



# Research Activities



U.S. Department of Health and Human Services • No. 318, February 2007

Agency for Healthcare Research and Quality

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## Diagnostic errors that harm outpatients are typically the result of multiple individual and system breakdowns

A study of 307 closed malpractice claims shows that many missed or delayed diagnoses of outpatients lead to dire outcomes. In some cases, diagnosis of a serious condition like cancer was delayed more than a year. Over half (59 percent) of the claims studied involved diagnostic errors that harmed patients. Also, 59 percent of these errors were associated with serious harm, and 30 percent resulted in death. Cancer was the diagnosis involved in 59 percent of the errors, chiefly breast (24 percent) and colorectal (7 percent) cancer. The next most commonly missed diagnoses were infections, fracture, and heart attacks.

The most common breakdowns in the diagnostic process were failure to order an appropriate diagnostic test (55 percent), failure to create a proper followup plan (45 percent), failure to obtain an adequate history or perform an adequate physical exam (42 percent), and incorrect interpretation of diagnostic tests (37 percent) by physicians, radiologists, or pathologists. In some cases, clinicians failed to

check on test results or to communicate them to patients, or they did not schedule a necessary followup appointment. In other cases, patients failed to keep an appointment to find out or follow up on abnormal test results.

Missed cancer diagnoses were more likely than other missed diagnoses to involve errors in the performance and interpretation of tests. Primary care physicians were centrally involved in most diagnostic errors. The findings reinforce the need for system interventions, such as clinical decision support systems that include alerts and reminders, to reduce these problems. The study was supported in part by the Agency for Healthcare Research and Quality (HS11886 and HS11285).

More details are in "Missed and delayed diagnoses in the ambulatory setting: A study of closed malpractice claims," by Tejal K. Gandhi, M.D., M.P.H., Allen Kachalia, M.D., J.D., Eric J. Thomas, M.D., M.P.H., and others, in the October 3, 2006 *Annals of Internal Medicine* 145, pp. 488-496. ■

## Shifting from a culture of blame to a culture of safety in nursing homes could help identify and prevent medical errors

**M**any nursing homes continue to harbor a culture of blame. As long as staff members feel they will be blamed for medical errors they report, patient safety will remain at risk. Creating a culture of safety in nursing homes is complicated by limited resources, overwhelmed leadership, and an educationally diverse workforce. Nevertheless, by improving team communication and participation in decisions, nurse leaders can create an environment in which every team member can contribute to resident safety, asserts Jill Scott-Cawiezell, Ph.D., of the University of Missouri-Columbia. In a study supported by the Agency for Healthcare Research and Quality (HS14281), she and fellow researchers surveyed staff members of five diverse Midwestern nursing homes. The staffers were members of a team whose goal was to improve medication safety practices.

The survey asked nursing home staff how strongly they agreed or disagreed that key safety elements—communication, teamwork, and leadership—were present for medication safety practices to develop and thrive. The

study authors also conducted a case study of a nursing home team trying to develop a culture of safety, which nevertheless was stuck in a culture of blame. In this particular case, staff members were assigned a point for every medication error they made. Staff members were disciplined after three points and could even be fired.

The team clearly understood the need to know about errors so that they could improve care, but no one was willing to get others in trouble. Also, the leader of the team often missed meetings due to crises or other problems. To alleviate the leadership void, the research nurse invited the nursing home administrator to the team's regular meetings. The team then became very open about safety issues in the nursing home. They also voiced their frustration with the continued blaming culture, which clearly led to underreporting of errors. The authors conclude that nursing homes must create a climate where everyone feels comfortable identifying and reporting safety concerns in order to shift to a safety culture.

See "Moving from a culture of blame to a culture of safety in the nursing home setting," by Dr. Scott-Cawiezell, Amy Vogelsmeier, M.S.N., Charlotte McKenney, B.S.N., and others, in the July 2006 *Nursing Forum* 41(3), pp. 133-140. ■

*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, Contributing Editor  
Joel Boches, Design and Production  
Karen Migdail, Media Inquiries

## Physician, patient, and pharmacy outreach reminders can improve recommended laboratory monitoring for certain medications

**S**pecific laboratory tests are recommended when doctors start patients on certain medications. For example, baseline liver enzyme testing is recommended before patients begin taking thiazolidinediones for diabetes because these drugs have been associated with liver toxicity. Later laboratory monitoring can uncover changes from baseline enzymes that indicate liver toxicity, so that the drug dose can be lowered or the drug discontinued. Yet some studies have shown that only 61 percent of patients receive recommended therapeutic monitoring. Failure to monitor drug therapy is a frequent cause of

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## Laboratory monitoring

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preventable adverse drug events. Physician reminders, patient reminders, and pharmacy outreach using nurses can improve laboratory monitoring when patients begin new medications, according to a new study.

The study was conducted by researchers at the HMO Research Network Center for Education and Research in Therapeutics, which is supported by the Agency for Healthcare Research and Quality (HS10391).

Researchers studied 10 medications prescribed to 961 patients in 15 primary care clinics. The goal was to measure the impact of 3 interventions on patients receiving the recommended laboratory monitoring for the 10 medications by comparing the interventions with usual care.

The 15 clinics were randomized into 4 groups that received either an intervention—an electronic medical reminder to the prescribing clinician to order the test(s)

or contact the patient to obtain the test(s), an automated voice message to the patient to obtain the test(s), or a pharmacy team outreach to the patient—or usual care. At 25 days after a study medication was prescribed, nearly half (48.5 percent) of the 196 patients in the electronic medical record reminder group, 66 percent of the 267 patients in the automated voice message group, and 82 percent of the 261 patients in the pharmacy team outreach group had completed all recommended baseline laboratory monitoring, compared with only 22 percent in the usual care group. These findings indicate that routine linkage of pharmacy and laboratory data to identify and correct lapses in therapeutic monitoring holds great promise for reducing medication errors and adverse events.

See “Improved therapeutic monitoring with several interventions,” by Adrienne C. Feldstein, M.D., M.S., David H. Smith, R.Ph., M.H.A., Ph.D., Nancy Perrin, Ph.D., and others, in the September 25, 2006 *Archives of Internal Medicine* 166, pp. 1848-1854. ■

## Few patients seek compensation for medical injuries through New Zealand’s no-fault medical malpractice system

In contrast to the medical malpractice system in the United States, New Zealand has a national no-fault compensation program for patients who suffer an injury due to medical care. Despite this no-fault system, only 3 percent of eligible patients seek compensation. Those least likely to seek compensation are older, poor, and minority patients, according to a study supported by the Agency for Healthcare Research and Quality (HS11886 and HS11285). Researchers estimated the percentage of eligible patients who claimed no-fault compensation by linking a national claims database (Accident Compensation Corporation, ACC) to records reviewed in the New Zealand Quality of Healthcare Study (NZQHS).

Claims included 741 patients who suffered from an adverse event associated with care in New Zealand public hospitals in 1998 and claimed compensation with the ACC, the national no-fault insurer. The claims also included 839 injured patients

who did not file a compensation claim. Among patients judged by NZQHS reviewers to be eligible for compensation, only 2.9 percent filed claims. Compared with claimants, non-claimants were older (mean age of 52 vs. 42 years), more likely to be male (45 vs. 39 percent), and more likely to be of Maori or Pacific ethnicity (16 vs. 9 percent and 4 vs. 2 percent). Non-claimants were also more likely to live in the most socioeconomically deprived areas (27 vs. 18 percent).

The small proportion of New Zealand claimants was very close to the proportion estimated to file claims for medical injury in tort systems in New York in the late 1980s and Utah and Colorado in the late 1990s. The findings are also consistent with estimates from Denmark, another country with a comprehensive no-fault system. Thus, the problem of chronic underclaiming appears to be insensitive to the structure of the compensation system.

See “Claiming behaviour in a no-fault system of medical injury: A

descriptive analysis of claimants and non-claimants,” by Marie M. Bismark, M.B., Ch.B., L.L.B., Troyen A. Brennan, M.D., Peter B. Davis, M.D., and David M. Studdert, L.L.B., Sc.D., M.P.H., in the August 21, 2006 *Medical Journal of Australia* 185(4), pp. 203-207. ■

### Also in this issue:

Medication errors in hospitalized children, see page 7

Reducing inappropriate medications and computerized order entry, see page 11

Effectiveness of antidepressant drugs, see page 13

Cost-sharing for care in the emergency department, see page 17

Advance care planning among nursing home residents, see page 19

## Not adjusting for pre-existing health problems may have exaggerated the number of deaths due to medical injury

In 2002, nearly 14 percent of adults hospitalized in Wisconsin suffered a care-associated medical injury which was believed to have increased their risk of dying by 48 percent compared with other patients. Researchers used the Wisconsin Medical Injuries Prevention Program (WMIPP) screening criteria to identify medical injuries (harm associated with a therapeutic or diagnostic healthcare intervention) among all 562,317 patients discharged from 134 acute care hospitals in Wisconsin in 2002. A total of 77,666 (14 percent) of discharges met WMIPP criteria for at least one medical injury. Overall, deaths occurred among 3.14 percent of those who suffered a medical injury and 2.13 percent of those who had no medical injury diagnosis upon discharge (a 48 percent difference).

However, after adjustment for patients' coexisting illnesses, severity of illness, and other factors (baseline mortality risk), the excess risk of dying associated with medical injury disappeared. The only types of medical injuries that were still associated with increased odds of dying were related to procedure-

related complications or to a device, implant, or graft. Both medical injury and in-hospital mortality risks were higher among older patients who had multiple coexisting medical problems at admission.

These findings suggest that previous unadjusted risks of dying attributable to medical injury, which did not account for patients' baseline mortality risk, may have exaggerated the number of deaths due to medical injury. In this study, researchers adjusted for baseline risk of death using an index of coexisting disease, age, sex, diagnosis, hospital characteristics, and clustering within hospital. Injuries related to procedures or to a device, implant, or graft were still associated with increased adjusted odds mortality of 39 percent and 16 percent, respectively. The study was supported in part by the Agency for Healthcare Research and Quality (HS11893).

See "Excess mortality caused by medical injury," by Linda N. Meurer, M.D., M.P.H., Hongyan Yang, M.S., Clare E. Guse, M.S., and others, in the September 2006 *Annals of Family Medicine* 4(5), pp. 410-416. ■

## A small proportion of patients are prescribed a medication that can interact with the QT-prolonging medication they also take

Several cardiac drugs, notably those used to treat abnormal heart rhythms, and noncardiac drugs can cause prolongation of the heart's QT-interval (the time between the start of the Q wave and the end of the T wave). This has been associated with increased risk of *torsades de pointes*, a potentially deadly heart arrhythmia. When patients taking a QT-prolonging drug are prescribed another QT-prolonging drug or a drug known to inhibit its metabolism, they are at even greater risk of *torsades de pointes* and death. Researchers found that nearly 5 percent of patients (10,415 patients and 48,465 incidents) who were taking a QT-prolonging medication also took a medication that could interact with it. In addition, 90 percent of the patients involved in incidents had additional risk factors

for QT prolongation or *torsades de pointes*, such as advanced age, female gender, or a history of heart problems.

QT-prolonging medications include certain antiarrhythmics, antipsychotics, antidepressants, antibiotics, and miscellaneous drugs such as quinine and methadone. Most (78 percent) of the drug interaction incidents in the study involved the antidepressant amitriptyline. Two percent of potential drug interaction incidents were listed as a contraindicated combination in drug product labeling, mostly the antipsychotic thioridazine with either paroxetine or fluoxetine.

The study involved identification of potential drug interactions among 228,550 patients who were members of 10 HMOs and had at least 1 prescription for a QT-

prolonging drug. The relatively low overall frequency of potential drug interactions may reflect the success of educational efforts and/or use of automated systems to screen for and alert practitioners to potential drug interactions. On the other hand, it may reflect the relatively small number of frequently used QT-prolonging medications currently on the market, note the researchers. Their work was supported by the Agency for Healthcare Research and Quality (HS11843 and HS10548).

See "Frequency of high-risk use of QT-prolonging medications," by Nancy M. Allen LaPointe, Pharm.D., Lesley H. Curtis, Ph.D., K. Arnold Chan, M.D., Sc.D., and others, in the June 2006 *Pharmacoepidemiology and Drug Safety* 15(6), pp. 361-368. ■

## Mitral valve repair, when compared with replacement, leads to better quality of life

Problems with the mitral valve, which allows blood to flow from the heart's left atrium into the left ventricle (the main pumping chamber of the heart), can lead to serious heart complications, including heart failure. Mitral valve replacement has been the standard of surgical care for mitral valve disease for over 30 years. Many considerations influence the decision to repair or replace mitral valves. However, a new study found that patients who had mitral valve repair reported a better health-related quality of life (HRQOL) 18 months after surgery compared with patients who underwent mitral valve replacement. In addition, physical and mental improvements were larger for patients who underwent repair compared with the modest improvements seen in patients receiving replacement.

Artyom Sedrakyan, M.D., Ph.D., of the Agency for Healthcare Research and Quality, and colleagues found that HRQOL improvements were substantial (higher than age-adjusted U.S. norms) in the valve repair group across most domains (physical role and functioning, vitality, social functioning, and mental health). In the valve replacement group, improvements

were in fewer domains (bodily pain, vitality, and mental health) and generally were slightly lower than population norms. However, the only change that was significant between the two groups was improved social functioning in the valve repair group.

These findings may help surgeons when discussing surgery options with patients. Many studies have suggested an advantage to valve repair over replacement. They cite less risk of heart failure death or complications and lower rates of embolism or anticoagulant-related hemorrhage compared with valve replacement. This study's finding of a tendency toward higher HRQOL associated with valve repair adds to evidence of the benefits of valve repair. However, the researchers caution that the findings need to be validated in a large multicenter study.

See "Health related quality of life after mitral valve repairs and replacements," by Dr. Sedrakyan, Viola Vaccarino, M.D., Ph.D., John A. Elefteriades, M.D., and others, in the September 2006 *Quality of Life Research* 15, pp. 1153-1160. Reprints (AHRQ Publication No. 07-R015) are available from AHRQ.\*

## Disparities/Minority Health

### Racial disparities in care vary widely among Medicare health plans and are only weakly correlated with overall quality of care

Few public reports about the quality of health care organizations have also assessed the equity of care provided by those organizations. A new study shows that in Medicare health plans, racial disparities in care vary widely and are only weakly correlated with the overall quality of care. Therefore, plan-specific performance reports of racial disparities in health outcome measures would provide useful information not currently conveyed by standard Health Plan Employer Data and Information Set (HEDIS) reports, conclude the researchers.

They used four HEDIS outcome measures to assess variations among 151 Medicare health plans

in overall quality and racial disparity from 2002 to 2004. The outcome measures included HbA1c (blood glucose measure) of less than 9.5 percent or less than 9 percent for enrollees with diabetes; low-density lipoprotein cholesterol level of less than 130 mg/dL for enrollees with diabetes or after a coronary event; and blood pressure of less than 140/90 mm Hg for hypertensive enrollees.

Health plans varied substantially in both overall quality and racial disparity on each of the four outcome measures, and quality and racial disparity were not correlated. Overall, 21 to 41 percent of enrollees did not achieve the relatively liberal goals for blood

pressure, glucose, and cholesterol control. Clinical performance on these measures was 7 to 14 percent lower for black enrollees compared with their white counterparts. For each measure, more than 70 percent of this disparity was due to different outcomes for black and white individuals enrolled in the same health plan rather than selection of black enrollees into lower-performing plans. While some plans did not show significant disparities between white and black enrollees, others showed disparities exceeding 20 percent on these measures. The study was supported in part by the Agency for Healthcare Research

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## Racial disparities

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and Quality (HS10803 and HS00020).

See “Relationship between quality of care and racial disparities in Medicare health plans,” by Amal N. Trivedi, M.D., M.P.H., Alan M. Zaslavsky, Ph.D., Eric C.

Schneider, M.D., M.Sc., and John Z. Ayanian, M.D., M.P.P., in the October 25, 2006 *Journal of the American Medical Association* 296(16), pp. 1998-2004. ■

## Little information exists on the willingness of different racial and ethnic groups to participate in genetic research

Scientists conduct genetic variation research to understand genetic differences between racial and ethnic groups, in hopes of addressing persistent racial/ethnic disparities in health. A recent review of studies on the topic revealed inadequate information to draw strong conclusions about the relative willingness of different groups to participate in genetic research. Advocates argue that significant genetic differences exist by racial/ethnic group, and that genetic variation research may lead to health benefits, such as improved understanding of disease susceptibility. Critics raise concerns about the validity of racial/ethnic group membership for studying genetic variation. They also assert that such research may encourage genetic determinism and scientific racism, divert attention from the powerful social and environmental determinants of health, and reinforce stereotypes about minority groups.

Investigators at the University of North Carolina, Chapel Hill, reviewed studies of public willingness to participate in and opinions about genetic research. They found limited racial/ethnic group diversity across the 14 studies, and only 6 studies compared consent by racial/ethnic group. Overall consent rates varied substantially in the eight studies that included actual requests for participation, with five studies

showing overall consent rates below 40 percent. Whites had the highest consent rates (more than 75 percent) and those with personal/familial history of a genetic condition reported lower overall consent rates (ranging from 28 to 53 percent).

Six studies found racial/ethnic group membership to be a significant predictor of consent. In particular, black race was a significant predictor of lower levels of consent in all but one study. The seven studies that examined concerns and opinions about genetic research revealed concerns about the potential for those at risk of genetic conditions to be stigmatized and ostracized, the initiation of premature treatment, changes in familial expectations or interest in “designer babies,” and religious objections. The study was supported in part by the Agency for Healthcare Research and Quality (HS00032).

See “Public willingness to participate in and public opinions about genetic variation research: A review of the literature,” by Rene Sterling, M.H.A., Gail E. Henderson, Ph.D., and Giselle Corbie-Smith, M.D., M.S., in the November 2006 *American Journal of Public Health* 96(11), pp. 1971-1978. ■

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## Proportion of black residents, profit status, and community locale influence the type of care provided at U.S. nursing homes

Studies have indicated that black nursing home residents are less likely than white residents to receive appropriate medication. However, one has to look beyond individual resident race when assessing the quality of nursing homes, suggests a study of 408 urban New York nursing homes. Researchers found that the racial composition and profit status of the nursing home, as well as the racial composition of the community in which it was located, influenced the quality of care for black and white residents. For example, black and white residents of nursing homes with higher proportions of blacks were less likely to be restrained, but were more likely (though not significantly) to receive antipsychotic drugs.

Also, black and white residents of for-profit homes were more likely to be restrained, receive

antipsychotic drugs, and suffer poor health outcomes than their counterparts at nonprofit homes. For example, compared with blacks in nonprofit nursing homes with a median (2.4 percent) proportion of black residents, blacks in for-profit nursing homes had twice the likelihood of receiving antipsychotic drugs, whether in facilities with a median (2.4 percent) proportion or a high (10.1 percent) proportion of black residents. For whites who were at low risk of receiving antipsychotic drugs (i.e., those without cognitive impairment or behavior problems), residing in a for-profit nursing home was associated with increased likelihood of receiving antipsychotic drugs. The effect of for-profit status did not vary significantly by proportion of black residents.

There was less use of physical restraints but more use of

antipsychotic drugs as racial diversity increased and as nurse staffing ratios decreased in nursing homes. Surprisingly, as the number of nurses per 100 beds increased from 13 to 18, the likelihood of being restrained increased by 14 percent for blacks and by 10 percent for whites. Though counterintuitive, the association between higher restraint use and higher nurse staffing ratios is consistent with some previous studies, note the Brown University researchers. Their study was supported by the Agency for Healthcare Research and Quality (HS10322).

See "Facility and county effects on racial differences in nursing home quality indicators," by Susan C. Miller, Ph.D., M.B.A., George Papandonatos, Ph.D., Mary Fennell, Ph.D., and Vincent Mor, Ph.D., in the December 2006 *Social Science & Medicine* 63, pp. 3046-3059. ■

### Child/Adolescent Health

## Eleven medications account for one-third of medication errors that harm hospitalized children

One-third of reported medication errors that harm hospitalized children involve 11 medications that have been in use for a considerable time. These errors are commonly due to wrong dosing and missed doses, according to a study using a national voluntary medication error reporting system, MEDMARX<sup>®</sup>. Researchers at the University of North Carolina Center for Education and Research on Therapeutics examined all pediatric medication error records submitted to the MEDMARX<sup>®</sup> program by subscribing hospitals and related health systems from January 1, 1999 to December 31, 2003.

They identified 816 harmful outcomes involving 242 medications during the 5-year period. About 4.2 percent of all pediatric medication errors were harmful and 11 medications from 3 drug classes were responsible for one-third of harmful medication errors. Opioid analgesics (morphine and fentanyl) were involved in 11.5 percent of errors, followed by antimicrobial agents (vancomycin, ceftriaxone, and gentamicin, 7.5 percent), antidiabetic agents (insulin, 4.5 percent), fluids and electrolytes (potassium

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**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.

## Medication errors

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chloride and total parenteral nutrition, 4.4 percent), bronchodilators (albuterol), inotropic agents (dopamine), and anticoagulants (heparin).

Over half of opioid analgesics and nearly one-fourth of antidiabetics in this study were given at the wrong dose. Dosage errors were often due to confusion between drug weight volumes and drug dosages, misprogramming of infusion pumps to deliver drugs per minute rather than per hour, and inappropriate recording of pounds instead of

kilograms. Omission errors often involved a specific change in care or in the environment of the patient, such as transfer between units, between shift changes, or following a procedure. The study was supported by the Agency for Healthcare Research and Quality (HS10397).

See "Harmful medication errors in children: A 5-year analysis of data from the USP's MEDMARX® program," by Rodney W. Hicks, M.P.A., M.S.N., A.R.N.P., Shawn C. Becker, M.S.N., R.N., and Diane D. Cousins, R.Ph., in the August 2006 *Journal of Pediatric Nursing* 21(4), pp. 290-298. ■

## Many children do not receive recommended well-child visits during the year, especially disadvantaged children

Compliance with recommended well-child visits has improved slightly since 1987. However, it remains low among U.S. children, with very low rates among certain disadvantaged groups, concludes a new study. Well-child visits are important because they help promote timely immunizations and present opportunities to screen for health conditions and normal development. They also offer clinicians the chance to answer parents' health-related questions and provide guidance, explains Thomas M. Selden, Ph.D., of the Agency for Healthcare Research and Quality (AHRQ).

Dr. Selden analyzed data from the 2000-2002 Medical Expenditure Panel Survey of U.S. households, which combines well-child care data over a 2-year period with a rich array of socioeconomic and health status measures. On average, 56.3 percent of all children up to 18 years of age had no well-child visits during a 12-month period, and 39.4 percent had no well-child visits over a 2-year period. The average rate of compliance with well-child visit

recommendations from the American Academy of Pediatrics was 61.4 percent; however, compliance rates varied substantially among various subgroups. Groups with high compliance rates were infants (83.2 percent), children with special health care needs (86.6 percent), children with college-educated parents (74.3 percent), children with family incomes over four times the poverty level (71.6 percent), and children living in New England and the Middle Atlantic regions (94.6 and 83.2 percent, respectively).

However, uninsured children had low levels of compliance (35.3 percent), especially uninsured children eligible for public health insurance coverage (28.4 percent). Other groups with low compliance rates included teenagers (49.2 percent), noncitizen children (43.9 percent), and children in the West South Central (44.9 percent), East South Central (48.8 percent), and Mountain (49.7 percent) regions. Although experts dispute the optimal frequency of well-child visits, the disparities observed in compliance rates among population

subgroups raise important public health concerns.

More details are in "Compliance with well-child visit recommendations: Evidence from the Medical Expenditure Panel Survey, 2000-2002," by Dr. Selden, in the December 2006 *Pediatrics* 118(6), pp. 1766-1778. Reprints (AHRQ Publication No. 07-R019) are available from AHRQ.\*

**Editor's note:** An AHRQ-supported article (HS10770) on a related topic found that children living in families with many other children or with other adults used less outpatient care and prescription medications than their peers. For more details, see Chen, A.Y. and Escarce, J.J. (2006, October). "Effects of family structure on children's use of ambulatory visits and prescription medications." *HSR: Health Services Research* 41(5), pp. 1895-1914. ■



## Children's deaths after cardiac surgery seem mostly determined by age and the type of cardiac surgery

According to a new study, about 5 to 6 percent of children who undergo surgery for congenital heart disease die in the hospital, while less than 1 percent of children who are discharged after cardiac surgery die within a year. Younger children and those undergoing certain types of cardiac surgery are more at risk of dying within that year. Knowing which children have a greater risk of dying once they leave the hospital can prompt clinicians to follow them carefully to improve their outcomes, notes Ruey-Kang Chang, M.D., M.P.H., of the University of California Los Angeles Medical Center.

Using data from California between 1989 and 1999, Dr. Chang and colleagues examined 25,402 pediatric cardiac surgery cases with 1,505 in-hospital deaths. Of 23,897 hospital discharges, 148 deaths (0.62 percent) occurred within a year of discharge, including 37 deaths within 30 days. Young age was an important risk factor for postdischarge death. For example, neonates were nearly 5 times more likely and infants 3.5 times more likely to die after hospital discharge than children over 1 year old. Another significant risk factor was the type of cardiac procedure (23 types were studied). For example, children who underwent the Norwood operation (reconstruction of an absent or small aorta using the child's own pulmonary artery)

were 8.4 times more likely to die within 30 days after discharge compared with children who underwent closure of ventricular septal defect.

Of the various surgical procedures, the Norwood operation was associated with the highest postdischarge death rate (6.77 percent), followed by aortopulmonary shunt with atrial septostomy (3.45 percent), repair of total anomalous pulmonary venous return (2.41 percent), truncus arteriosus repair (2.38 percent), and aortopulmonary shunt (2.13 percent). Other sociodemographic factors and hospital case volume were not significant predictors of postdischarge deaths. These findings were based on analysis of California hospital discharge data from 1989 to 1999, which the researchers linked to statewide death registry data. The study was supported in part by the Agency for Healthcare Research and Quality (HS13217).

More details are in "Risk factors for deaths occurring within 30 days and 1 year after hospital discharge for cardiac surgery among pediatric patients," by Dr. Chang, Sandra Rodriguez, M.S., Maggie Lee, M.P.H., and Thomas S. Klitzner, M.D., Ph.D., in the *American Heart Journal* 152(2), pp. 386-393, 2006. ■

## Women's Health

### Some pregnant women are still prescribed medications with the potential to harm the fetus

About 120,000 U.S. infants are born each year with a birth defect. Teratogens such as isotretinoin (Retin-A) and lithium are drugs that can increase the risk of birth defects. A new study found that 1 percent of women from eight HMOs, who delivered babies from 1996 through 2000, received a teratogenic drug during pregnancy. Nearly 6 percent of this group received U.S. Food and Drug Administration (FDA)

category X or category D drugs during pregnancy. Category X drugs are contraindicated in pregnancy because the risk to the fetus clearly outweighs any benefit. Category D drugs, such as certain antiepileptics, are those whose therapeutic benefits may outweigh the risks.

It's not clear whether women refilled medications that had been prescribed before pregnancy without their doctors' knowledge or

without recognizing that they were pregnant. On the other hand, some physicians may not have been aware of the potential risks associated with the medications. Nevertheless, the findings underscore the need to educate women about the risks of taking certain medications during pregnancy and of preventing pregnancy when taking medications

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## Birth defects

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with potential for fetal harm, note the researchers.

They analyzed the frequency of use of prescription drugs with a potential for fetal harm for 90 days prior to pregnancy and during pregnancy among the 114,165 pregnant women studied. They found that use of these problematic drugs was higher in the first than in later trimesters. Women who were prescribed a teratogen or category

D or X drug in the 90 days before pregnancy were 39 and 4 times, respectively, more likely to be prescribed these medications during pregnancy. Fluconazole, carbamazepine, propylthiouracil, and tetracycline were the most commonly dispensed teratogenic drugs. The most frequently dispensed category D and X drugs included female reproductive hormones, doxycycline, atenolol, secobarbital, and benzodiazepines. The study was led by researchers at the HMO Research Network Center

for Education and Research on Therapeutics at Harvard Pilgrim Healthcare, which is supported by the Agency for Healthcare Research and Quality (HS10391).

More details are in "Use of prescription medications with a potential for fetal harm among pregnant women," by Susan E. Andrade, Sc.D., Marsha A. Raebel, Pharm.D., Abraham N. Morse, M.D., and others in the August 2006 *Pharmacoepidemiology and Drug Safety* 15(8), pp. 546-554. ■

## Japanese and Filipino women are much less likely than white women to undergo breast-conserving therapy for breast cancer

A new study reveals disparities in the management of early-stage breast cancer among Asian American and Pacific Islander (AAPI) women, particularly among Japanese and Filipino women. Researchers found that in Hawaii, Japanese and Filipino women were less likely than white women to undergo recommended breast-conserving surgery (BCS) for early-stage breast cancer. Japanese women were diagnosed with earlier stage cancer, whereas Filipino and Hawaiian women were more likely to be diagnosed at more advanced stages.

Researchers linked data from the Hawaii Tumor Registry to healthcare claims and census information to create a database of information on patient and tumor characteristics and primary treatment. They retrospectively analyzed breast cancer management of 2,030 women (935 Japanese, 144 Chinese, 235 Filipino, 293 Hawaiian, and 423 white women), who were diagnosed with early breast cancer (stages I, II, and IIIA) in Hawaii from 1995 to 2001. They evaluated BCS, radiotherapy after BCS, and chemotherapy for lymph node-positive cancer.

Only 55.6 percent of women received BCS; 85.1 percent of these women also received radiation. Of those with lymph node involvement, 82.7 percent

received chemotherapy. Japanese and Filipino women were 38 percent and 53 percent, respectively, less likely than white women to undergo BCS. Filipino women were 20 percent less likely than white women to receive recommended radiation after BCS. However, AAPI women overall were as likely as white women to receive adjuvant chemotherapy for cancer spread to the lymph nodes. The disparities in management of early-stage breast cancer were not entirely explained by differences in patient and tumor characteristics, suggesting that women of certain ethnic groups may not be completely exercising their choice of surgery (mastectomy vs. BCS). On the other hand, ethnic variation in breast size (small breasts make the cosmetic outcome of BCS unacceptable to some) and cultural differences may explain some of the observed differences. The study was supported by the Agency for Healthcare Research and Quality (HS11627).

See "Ethnic disparities in breast cancer management among Asian Americans and Pacific Islanders," by Rebecca P. Gelber, M.D., M.P.H., Ellen P. McCarthy, Ph.D., M.P.H., James W. Davis, Ph.D., and Todd B. Seto, M.D., M.P.H., in the July 2006 *Annals of Surgical Oncology* 13(7), pp. 977-984. ■

### Computerized and age-specific drug alerts can reduce both inappropriate prescribing of drugs and unnecessary drug alerts

**E**lderly patients are commonly prescribed medications that are potentially harmful to them, such as tertiary tricyclic amine antidepressants, long-acting benzodiazepines, or propoxyphene. To prevent this, computerized order entry (CPOE) systems include drug-specific alerts that warn clinicians about medications that are potentially inappropriate for older people each time the drug is ordered, regardless of the patient's age. Such alerts often annoy physicians when they are prescribing these drugs for younger patients. However, researchers recently modified a CPOE system so that age-specific drug alerts only occurred when clinicians prescribed target drugs to elderly patients. The system then suggested an alternative medication. This approach limited the number of unnecessary alerts faced by

prescribers, while still maintaining the effectiveness of the drug-specific alerts.

The study was led by researchers at the HMO Research Network Center for Education and Research in Therapeutics at Harvard Pilgrim Health Care, which is supported by the Agency for Healthcare Research and Quality (HS11843). The research team randomly assigned seven practices to receive age-specific prescribing alerts plus an academic detailing intervention (interactive educational program on medications that can potentially harm the elderly). Eight practices received age-specific alerts alone.

Age-specific alerts resulted in continued effectiveness of the drug-specific alerts over a 1-year period. Group academic detailing did not enhance the effect of the alerts; however, the age-specific alerts led to fewer false-positive alerts for

clinicians. During the drug-specific intervention (January to June 2002), each physician received an average of 18 alerts, 14 (82 percent) of which were false-positive (i.e., prescribed for nonelderly patients). During the age-specific intervention (January to June 2004), each physician received an average of four drug alerts, all of which were for elderly patients.

More details are in "Computerized prescribing alerts and group academic detailing to reduce the use of potentially inappropriate medications in older people," by Steven R. Simon, M.D., M.P.H., David H. Smith, R.Ph., Ph.D., Adrienne C. Feldstein, M.D., M.S., and others, in the June 2006 *Journal of the American Geriatric Society* 54, pp. 963-968. ■

### Standardizing data input for electronic health records may improve their potential to measure care quality

**A**utomated quality assessment using electronic health records (EHRs) does not appear to accurately reflect the quality of care for coronary artery disease (CAD), indicating that changes are needed in how data are routinely recorded in an EHR to improve the accuracy of this type of measurement. Researchers compared two ways to identify apparent care quality failures of patients with CAD from a large internal medicine practice. They compared simple automated review of electronic health records with a two-step process of automated review supplemented by manual review of electronic medical records for free-text notes made by care providers.

Seven CAD care performance measures that ranged from antiplatelet drug and lipid-lowering drug administration to blood pressure measurement and lipid measurement were reviewed. Based on automated measurement, performance varied from 81.6 percent

for lipid measurement to 97.6 percent for blood pressure measurement. However, a review of free-text notes for cases failing an automated measure revealed that misclassification was common and that 15 to 81 percent of apparent quality failures either satisfied the performance measure or met valid exclusion criteria.

After chart review that included free-text data, adherence success rates were 1.5 to 14.2 percentage points higher and varied from 87.5 percent for lipid measurement and LDL cholesterol control to 99.2 percent for blood pressure measurement. Review of free text revealed that in the EHR, diagnoses were often used incorrectly, and data that would have fulfilled quality criteria were not always documented in searchable portions of patient records. For example, doctors wrote in their notes (not accessed by the EHR) that they told patients to use aspirin, but did not enter

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## Electronic health records

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the aspirin into the EHR standardized medication list. The study was supported by the Agency

for Healthcare Research and Quality (HS13690).

See “Assessing the validity of national quality measures for coronary artery disease using an electronic health record,” by

Stephen D. Persell, M.D., M.P.H., Jennifer M. Wright, M.D., Jason A. Thompson, B.A., and others, in the November 13, 2006 *Archives of Internal Medicine* 166, pp. 2272-2277. ■

## Outcomes/Effectiveness Research

### Evidence is lacking to support many off-label uses of atypical antipsychotic drugs

Some newer antipsychotic medications approved to treat schizophrenia and bipolar disorder are being prescribed to millions of Americans for depression, dementia, and other psychiatric disorders without strong evidence that such off-label uses are effective, according to a new analysis by the Agency for Healthcare Research and Quality (AHRQ). The federally funded comparative effectiveness review of these drugs—called atypical antipsychotics—identified the medications’ potential for serious side effects while pointing to an “urgent need” for more research into new treatments for the growing population of dementia patients who display severe agitation.

Atypical antipsychotics are second-generation medicines designed to cause fewer neurological complications than conventional antipsychotics. They include aripiprazole, olanzapine, quetiapine, risperidone, and ziprasidone. Each is approved by the Food and Drug Administration (FDA) to treat schizophrenia and bipolar disorder, and risperidone is also approved to treat irritability in children ages 5 to 16 who have autism.

Some studies suggest that atypical antipsychotics may help patients with mental health conditions for which there are no FDA-approved alternatives. Risperidone and quetiapine, for example, help certain patients with obsessive-compulsive disorder when used in conjunction with antidepressants. Risperidone and olanzapine improve sleep problems, depression, and other symptoms in men with combat-related post-traumatic stress disorder (PTSD) when used to augment therapy with antidepressants or other psychotropic medications.

Overall, however, researchers found that much of the scientific evidence for off-label use of antipsychotics was of insufficient quality because studies were too small or lacked scientific rigor. Review authors evaluating the potential benefits and risks of the

medications also found strong evidence that atypical antipsychotics can increase chances of adverse events. Some of the drugs increase risks of stroke, tremors, significant weight gain, sedation, and gastrointestinal problems.

The new review was produced by AHRQ’s Effective Health Care program. It was authored by AHRQ’s Southern California/RAND Evidence-based Practice Center. The center examined 84 published studies on atypical antipsychotics and summarized evidence about several conditions:

- **Dementia:** One analysis showed a small benefit for risperidone and aripiprazole in the treatment of agitation and psychosis. Another suggested olanzapine may help treat psychosis. But a large clinical trial that explored whether risperidone, olanzapine, and quetiapine controlled behavioral disturbances in Alzheimer’s patients concluded that the risks of adverse events offset the potential benefits. Overall, analyses identified potential harms as a small increase in the risk of death and increased chances of stroke, neurological problems (such as tremors or muscle contractions), and weight gain.
- **Depression:** For patients who do not benefit from selective serotonin reuptake inhibitors (SSRIs), the supplemental use of atypical antipsychotics was not helpful, according to research. No studies showed the drugs provided a clear benefit for patients with major depressive disorder with psychotic features. Evidence is conflicting for bipolar depression.
- **Obsessive-Compulsive Disorder:** Atypical antipsychotics significantly helped patients who do not respond adequately to SSRI therapy, studies showed. Overall, patients taking the drugs were about 2.7 times as likely to improve as patients

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## Antipsychotic drugs

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- taking a placebo. The chances of benefiting were best for risperidone and quetiapine.
- Post-Traumatic Stress Disorder: Studies of men with combat-related PTSD showed risperidone and olanzapine, when used with antidepressants or other psychotropic medications, improved sleep quality, anxiety, and other symptoms. Studies were inconclusive when measuring benefits for women.
  - Personality Disorders: For patients with borderline personality disorder, one study suggested olanzapine was more effective than placebo but showed little benefit when used to augment talk

therapy. All studies of olanzapine were very small, however, and patients experienced significant weight gain. Two other small trials suggested risperidone may benefit patients with schizotypal personality disorder, and aripiprazole may help patients with borderline personality disorder.

- Tourette's Syndrome: Risperidone is more effective than placebo, according to a small body of research. The benefits of ziprasidone are uncertain.

The report, *Efficacy and Comparative Effectiveness of Off-Label Use of Atypical Antipsychotics*, from AHRQ's Effective Health Care program, can be found at [www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov). ■

## Newer class of antidepressants is similar in effectiveness, but side effects differ

Today's most commonly prescribed antidepressants are similar in effectiveness to each other, but differ when it comes to possible side effects, according to an analysis released by the Agency for Healthcare Research and Quality (AHRQ). The findings, based on a review of nearly 300 published studies of second-generation antidepressants, show that about 6 in 10 adult patients get some relief from the drugs. The same proportion also experience at least one side effect, ranging from nausea to sexual dysfunction.

Patients who don't respond to one of these drugs often try another medication within the same class. About one in four of those patients recover, according to the review. Overall, current evidence on the drugs is insufficient for clinicians to predict which medications will work best for individual patients.

Second-generation antidepressants, which include selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs), are often prescribed because first-generation

antidepressants (such as tricyclic antidepressants) can cause intolerable side effects and carry high risks.

The authors of the new Comparative Effectiveness Review analyzed the benefits and risks of a dozen second-generation antidepressants: bupropion, citalopram, duloxetine, escitalopram, fluoxetine, fluvoxamine, mirtazapine, nefazodone, paroxetine, sertraline, trazodone, and venlafaxine. Many of these drugs are sold in generic form.

The analysis, which examined only adult use of second-generation antidepressants, drew on 293 published studies. Of those, 187 were judged to be of good or fair quality. The analysis compared the drugs' benefits and risks in the treatment of major depressive disorder, dysthymia (a chronic, less-severe form of depression), and subsyndromal depression (an acute mood disorder that is less severe than major depression). Each of the disorders can be disabling. Major depressive disorder affects more than 16 percent of U.S. adults at least once during their lifetime, the

review noted. In 2000, the economic burden of depressive disorders was estimated to be \$83.1 billion. More than 30 percent of these costs are for direct medical expenses, such as doctors' fees, hospital bills, and medications.

The new analysis, produced by AHRQ's Effective Health Care program, was completed by the Agency's RTI International—University of North Carolina Evidence-based Practice Center. Evidence reviewed by the authors suggests:

- In general, the various second-generation antidepressants have similar rates of effectiveness. In controlled studies, about 38 percent of patients saw no improvement and 54 percent had only partial improvement.
- According to the National Institute of Mental Health's Sequenced Treatment Alternative to Relieve Depression (STAR-D) trial, a substantial number (between about 25 percent and 33 percent) of patients will improve with the

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## Antidepressants

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- addition or substitution of a different drug.
- On average, 61 percent of patients taking second-generation antidepressants

experience at least one side effect. The most common are nausea and vomiting, constipation, diarrhea, dizziness, headache, and sleeplessness.

The report, *Comparative Effectiveness of Second-Generation*

*Antidepressants in the Pharmacologic Treatment of Adult Depression*, from AHRQ's Effective Health Care program, can be found at <http://effectivehealthcare.ahrq.gov>. ■

## Primary Care Research

### Simultaneous control of risk factors for diabetes complications is difficult to achieve

Control of blood glucose (HbA1c), low-density lipoprotein cholesterol (LDL-C), and blood pressure (BP) is associated with reduced risk of diabetes-related complications. Yet according to a new study, only one-third of veterans with diabetes achieved simultaneous control of these three risk factors. Moreover, control of one risk factor had little association with control of another risk factor. Thus, clinicians cannot assume that aggressive pursuit of controlling one risk factor will result in control of other risk factors, concludes George L. Jackson, Ph.D., M.H.A., of the Durham Veterans Affairs Medical Center.

However, study results showed a significant relationship between body mass index (BMI) and all risk factors, indicating that clinicians may want to focus on weight reduction as one approach for

reducing several risk factors for diabetes-related complications. Researchers examined simultaneous achievement of blood glucose, cholesterol, and blood pressure control among 8,207 patients with diabetes cared for at Veteran Administration (VA) hospitals in 1999 and 2000. They defined simultaneous control of outcomes using both 1997 VA guidelines and the more stringent 2004 American Diabetes Association (ADA) guidelines.

Based on VA guidelines (HbA1c less than 9 percent, LDL-C less than 130 mg/dL, and BP less than 140/90 mm Hg), 31 percent of patients achieved simultaneous control. Control levels of individual outcomes were HbA1c (82 percent), LDL-C (77 percent), and BP (48 percent). Using the ADA guidelines (HbA1c less than 7 percent, LDL-C less than 100 mg/dL, and BP less than 130/80 mm Hg), only 4

percent achieved simultaneous control, and control levels of individual outcomes were HbA1c (36 percent), LDL-C (41 percent), and BP (23 percent). Associations between individual risk factors were weak. However, women, individuals with greater BMI, and blacks and Hispanics were less likely to achieve simultaneous control. The researchers caution that they lacked data on important confounding factors, such as individual exercise, diet, and smoking status. The study was supported in part by the Agency for Healthcare Research and Quality (HS00079).

See "Simultaneous control of intermediate diabetes outcomes among Veterans Affairs primary care patients," by Dr. Jackson, David Edelman, M.D., M.H.S., and Morris Weinberger, Ph.D., in the October 2006 *Journal of General Internal Medicine* 21, pp. 1050-1056. ■

### A protocol for adjusting diabetes medications can improve diabetes management and patient blood-sugar levels

People with diabetes must control their blood-sugar levels through diet, exercise, and/or medication in order to avoid serious complications such as eye or kidney disease. Yet doctors don't always intensify patients' medication when their blood glucose levels remain high on their current medication regime. However, a new protocol

encourages better diabetes management and improves patient blood-sugar levels, according to a new study. The protocol for adjusting diabetes medications is based on a patient's current therapy and their glucose levels at the time of the visit, and is called a glucose algorithm.

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## Diabetes

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The algorithm was tested at a diabetes clinic in Georgia that serves a predominantly black indigent population. The physicians measured plasma glucose at each visit and hemoglobin A1c (average blood-sugar level) every 3 months. Both test results were available to the providers each time a patient was seen. If adequate glycemic control was not attained after 2 months of lifestyle modification and perhaps medications, then medication therapy was either begun or increased. Medication therapy was advanced using a stepped-care approach, beginning with a single oral agent (for example, metformin) and then progressing to combination oral agents, oral agents plus bedtime insulin, and finally, multiple-dose insulin regimens.

Goals for glycemic control included an A1c level below 7 percent (the American Diabetes Association goal), a random plasma glucose level below 150

mg/dL, and a fasting plasma glucose level below 125 mg/dL. The researchers assessed patient management 7 months before and 7 months after initiation of the algorithm. When the algorithm was available, providers were 45 percent more likely to intensify therapy when indicated and increased therapy by a 20 percent greater amount. The A1c level at followup was 90 percent more likely to be less than 7 percent in the algorithm group, even after adjusting for patient clinical and sociodemographic differences. The study was supported in part by the Agency for Healthcare Research and Quality (HS09722).

More details are in "Use of a glucose algorithm to direct diabetes therapy improves A1C outcomes and defines an approach to assess provider behavior," by Christopher D. Miller, M.D., David C. Ziemer, M.D., Paul Kolm, Ph.D., and others, in the July 2006 *Diabetes Educator* 32(4), pp. 533-545. ■

## Primary care patients with pain and psychosocial problems benefit from nurse telephone calls

Primary care patients who suffer from pain are often plagued by psychosocial problems, including emotional problems, substance abuse, and domestic violence. These patients can gain substantial and sustained reduced pain and improvement in psychosocial problems, as well as physical function, when a nurse educator talks to them by telephone about problem-solving strategies and basic pain management skills, concludes a new study. Operating from a central location, nurses were able to achieve positive outcomes with an average of three telephone calls to each patient. This approach could benefit many primary care patients, given that more than one-third of Americans aged 19 to 69 years report levels of pain similar to the study patients, and about 40 percent also report psychosocial problems, notes Tim A. Ahles, Ph.D., of Dartmouth-Hitchcock Medical Center.

Dr. Ahles and fellow researchers randomized patients from 14 rural primary care practices (47 physicians) to usual care or intervention groups. Overall, 644 patients reported pain and psychosocial problems and 693 patients reported pain problems without psychosocial problems. Patients in the intervention group received information tailored to their problems and concerns (INFO). Their physicians received feedback about their patients' problems and concerns (FEED) and a nurse-educator (NE) telephoned patients to teach problem-solving strategies and basic pain management skills.

At the 6-month assessment, more patients in the INFOFEED + NE group than in the usual care group achieved meaningful improvement in bodily pain (53 vs. 40 percent), physical role (41 vs. 26 percent), social functioning (55 vs. 37 percent), and vitality (46 vs.

28 percent). However, there was no advantage in emotional role (32 vs. 22 percent) or physical function (36 vs. 27 percent). At 12 months, clinically meaningful differences were sustained for several of these measures. However, patients who received INFOFEED alone without the nurse calls experienced minimal improvements over the usual care group, which were not sustained at the 12 month assessment. The study was supported in part by the Agency for Healthcare Research and Quality (HS10265).

See "A controlled trial of methods for managing pain in primary care patients with or without co-occurring psychosocial problems," by Dr. Ahles, John H. Wasson, M.D., Janette L. Seville, Ph.D., and others, in the July 2006 *Annals of Family Medicine* 4(4), pp. 341-350. ■

## Demand for primary care internists has decreased, while demand for hospital-based internists has increased

Overall demand for internal medicine doctors has changed little in the past 10 years. However, the decline in demand for outpatient-based general internists has been offset by increased demand for hospital-based internists (hospitalists), according to a new study. Like primary care internists, the vast majority of hospitalists have no additional board certification or fellowship training beyond internal medicine residency. However, as the physician marketplace continues to differentiate between outpatient and hospital-based physicians, segmenting internal medicine residency training into outpatient or inpatient tracks may be reasonable, suggests Andrew D. Auerbach, M.D., M.P.H., of the University of California, San Francisco.

Dr. Auerbach and colleagues reviewed medical advertisements for internal medicine physicians published in four medical journals between 1996 and 2004. They found that demand for most subspecialties remained stable, while demand for outpatient generalists decreased modestly. Over the same time, demand for inpatient-based critical care physicians and hospitalists jumped markedly. These findings suggest that, barring new changes in the marketplace for

physicians, overall demand for generalist-trained physicians will not change, at least in the short term.

During the review period, the researchers calculated a total of 4,224 advertisements posted for 4,992 internal medicine positions. Jobs in the Northeast (31 percent of positions) or for single specialty groups (37 percent) were the most common. The relative proportion of ads for nephrologists declined while the relative proportion of ads for critical care specialists increased from 0.5 percent in 1996 to 1.7 percent in 2004. Ads for hospitalists jumped dramatically from 1 percent in 1996 to 12.1 percent in 2004, but ads for outpatient-based primary care and internal medicine positions declined by about 2.7 percent per year between 1996 and 2004. The study was supported by the Agency for Healthcare Research and Quality (HS11416).

See "Trends in market demand for internal medicine 1996 to 2004," by Dr. Auerbach, Richard Chlouber, B.S., Jennifer Singler, B.A., and others, in the October 2006 *Journal of General Internal Medicine* 21, pp. 1079-1085. ■

## Follow-up care after total hip replacement could be improved

Less than half of individuals who undergo total hip replacement (THR) receive follow-up radiography within 6 years after the operation, according to a new study. Radiography can detect osteolysis, a progressive inflammatory reaction to the hip prosthesis, which can lead to destruction of bone and need for revision THR. While osteolysis is typically painful in its later stages, when it causes substantial loosening of the prosthesis, the early phases of osteolysis are generally asymptomatic. Radiography can detect osteolysis early so that monitoring and therapy can help delay or prevent the need for more complex revision surgery.

However, researchers found that less than half of elderly adults who underwent THR had consistent radiographic followup. The researchers analyzed Medicare claims data to identify a group of 622 elderly patients in 3 states (Ohio, Pennsylvania, and Colorado), who received elective primary THR in 1995. They surveyed the patients 3 and 6 years after the surgery. Overall, 15 percent of patients had no followup radiographs, 43 percent had early followup only, and 42 percent had consistent followup radiographs over 6 years.

After accounting for other factors, older patients were 24 percent less likely to have radiographic follow up than younger patients per each 5-year

increase in age. Patients with no college education were 42 percent less likely to have radiographic followup than those with more education, and those with lower income were 50 percent less likely to have followup than those with a higher income. These groups should be targeted for interventions to improve followup after elective THR, suggest the researchers. Their study was supported in part by the Agency for Healthcare Research and Quality (HS09775).

See "Extent of followup care after elective total hip replacement," by Paola de Pablo, M.D., M.P.H., Elena Losina, Ph.D., Nizar Mahomed, M.D., Sc.D., and others in the June 2006 *Journal of Rheumatology* 33, pp. 1159-1166. ■



### Modest levels of cost-sharing for emergency department care decrease emergency department visits without worsening health

As health care costs increase in the United States, finding ways to provide access to appropriate care and to pay for this care are critical. Previous studies have found that requiring patients to pay for some of their costs, i.e., cost-sharing, decreases health care spending, but some patients avoid necessary care. These studies have had limited ability to determine whether these changes actually worsen patient outcomes.

John Hsu, M.D., M.B.A., M.S.C.E., of Kaiser Permanente's Division of Research, and colleagues, examined the impact of emergency department (ED) cost-sharing on mortality and other unfavorable clinical events using a large natural experiment in which some patients faced higher ED copayments starting in January 2000, while others had no changes in their copayments. They found that modest copayments for emergency care reduced emergency room visits, without increasing adverse clinical events. Among commercially insured persons, ED visits were 12 percent lower for those with a \$20-35 copayment and 23 percent lower for those with a \$50-100 copayment, compared with patients with no ED copayment. Among Medicare-insured patients, ED visits were 4 percent lower for patients with a \$20-50 copayment compared with no copayment. While ED

visit rates decreased substantially as the ED copayment amount increased, the authors did not find an increase in unfavorable clinical events such as hospitalizations, ICU admissions, and mortality.

The results of this study are encouraging in that these modest copayments appeared to reduce ED use without harming patients. However, the results must be interpreted within the context of the study—i.e., an integrated delivery system of insured and generally non-indigent patients with a wide range of care delivery options (e.g., calling or e-mailing providers) and low levels of cost-sharing.

The researchers used automated clinical data on ED visits and unfavorable clinical events over a 36-month period (January 1999 through December 2001) among 2,257,445 commercially insured and 261,091 Medicare-insured health system members. The study was supported by the Agency for Healthcare Research and Quality (HS11434).

More details are in "Cost-sharing for emergency care and unfavorable clinical events: Findings from the safety and financial ramifications of ED copayments study," by Dr. Hsu, Mary Price, M.A., Richard Brand, Ph.D., and others, in the October 2006 *HSR: Health Services Research* 41(5), pp. 1801-1820. ■

### Medications can aid endotracheal intubation of critically ill or injured patients who are not in cardiac arrest

Paramedics often have to insert a breathing tube into the trachea (endotracheal intubation, ETI) of critically ill or injured patients to enable them to breathe. However, compared with patients in cardiac arrest, ETI of patients who are not in cardiac arrest can be more difficult because of protective airway reflexes like the gag reflex or clenched jaw, which resist tube insertion. Use of medications such as sedatives and/or neuromuscular blocking agents to depress or ablate protective airway reflexes can aid ETI, according to a preliminary

study. Henry E. Wang, M.D., M.P.H., of the University of Pittsburgh School of Medicine, and colleagues analyzed clinical ETI data reported on standard forms by rescuers from 42 emergency medical services systems. They defined successful ETI as intratracheal placement of the endotracheal tube on the last ETI attempt.

Rescuers reported the presence and ablation of six protective airway reflexes: gag reflex, clenched jaw, inadequate relaxation, combativeness, laryngospasm, and seizure/myoclonus (sudden jerking

movements). Of 1,953 ETIs, nearly 11 percent used drug-assisted intubation (DAI). DAI was nearly 13 times more likely to be successful with ablation of the gag reflex and was also much more likely to be successful with ablation of clenched jaw, inadequate relaxation, and combativeness.

Ablation of selected and all protective airway reflexes was associated with DAI success. On the other hand, ablation of individual reflexes did not necessarily lead to DAI success.

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## Endotracheal intubation

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Patient anatomic factors and operator skill still play key roles in ETI efforts. Thus, protective reflexes, anatomic features, and operator skills must all be considered when attempting to characterize DAI performance or the effectiveness of specific drug facilitation regimens, suggest the researchers. Their study was supported in part by the Agency for Healthcare Research and Quality (HS13628).

See “Drug-assisted effects on protective airway reflexes during out-of-hospital endotracheal intubation (preliminary report),” by Christopher D. Cole, M.D., Dr. Wang, Benjamin N. Abo, B.S., N.R.E.M.T.-P., and Donald M. Yealy, M.D., in the October 2006 *Prehospital Emergency Care* 10(4), pp. 472-475.

**Editor’s note:** A related study (HS13628) by the same researchers concludes that basic emergency medical technicians can be trained to perform more advanced cardiac resuscitation

interventions such as administration of resuscitative medications and invasive airway support. This could expand their role beyond use of cardiac defibrillators and chest compressions. For more details, see Guyette, F.X., Rittenberger, J.C., and Platt, T. (2006, October-December). “Feasibility of basic emergency medical technicians to perform selected advanced life support interventions.” *Prehospital Emergency Care* 10(4), pp. 518-521. ■

## The likelihood of hemorrhage due to pelvic fracture can be estimated from initial pelvic x-ray, pulse, and hematocrit

**P**elvic fractures can cause major hemorrhage in victims of blunt trauma. Knowing which patients with pelvic fractures are most likely to have serious arterial hemorrhage can aid early triage and possible transfer to a trauma center with angiography to diagnose and treat the hemorrhage. According to a new study supported by the Agency for Healthcare Research and Quality (HS11291), the probability of hemorrhage in these patients can be estimated based on initial pelvic x-ray, pulse, and hematocrit (percentage of red blood cells in the blood). Craig Blackmore, M.D., M.P.H., of the University of Washington, and colleagues retrospectively reviewed the charts of 627 patients with pelvic fractures from blunt force (mostly motor vehicle crashes). The patients had received care at a level one trauma center during a 4-year period.

A review of their medical charts identified findings from initial pelvic x-rays and from emergency department (ED) care, including mechanism of injury and blood status. Twenty percent of patients had major pelvic hemorrhage, which was defined by angiographic findings, transfusion requirements, and

pelvic hemorrhage volume. Predictors of major hemorrhage included ED hematocrit of 30 or less, pulse rate of 130 or greater, x-ray evidence of displaced (1 cm or more) obturator ring fracture, and x-ray evidence of diastasis of the pubic symphysis of 1 cm or more. Age and mechanism of injury were not important predictors of arterial hemorrhage.

The final four-factor prediction rule was able to stratify pelvic fracture patients into groups with probabilities of major hemorrhage ranging from less than 2 percent for no predictors to over 60 percent for three or more predictors. For example, a patient with a displaced obturator ring fracture, hematocrit of 25, and pulse of 142 was predicted to have a 66 percent probability of major pelvic hemorrhage.

See “Predicting major hemorrhage in patients with pelvic fracture,” by Dr. Blackmore, Peter Cummings, M.D., M.P.H., Gregory J. Jurkovich, M.D., and others, in the August 2006 *Journal of Trauma* 61, pp. 346-352. ■

### Advance care plans of nursing home residents vary by age, race/ethnicity, and income

**A**dvance care planning documents ensure that nursing home residents' wishes will be carried out when they are no longer capable of making decisions about their care. Advance care plans vary substantially by nursing home residents' age, race/ethnicity, and income, according to a new study. Racial and ethnic minorities were less likely to have advance care plans than whites. Also, nursing home residents who had less daily contact with friends or relatives and lower household income were less likely to have do-not-resuscitate (DNR) orders, feeding/medication/other treatment (FMT) restrictions, and living wills in place.

It is not clear whether these disparities are due to inadequate education about advance care plans or differing attitudes and beliefs, notes Aram Dobalian, Ph.D., J.D.,

of the University of California, Los Angeles. Dr. Dobalian used the Nursing Home Component of the 1996 Medical Expenditure Panel Survey, a nationally representative sample of 815 nursing homes and 5,899 residents, to examine documentation of advance care plans among residents. Overall, about 53 percent of the population (3,105 residents) had at least 1 advance care plan. DNR orders were less common among blacks and Latinos than whites. DNR orders were more prevalent among residents 75 years and older and those with severe cognitive impairment, dementia, emphysema, cancer, and longer nursing home stays.

Latinos were less likely to have FMT restrictions than blacks and whites. Living wills were more common among residents aged 75 years and older and those with

psychiatric/mood disorders and heart disease, but less prevalent among blacks. Residents with less social engagement and household incomes below 400 percent of the Federal poverty level were less likely to have living wills. Residents with Medicaid as their largest payer were less likely to have an advance care plan than those with Medicare or other payment mechanisms. The study was supported by the Agency for Healthcare Research and Quality (HS00046).

More details are in "Advance care planning documents in nursing facilities: Results from a nationally representative survey," by Dr. Dobalian, in the September/October 2006 *Archives of Gerontology and Geriatrics* 43, pp. 193-212. ■

### Seminars can improve nurses' skills in discussing end-of-life issues with heart failure patients and their families

**A**bout half of people diagnosed with heart failure die within 5 years, but the trajectory is unpredictable. Thus, it is important for nurses to communicate with these patients and their families about advanced planning and end-of-life issues. A new study showed that a pilot 1-hour educational seminar significantly increased the ability of hospital inpatient nurses to discuss advance care issues (as self-reported 2 months later). The seminar helped normalize the topic of dying for nurses, encouraged discussion, and validated nurses' concerns. It also modeled communication strategies and prompted shared experiences between older and younger staff.

After taking the seminar, nurses felt more confident in their ability to manage pain, shortness of breath, or respiratory distress in heart failure patients. They also

felt more competent to break bad news to patients about illness, to manage patients' emotional suffering, and to discuss end-of-life issues with patients and families. However, communicating with heart failure patients about end-of-life issues is complicated by a workforce of relatively young nurses and doctors' overly optimistic views about the prognosis of heart failure patients.

Of the 37 nurses who attended the seminar and completed a postseminar test, about one-third had a year or less of nursing experience and 58 percent had 2 to 6 years of experience. One-fifth reported that none of their patients had died over the past 6 months. Nurses also found it difficult to approach the topic of end-of-life care with physicians, who may not view heart

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failure as a terminal illness. Unlike cancer patients, heart

## Heart failure patients

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failure patients can have constant periods of stability or erratic functional status, periodic crises, and recovery, yet the patient and family must cope with the threat of sudden death. The pilot study was supported

by the Agency for Healthcare Research and Quality (HS10871).

See “End-of-life communication and hospital nurses: An educational pilot,” by Jane G. Zapka, Sc.D., Winnie Hennessy, R.N., M.S., Rickey E. Carter, Ph.D., and Elaine J. Amella, Ph.D., A.P.R.N., B.C., in the May/June 2006 *Journal of Cardiovascular Nursing* 21(3), pp. 223-231. ■

## Health Care Utilization, Costs, and Financing

### Employer-sponsored insurance coverage of smoking cessation treatments could save employers and insurers money

Several interventions are known to improve smokers' ability to quit, including counseling, nicotine replacement therapies, and the medication bupropion. Insurance coverage of these interventions encourages their use and increases quit rates, but many employers and health insurance plans still do not cover smoking cessation treatments. According to a new study, both employers and insurers could begin to save money after several years if they added smoking cessation benefits, especially for a stable group of employees/enrollees.

Harvard Medical School researcher Douglas E. Levy, Ph.D., calculated the cost benefit of covering smoking cessation interventions for a hypothetical group of nonelderly, privately

insured adults over a 20-year period. He derived population characteristics from the 1997-2002 National Health Interview Surveys. Based on Medical Expenditure Panel Survey models, Dr. Levy calculated the cost savings of implementing the smoking cessation benefit itself. His calculations were based on the costs of the benefit per additional person who quit smoking and the marginal savings from reduced medical care expenditures. He also calculated employer's marginal savings from reduced smoking-related productivity losses and absenteeism.

He estimated that, by the final simulation year, insurers had benefit-cost ratios of 0.56 to 1.67, with per member per month costs of -\$0.22 to \$0.43. The earliest

year at which savings were achieved for insurers was year 8. Employers saw benefit-cost ratios of 1.88 to 5.58 by the final simulation year, with per member per month costs of -\$1.23 to -\$0.15. Employers achieved savings as early as year 3 and as late as year 8. Cost benefits were sensitive to the rate at which population members were assumed to exit the insurer or employer. The study was supported in part by the Agency for Healthcare Research and Quality (HS00020).

More details are in “Employer-sponsored insurance coverage of smoking cessation treatments,” by Douglas E. Levy, Ph.D., in the September 2006 *American Journal of Managed Care* 12(9), pp. 553-562. ■

### Growth in local jobs that offer health insurance can move the working poor off the Medicaid program

California's Medicaid program, Medi-Cal, is the largest State insurance program in the United States. When more local jobs are available that offer private health insurance, more people move off the Medi-Cal rolls, according to a new study supported in part by the Agency for Healthcare Research and Quality (HS09884). Conversely, continued decreases in employer-based health insurance coverage will greatly increase the demand for public insurance

coverage. This will place financial pressures on State governments, cautions study author, Krista M. Perreira, Ph.D., of the University of North Carolina, Chapel Hill.

Dr. Perreira created an index of the availability of employer-sponsored health insurance to the working poor (employed persons living below 200 percent of the Federal Poverty Level, FPL) using Statewide health

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## Medicaid program

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insurance and other data from 1987 and 1995. Dr. Perreira estimated results using a discrete duration model, where the monthly Medicaid exit probability was a function of demographic characteristics, local labor market variables, the probability of having employer-sponsored insurance, and fixed year and county effects.

Based on the model, she calculated that a 2.5 percent increase in the availability of employer-sponsored insurance would lead to a 6 percent increase in the likelihood a worker would exit Medicaid within

2 years. It would take a 2 percent decrease in unemployment rates or a 10 percent increase in average quarterly earnings to yield an equivalent increase in the likelihood of exiting Medicaid within 2 years. During the study period, the average California unemployment rate was 8.6 percent, average quarterly earnings were \$5,343 (1987 dollars), and 51 percent of civilian workers were insured through their own employer. The average insurance rate was lower (44 percent) for those living below 200 percent of the FPL.

See “Crowd-in: The effect of private health insurance markets on the demand for Medicaid,” by Dr. Perreira, in the October 2006 *HSR: Health Services Research* 41(5), pp. 1762-1781. ■

## Inpatient lumbar surgery rates remained stable from 1994 to 2000, but outpatient surgery increased

**T**echnological advances and financial incentives have shifted various types of health care from the hospital to outpatient settings. Lumbar spine surgery for degenerative conditions is no exception. A new study found that, while inpatient lumbar surgery rates remained relatively stable for 1994 to 2000, outpatient surgery increased over time. Discectomy was the most common procedure performed on an outpatient basis. Outpatient surgery was rarely used for spinal fusions and was not commonly used for laminectomies, notes Darryl T. Gray, M.D., Sc.D., of the Agency for Healthcare Research and Quality (AHRQ).

Dr. Gray and colleagues from the University of Washington used diagnosis and procedure code data from several databases to identify lumbar spine operations among individuals 20 years of age and older. The data sources included databases from AHRQ’s Healthcare Cost and Utilization Project,

namely State Inpatient Databases and State Ambulatory Surgery Databases from several geographically diverse states, as well as the National Inpatient Sample (NIS). The other data sources were the National Hospital Discharge Survey and the National Survey of Ambulatory Surgery. NIS data indicated that nationwide inpatient lumbar spine surgery rates were stable between 1994 and 2000 (159 cases/100,000 in 1994 vs. 162 cases/100,000 in 2000).

Combined data from all sources suggested only a modest rise in total inpatient and outpatient lumbar spine surgery rates (164 cases/100,000 in 1994 vs. 201 cases/100,000 in 2000), mostly due to increases in outpatient discectomies. Outpatient cases rose from 4 to 13 percent of lumbar surgery procedures (mostly discectomies) performed from 1994 to 1996 to 9 to 17 percent from 1997 to 2000. Yet the proportion of discectomies performed on an

outpatient basis jumped from 4 percent in 1994 to 26 percent in 2000. Outpatient fusions and laminectomies were uncommon. Other researchers suggest that outpatient lumbar spine procedures are safe and effective. However, the authors of the current study call for more research to document whether or not the shorter postoperative monitoring and immobilization periods accompanying this approach are associated with higher rates of complications such as bleeding or infection.

See “Population-based trends in volumes and rates of ambulatory lumbar spine surgery,” by Dr. Gray, Richard A. Deyo, M.D., M.P.H., William Kreuter, M.P.A., and others, in the August 2006 *Spine* 31(17), pp. 1957-1963; an accompanying editorial is on page 1964. Reprints of the article (AHRQ Publication No. 07-R010) are available from AHRQ.\* ■

### Los Angeles County hospitals are limited in disaster preparedness and severely limited in surge capacity

Few Los Angeles County hospitals, including major trauma centers, can expand their capacity to handle a surge of more than 20 patients if a public health disaster strikes, according to a new study. This limited surge capacity and failure to integrate disaster training and planning with other agencies and medical facilities limits the ability of these hospitals to plan for public health disasters, conclude Amy H. Kaji, M.D., M.P.H., and Roger J. Lewis, M.D., Ph.D., of Harbor-University of California, Los Angeles Medical Center.

The researchers evaluated the hospital disaster plan structure, agreements, communications, supplies, drills and training, and surge capacity of 45 Los Angeles County hospitals that receive 911 calls. A total of 43 hospital plans were based on the Hospital Emergency Incident Command System. The majority had protocols for hospital lockdown (100 percent), canceling elective surgeries (93 percent), early discharge (98 percent), day care for children of staff (88 percent), designating victim overflow areas (96 percent), and predisaster “preferred” vendor agreements (96 percent).

Fewer hospitals involved law enforcement (56 percent) or had mutual aid agreements with other

hospitals (20 percent) or long-term care facilities (7 percent). Although 96 percent conducted multiagency drills, only 16 percent actually involved other agencies in their disaster training. Less than one-third (29 percent) had a surge capacity of more than 20 beds. Less than half (42 percent) had 10 or more isolation rooms, and 60 percent had to divert ambulances to other hospitals more than 20 percent of the time. The hospitals had a generally high level of availability of equipment and supplies, yet less than half of hospitals had warm-water decontamination showers and an antibiotic stockpile, and less than one-third had immediate access to six or more ventilators. This suggests a significantly limited ability to respond to a biological or chemical event resulting in multiple victims with respiratory failure. The study was supported in part by the Agency for Healthcare Research and Quality (HS13985).

See “Hospital disaster preparedness in Los Angeles County, by Drs. Kaji and Lewis, in the November 2006 *Academic Emergency Medicine* 13(11), pp. 1198-1203. ■

## Agency News and Notes

### AHRQ Report Finds Safety-Net Hospitals Struggling

The nation’s safety-net hospitals suffered an average patient care margin loss of 3 percent compared with 1 percent for other hospitals in 2003, according to a new study by the federal Agency for Healthcare Research and Quality. Patient revenue margin is the net revenue that a hospital collects from billings of insurers and patients divided by its operating costs.

Only one in 10 hospitals is a safety-net facility, but they account for almost one-third of all uninsured hospital stays in the United States. Between 9 percent

and 50 percent of patient stays in safety-net hospitals are uninsured.

The study also found that after subsidies and government allocations were added to net patient revenue, safety-net facilities had a 20 percent lower total income margin than nonsafety-net hospitals — 2.4 percent compared with 3 percent. Total income margin is hospitals’ net income divided by the total expenses.

More than one-third of safety-net hospitals ended the year with negative total income margins in 2003, compared with 28 percent for nonsafety-net hospitals.

Among safety-net hospitals, publicly owned facilities were the most financially vulnerable. They had an average patient revenue margin of nearly minus 7 percent, compared with a 0.8 percent margin for nonprofit safety-net hospitals.

The average total income margin of rural safety-net hospitals, regardless of type of ownership, was five times lower than that of urban safety-net hospitals, minus 0.5 percent compared to 2.5 percent. Rural facilities accounted for 56 percent of all safety-net hospitals. AHRQ also found that:

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## Safety-Net Hospitals

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- Two-thirds of all safety-net hospitals are in the South.
- Over half of safety-net hospitals have fewer than 100 beds.
- One in five safety-net hospitals is a teaching facility.

- Safety-net hospitals admit larger proportions of patients for alcohol and mental health problems and smaller proportions for specialized surgery.

The report uses statistics from AHRQ's Healthcare Cost and Utilization Project's Nationwide Inpatient Sample, a database of hospital inpatient stays that is

nationally representative of all short-term, non-Federal hospitals. HCUP is a Federal-State-Industry partnership to create a multi-State, national resource of health care data.

For other findings, see *Serving the Uninsured: Safety-Net Hospitals, 2003*, at

<http://www.ahrq.gov/data/hcup/>. ■

## Announcements

### New members of U.S. Preventive Services Task Force are announced

The Agency for Healthcare Research and Quality (AHRQ) recently announced new members of the U.S. Preventive Services Task Force. Allen Dietrich, M.D., of Hanover, New Hampshire, and Rosanne Leipzig, M.D., Ph.D., of New York City, join the Task Force this month. George Isham, M.D., of Minneapolis, joined the Task Force in 2006.

Dr. Dietrich, a board-certified family physician, is a professor of community and family medicine at Dartmouth Medical School and a member of the Institute of Medicine of the National Academy of Sciences. He also is associate director for population sciences at the Norris Cotton Cancer Center at Dartmouth-Hitchcock Medical Center and serves as chair of the John D. and Catherine T. MacArthur Foundation Initiative on Depression and Primary Care.

Dr. Leipzig, a board-certified internist and geriatrician, is a professor in the departments of Geriatrics and Adult Development, Medicine, and Health Policy at Mount Sinai School of Medicine in New York. She also serves as vice chair of Education in the Departments of Education and Geriatrics and Adult Development at Mount Sinai. She has been a recipient of the American College of Physicians' Richard and Hinda Rosenthal award, given for the notable contribution her work in evidence-based medicine has made to improve clinical care in internal medicine.

Dr. Isham is medical director and chief health officer for HealthPartners, a large health care plan in Minnesota that provides care for nearly 800,000 members. Dr. Isham is responsible for quality, utilization management, health promotion and disease management, research, and health professionals' education. He is also active in strategic planning and policy issues. He is an experienced primary care clinician and was chair of the Institute of Medicine committee that produced the report *Priority Areas for National Action: Transforming Health Care Quality*.

AHRQ supports the Task Force, which is the leading independent panel of experts in prevention and primary care. The Task Force conducts rigorous, impartial assessments of the scientific evidence for the effectiveness of a broad range of clinical preventive services, including screening, counseling, and preventive medications. Its recommendations are considered the gold standard for clinical preventive services.

The Task Force has made recommendations on a range of preventive services, including screening for obesity, prostate cancer, cervical cancer, and abdominal aortic aneurysm, as well as the use of aspirin to prevent heart disease, vitamins to prevent cancer and heart disease, and hormone therapy. More information about the Task Force can be found on the AHRQ Web site at [www.preventiveservices.ahrq.gov](http://www.preventiveservices.ahrq.gov). ■

**Baser, O., Gardiner, J.C., Bradley, C.J., and others. (2006). "Longitudinal analysis of censored medical cost data." (AHRQ grant HS14206). *Health Economics* 15, pp. 513-525.**

Challenges in analyzing medical cost data include addressing askewness in cost distributions, heterogeneity across samples, and complexities due to censoring. This paper applies the inverse probability weighted (IPW) least-squares method to estimate the effects of lung cancer treatment on total medical cost for 201 Medicare patients, subject to censoring, in a panel-data setting. The researchers used IPW pooled ordinary-least squares (POLS) and IPW random effects (RE) models. Because total medical cost might not be independent of survival time under administrative censoring, unweighted POLS and RE cannot be used with censored data to assess the effects of certain explanatory variables. Even under the violation of this independency, IPW estimation yielded consistent asymptotic normal coefficients with easily computable standard errors.

**Bisson, G.P., Gross, R., Strom, J.B., and others. (2006). "Diagnostic accuracy of CD4 cell count increase for virologic response after initiating highly active antiretroviral therapy." (AHRQ grant HS10399). *AIDS* 20(12), pp. 1613-1619.**

Monitoring plasma HIV-1 RNA levels (viral loads) is critical to identifying treatment failure in patients taking highly active antiretroviral therapy (HAART). HIV treatment programs in resource-constrained settings could consider the use of CD4 cell count increases to triage patients for viral

load testing. However, the authors of this study call for more accurate approaches to monitoring virologic failure. They found that an increase in CD4 cell count after beginning HAART had only moderate discriminating ability to identify patients with an undetectable viral load (400 copies/ml or less). The predictive ability of CD4 cell count was even lower in patients with lower baseline CD4 cell counts. Their findings were based on a retrospective study at two HIV care clinics in Gaborone, Botswana.

**Gardiner, J.C., Luo, Z., Bradley, C.J., and others. (2006). "A dynamic model for estimating changes in health status and costs." (AHRQ grant HS14206). *Statistics in Medicine* 25, pp. 3648-3667.)**

These authors describe development of an innovative method to estimate changes in health status and costs. They used a Markov model to estimate the transition probabilities between health states and the impact of patient variables on transition intensities for 624 cancer patients. They used a mixed-effects model for sojourn costs, with transition times as random effects and patient variables as fixed effects. They combined the models to estimate net present values of expenditures, as a function of patient characteristics, by cancer site and cancer stage over a 2-year period.

**Haidet, P., Kroll, T.L., and Sharf, B.F. (2006). "The complexity of patient participation: Lessons learned from patients' illness narratives." (AHRQ grant HS10876). *Patient Education and Counseling* 62, pp. 323-329.**

Based on interviews with primary care patients in Texas, this

paper provides insight into the patient's perspective of what active participation in care means. Patients' illness narratives reflected several themes related to patient participation. For example, they described how central their illness was in their overall life story and how changeable they believed their illness to be. They also described actions they pursued in the context of these illness narratives and the role of partnership with their physician in health decision making and illness management. Generally, patients' illness management strategies were explained by these four themes in dynamic interplay, with unique variations for each individual. The researchers call for more studies to explore how these themes influence communication between patients and physicians.

**Harless, D.W., and Mark, B.A. (2006, October). "Addressing measurement error bias in nurse staffing research." (AHRQ grant HS10153). *HSR: Health Services Research* 41(5), pp. 2006-2024.**

Nurse staffing allocation methods induce substantial attenuation bias, the authors conclude; however, there are easily implemented estimation methods that overcome this bias. They analyzed data from the California Office of Statewide Health Planning and Development to estimate the measurement error and resulting bias from applying different methods to allocate nursing staff. The bias induced by the adjusted patient days method was smaller than for other methods, but the bias was still substantial. Instrumental variable estimation, using one staffing allocation measure as an instrument for

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## Research briefs

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another, addressed this bias. However, only particular choices of staffing allocation measures and instruments are suitable.

**Hays, R.D., Brown, J., Brown, L.U., and others. (2006, November).** “Classical test theory and item response theory analyses of multi-item scales assessing parents’ perceptions of their children’s dental care.” (AHRQ grant HS00924). *Medical Care* 44(11), S60-S68.

Evaluation of a beta (pre-release) version of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) dental care survey found that it performed well. The beta version included two global rating items (dental care, dental plan), as well as multi-item scales that assessed getting needed dental care, getting care quickly, communication with dental providers, office staff, and customer services. The researchers examined 2001 and 2002 survey data of families with children between ages 4 to 18, who were enrolled in one of five dental plans for a year or longer. Item missing data rates were low. Item-scale correlations for hypothesized scales (corrected for overlap) tended to exceed correlations of items with other scales. Classical test theory analyses identified 5 of 10 communication items that did not perform well. Item response theory painted a more promising picture than classical test theory for the two communication items that assessed access to an interpreter when needed.

**Hermann, R.C., Chan, J.A., Provost, S.E., and Chiu, W.T. (2006, October).** “Statistical benchmarks for process measures of quality of care for mental and substance use disorders.” (AHRQ

grant HS10303). *Psychiatric Services* 57(10), pp. 1461-1467.

Benchmarks can be used to set achievable goals for improving care; yet, until now, they have not been available for mental health care. This article describes the application of a method for developing statistical benchmarks for 12 process measures of quality of care for mental and substance use disorders. Three measures involved antidepressant treatment, two involved antipsychotic treatment, and one involved mood stabilizers for bipolar disorder. Six other measures involved followup treatment visits. Benchmarks for provider-level performance ranged from 59.7 percent to 97.7 percent, markedly higher than the mean results, which ranged from 9.4 percent to 65.4 percent. The researchers conclude that statistical benchmarks can be applied to results from quality assessment of mental health care.

**Katerndahl, D. and Crabtree, B. (2006, September).** “Creating innovative research designs: The 10-year methodological think tank case study.” (AHRQ grant HS08775). *Annals of Family Medicine* 4(5), pp. 443-449.

Important but complex research issues have emerged that defy direct application of most available research designs and methods in which investigators have been trained. Each year, a group of three to four methodologists with expertise balanced between quantitative and qualitative backgrounds is invited to the annual Methodological Think Tank, which has been held in conjunction with the Primary Care Research Methods and Statistics Conference in San Antonio since 1994. Over 2 days, participants discuss a research question selected from those submitted in response to a call for proposals. During the first half-day,

the experts explore the content area with the investigator, often challenging beliefs and assumptions. During the second half-day, the think tank participants systematically prune potential approaches until a desirable research method is identified. To date, the most recent seven think tanks have produced fundable research designs.

**MacAdam, H., Zaoutis, T.E., Gasink, L.B., and others. (2006).** “Investigating the association between antibiotic use and antibiotic resistance: Impact of different methods of categorizing prior antibiotic use.” (AHRQ grant HS10399). *International Journal of Antimicrobial Agents* 28, pp. 325-332.

Prior antibiotic use has been identified as one of the most consistent and modifiable risk factors associated with antibiotic-resistant infections. However, this review of studies concludes there has been no consistent approach to categorizing prior antibiotic use in studies of risk factors for extended-spectrum-B-lactamase-producing *Escherichia coli* and *Klebsiella* spp. (ESBL-EK). Among the 20 studies reviewed, there was tremendous variability in how prior antibiotic use was categorized—for example, by agent, class, spectrum, and/or a combination of these. Yet different categorization schemes had a substantial impact on the antibiotic exposures associated with antibiotic-resistant infections.

**McHorney, C.A. and Fleishman, J.A. (2006, November).** “Assessing and understanding measurement equivalence in health outcome measures.” *Medical Care* 44(11), pp. S205-S210.

This article provides an overview of this journal’s special supplement

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## Research briefs

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on issues of measurement equivalence in diverse populations, particularly populations characterized by health disparities. Measurement bias can lead to flawed population forecasts for service needs or resource allocations, as well as misguided research on health disparities. Measurement bias could also degrade the validity, interpretability, and generalizability of “real-world” outcome effectiveness studies, note the authors. Articles in the supplement provide an excellent overview of the importance of considering differential item functioning (DIF) when making group comparisons, as well as different techniques for identifying DIF, to avoid measurement bias when measuring health outcomes.

**Meterko, M., Young, G.J., White, B., and others. (2006, October). “Provider attitudes toward pay-for-performance programs: Development and validation of a measurement instrument.” (AHRQ grant HS13591). *HSR: Health Services Research* 41(5), pp. 1959-1978.**

These researchers developed a questionnaire for assessing physician attitudes toward pay-for-performance incentive programs, based on an extensive review of the literature and discussions with experts in the field. They distributed a revised version to 2,497 primary care physicians affiliated with 2 of 7 demonstration sites that are testing different ways to give providers incentive to improve quality of care. Each of several attitudinal measures—awareness and understanding of incentives, clinical relevance, cooperation, unintended consequences, control, financial

salience, and impact—was a significant predictor of a provider’s perceived impact of quality-based financial incentives. The researchers conclude that it is possible to identify and measure the key salient features of pay-for-performance programs using a valid and reliable 26-item survey.

**Nace, G.S., Grumlich, J.F., and Aldag, J.C. (2006). “Software design to facilitate information transfer at hospital discharge.” (AHRQ grant HS15084). *Informatics in Primary Care* 14, pp. 109-119.**

This paper describes development of discharge software to overcome communication barriers. The authors found that the discharge software can help inpatient physicians transfer timely, complete, and legible information to outpatient physicians, pharmacists, and patients. Use of the software revealed that physician factors significantly affected the time to complete a discharge while using the software. For example, an increased number of accesses (log-ins) and more free text typing lengthened the time to complete the computerized discharge. Patient-related factors that increased physician time were discharge diagnoses, prescriptions, and length of hospital stay.

**Napoles-Springer, A.M., Santoyo-Olsson, J., O’Brien, H., and Stewart, A.L. (2006, November). “Using cognitive interviews to develop surveys in diverse populations.” (AHRQ grant HS10599); and Napoles-Springer, A.M., and Stewart, A.L. (2006, November). “Overview of qualitative methods in research with diverse populations.” (HS10856). *Medical Care* 44(11), pp. S21-S30, S5-S9.**

Cognitive interviews are used widely in questionnaire

development to detect items that are not understood by respondents as intended by the survey developers. In the first paper, the authors describe an interaction analysis approach using qualitative data analysis software to analyze transcripts of cognitive interviews. Their goal was to develop a survey to assess the quality of interpersonal processes of care for diverse patients. They completed interviews with 48 Latino, black, and white adults. They identified problems with 126 of 159 survey items (79 percent). Behavior coding identified 32 problematic items (20 percent). Interaction analysis of the survey transcript and retrospective probes identified 94 additional problematic items (59 percent). In the second paper, the authors provide an overview of qualitative methods in research with diverse populations.

**Raab, S.S. (2006, May). “Improving patient safety through quality assurance.” (AHRQ grant HS13321). *Archives of Pathology & Laboratory Medicine* 130, pp. 633-637.**

Anatomic pathology laboratories use several quality assurance tools to detect errors and to improve patient safety. The authors of this paper reviewed several pathology laboratory patient safety quality assurance practices and found that anatomic pathology error frequencies varied according to the detection method used. In addition, there was a lack of standardization across laboratories, even for governmentally mandated quality assurance practices such as cytologic-histologic correlation. Nevertheless, pathology laboratories are starting to use data from quality assurance practices for initiatives to reduce pathology errors.

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## Research briefs

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**Robertson, K.B., Janssen, W.J., Saint, S., and Weinberger, S.E. (2006, November). "The missing piece." (AHRQ grant HS11540). *The New England Journal of Medicine* 355(18), pp. 1913-1918.**

This paper describes the case of a young man who contracted a food-borne parasitic infection during his work with raw fish as a sushi chef. The man had abdominal pain and respiratory cough, sputum, and dizziness on exertion. The clinician focused on the sources of abdominal pain and respiratory disease to rule out certain possibilities. As more information became available, he was able to identify more specific patterns, including pleuroparenchymal lung disease and subcutaneous nodules. The patient's striking peripheral-blood eosinophilia (high white cell count) proved to be the sentinel clue, pointing to a parasitic infection with gastrointestinal and pulmonary involvement as the likely diagnosis. The final diagnosis was paragonimiasis, a food-borne parasitic infection caused by numerous species of lung flukes. Humans are infected when they ingest raw or partially cooked crabs or crayfish containing paragonimus metacercariae.

**Schackman, B.R., Gebo, K.A., Walensky, R.P., and others. (2006, November). "The lifetime cost of current human immunodeficiency virus care in the United States." (AHRQ Contract No. 290-01-0012). *Medical Care* 44(11), pp. 990-997.**

This study calculated that from the time of entering HIV care in 2001, a person with HIV disease could expect to live another 24.2 years, compared with 4 years in 1997. The lifetime HIV care costs (2004 dollars) would be \$618,900 (undiscounted) for adults who begin antiretroviral therapy (ART) with a CD4 cell count less than 350. Nearly three-fourths (73 percent) of the cost would be for antiretroviral medications, 13 percent for inpatient care, 9 percent for outpatient care, and 5 percent for other HIV-related medications and laboratory costs.

The total lifetime care cost would be comparable to the estimated \$599,000 (undiscounted) lifetime medical cost for nonelderly women with cardiovascular disease, who also are expected to live long with appropriate medical management. Life expectancy and costs are slightly lower for patients who begin ART with a CD4 cell count less than 200 (an indicator of advanced disease, and the point at

which opportunistic infections become a problem).

**Sexton, J.B., Makary, M.A., Tersigni, A.R., and others. (2006, November). "Teamwork in the operating room." (AHRQ grants HS14246 and HS11544). *Anesthesiology* 105(5), pp. 877-884.**

It is possible to use the teamwork climate domain of the Safety Attitudes Questionnaire to assess teamwork in the hospital operating room (OR), concludes this study. The researchers surveyed OR personnel in 60 U.S. hospitals about the survey's 6 teamwork items. These included difficulty speaking up, conflict resolution, physician-nurse collaboration, feeling supported by others, asking questions, and heeding nurse input. The researchers grouped individual-level responses to a single score at each hospital OR level and used multivariate analysis of items and scale to detect differences at the hospital OR level and by caregiver type. They found that teamwork climate differed significantly by hospital and OR caregiver type. This tool and initial benchmarks should allow hospitals to compare their OR teamwork climate to national means, in an effort to focus more on what excellent surgical teams do well. ■

## Ordering Information

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AHRQ Pub. No. 07-0018  
February 2007

ISSN 1537-0224