of restriction in pharmacoepidemiologic database studies of elderly and comparison with randomized trial results," (AHRQ grant HS10881), pp. S131-S142.

To ensure they compare apples to apples and avoid bias, researchers restrict who can participate in a study to create a similar study group with similar characteristics. The authors of this paper undertook a large database study of 122,406 patients who use statins to control blood cholesterol levels. They winnowed out participants by establishing five restrictions. In the end, they came up with results that closely reflected those reported in randomized clinical trials. The authors suggest that putting restrictions in place does not significantly diminish the generalizability of research findings.

Segal, J.B., Griswold, M., Achy-Brou, A., and others, "Using propensity scores subclassification to estimate effects of longitudinal treatments: An example using a new diabetes medication," (AHRQ contract 290-05-0034), pp. S149-S157.

Researchers comparing medication effectiveness using observational data must consider patient characteristics that cause treatments to change over time. Armed with claims data for 131,714 patients with diabetes, the authors developed a method that generates potential outcomes using propensity scores at multiple time points. They used their method to estimate the effects of treatments for diabetes at different time points to compare outcomes between a new drug (exenatide) and traditional drugs (insulin and oral medications). They found there were no differences in the new drug's outcomes compared with existing therapies. The authors suggest that their method will make large observational databases more useful for comparing the effectiveness of new drugs and treatments. ■

Possible problematic drug interactions are not always reported in medical records

Doctors know that prescribing certain drug pairs can have dangerous side effects. For example, combining warfarin, a blood thinner, with an anti-inflammatory drug can increase the risk of gastrointestinal bleeding. A recent survey of medical records found that when doctors coprescribe certain drugs, they typically don't document what they told their patients about possible drug interactions; however, they do order more laboratory tests to monitor patients.

Jennifer Elston Lafata, Ph.D., of the Henry Ford Health System, and fellow researchers used pharmacy claims data from 10 organizations comprising the HMO Research Network's Centers for Education and Research on Therapeutics (CERTs) to identify those patients who received a potentially dangerous drug pair between January 1 and December 31, 2000. In addition to a warfarin and anti-inflammatory combination, they looked for a heart medication (digoxin) given with calcium channel blockers (verapamil or diltiazem) that can cause irregular heart rhythms and a blood cholesterol-regulating medicine (lovastatin or simvastatin) with calcium channel blockers (verapamil or diltiazem) that can cause muscle weakness.

When they collected data from medical records for these patients, the researchers found that between 16

continued on page 17

Drug interactions

continued from page 16

and 37 percent of patients had no medical record documentation of the coprescribing of those drug pairs, calling into question whether a clinician was aware the patient was using both medications. Regarding steps to mitigate potentially dangerous interactions, only 1 to 14 percent of patients had any documentation in the medical record of the risks associated with the use of both drugs, and 3 to 14 percent had any documentation that patient education was provided at the visit. This inadequate recordkeeping could pose a legal liability for the clinician.

More commonly, documentation of changes in clinical management was observed in the majority of patients (64 to 79 percent) prescribed the drug pairs, usually through laboratory testing. Lack of documentation regarding associated risks or failure to make a clinical change may not necessarily reflect a deficit in physician knowledge of the risks. Such omissions, however, call into question the adequacy of documentation and have obvious medico-legal implications. Medical record documentation can go a long way to illustrate that a patient was informed and accepted the alternative risks, as well as the potential benefits associated with combination therapy.

This study was funded in part by the Agency for Healthcare Research and Quality (HS11843).

See "What do medical records tell us about potentially harmful co-prescribing?," by Dr. Lafata, Janine Simpkins, M.A., Scott Kaatz, D.O., and others in the July 2007 *The Joint Commission Journal on Quality and Patient Safety* 33(7), pp. 395-400. ■

Nonsteroidal anti-inflammatory drugs do not appear to protect against development of lung cancer

Evidence that use of nonsteroidal anti-inflammatory drugs (NSAIDs) might be associated with decreased risk of colon cancer has raised hope that they might prevent other cancers. However, a new State-wide study of the Tennessee Medicaid (TennCare) population found that NSAIDs did not protect against lung cancer. Researchers at the Vanderbilt Center for Education and Research on Therapeutics examined the relationship between NSAID use and subsequent lung cancer development. They identified lung cancer cases from the TennCare database and randomly selected age-and sex-matched controls. A pharmacy database identified NSAID use during the 5 years prior to cancer diagnosis.

During followup for a median of 6.3 years per person, 3,370 lung cancer cases were identified among the 303,399 persons enrolled in the study. The odds of developing lung cancer among those who had ever used NSAIDs were no different than those who had never used them. There was no difference even among those who had used NSAIDs for more than 2 years in the 5 years prior to lung cancer diagnosis. Thus, there was no protective effect demonstrated for any level of NSAID use. Similar results were found among the 2,519 individuals with chronic obstructive pulmonary disease, who have a higher risk of developing lung cancer.

Although the pharmacy database was an accurate measure of prescription NSAID dispensing, it provided no information on prescription compliance or use of nonprescription NSAIDs. However, most patients in the Medicaid population are reluctant to pay for over-the-counter NSAIDs on an ongoing basis, because prescription NSAIDs are free. Another study limitation was the lack of information about patients' use of tobacco, an important risk factor for developing lung cancer. Thus, smoking status may have confounded the relationship between NSAID use and lung cancer. The study was supported in part by the Agency for Healthcare Research and Quality (HS10384).

See "Nonsteroidal anti-inflammatory drugs and lung cancer risk: A population-based case control study," by Richard J. Wall, M.D., M.P.H., Yu Shyr, Ph.D., and Walter Smalley, M.D., M.P.H., in the February 2007 *Journal of Thoracic Oncology* 2(2), pp. 109-114. ■

New studies reveal the impact of drug copayment and coinsurance policies on statin and beta-blocker therapy after heart attack

Statins are among the most effective drugs to prevent coronary heart disease and reduce the risk for heart attack and stroke, while beta-blockers are typically prescribed as long-term therapy for patients who have been hospitalized for a heart attack. Two new studies led by Sebastian Schneeweiss, M.D., Sc.D., of Harvard Medical School, and supported in part by the Agency for Healthcare Research and Quality (HS10881), investigated the use of these drugs among elderly British Columbia residents. The first study found that only about half of patients adhere to statin therapy a year after starting the medication. While fewer than one in five seniors adhere to beta-blocker therapy, a second study found that copayments or coinsurance do not worsen this situation. Both studies are summarized below.

Schneeweiss, S., Patrick, A.R., Maclure, M., and others. (2007, April). "Adherence to statin therapy under drug cost sharing in patients with and without acute myocardial infarction." ***Circulation*** **115, p. 2128-2135.**

Only 55.8 percent of patients with full prescription drug coverage adhere to statin therapy a year after starting on the medication. The addition of a $20 copayment or 20 percent coinsurance to each dispensing of a statin will further reduce adherence by 5 percentage points, according to a new population-based study. However, these cost-sharing policies don't seem to affect initiation of statin therapy after hospitalization for a heart attack.

A closer look at the reasons for reduced statin adherence revealed that patients' insurance status and actual out-of-pocket payments were significant predictors for stopping statin use. This finding has important implications for the new Medicare Part D drug coverage for seniors. Policies that simply share the financial burden of buying drugs with patients will lead to suboptimal use of critical life-prolonging drugs such as statins. Consideration should be given to fully exempting high-risk patients from drug cost-sharing, including patients who have had a heart attack, suggest the researchers.

The researchers examined adherence to statin therapy among three groups of patients in the British Columbia, Canada, PharmaCare program: those who began statin therapy during full drug coverage (2001), coverage with a $10 or $25 copay (2002), and coverage with a 25 percent coinsurance benefit (2003-2004). They followed each group 9 months after each policy change. Adherence to statin therapy was defined as 80 percent or more days covered. Relative to full-coverage policies, adherence to new statin therapy was significantly reduced from 55.8 to 50.5 percent under a fixed copayment and the subsequent coinsurance policy. Sudden changes to full out-of-pocket spending, similar to Medicare's Part D "doughnut hole," almost doubled the risk of stopping statins.

Schneeweiss, S., Patrick, A.R., Maclure, M., and others. (2007, August). "Adherence to beta-blocker therapy under drug cost-sharing in patients with and without acute myocardial infarction." ***American Journal of Managed Care*** **13(8), pp. 445-452.**

The researchers compared new use of beta-blockers following a heart attack among elderly British Columbia residents who began beta-blocker therapy during periods of full drug coverage (2001), a $10 or $25 copay depending on income (2002), and 25 percent coinsurance (2003-2004). All groups quickly reduced their beta-blocker adherence (drug supply for 80 percent of the month) by 6.3 percent per month after beginning therapy, with a decline to about 70 percent compliance at 6 months. This decline stabilized after 9 months to a decline in adherence of about 1 percent per month. Adherence was only marginally reduced by 1.3 percentage points as a consequence of the copayment policy and 0.8 percentage points due to the coinsurance policy.

The proportion of patients who began beta-blocker therapy after a heart attack and continued therapy remained steady at about 61 percent during the study period. This adherence rate was similar to that observed in a control group of elderly Pennsylvania residents with full drug coverage. The lack of impact of cost-sharing on drug use may have been due to the availability of low-cost beta-blockers in British Columbia. For example, the median cost, including insurance and out-of-pocket costs, for a 90-day beta-blocker supply was $29 under full coverage, and $22 and $23 under cost-sharing, indicating that patients switched to lower-cost beta-blockers. ■

HIV/AIDS Research

Illinois hospitals are not ready to implement intrapartum strategies to eradicate pediatric HIV infection

A combined regimen of zidovudine (AZT) provided to HIV-infected mothers during pregnancy and labor and to exposed newborns for 6 weeks postdelivery can reduce perinatal HIV infection by 67 percent. When maternal HIV status is known by U.S. perinatal care providers and appropriate actions are taken, the risk of HIV transmission from mother to child can be reduced to less than 2 percent. Yet, despite the 2003 passage of legislation in Illinois to increase perinatal HIV testing and reduce transmission, Illinois birth hospitals are not ready to implement the intrapartum interventions needed to eradicate pediatric HIV infection, concludes a new study.

A team of Illinois researchers surveyed nurse managers of all 137 Illinois birthing hospitals about current labor and delivery practices for testing, identification, and documentation of maternal HIV status, and AZT availability in March 2004. This was 6 months after passage of the Illinois Perinatal HIV Prevention Act and prior to Statewide perinatal rapid HIV testing in 2005.

Overall, only 17 hospitals (12.4 percent) met 5 requirements for overall readiness to prevent perinatal HIV transmission. Another 16 hospitals (11.6 percent) met a minimal level of readiness, that is, they documented prenatal HIV status and had AZT available. However, the majority of hospitals (76 percent) did not meet the minimal definition of readiness to prevent perinatal HIV transmission, and over one-third did not have AZT available. Illinois hospital patterns are likely similar to current hospital practices in other States, note the researchers. Their study was supported by the Agency for Healthcare Research and Quality (T32 HS00078).

See "Ready or not—intrapartum prevention of perinatal HIV transmission in Illinois," by Ann E. Bryant Borders, Rebecca L. Eary, Yolanda Olszewski, and others, in the September 2007 *Maternal and Child Health Journal* 11, pp. 485-493. ■

Complementary/Alternative Medicine

Use of complementary and alternative medicine is common among persons who have been hospitalized for coronary artery disease

Nearly one-fifth of patients hospitalized for acute coronary syndrome (ACS, heart attack or unstable angina) were using complementary and alternative medicine (CAM) at the time of hospital admission. However, patients did not use CAM therapies at the expense of traditional evidence-based therapies. Rather, it was quite the opposite, according to a new study: CAM users were just as likely as non-CAM users to use aspirin (73 vs. 74 percent) or statins (71 vs. 68 percent), and were significantly more likely to use beta blockers (64 vs. 46 percent). Adjusting for demographic, socioeconomic factors, medical history, and coexisting illnesses did not change the results.

More CAM users than non-CAM users were uninsured (12 vs. 7 percent), economically burdened (58 vs. 29 percent), and had a history of depression (13 vs. 6 percent)—all typically associated with poorer medication compliance, note the researchers. Their findings suggest that patients with coronary artery disease (CAD) are using CAM as an adjunctive therapy rather than replacement for conventional treatments.

CAM users were more likely to arrive at the hospital with unstable angina than heart attack and to have a history of depression and high blood pressure. Also, more CAM users were white (31 vs. 12 percent) than other races. The most frequently reported CAM therapies were use of formal relaxation techniques and home remedies. The impact of CAM on such outcomes as mortality and health status in patients with CAD is unknown. Nevertheless, without evidence of harm, the findings suggest no reason to discourage CAM use in patients with CAD, conclude the researchers. Their study was based on analysis of a registry of patients

continued on page 20

Coronary artery disease

continued from page 19

hospitalized with ACS at two Missouri hospitals in 2001 and 2002 and patients' self-reported use of CAM and evidence-based therapies. The study was supported by the Agency for Healthcare Research and Quality (HS11282).

More details are in "Self-reported use of complementary and alternative medicine in patients with previous acute coronary syndrome," by Carole Decker, R.N., Ph.D., Jason Huddleston, D.O., Mikhail Kosiborod, M.D., and others, in the April 2007 *American Journal of Cardiology* 99, pp. 930-933. ■

Agency News and Notes

Combining medications is often the best strategy to battle rheumatoid arthritis

About 2 million Americans have rheumatoid arthritis, a long-term illness that causes joint and tissue inflammation. For patients with rheumatoid arthritis, combining one well-known, lower cost synthetic drug with one of six biologic medications often works best to reduce joint swelling or tenderness, according to a new report funded by the Agency for Healthcare Research and Quality (AHRQ). Researchers reviewed published evidence to compare the benefits and harms of three classes of medications: synthetic disease-modifying antirheumatic drugs (DMARDs), biologic DMARDs, and corticosteroids. Synthetic DMARDs include hydroxychloroquine, leflunomide, methotrexate and sulfasalazine; biologic DMARDs include abatacept, adalimumab, anakinra, etanercept, infliximab and rituximab; and corticosteroids include drugs such as prednisone.

The report concluded that combining methotrexate, a synthetic DMARD, with one of the biologic DMARDs works better than using methotrexate or a biologic DMARD alone. The report also found that methotrexate works as effectively as the biologic DMARDs adalimumab and etanercept for patients who have early rheumatoid arthritis. Adalimumab and etanercept, however, show better short-term results as measured by X-rays of joints. The report also emphasized that biologic DMARDs and methotrexate increase the risk of serious infection, including a reoccurrence of tuberculosis.

Among other findings in the report:

- Combining prednisone with the synthetic DMARD hydroxychloroquine, methotrexate, or sulfasalazine works better than using only a synthetic DMARD to reduce joint swelling and tenderness and to improve function.
- No meaningful clinical differences can be found between methotrexate and either leflunomide or sulfasalazine.
- Combining the synthetic DMARDs methotrexate and sulfasalazine is no more effective than using just one of the medications for patients with early rheumatoid arthritis.
- Not enough evidence exists to determine whether combining two biologic DMARDs is more effective than using one biologic DMARD.
- About 17 of every 1,000 people taking a biologic DMARD for 3 to 12 months have a serious infection. Combining two biologic DMARDs can increase the risk.
- Among biologic DMARDs, rates of painful injection site reactions are more common for anakinra (67 percent) than for etanercept (22 percent) or adalimumab (18 percent).
- More long-term research is needed on rheumatoid arthritis medications, including how the outcomes of these drugs vary among patients with different health conditions and demographic characteristics. More comparative studies on various combinations of drugs are critical. Also important is investigating whether taking the medications earlier (especially biologic DMARDs) is better for long-term outcomes.

The report, *Comparative Effectiveness of Drug Therapy for Rheumatoid Arthritis and Psoriatic Arthritis in Adults*, was authored by the AHRQ-funded RTI International-University of North Carolina Evidence-based Practice Center in Chapel Hill, NC. It is the newest analysis from AHRQ's Effective Health Care Program. The program represents an important Federal effort to compare alternative treatments for significant health conditions and make the findings public. It is intended to help patients, doctors, nurses and others choose the most effective treatments. Information on the program, including full reports and plain-language summary guides, can be found at www.effectivehealthcare.ahrq.gov. ■

Hospitalizations for complications from HIV declined between 1998 and 2005

The number of infants under age 2 with HIV who were hospitalized fell by 64 percent between 1998 and 2005, according to the Agency for Healthcare Research and Quality (AHRQ). During the same period, hospitalizations for children and adolescents with HIV age 2 to 17 and for adults with HIV age 18 to 44 dropped by 41 percent and 31 percent, respectively

Overall, hospitalizations for complications from HIV declined primarily due to life-prolonging protease inhibitor drugs known as the "AIDS cocktail" introduced in 1995:

- Cytomegaloviral diseases, caused by the herpes virus, declined 56 percent.
- Pulmonary tuberculosis, a contagious bacterial infection caused by Mycobacterium tuberculosis, fell 47 percent.
- Mycobacterial diseases, which can cause tuberculosis, leprosy, and other infections, fell by 37 percent.
- Toxoplasmosis, a parasitic disease that can cause damage to the brain, eyes, and other organs in people with weakened immune systems, declined by 37 percent.

However, life-prolonging drugs may be increasing admissions of older people with HIV who develop other chronic illnesses. AHRQ data found that the rate of hospitalizations rose 43 percent for patients ages 45 to 54, 61 percent for those between 55 and 64 years of age, and 56 percent for Americans aged 65 and over.

This AHRQ report is based on data in "HIV Hospitalizations in 1998 and 2005." The report uses statistics from the Nationwide Inpatient Sample (NIS), a part of the Healthcare Cost and Utilization Project (HCUP) family of health care databases. The NIS is 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. The authors used AHRQ's Inpatient Quality Indicators to determine the in-hospital, risk-adjusted death rates. To read the statistical brief and for more information on HCUP, go to www.hcup-us.ahrq.gov. ■

Two new guides summarize the effectiveness and safety of oral diabetes medications

Two new plain-language guides that outline the latest scientific evidence on the effectiveness and safety of oral medications for adults with type 2 diabetes are now available from the Agency for Healthcare Research and Quality (AHRQ). The guides for consumers and clinicians are tools to help patients and their families and health care providers make informed decisions about treating a condition that affects more than 15 million Americans.

AHRQ's new analysis is the first to summarize evidence on the effectiveness and adverse events for all commonly used type 2 diabetes medications. As new classes of oral diabetes medications have become available, patients and clinicians have faced a growing list of treatment options. The consumer-targeted guide includes information on the various types of diabetes pills, how well they work, possible side effects, and medication costs. The clinician's guide includes more detail on those topics and provides "confidence ratings" for evidence that supports those conclusions.

Type 2 diabetes is an increasingly common chronic disease that occurs in people who have too much glucose in their blood. Blood glucose levels are high either because their cells are resistant to insulin (a hormone that helps convert glucose into energy) or because their pancreas does not produce enough insulin. Excessive glucose levels can cause severe problems with the heart, eyes, kidneys, and nerves. Obesity increases the risks of developing diabetes.

The diabetes guides are part of a series of informational products created by the Agency's Effective Health Care program. Print and audio versions can be found on the Web site, www.effectivehealthcare.ahrq.gov/reports. ■

AHRQ-sponsored project will develop strategies to optimize medical resident hours and work schedules to improve patient safety

The Agency for Healthcare Research and Quality (AHRQ) is sponsoring the Institute of Medicine's Committee on Optimizing Graduate Medical Trainee (Resident) Hours and Work Schedules to Improve Patient Safety. The Committee will focus on two tasks: (1) reviewing and synthesizing the evidence on optimal resident work schedules, and (2) developing strategies for implementing optimal resident work schedules.

As part of the first task, the Committee will review the evidence on the relationship between resident work schedules, resident education and training experience, and resident performance. The Committee will also consider other strategies that the United States and other countries have implemented to optimize the work schedules for residents to assure the safety and quality of patient care. In addition, the Committee will identify barriers to change and strategies for overcoming them.

As part of the second task, the Committee will make recommendations on how the strategies, practices, interventions, and tools identified in the first task can be implemented to optimize resident schedules to improve the safety of the health care work environment and the quality of care. These recommendations would include actions that can be taken in the short- and long-term by residents, hospitals, professional societies, accrediting bodies, administrators and those who fund residency training programs, Federal and State agencies, and policymakers at all levels.

The project began in September 2007, and a report is expected at the end of the project in approximately 18 months. The first public workshop was held on December 3, 2007. Future meetings are tentatively scheduled for:

- March 4-5, 2008, Irvine, CA
- May 8-9, 2008, Washington, DC
- June 26-27, 2008, Washington, DC

For more information, go to http://www.ahrq.gov/news/sp120307.htm. ■

Research Briefs

Bito, S., Matsumura, S., Singer, M., and others. (2007). "Acculturation and end-of-life decisionmaking: Comparison of Japanese and Japanese-American focus groups." (AHRQ grant HS07370). *Bioethics* 21(5), pp. 251-262.

End-of-life decisionmaking varies among ethnic groups and may also vary within ethnic groups, depending on their acculturation. The researchers conducted separate focus groups among Japanese, Japanese-speaking Japanese-Americans, and English-speaking Japanese Americans to assess possible differences. They found that disclosure of a terminal diagnosis became more acceptable with acculturation; however, Japanese Americans still preferred that the diagnosis be disclosed first to the family, who would then decide in what form to communicate it to the patient. Japanese-Americans also trusted their physician more than the Japanese, because there is a less hierarchical physician-patient relationship in the United States than in Japan. All three groups accepted the concept of advance care planning, but the Japanese participants rejected formal advance directives, consistent with the less frequent personal use of lawyers in Japan compared with the United States. In addition, the three groups preferred a family-oriented decisionmaking model to one based on the autonomous individual, which would not conform to the cultural norms of many Japanese-Americans.

Bracken, M.E., Medzon, R., Rathleve, N.K., and others. (2007, January). "Effect of intoxication among blunt trauma patients selected for head computed tomography scanning." (AHRQ grant HS09699) *Annals of*

continued on page 23

Research briefs

continued from page 22

***Emergency Medicine* 49(1), pp. 45-51.**

A new study found that the prevalence of intracranial injury among intoxicated blunt trauma patients selected for computed tomography (CT) scanning was lower than nonintoxicated patients. This is not due to the protective nature of intoxication in blunt trauma, but rather, it is probably due to emergency physicians' heightened concern about cranial injury in intoxicated patients.

The researchers analyzed data from the National Emergency X-Radiography Utilization Study II (NEXUS II) head injury database. Physicians detected intracranial injury in 1,193 of the 13,728 enrolled patients (8.7 percent) at 21 emergency departments. About one-fourth (24.4 percent) of enrolled patients were intoxicated. Overall, 6.9 percent of intoxicated patients and 8.1 percent of nonintoxicated patients suffered intracranial injury. The NEXUS II decision instrument considers patients at low risk based on the absence of all of the following criteria: older than 65 years, evidence of significant skull fracture, scalp hematoma, neurologic deficit, abnormal level of alertness, abnormal behavior, coagulopathy (abnormal blood clotting), and persistent vomiting.

Farquhar, M., Collins Sharp, B.A., and Clancy, C. (2007). "Patient safety in nursing practice." *AORN Journal* 86(3), pp. 455-457.

Patient safety, and in particular, the reduction of preventable medical errors, have become central public concerns. Nurses, as the largest group of direct health care providers, are vital to the effort to prevent errors, note the authors of this commentary. The Agency for Healthcare Research and Quality is a partner in this effort as it seeks to make sure that the findings, knowledge, and tools that result from research are broadly applied to improve health care. For example, AHRQ-funded research has shown that nurse managers can help patients with congestive heart failure achieve better results. Our knowledge that patient safety problems are usually the result of structural design flaws will help lead to system transformation. Research has shown that the long hours demanded of nurses and low nurse staffing levels can lead to errors in administering medications and poor outcomes for patients. The authors suggest that the ultimate goal must be the creation of a culture of patient safety in which errors, near misses, and adverse events can be reported and discussed in an atmosphere of trust and respect without fear of retribution. Reprints (AHRQ publication no. 08-R019) are available from AHRQ.

Friedman, A.L., Geoghehan, S.R., Sowers, N.M., and others. (2007, March). "Medication errors in the outpatient setting." (AHRQ grant HS15038). *Archives of Surgery* 142, pp. 278-283.

To identify and prevent medication errors in organ transplant patients, researchers examined outpatient medication errors among its liver, kidney, and/or pancreas transplant patients during a 1-year period in 2004 and 2005. The researchers identified 149 medication errors (and 5 major types) in 93 transplant patients who were prescribed a mean of 11 medications each. Patient harm or adverse events were associated with 32 percent of errors, including hospitalizations or outpatient invasive procedures in 13 percent of cases. Nine episodes of rejection and 6 failed transplants were also identified. The most common type of medication error was patient error (incorrect use of an available prescribed medication, 56 percent), followed by prescription errors (13 percent), delivery errors (13 percent), availability errors (patient did not have enough medicine for 24 hours or more, 10 percent), and reporting errors (8 percent). Root cause analysis identified the patient as the cause of 68 percent of errors and the health care system as the cause of 27 percent of errors. Finances were linked to 5 percent of errors.

Jodlowski, D., Sharf, B.F., Nguyen, L.C., and others. (2007). "Screwed for life: Examining identification and division in addiction narratives." (AHRQ grant HS10876). *Communication & Medicine* 4(1), pp. 15-26.

Online support groups have evolved as a way for opiate addicts to share their experiences and assist each other in recovering from addiction. The researchers examined the contents of a specific online Web site to determine both the attributes of communication that enhance supportive communication and those that contribute to divisiveness. More specifically, they used the theories of Kenneth Burke to question how the motives of suffering and the attempt to strive for perfection led to bringing participants closer together (identification) or estranging them from one another (division). Suffering is discussed from the standpoint of what it feels like to recover from drug addiction. The drive for perfection is related to a debate over what it means to be "clean" with respect to drug usage. Much of the article consists of quotations from and analysis of participant narratives. The

continued on page 24

Research briefs

continued from page 23

researchers conclude that the narrative of suffering brings participants closer together while the narrative of seeking perfection (that is, how to stay "clean") tends to be divisive.

Landon, B.E., Hicks, L.S., O'Malley, A.J., and others. (2007, March). "Improving the management of chronic disease at community health centers." (AHRQ grant HS13653) ***New England Journal of Medicine*** **356, pp. 921-934.**

This study examined the impact of the Health Disparities Collaboratives on improved quality of care for patients with asthma, diabetes, and hypertension who received care at community health centers. The researchers compared quality of care among 9,658 patients at 44 collaborative community health centers and 20 non-collaborative community health centers. Overall, the collaborative centers improved the quality of care for asthma and diabetes (but not hypertension) considerably more than the control centers. For example, compared with control centers, the collaborative centers had significant improvements in prevention and screening measures. These included a 16-percent increase in the assessment of glycated hemoglobin levels and a 21-percent increase in foot exams for patients with diabetes as well as a 14-percent increase in the use of anti-inflammatory medications for patients with asthma.

Levine, S.R. and McConnochie, K.M. (2007). "Telemedicine for acute stroke. When virtual is as good as reality." (AHRQ grant HS15165). ***Neurology*** **69, pp. 819-820.**

The primary barrier to ideal care for stroke in a small hospital is the lack of an experienced stroke neurologist. A study on telemedicine for patients with acute ischemic stroke (AIS) published in the same issue of this journal reported that community hospitals employing telemedicine access to stroke neurologists had results (mortality rates and functional outcomes) similar to those obtained by stroke experts in their own centers. The hospitals combined telemedicine (video/audio conferencing and transmission of computerized tomography images) and the use of recombinant tissue plasminogen activator (rt-PA) in the care of AIS patients. When rt-PA is initiated within 60 minutes of initial stroke symptoms, rather than 3 or more hours later, the chances of recovery without disability are quadrupled. The authors of this editorial note that rt-PA is not given in over 95 percent of cases and that success with telemedicine systems is "much more about politics than technology." As such, use of telemedicine for acute stroke requires new organizational and personal relationships which are established and maintained through interactions serving organizational and professional values.

Nutting, P.A., Dickinson, W.P., Dickinson, L.M., and others. (2007, January). "Use of chronic care model elements is associated with higher-quality care for diabetes." (AHRQ grant HS10123). ***Annals of Family Medicine*** **5(1), pp. 14-20.**

This study surveyed primary care practices to assess the extent to which they used the chronic care model (CCM) in routine care of patients with diabetes. The researchers surveyed 90 clinicians from 30 small independent primary care practices about their use of elements of the CCM. Analysis included a clinical care composite score that included patient-reported assessments of blood pressure, lipids, microalbumin (a protein in urine that indicates kidney functioning), and glycated hemoglobin (HbA1c); foot examinations; and dilated retinal examinations. Researchers also computed a behavioral care composite score for support from the clinician in setting self-management goals, provision of nutrition education or therapy, and encouragement to self-monitor blood-glucose levels. For every unit increase in clinician-reported CCM use (for example, from rarely to occasionally), there was an associated 0.30 percent reduction in HbA1c value and 0.17 reduction in the ratio of total cholesterol to high-density lipoprotein cholesterol. Clinician use of the CCM elements was significantly associated with the behavioral composite score and marginally associated with the clinical care composite score.

Plantinga, L.C., Fink, N.E., Jaar, B.G., and others. (2007). "Relation between level or change of hemoglobin and generic and disease-specific quality of life measures in hemodialysis." (AHRQ grant HS08365). ***Quality of Life Research*** **16, pp. 755-765.**

One consequence of chronic kidney disease is anemia, as reflected by low hemoglobin and hematocrit levels. Effective treatment of anemia has been shown to improve quality of life (QOL). The authors of this study examined the impact on various aspects of QOL of raising hemoglobin levels to 11 g/dl (the minimum guideline established by the Kidney Disease Outcomes Quality Initiative) among 438

continued on page 25

Research briefs

continued from page 24

hemodialysis patients with kidney failure. These aspects included such QOL domains as physical, social, and cognitive functioning, and domains related to fatigue levels such as sexual functioning, work, and recreation. After one year, patients who had achieved 11 g/dl for at least 6 months, had significantly higher QOL for physical functioning, bodily pain, mental health, social functioning, cognitive functioning, as well as diet restriction and dialysis access domains. In addition, even incremental increases of 1 g/dl over initial hemoglobin levels were correlated with higher QOL scores for most domains.

Reyes Ortiz, C.A., Freeman, J.L., Koop, Y., and others. (2007). "The influence of marital status on stage at diagnosis and survival of older persons with melanoma." (AHRQ grant HS11618). *Journal of Gerontology: Medical Science* 62A (8), pp. 892-898.

Skin-screening programs should target unmarried older persons, especially widowed older patients, recommend the authors of this study. To determine the association between marital status, stage at diagnosis, and survival of older persons with melanoma, they analyzed data on 14,630 elderly men and women from the Surveillance, Epidemiology, and End Results (SEER) registries—Medicare-linked database (1991-1999). Older married persons were diagnosed with melanoma at earlier stages and survived longer than those were widowed. These results persisted even after adjusting for age, gender, income, ethnicity, and tumor characteristics. Some possible explanations include high emotional stress (for example, grief), loss of social support, decreased income, less adherence to treatment or lower quality hospitals, and weakened immunity. An additional finding was that married women were less likely than married men be diagnosed with melanoma at late stage. Neither of these differences was found to exist between unmarried women and unmarried men.

Rosenberg, M.A., Frees, E.W., Sun, J., and others. (2007). "Predictive modeling with longitudinal data: A case study of Wisconsin nursing homes." (AHRQ grant HS16519). *North American Actuarial Journal* 11(3), pp. 54-69.

The article is intended as a tutorial for analysts, who may be interested in using this type of predictive model with longitudinal data. Predictive modeling is a process that involves problem identification, data analysis, and candidate model development, estimation, and validation. Predictive modeling with the use of longitudinal data allows for more accurate predictions than regression modeling since it takes into account historical trends. Its prior health care applications have included provider profiling, provider reimbursement, and identification of high-cost users. To illustrate how the model works in practice, the authors use cost reports for 400 Wisconsin nursing homes to make forecasts of total patient days. The article demonstrates many of the common difficulties that analysts face in analyzing longitudinal health care data, as well as techniques for addressing these difficulties.

Rumptz, M.H., Tobias, C., Rajabiun, S. and others. (2007). "Factors associated with engaging socially marginalized HIV-positive persons in primary care." (AHRQ grant HS10858). *AIDS Patient Care and STDs* 21(Suppl.1), pp. S30-S39.

Engagement in medical care is essential, if people living with HIV disease are going to benefit from life-prolonging HIV care and treatment. This study examined factors related to HIV-positive persons who were only somewhat engaged in care or not at all engaged in care. Of the 984 socially marginalized patients initially surveyed, 40 percent were somewhat engaged and 12 percent were not at all engaged in HIV primary care. Twelve months later, according to a followup survey, 58 percent of those not initially engaged in care had become more fully engaged in HIV primary care. The use of HIV primary care had increased as the major barriers to care (drug use, structural barriers, belief barriers, and unmet needs) were discontinued or reduced. These patients were part of a multisite demonstration study in which the barriers to care were addressed by one or more of 10 types of outreach intervention.

Tobias, C., Cunningham, W.E., Cunningham, C. O., and others. (2007). "Making the connection: The importance of engagement and retention in HIV medical care." (AHRQ grant HS10858). *AIDS Patient Care and STDs* 21(Suppl.1), pp. S3-S8.

This paper is an introduction to a supplemental journal issue reporting on the results of a 5-year multisite outreach initiative to engage and retain patients in HIV care. It focuses on HIV patients not receiving ongoing HIV care and the barriers to care that they face. It also discusses intervention options and the public policy implications of this issue. Barriers to care may be structural, financial, or personal/cultural, according to a framework developed by the

continued on page 26

Research briefs

continued from page 25

Institute of Medicine. Structural barriers include unavailable or inconveniently located services, as well as subsistence needs competing with health care priorities. Financial barriers include lack of insurance, underinsurance, or the cost of services. Personal/cultural barriers include individual attitudes and beliefs as well as racism, sexism, and homophobia. To counteract these different barriers, the researchers used relationship building, service linking, and advocacy as part of the outreach initiative. The journal supplement provides new evidence about outreach and related strategies that promote sustained participation in HIV care by underserved populations.

Van der Steen, J.T., Mitchell, S.L., Fritjers, D.H.M., and others. (2007, September). "Prediction of 6-month mortality in nursing home residents with advanced dementia: validity of a risk score." (AHRQ grant HS08551). *Journal of the American Medical Directors Association* 8, pp. 464-468.

Seventy percent of U.S. patients with dementia die in nursing homes. Families and physicians of these patients can make use of prognostic information to make decisions about palliative care. The authors developed a risk score based on variables from the Minimum Data Set (MDS) to predict 6-month mortality in 269 Dutch nursing home patients with advanced dementia and 270 Missouri nursing home patients with both advanced dementia and lower respiratory infections. The risk score identified residents at low and moderate risk of 6-month mortality (up to 40 percent) with reasonable accuracy. As mortality rates rose incrementally in each group, the risk score increased. It performed less well for residents with a higher risk of mortality; however, very few residents were estimated to have a mortality risk of well over 50 percent. Well-derived risk scores, while not suitable as a sole guide, can add important information for those making palliative care decisions.

Whitney, S.N. and McCullough, L.B. (2007). "Physicians' silent decisions: Because patient autonomy does not always come first." (AHRQ grant HS11289). *The American Journal of Bioethics* 7(7), pp. 33-38.

Although patients today are increasingly participating in medical decisionmaking about their care, there remains a context in which physicians may justifiably make silent decisions about patient care, i.e., they may consider and reject decisions without informing the patient. Silent decisions may represent the physician's choice to follow a widely recognized guideline, to invoke an accepted exception to the guideline, or to take some other action that is justified by an individual patient's circumstance. Such decisions are frequent, inevitable, and entirely appropriate, according to these authors. For example, the physician, by the exercise of his professional clinical judgment, may determine that a procedure offers no net benefit to the patient and therefore does not mention it to the patient. The authors discuss several examples of silent decisions. In the process, they make an ethical case for a limited set of clinically significant, ethically valid silent decisions. ■

2007 Author and Subject Index

Research Activities - 2007 Author Index

The following is an alphabetical listing of the first authors of journal articles, book chapters, and reports summarized in *Research Activities* during 2007. Month and page number(s) are given.

continued on page 27

2007 Author index

continued from page 26

continued on page 28

2007 Author index

continued from page 27

continued on page 29

2007 Author index

continued from page 28

continued on page 30

2007 Author index

continued from page 29

Research Activities - 2007 Subject Index

The following is an alphabetical listing of research topics featured in *Research Activities* in 2007. Month of publication and page number(s) are given.

continued on page 31

2007 Subject index

continued from page 30

continued on page 32

2007 Subject index

continued from page 31

continued on page 33

2007 Subject index

continued from page 32

continued on page 34

2007 Subject index

continued from page 33

Subscribe now to AHRQ's Patient Safety E-newsletter

The Agency for Healthcare Research and Quality publishes the Patient Safety E-Newsletter to make available important patient safety news and information. Issued monthly, the E-newsletter features concise descriptions of recent findings from AHRQ-supported research and information about new initiatives, upcoming meetings, and other important patient safety activities. Web links will be provided for those who want to followup or get more detailed information. All you need to sign up for this free service is a computer and an e-mail address. To subscribe, follow these simple steps:

1. Send an e-mail message to: listserv@list.ahrq.gov
2. In the subject line type: Subscribe
3. In the body of the message type: sub patientsafetyenewsletter and your full name

To receive the e-newsletter in text-only format:

1. Follow steps 1 and 2 above. In the body of the message type: sub patientsafetynewslettertext and your full name

You will receive an e-mail confirmation of your subscription. For questions, e-mail Salina Prasad in AHRQ's public affairs office at salina.prasad@ahrq.hhs.gov. ■

Don't Forget—
Visit AHRQ's Web Site

AHRQ's Web site—http://www.ahrq.gov/—makes practical, science-based health care information available in one convenient location. You can tap into the latest information about the Agency and its research findings and other initiatives, including funding opportunities and job vacancies. *Research Activities* is also available and can be downloaded from our Web site. Do you have comments or suggestions about the site? Send them to info@ahrq.hhs.gov.

Check out what's new this month in...

Healthcare 411 Podcasts

http://www.ahrq.gov/

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. 08-0015
January 2008

ISSN 1537-0224