



RESEARCH ACTIVITIES

U.S. Department of Health and Human Services • No. 340, December 2008

Highlights

Departments

Patient Safety and Quality . . 2

**Health Information
Technology 7**

Women's Health 9

Child/Adolescent Health . . . 10

Elderly/Long-term Care . . . 12

Chronic Disease 14

Emergency Medicine 16

Pharmaceutical Research . . 17

**Outcomes/Effectiveness
Research 18**

Acute Care/Hospitalization . 19

**Health Care Costs and
Financing 21**

Emergency Preparedness . . 21

Regular Features

Agency News and Notes . . . 22

Announcements 24

Research Briefs 24

More than 2 million children with insured parents are uninsured

Some 2.3 million children a year, mostly from low- to middle-income families, have no health care coverage to pay for preventive or other medical needs, even though at least one of their parents is insured, according to a new study supported by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Research Resources, part of the National Institutes of Health. The new study is one of the first to examine the characteristics of uninsured children under age 19 whose parents were insured all year. These children account for a quarter of the estimated 9 million uninsured children in the United States.

Researchers led by Jennifer DeVoe, M.D., of the Oregon Health & Science University in Portland, studied 2002-2005 national data from AHRQ's Medical Expenditure Panel Survey and found that children from low-income families where at least one parent had health insurance were more than twice as likely to be uninsured at some point during the year as were similar children from high-income families. They were also 73 percent more likely to be uninsured for more than 6 months. In 2005, a typical low-income family of four

earned between roughly \$24,000 and \$39,000, whereas the typical high-income family of four earned more than \$77,000 a year.

Children from middle-income families—those earning between \$39,000 and \$77,000 a year for a typical four-member family—had a 48 percent greater chance of being uninsured with at least one insured parent at some point during the year compared with high-income children and had a 56 percent higher likelihood of being uninsured for over 6 months. The researchers also found that:

- Children living with an insured single parent had two times the odds of being uninsured at any point during the year as children living with two married people of whom at least one was insured.
- Children with at least one parent who did not complete high school were 44 percent more likely than children whose parent or parents were high school graduates to be uninsured at any point during the year.
- Hispanic children had a 65 percent higher probability than non-Hispanic, white children of

continued on page 2

Uninsured children

continued from page 1

being uninsured at some point during the year with an insured parent and an 80 percent greater chance of being uninsured for more than 6 months.

- Children whose parents had Medicaid or other public insurance were 54 percent less likely to be uninsured at any point during the year than

children with privately insured parents and 59 percent less likely to be uninsured for more than 6 months.

The study was supported in part by AHRQ (HS16181) and the Biostatistics Shared Resource of the Oregon Health & Science University and the Oregon Clinical Translational Research Institute, which is part of a national Clinical and Translational Science Award

consortium funded through the National Center for Research Resources of the National Institutes of Health.

See “Uninsured children and adolescents with insured parents,” by Dr. DeVoe, Carrie Tillotson, M.P.H., and Lorraine S. Wallace, Ph.D., in the October 22/29, 2008 *Journal of the American Medical Association* 300(10), pp. 1904-1913. ■

Patient Safety and Quality

Few medical trainees are trained to disclose errors to patients by the time they assume some patient care

Few medical trainees have been formally prepared to disclose errors to patients by the time they are faced with the challenge, finds a new study. Although a few medical schools provide formal instruction in error disclosure, these skills are largely taught via the hidden curriculum and role modeling during internships and residencies. To measure trainees’ attitudes and experiences regarding medical error and error disclosure, Thomas H.

Gallagher, M.D., of the University of Washington School of Medicine, and colleagues surveyed second- and fourth-year medical students, medicine and surgery interns, and medicine and surgery residents.

Of the 889 trainees who responded to the survey, most (74 percent) agreed that medical error is among the most serious health care problems. Nearly all (99 percent) agreed serious errors should be disclosed to patients, but

87 percent acknowledged barriers to disclosure such as the patient’s lack of understanding or the threat of a lawsuit. Personal involvement with medical errors was common among the fourth-year medical students (78 percent) and the residents (98 percent). Among residents, 45 percent reported involvement in a serious error, 34 percent reported experience disclosing a serious error, and 63

continued on page 3

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

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

Barbara L. Kass, MPH, CHES
Managing Editor

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

Also in this issue:

Quality improvement and impact on primary care, see page 5

Medication barcode scanning systems and workarounds, see page 8

Cancer diagnosis and patient choice of Medicare plans, see page 12

Functionality after stroke for patients with arthritis and lupus, see page 15

Gene variants and acute coronary syndrome, see page 20

Medical trainees

continued from page 2

percent had disclosed a minor error. Although only 33 percent of trainees had received training in error disclosure, 92 percent expressed interest in such training, particularly at the time of disclosure.

To improve the frequency and content of error disclosure as well

as to maintain public trust, the next generation of physicians must be prepared to properly disclose medical errors, the researchers recommend. They call for development of formal disclosure curricula, coupled with supervised practice, to prepare trainees to independently disclose errors to patients by the end of their training. Their study was supported in part

by the Agency for Healthcare Research and Quality (HS11898 and HS14012).

More details are in "The attitudes and experiences of trainees regarding disclosing medical errors to patients," by Andrew A. White, M.D., Dr. Gallagher, Melissa J. Krauss, M.P.H., and others, in the March 2008 *Academic Medicine* 83(3), pp. 250-256. ■

Identifying drug orders stopped within 45 minutes of prescribing can help detect medication errors

Drug prescribing errors are one of the most frequent types of medical errors. Methods for identifying medication errors are subject to inaccuracy and systematic bias. However, a new study shows that identifying drug prescriptions that are stopped within 45 minutes of the initial prescribing is an inexpensive and quick way to detect prescribing errors.

Researchers at the University of Pennsylvania Center for Education and Research on Therapeutics analyzed medication orders that were entered into a computerized physician order entry (CPOE) system at an urban hospital and discontinued within 2 hours. They then investigated these stop orders in real time via interviews with the corresponding ordering physicians. Each order was also independently reviewed by a clinical pharmacist or physician. Of 114 rapidly discontinued orders by 75 physicians during a 24-day period, two-thirds of medication orders discontinued within 45 minutes were deemed inappropriate (for example, wrong dose or drug). In addition, 55 percent of medication orders discontinued within 2 hours were deemed inappropriate.

Physicians said they typically stopped orders due to drug-disease reconsiderations, drug-drug interactions, and patient preferences. Although doctors often caught their own mistakes, the impetus for the stop order often came from other house staff, nurses, pharmacists (who often call prescribing physicians with questions), and attending physicians. The classes of drugs most likely to be quickly discontinued were low therapeutic index drugs, insulin, antiretrovirals, antineoplastics, and immunosuppressive drugs. The study was supported by the Agency for Healthcare Research and Quality (HS11530).

See "Identifying and quantifying medication errors: Evaluation of rapidly discontinued medication orders submitted to a computerized physician order entry system," by Ross Koppel, Ph.D., Charles E. Leonard, Pharm.D., A. Russell Localio, J.D., Ph.D., and others, in the July/August 2008 *Journal of the American Medical Informatics Association* 15, pp. 461-465. ■

Fall prevention program yields benefits at first then wanes

Patient falls in hospitals can lead to injuries, longer stays, and higher costs. Further, as of October 2008, Medicare and many State Medicaid agencies halted reimbursements to hospitals for costs associated with treating injuries that patients incurred when they fell while hospitalized. Researchers from the Washington University School of Medicine tested the effectiveness of a

fall prevention program on four floors (two intervention, two control) of the Barnes-Jewish Hospital from April to December 2005. Control floors had 7.5 and 6.9 falls per 1,000 patient days, while intervention floors had 6.4 and 5.1 falls per 1,000 patient days.

Prevention strategies for all floors included ones the hospital normally employed, such as daily

assessment of a patient's risk of falling, a review of fall prevention strategies with the patient and family members, and use of fall prevention signs. Additionally, staff on the intervention floors received self-study modules and in-service training. They also communicated with each other on a patient's risk by using dry erase boards or patient

continued on page 4

Fall prevention program

continued from page 3

armbands. They implemented a toileting schedule, requested physical therapy or occupational therapy consultations, and reviewed with the patient and family any medications that could put patients at risk for falls.

Intervention floors saw a 23 percent reduction in patient falls when compared with control floors (57 and 70 falls, respectively), but

results were not statistically significant. An initial decrease in falls of 43 percent for the intervention floors held fast for 5 months, but rates then rose again. The authors suggest that staff turnover, high patient volume and turnover, high patient-to-nurse ratios, lack of buy-in from providers, and demands on nursing staff may explain why compliance was less than optimal. For example, though a toileting schedule was implemented, staff found it difficult

to carry out because many patients chose not to use the facilities at their scheduled times. This study was funded in part by the Agency for Healthcare Research and Quality (HS11898).

See "Intervention to prevent falls on the medical service in a teaching hospital," by Melissa J. Krauss, M.P.H., Nhial Tutlalm, M.P.H., Eileen Costantinou, M.S.N., R.N., and others in the June 2008 *Infection Control and Epidemiology* 29(6), pp. 539-545. ■

Analysis of care quality is nearly universal among HMO health plans

Health maintenance organizations (HMOs) are almost universally collecting and reporting data on care quality measures that are often reported back to physicians or medical groups within the health plan's care delivery network, according to a new study. These quality measures are used to guide health plan efforts on quality improvement, as well as allowing the plans to set up pay-for-performance programs to encourage quality improvement by care providers. A smaller but substantial percentage of HMOs collect similar data on hospital performance, although most health plans have not based hospital payment on hospital quality performance.

The researchers surveyed all health plans with an HMO option in each of 41 randomly selected metropolitan statistical areas (MSAs), totaling 242 plans. They collected information about health plan enrollment in the market, whether the plan used primary care physicians as gatekeepers, accreditation by the NCQA or another organization, and ownership (for-profit or not-for-profit). They also inquired about whether the plan relied on salary, capitation (flat payment per enrollee), or fee-for-service to pay primary care physicians or groups of physicians within the plan. Finally, the researchers asked about the HMO's data collection programs at the plan and physician levels, selecting seven care quality measures (including one each for patient satisfaction, prevention, and mental health, and four measures for chronic disease management).

Almost all of the 242 health plans collected plan-level data on the seven outpatient measures examined by the researchers, ranging from 92.1 percent of plans that collected data on hypertension control and cholesterol management to 99.2 percent that collected information on patient satisfaction. Except for hypertension control, more than eight out of 10 plans targeted these measures for plan-wide improvement.

However, demonstration of improvement ranged from 45.5 percent for breast cancer screening to 93 percent for diabetes care. A smaller proportion of plans collected data at the physician or physician-group level ranging from 50.4 percent for hypertension control to 81.4 percent for diabetes care. For each measure, a slightly smaller percentage of plans provided the physicians with feedback based on the measures. Diabetes care was used most frequently (50.5 percent) for pay-for-performance programs, while diabetes care, breast cancer screening, and appropriate asthma medication use were the most frequently used measures (all above 20 percent) on health plans' physician report cards. The study was funded in part by the Agency for Healthcare Research and Quality (HS13335).

More details are in "Quality monitoring and management in commercial health plans," by Bruce E. Landon, M.D., M.B.A., Meredith B. Rosenthal, Ph.D., Sharon-Lise T. Normand, Ph.D., Richard G. Frank, Ph.D., and Arnold M. Epstein, M.D., M.A., in the June 2008 *The American Journal of Managed Care* 14(6), pp. 377-386. ■

A multifaceted quality improvement program can have a robust impact on the quality of primary care

Primary care practices that participate in a quality improvement (QI) project, which involves performance reports, optional practice site visits to educate clinicians, and annual network meetings to share best practices, can improve their performance on a broad spectrum of clinical quality indicators, concludes a new study. The researchers examined the impact of a QI demonstration project on 31 process and 5 outcome quality measures among practices in a primary care practice-based research network, the Practice Partner Research Network (PPRNet). The QI program, which involved 99 practices that used the same electronic medical record (EMR) system and 530 clinicians and staff, significantly improved 29 of the 36 quality of care measures.

A Medical University of South Carolina team, led by Steven Ornstein, M.D., extracted EMR data on 847,073 patients to identify the quality measures pertinent to cardiovascular disease and diabetes, cancer screening, adult immunization, respiratory and infectious disease, mental health and substance abuse, obesity and nutrition, safe medication prescribing in the elderly, as well as a summary measure, the Summary Quality Index (SQUID).

With the QI program, the SQUID improved by 2.43 percent, with clinically significant improvements for 29 of the 36 quality measures, including all 5 outcome measures. The specific improvement strategies involved prioritizing performance, involving all staff in development of QI approaches, redesigning delivery

systems, activating patients (for example, limiting medication refills when appointments were needed), and using EMR tools to a greater extent. The findings suggest that broader adoption of EMR and specific QI activities among primary care practices can improve the quality of primary care in the United States. The study was supported by the Agency for Healthcare Research and Quality (HS13716).

More details are in "Improving the translation of research into primary care practice: Results of a national quality improvement demonstration project," by Dr. Ornstein, Paul J. Nietert, Ph.D., Ruth G. Jenkins, Ph.D., and others, in the July 2008 *Joint Commission Journal on Quality and Patient Safety* 34(7), pp. 379-390. ■

AHRQ sponsors first theme issue of *Health Services Research* with focus on improving efficiency and value in health care

The Agency for Healthcare Research and Quality (AHRQ) has sponsored the first in a new series of theme issues for the October 2008 *Health Services Research* 43 (5, Part 2). Seven new studies in this theme issue, "Improving Efficiency and Value in Health Care," seek to move beyond the measurement of efficiency toward implementing improvements in care efficiency and value. The issue begins with an introduction to the topic by AHRQ researchers Irene Fraser, Ph.D., and William Encinosa, Ph.D., and Columbia University investigator Sherry Glied, Ph.D.

The first four studies include examinations of 21 quality

improvement (QI) programs in Minnesota hospitals; the impact of the Group Health Cooperative's Access Initiative on physician productivity; front-line staff perspectives on opportunities for improving safety and efficiency in hospital work systems; and the effect of a tiered hospital network on hospital admissions. The other three national-level studies explore the efficiency of specialty hospitals in the U.S.; analyze the efficient use of physician assistants across the country; and examine the efficiency of 1,377 U.S. hospitals. Brief summaries of the studies follow.

Olson, J.R., Belohlav, J.A., Cook, L.S., and Hays, J.M., "Examining

quality improvement programs: The case of Minnesota hospitals," pp.1787-1806.

Hospitals vary widely in their ability to implement QI programs, depending in part on the difficulty of the programs, concludes this survey of 109 Minnesota hospital administrators. The administrators scored 21 QI programs based on difficulty of implementing them and then scored their hospital on how well they implemented the programs they attempted. The scoring provided a quantifiable prediction of success. For example, if a hospital with a lower ability tried to implement a very difficult program such as the Malcolm

continued on page 6

Health Services Research

continued from page 5

Baldrige Award program, its chance of success was less than 5 percent. However, its chance of implementing an easier improvement, such as an employee suggestion system, was 75 percent.

Tucker, A.L., Singer, S.J., Hayes, J.E., and Falwell, A., “Front-line staff perspectives on opportunities for improving the safety and efficiency of hospital work systems,” pp. 1807-1829.

This study designed and implemented an intervention called “Leveraging Front-Line Expertise” in 20 hospitals to gather input from front-line workers about hospital patient safety system failures. According to the front-line workers, 36 percent of failures were equipment/supply failures or facility failures, which posed safety risks and diminished staff efficiency. Examples ranged from broken, missing, or inappropriate equipment or supplies to poor facility housekeeping and inadequate lighting. However, these types of failures have not been priorities of national patient safety initiatives and are not typically considered important to examine in QI programs. Campaigns to monitor and track equipment and facility failures may be a fruitful next step for major improvements

in safety and efficiency of hospital systems, conclude the researchers.

Valdmanis, V.G., Rosko, M.D., and Mutter, R.L., “Hospital quality, efficiency, and input slack differentials,” pp. 1830-1848.

By eliminating inefficiency, hospitals could increase outputs by 26 percent on average, found this study. The authors used a method to measure and quantify inefficiency in 1,377 hospitals across 34 States. They found that about 3 percent of the hospitals’ inefficiency could be attributed to congestion (productivity loss due to the occurrence of patient safety problems). However, even among high-quality hospitals with low patient safety problems, there was still much inefficiency due principally to unused resources such as idle personnel. On the other hand, low-quality hospitals hired too few personnel, especially full-time licensed practical nurses. The high-quality hospitals tended to have higher overall efficiency than the other hospitals, suggesting that costs and quality do not necessarily need to be traded off. Reprints (AHRQ publication no. 09-R005) are available from AHRQ.*

Scanlon, D.P., Lindrooth, R.C., and Christianson, J.B., “Steering patients to safer hospitals? The effect of a tiered hospital network on hospital admissions,”

(AHRQ grants HS13680 and HS10730), pp.1849-1868.

This study found that union workers whose company gave them financial incentives to choose hospitals that met the Leapfrog Group’s three patient safety “leaps” were substantially more likely to choose high-quality hospitals for medical admissions. However, the incentive did not affect their hospital selection for surgical admissions. This result suggests potential “efficiencies” by appropriate use of financial incentives for patients. All patients were averse to travel time, but the union patients selecting an incentive hospital were less averse to travel time. Although financial incentives for surgery may need to be large enough so that patients are willing to travel further to a high-quality hospital, this may not be necessary for medical hospitalizations, conclude the researchers.

Carey, K., Burgess Jr., J.F., and Young, G.Y., “Specialty and full-service hospitals: A comparative cost analysis,” pp. 1869-1887.

The number of specialty hospitals grew dramatically from 1998 to 2004. These specialty hospitals are no more efficient than the full-service hospitals with whom they compete, found this study. Indeed, surgical and orthopedic specialty hospitals had

continued on page 7

Visit the AHRQ Patient Safety Network Web Site

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

Health Services Research

continued from page 6

significantly higher levels of cost inefficiency than traditional full-service hospitals (inefficiency score of 47 vs. 27 percent). However, cardiac specialty hospitals were similar to traditional hospitals. Perhaps because many specialty hospitals are also physician-owned, efforts to be efficient may focus on setting operating room schedules for surgeons' convenience and workload rather than on minimizing hospital inefficiencies in resource use, suggest the authors. Their findings were based on analysis of Medicare cost data and hospital discharge data for three States.

Conrad, D., Fishman, P., Grembowski, D., and others, "Access intervention in an integrated, prepaid group practice: Effects on primary care physician productivity," pp. 1888-1905.

These researchers examined the impact of the Group Health Cooperative's (GHC's) Access Initiative on primary care physician productivity over an 8-year period.

The initiative included seven system-wide incentives to improve patient access to care. Three of the seven incentives directly addressed productivity: primary care redesign to control costs, linking physician compensation to productivity, and financial incentives for physicians to use secure messaging with patients through a Web site. The incentives increased the number of enrollees for whom the physician was responsible. Moreover, service intensity per visit increased, while visits per full-time-equivalent (FTE) physician fell without reducing care quality. Overall, costs per patient declined. The findings were based on linking administrative records of physician characteristics, compensation, and FTE data to GHC enrollee care use and cost information.

Morgan, P.A., Shah, N.D., Kaufman, J.S., and Albanese, M.A., "Impact of physician assistant care on office visit resource use in the United States," pp. 1906-1922.

The number of employed physician assistants (PAs) grew from 20,000 in 1991 to over 68,000

in 2006. Patients whose care includes PAs have 16 percent fewer office-based visits than patients cared for by physicians only, according to this study. Moreover, this efficiency gain is not offset by increased office visit resource use in other settings, suggesting the potential for further productivity gains through use of PAs. These findings indicate that PAs serve more to extend physician services to patients than to play a complementary role that leads to increased health care resource use. If predicted physician shortages materialize, PAs will provide a larger share of U.S. patient care in the future at a reduced cost, thus increasing efficiency in health care delivery.

To access the complete articles in the *HSR* theme issue, "Improving Efficiency and Value in Health Care," go to www3.interscience.wiley.com/journal/121414513/issue. A limited supply of copies of "Improving Efficiency and Value in Health Care" (Publication No. OM 09-0006) are also available from AHRQ.* ■

Health Information Technology

Children get less safety benefit than adults from hospital computer order entry systems

Commercially available computerized physician order entry (CPOE) systems may need modification to be as effective at preventing serious medication errors among children as they have for adults, according to a new study. Studies of the effect of CPOE systems on medication errors in adult patients have shown reductions of up to 55 percent in serious medication errors that would otherwise have not been intercepted by hospital staff. However, the results for pediatric centers have been much more variable.

In the new study, Christopher P. Landrigan, M.D., of Brigham and Women's Hospital and Children's

Hospital Boston, and colleagues compared monthly rates of medication errors 7 months before and 9 months after implementation of a commercial CPOE system, collecting data on 627 children hospitalized at a hospital pediatric surgical or medical unit, a pediatric intensive care unit (PICU), and a neonatal intensive care unit (NICU). Using comprehensive error surveillance methods, the researchers did not find a statistically significant difference before and after implementation of CPOE for total errors (44.7 vs. 50.9 errors per 1,000 patient-days), serious medical errors

continued on page 8

Computer order entry systems

continued from page 7

(31.7 vs. 33.0 errors per 1,000 patient-days), and nonintercepted serious medical errors (23.1 versus 20.6 errors per 1,000 patient days). They found a downward trend in nonintercepted serious errors from the beginning of the academic year (September or October) to later in the academic year (February or March), both before and after implementation of CPOE, suggesting the learning curve for new residents. However, there was a significant 7 percent drop in the level of rates of nonintercepted serious medication errors after CPOE implementation compared with pre-CPOE rates. No similar significant changes were seen for all medication errors or all serious medication errors, or for injuries caused by medication errors.

The researchers point out that the commercial CPOE system evaluated in the new study was not optimally designed to prevent common pediatric medication errors, such as the use of weight-based dosing calculations to prevent dosage errors. At the time of the study, the CPOE system required the user to select the pediatric version of the medication to engage weight-based dosing. If the unspecified form of the medication was chosen, this calculation was not done. The study was funded in part by the Agency for Healthcare Research and Quality (HS13333).

More details are in "Effect of computer order entry on prevention of serious medication errors in hospitalized children," by Kathleen E. Walsh, M.D., Dr. Landrigan, William G. Adams, M.D., and others, in the March 2008 *Pediatrics* 121(3), pp. e421-e427. ■

Hospital processes are the usual causes for workarounds to medication barcode scanning systems

Most hospitals rely on electronic systems to ensure the right patient receives the right medication in the right dosage at the right time. Clinicians often perform workarounds when it comes to these barcoded medication administration (BCMA) systems. To identify the reasons for workarounds, a team of researchers observed and interviewed staff, attended staff meetings, and analyzed override data at a 470-bed hospital in the Midwest and a 929-bed health care system on the East Coast from 2003 to 2006.

They identified three categories of workarounds. The first type of workaround was omission of process steps. It included actions such as providing medication without first confirming the patient's identity or scanning the medication without reviewing the medication list, its name, or the

dosage. Steps performed out of sequence comprised the second type of workaround. It included using the BCMA system to document the medication as administered either long before or long after it actually was given. The final workaround, unauthorized process steps, included adding new steps in the process or changing how a step was performed, such as putting a patient's barcode on a clipboard and scanning it from there.

Causes determined for the workarounds were technology related, task related, organizational, patient related, and environmental. The most common causes for workarounds were organizational, in which workflow policies were incompatible with safety. Examples included having medications and patients with no barcodes, multiple barcodes on medications, or labels

obscuring barcodes so that scanners could not record the data. Most workarounds resulted from poor process design, such as having to wake a patient to scan a wristband when providing IV medication. Because of the prevalence of workarounds, the authors recommend that hospitals revise their protocols so that adhering to policy is easier than deviating from it. This work was funded in part by the Agency for Healthcare Research and Quality (HS11530 and HS14253).

See "Workarounds to barcode medication administration systems: Their occurrences, causes, and threats to patient safety," by Ross Koppel, Ph.D., Tosha Wetterneck, M.D., M.S., Joel Leon Telles, Ph.D., and Ben-Tzion Karsh, Ph.D., in the July/August 2008 *Journal of the American Medical Informatics Association* 15(4), pp. 408-423. ■

Electronic tools could substantially reduce medication errors in primary care

Around 1.5 million preventable adverse drug events are estimated to occur each year in the United States. However, little is known about the types and consequences of medication errors in primary care settings, where at least 3.5 billion medication prescriptions are written each year. A new study found that 57 percent of medication errors made in family physicians' offices could have been prevented by electronic medical records or computerized physician order entry. Researchers analyzed the type, severity, and potential preventability of medication errors and their associated adverse drug events reported by more than 440 family physicians and staff from 52 practices.

Of the 194 reported medication errors, 70 percent were prescribing errors, 10 percent were medication administration errors, 10 percent were documentation errors, and 3 percent were monitoring errors. Overall, 16 percent of the errors resulted in temporary harm (an adverse drug event). The two most commonly reported medication errors were related to medication dose and selection, followed by the actual prescription itself and communication issues. The most common reasons for these error types included incorrect dose, incorrect drug selection, patient contraindications to the prescribed drug, communications problems with the pharmacy, and

insufficient information on the prescription. The researchers estimated that more than half of the medication errors could have been prevented by electronic medical records and computerized physician order entry.

Physicians were thought to be primarily responsible for most (62 percent) of the errors, followed by nurses (11 percent), other clinic staff (7 percent), pharmacists (6 percent), and patients (4 percent). Pharmacists prevented nearly half of those errors that did not reach the patient. The medications most frequently associated with errors were analgesics, antibiotics, cardiovascular drugs (for hypertension or hyperlipidemia), and endocrine drugs (oral antidiabetics, insulin, estrogen/progesterone, and levothyroxine). The data for this study came from two error reporting studies conducted in 2000 by the American Academy of Family Physicians National Research Network and the Robert Graham Center supported by the Agency for Healthcare Research and Quality (HS11584 and HS14552).

See "Medication errors reported by U.S. family physicians and their office staff," by Grace M. Kuo, Pharm.D., Robert L. Phillips, M.D., Deborah Graham, M.S.P.H., and John M. Hickner, M.D., in *Quality and Safety in Health Care* 17, pp. 286-290. ■

Women's Health

Physical demands of a pregnant woman's job affect the baby's birth date and weight

The biological effects of stress can cause expectant mothers to deliver early or have children with lower-than-normal birth weights, concludes a new study. To determine how workplace stress affects births, Janice F. Bell, Ph.D., of the University of Washington, matched a Department of Labor database with a U.S. Bureau of Labor Statistics survey to track work characteristics and birth outcomes of 2,508 women with 3,386 single

births between 1979 and 2000, who worked the 13 weeks prior to delivery.

Researchers developed three categories of work attributes. The first, physical demands, comprised jobs that involved much standing, bending, and twisting. It included janitorial, farming, and nursing jobs. The status and recognition category described jobs with social status, autonomy, and recognition for effort. Professions included

physicians, dentists, and engineers. The final category, exposure to conflict, encompassed jobs with moral challenges or regular encounters with angry people. Social workers, police officers, and lawyers fell into this category.

A job with high physical demands was a risk factor for early labor and was associated with infants having lower-than-average birth weights for women with low

continued on page 10

Expectant mothers

continued from page 9

incomes and low education levels and for black mothers compared with white mothers. The authors suggest that stress hormones in the blood may cause premature labor. Similarly, a job with low status and recognition was a risk factor for fetal growth restriction for women with low incomes. Conversely, women at any income level with

jobs with high job status and recognition tended to carry their babies to term. The authors suggest that high status and recognition may reduce the mother's blood pressure so fetal growth is not restricted.

Though the authors predicted more preterm births for women whose jobs exposed them to conflict, black women in this category defied this expectation. One explanation is that women who

are adept at facing challenges may thrive in these jobs, thus their pregnancies are unaffected. This study was funded in part by the Agency for Healthcare Research and Quality (HS13853).

See "Maternal work and birth outcome disparities," by Dr. Bell, Frederick K. Zimmerman, Ph.D., and Paula K. Diehr, Ph.D., in the July 2008 *Journal of Maternal and Child Health* 12(4), pp. 415-426. ■

Depression symptoms are similar in pregnant and nonpregnant women

The symptoms of major depression are essentially the same in women who are pregnant and women who are not, according to a new study by Stanford University researcher Rachel Manber, Ph.D., and her colleagues. The researchers compared three groups of women—pregnant women with major depression, nonpregnant women with major depression, and pregnant women without depressive symptoms. Depressed pregnant women and depressed nonpregnant women had similar severity of depressive symptoms. However, depressed pregnant women had fewer intense feelings of suicide and guilt, and had significantly less difficulty falling asleep, but were more likely to show slowed movement and/or speech.

These findings are consistent with previous findings that childbearing alone has a modest, clinically insignificant effect on psychiatric symptoms. While pregnancy appears to reduce the intensity of some symptoms of depression, standardized measures of depression severity can be used to assess depression during pregnancy. The researchers recommend that symptoms of psychological distress should not be

written off as a normal part of pregnancy and that more attention should be focused on screening and identifying depressed pregnant women.

They recruited the two samples of pregnant women (61 depressed and 41 nondepressed) from a larger study conducted at Stanford University through obstetric clinics and ads in local parent and baby magazines. Fifty-three depressed nonpregnant women were recruited from a larger study of acupuncture treatment for depression at the University of Arizona. All of the women were in the same age range, and the two depressed groups had equivalent severity of depressive symptoms. The researchers administered two standardized measures of depression, the Hamilton Rating Scales for Depression and the Beck Depression Inventory, to all of the women participating in the study. The study was funded in part by the Agency for Healthcare Research and Quality (HS09988).

More details are in "Depression symptoms during pregnancy," by Dr. Manber, Christine Blasey, Ph.D., and John J. B. Allen, Ph.D., in *Archives of Women's Mental Health* 11, pp. 43-48, 2008. ■

Child/Adolescent Health

Changing criteria in a definition of high-risk asthma may help pinpoint those who will need the most care

The Health Effectiveness Data and Information Set (HEDIS) definition of high-risk asthma can help determine which young patients are likely to need interventions to manage their asthma, the most common chronic health

condition affecting children and teens. However, because the definition casts a broad net, it often includes patients who are unlikely to need additional services. Researchers compared the 2006 HEDIS definition with a revised definition

they developed to determine which best predicted care use over 2 years for 769 youth ages 11 to 17 who were enrolled in an insurance plan in Washington.

continued on page 11

High-risk asthma

continued from page 10

Both definitions include the criteria of more than one emergency department (ED) visit or hospitalization for asthma. However, the HEDIS definition criteria include more than four prescriptions for asthma medication or more than four ambulatory visits and more than two drug prescriptions for asthma. The revised definition dispenses with those criteria, and considers instead whether the patient received more than one oral steroid prescription for asthma.

The revised definition for high-risk asthma identified 223 high-risk youth. The HEDIS criteria included 514 youth, 295 of whom did not have asthma-related hospitalizations, ED visits, or prescriptions for oral steroids. In the second year, youth identified with the revised definition had more ED visits, more oral steroid prescriptions, and higher medical costs (an average of \$600) than those identified with the HEDIS definition. Because the revised definition better predicted which patients with asthma will likely need additional services, it may

help health plans put care management plans in place to forestall ED visits and hospitalizations, the authors suggest. This study was funded in part by the Agency for Healthcare Research and Quality (HS13853).

See “Identifying high-risk asthma with utilization data: A revised HEDIS definition,” by Antonia V. Bennett, M.A., Paula Lozano, M.D., Laura P. Richardson, M.D., and others in the July 2008 *American Journal of Managed Care* 14(7), pp. 450-456. ■

Time from sedation to discharge in a pediatric endoscopy unit is similar for drugs administered by an anesthesiologist or an endoscopist

The length of time from administration of anesthesia to hospital discharge is one measure of the efficiency of pediatric endoscopy units. Many pediatric endoscopists (specialists in the use of endoscopes for surgical and other procedures) are adopting the medication propofol, with the expectation that it will increase their overall efficiency. Yet a new study found that children given faster acting propofol by an anesthesiologist before being taken to the operating room did not leave the hospital sooner than patients administered the two-drug combination of midazolam and fentanyl by the endoscopist at the beginning of the procedure.

The patients at a large academic medical center received either type of anesthesia according to the preference of their gastroenterologist, noted Jenifer R. Lightdale, M.D., M.P.H. Her team prospectively tracked 134 children at a pediatric teaching hospital who underwent an endoscopic procedure. They looked at time to onset of sedation, procedure time, discharge time, and total time. Both groups had similar demographics, but overall time differences between the two groups balanced out. Dr. Lightdale's

team found that, while patients given propofol had slightly shorter median times for anesthesia onset (by 2–4 minutes) than those given midazolam and fentanyl, they also had longer procedure times and longer times to discharge. Overall, the time from initiation of anesthesia to release from the hospital were comparable, although patients given propofol were shown by earlier researchers to be faster in opening their eyes, responding to verbal commands, and orienting themselves. Times to sitting up, standing, and discharge were similar for both anesthesia groups. The study was funded in part by the Agency for Healthcare Research and Quality (HS13675).

More details are in “Efficiency of propofol versus midazolam and fentanyl sedation at a pediatric teaching hospital: A prospective study,” by Dr. Lightdale, Clarissa Valim, M.D., Sc.D., Adrienne R. Newburg A.B., and others, in the July 2008 *Gastrointestinal Endoscopy* 67(7), pp. 1067–1075. ■

Elderly/Long-term Care

Study examines the impact of Medicare Part D on drug adherence among the elderly

Medicare coverage of prescription drugs through Medicare Part D was designed to reduce the financial burden of life-saving medicines taken by the elderly, many of whom were cutting back on pills or not refilling prescriptions to save money. Not adhering to drug regimens due to concerns about cost declined somewhat following Part D implementation, although not among the sickest Medicare beneficiaries.

This study of a nationally representative group of Medicare beneficiaries found that implementation of the Medicare Part D drug plan was associated with a small, but significant, decrease in the prevalence of cost-related medication nonadherence (CRN). Nearly a year after implementation of Medicare Part D, the prevalence of CRN had declined by about 15 percent, and spending less on basic needs to afford medicines declined by approximately 40 percent compared with prior years. While CRN did not decrease among

individuals who were seriously ill, they did report reductions in foregoing basic needs to afford medication that were similar to those among beneficiaries in good to excellent health.

The modest benefit of Part D was predictable, given that the sample included all noninstitutionalized Medicare beneficiaries, regardless of whether they enrolled in Part D. Less healthy beneficiaries who did enroll in a Part D plan would have paid substantially more in copayments (due to intensive use of medication) than other beneficiaries. Thus, they would more likely have experienced the “doughnut hole” coverage gap, in which they would pay 100 percent of copayments after the first \$2,250 in total drug costs until they spent \$3,600 out-of-pocket.

The findings suggest that the intensive medicine needs and financial barriers to prescription drug access among the sickest Medicare beneficiaries may not have been fully addressed by Part D. The findings were based on

analysis of the Medicare Current Beneficiary Surveys in 2004, 2005, and 2006 (before and after Medicare Part D implementation). The researchers compared self-reports of CRN (skipping or reducing doses, not filling prescriptions) and spending less on basic needs to afford medicines before and after implementation of the Part D drug plan.

This study was supported in part by a grant to the HMO Research Network Center for Education and Research on Therapeutics (CERT) from the Agency for Healthcare Research and Quality (HS10391). For more information on the CERTs program, go to www.ahrq.gov/clinic/certsovr.htm.

Details are in “Cost-related medication nonadherence and spending on basic needs following implementation of Medicare Part D,” by Jeanne M. Madden, Ph.D., Amy J. Graves, M.P.H., Fang Zhang, Ph.D., and others, in the April 2008 *Journal of the American Medical Association* 299(16), pp. 1922-1928. ■

Medicare patients with cancer don't switch from managed care to fee-for-service

More than half of all cancer diagnoses and 70 percent of all cancer deaths occur in people aged 65 years or older. Cancer patients typically require regular visits with specialists, coordination of care among multiple providers, and frequent testing to monitor disease. Even though Medicare managed care plans tend to restrict provider choice in an effort to control costs, which may not appeal to elderly patients with cancer, they do not tend to abandon managed care plans for Medicare

fee-for-service (FFS), according to a new study. This might be because Medicare managed care plans offer enrollees lower out-of-pocket costs and provide benefits that are not available in the traditional FFS program, suggests Elena B. Elkin, Ph.D., of the Memorial Sloan-Kettering Cancer Center.

Dr. Elkin and colleagues identified elderly Medicare managed care enrollees who were diagnosed with

continued on page 13

Medicare patients

continued from page 12

primary breast, colorectal, prostate, or lung cancer from 1995 through 2002 from the Surveillance, Epidemiology, and End Results (SEER) cancer registry records linked with Medicare files. They matched cancer patients with cancer-free enrollees by age, sex, race, and geographic location.

In the 2 years after diagnosis, breast cancer patients were 22 percent less likely to disenroll from Medicare managed care than their matched cancer-free peers. Similarly, patients with colorectal, prostate, or lung cancer were also less likely to disenroll (16 percent, 14 percent, and 19 percent, respectively).

These cancers are often treated by community-based physicians and do not necessarily require services available only at specialized centers. Therefore, even Medicare managed care plans that limit access to specific providers may still offer satisfactory care to patients with these common cancers. However, even Medicare patients with rarer cancers such as acute leukemia were no more likely to disenroll from managed care plans. The study was supported in part by the Agency for Healthcare Research and Quality (HS14831).

See “Disenrollment from Medicare managed care among beneficiaries with and without a cancer diagnosis,” by Dr. Elkin, Nicole Ishill, M.S., Gerald F. Riley, Ph.D., and others, in the July 16, 2008 *Journal of the National Cancer Institute* 100(14), pp. 1013-1021. ■

A nursing home's strategic orientation influences how it reacts to publication of its care quality scores

One-fourth of the nation's nursing homes have serious deficiencies in care that have caused actual harm or risk to residents. Publicizing nursing home quality is a market solution to the purely regulatory approach to improving the quality of nursing home care, notes William D. Spector, Ph.D., of the Agency for Healthcare Research and Quality.

He and fellow researchers surveyed nursing home administrators at 1,502 nursing homes included in the first publication of the Nursing Home Compare Report conducted in May and June 2004. In addition to questions on whether and how they responded to publication, administrators were asked to select the strategic orientation (based on the typology developed by Miles and Snow) that best characterized their facility. About 43 percent of

the 724 responding administrators self-typed as defenders (compete on efficiency and services), followed by analyzers (33 percent, strive to maintain a stable base of products and services), prospectors (19 percent, compete on innovation), and reactors (6.6 percent, lack a consistent strategy).

While 37 percent of those surveyed took action immediately after the initial publication of the quality measures, nearly 30 percent took no action at all. Whether and how facilities responded was associated with strategic orientation. Compared with defenders, prospectors were 58 percent more likely and reactors were 74 percent less likely to respond immediately after the first quality measure reporting period. Analyzers were likely to immediately respond to the quality reports, but not as strongly as

prospectors. Relative to defenders, both prospectors and analyzers were more likely to investigate the reasons for poor scores. Compared with defenders at facilities with poor scores, prospectors were almost twice as likely and analyzers 67 percent more likely to change priorities of existing quality programs.

More details are in “Strategic orientation and nursing home response to public reporting of quality measures: An application of the Miles and Snow typology,” by Jacqueline S. Zinn, Ph.D., Dr. Spector, David L. Weimer, Ph.D., and Dana B. Mukamel, Ph.D., in the April 2008 *HSR: Health Services Research* 43(2), pp. 598-615. Reprints (AHRQ Publication No. 08-R070) are available from AHRQ.* ■

Chronic Disease

Lack of accessibility and affordability are linked to underdiagnosis of chronic disease in blacks and Hispanics

A new study links lack of accessibility, affordability, and continuity of medical care to underdiagnosis of chronic medical conditions among blacks and Hispanics. The researchers correlated self-diagnosis of chronic medical and mental health conditions among 287 black and Latino heads of households in 3 urban public housing communities in Los Angeles County with a physician's diagnosis of the conditions.

Overall, 85 percent of those interviewed said that they were suffering from at least one chronic condition. However, 43 percent of them claimed that a physician had never diagnosed at least one of their illnesses. For example, only one in three individuals who said they suffered from depression were ever diagnosed with depression by a physician. Only half of those self-diagnosed with hearing impairment were diagnosed by a physician, and only about one in five who said they suffered from arthritis, dental problems, or blood circulation problems were diagnosed by a physician.

Physician-based diagnosis of medical conditions was associated with five enabling factors: greater accessibility to medical services, affordability of medical care, availability of health-related information, continuity of medical care, and less financial strain. Need-for-care characteristics were not significant. The findings suggest that for patients with a similar health condition, those with better access to medical care are more likely to be diagnosed by physicians. The study was supported in part by the Agency for Healthcare Research and Quality (HS14022).

More details are in "Correlates of self-diagnosis of chronic medical and mental health conditions in underserved African American and Latino populations," by Chizobam Ani, M.D., M.P.H., Mohsen Bazargan, Ph.D., Shahrzad Bazargan-Hejazi, Ph.D., and others in the Spring 2008 *Ethnicity & Disease* 18(2 Suppl. 2), pp. S2-105-S2-111. ■

People with diabetes and depression are less likely to self-manage their diabetes

Indigent persons suffering from type 2 diabetes and depression are less likely to manage their diabetes with proper diet, exercise, medication, and blood-sugar testing, and also feel less in control of their illness than their nondepressed counterparts, according to a new study. Self-management of the disease is critical to achieving optimal blood-sugar control and avoiding diabetes-related complications that range from stroke and hypertension to blindness, kidney disease, and amputations (due to poor circulation).

Medical University of South Carolina researchers, Leonard E. Egede, M.D., M.S., and Charles Ellis, Ph.D., recruited 201 patients with type 2 diabetes from an indigent care clinic; 20 percent of them were depressed. The patients were surveyed to assess their

diabetes knowledge, diabetes self-management, and perceived control of diabetes. Patients with depression were more than twice as likely to report self-care control problems, were nearly three times less likely to report a positive attitude about their condition, and were more than three times less likely to report self-care ability and adherence to self-care regimens. Depressed patients were also less likely to feel in control of their diabetes (mean of 47.7 vs. 57.8 out of 75).

It is thought that good diabetes knowledge enhances diabetes self-management. However, the groups were not significantly different in their knowledge of diabetes, understanding of self-care tasks, and perceived importance of self-care tasks. Depression-related perceived lack of control and impairment in

self-care were probably more important barriers to good diabetes outcomes than differences in knowledge among this group of patients, note the researchers. They suggest that future programs targeted toward this group focus on improving self-management skills and patient empowerment. The study was supported by the Agency for Healthcare Research and Quality (HS11418).

More details are in "The effects of depression on diabetes knowledge, diabetes self-management, and perceived control in indigent patients with type 2 diabetes," by Drs. Egede and Ellis, in the June 2008 *Diabetes Technology & Therapeutics* 10(3), pp. 213-219. ■

People with arthritis and lupus have less functionality after strokes than others without those conditions

Recovery from the damage a stroke causes often requires stays in inpatient rehabilitation centers. There, staff members work to help patients regain their mobility or learn new techniques to complete daily tasks. People who suffer strokes, and also have conditions that cause joint pain and swelling, such as rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE), face even more hurdles during recovery, a new study finds.

Tracy U. Nguyen-Oghalai, M.D., of the University of Texas, and colleagues used a national database to identify 47,853 patients who received inpatient rehabilitation services after strokes from 1994 to 2001. Of those patients, 368 had RA and 119 had SLE. Researchers used ratings from the Functional Independence Measure (FIM) instrument that gauges the amount of assistance a person needs to complete 18 tasks. Ratings can range from 18, meaning total dependence, to 126, indicating total independence. On admission to inpatient rehabilitation, FIM instrument ratings were similar for stroke victims who had and did not have RA or SLE. However, at discharge, patients with RA had an average FIM instrument rating of 85.8 compared with 87.8 for patients who did not have RA or SLE. At followup visits between 3 and 6 months, ratings for patients with RA continued to be lower

(95.9 vs. 99.6). Outpatient therapy after discharge may further improve functionality for patients with RA, the authors suggest.

Stroke patients with SLE tended to be 17.5 years younger than patients without RA or SLE, but their age did not provide an advantage in their recovery. They did not return home more often than older people with no RA or SLE felled by strokes, nor did they have better functionality at discharge or at followup compared with that group. An earlier study indicated that people with SLE who have strokes end up in skilled nursing facilities at the same rate as older patients after experiencing strokes. Because of these poorer outcomes, more aggressive preventive strategies to combat cardiovascular disease may be needed to prevent these people from suffering strokes, the authors suggest.

The study was funded in part by the Agency for Healthcare Research and Quality (HS11618). See “Functional outcome after stroke in patients with rheumatoid arthritis and systemic lupus erythematosus,” by Dr. Nguyen-Oghalai, Helen Wu, Ph.D., Terry A. McNearney, M.D., and others in the July 15, 2008 *Arthritis & Rheumatism* 59(7), pp. 984-988. ■

Hypertension questionnaire exposes knowledge gaps in New Orleans

High blood pressure (hypertension) is a chronic disease that, left unchecked, can lead to kidney failure, stroke, or heart attack. Yet one-third of adults with high blood pressure in New Orleans have little knowledge about their condition, according to a new study from the Tulane University School of Medicine. From October 2004 to August 2005, 296 patients with high blood pressure treated at the Medical Center of Louisiana answered a 10-item telephone questionnaire designed to assess their knowledge of their condition. Of the participants, 89 percent were black, 79 percent were female, 75 percent had incomes of less than \$1,000 a

month, and 62 percent were high school graduates.

Researchers used three categories to describe participants' knowledge of hypertension: low (7 or fewer questions answered correctly), medium (8 questions correct), and high (9 or 10 questions correct). Sixty-five percent of participants answered eight or more questions correctly. Those who scored in the low category tended to be older than 60 (46.5 percent), have a recent diagnosis of high blood pressure (55.6 percent), and not be high school graduates (43.9 percent).

More than a third (40.2 percent) of participants could not identify a

reading for normal blood pressure. More than half (58.1 percent) were unaware that high blood pressure does not cause cancer. Finally, many participants (39.5 percent) did not know that high blood pressure is a lifelong condition.

The authors state that a patient's understanding of how to manage high blood pressure is critical because of the self-management the condition entails, including taking daily medication and reducing salt in the diet. Identifying where knowledge gaps exist can assist medical professionals in crafting targeted education programs for high-risk populations. This study

continued on page 16

Hypertension

continued from page 15

was funded in part by the Agency for Healthcare Research and Quality (HS11834).

See “Hypertension knowledge among patients from an urban

clinic,” by Shane Sanne, B.S., Paul Muntner, Ph.D., Lumie Kawasaki, M.D., and others in the Winter 2008 *Ethnicity and Disease* 18, pp. 42-47. ■

Emergency Medicine

One in five patients with asthma receives unnecessary antibiotics at emergency department visits

Patients with asthma sometimes end up in emergency departments (EDs), gasping for breath due to inflamed and constricted airways caused by an asthma episode. They typically receive adrenalin and inhaled bronchodilators to open up their airways. However, a new study finds that some ED clinicians continue to prescribe antibiotics (perhaps because underlying lung infections spark asthma episodes), even though they have not been proven effective for asthma.

To determine the number of antibiotic prescriptions given to treat asthma in EDs, Massachusetts General Hospital researchers used data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) and the National Emergency Department Safety Study (NEDSS). The NHAMCS data revealed that 22 percent of 16.1 million ED visits for asthma from 1993 to 2004 resulted in prescriptions for antibiotics. This number showed a slight decline to 20 percent in 2004, which could be attributed to the Centers for Disease and Control and Prevention’s Get Smart campaign, intended to reduce inappropriate antibiotic use. Similarly, the NEDSS data from 2003

through 2006 showed that 18 percent of 4,053 patients with asthma seen in EDs received antibiotics.

Patients with asthma who received prescriptions for antibiotics tended to be older and live in the South and nonurban areas, which may benefit from targeted interventions for reducing antibiotic overuse. More whites than Hispanics and blacks received prescriptions for antibiotics, putting the minority patients at less risk for adverse reactions. Forty-four percent of the antibiotics prescribed for asthma patients fell into a class called erythromycin-lincosamides-macrolides, which have not been shown to be useful for treating asthma. This study was funded in part by the Agency for Healthcare Research and Quality (HS13099).

See “Inappropriate use of antibiotics for acute asthma in United States emergency departments,” by Stefan G. Vanderweil, B.A., Chu-Lin Tsai, M.D., M.P.H., Andrea J. Pelletier, M.P.H., M.S., and others in the August 2008 *Academy of Emergency Medicine* 15(8), pp. 736-743. ■

Injuries account for a nearly one-third of pediatric emergency department visits

Nearly one-third of emergency department (ED) visits (more than 1.5 million) were for pediatric injuries in 2003, according to a study of 14 states. Nationally, 5.4 percent of children had an injury-related ED visit, and about \$2.3 billion was spent on outpatient injury-related ED visits that year. Infants, adolescents, children from very low-income communities, and children from rural areas were more likely to have an injury-related ED

visit than their peers. Although patient characteristics were fairly consistent across States, admission rates and expected source of payment for injury-related ED visits varied considerably by State.

Hospital admission rates ranged from 1.5 to 4.4 percent of injury-related ED visits and expected payer estimates ranged from 37.1 to 71.0 percent of visits billed to private insurance, 17.9 to 47.0 percent billed to Medicaid, and 2.1

to 10.4 percent billed to the uninsured.

This variation suggests several opportunities to improve emergency care for injured children, note Pamela L. Owens, Ph.D., Marc W. Zodet, M.S., Terceira Berdahl, Ph.D., and Denise Dougherty, Ph.D., of the Agency for Healthcare Research and Quality (AHRQ).

They and fellow investigators retrospectively analyzed data from

continued on page 17

Pediatric emergencies

continued from page 16

the 2003 State Emergency Department Databases and State Inpatient Databases of AHRQ's Healthcare Cost and Utilization Project and Medical Expenditure Panel Survey. They examined patient and injury characteristics and hospital admission status by

age, injury severity, and expected payer. The researchers call for studies on the relationships among State programs, policies, and care system characteristics and the nature and outcomes of injury-related ED care. Reprints (AHRQ Publication No. 08-R082) are available from AHRQ.*

More details are in "Annual report on health care for children and youth in the United States: Focus on injury-related emergency department utilization and expenditures," by Dr. Owens, Mr. Zodet, Dr. Berdahl, and others, in the July-August 2008 *Ambulatory Pediatrics* 8(4), pp. 219-240. ■

Pharmaceutical Research

Patients prescribed antidepressants from psychiatrists are more likely to receive and continue higher doses

Public awareness campaigns urge people to seek help for depression and the pharmaceutical industry promotes antidepressants with few side effects. Using a national survey's 2001-2003 data, researchers found 1 in 10 people received prescriptions for these drugs from primary care physicians or psychiatrists in the course of a year. They examined the antidepressant prescribing patterns of psychiatrists and primary care providers for 928 patients ages 18 and older.

More than 70 percent of patients reported receiving their antidepressant prescription from their primary care provider in the past year. These patients were typically at least 65 years old, female, and residents of non-urban areas. Nearly 30 percent of patients received their prescriptions for antidepressants from psychiatrists. The patients tended to meet established criteria for major depressive, bipolar, panic, or post-traumatic stress disorders or social phobia and have a larger number of mood and anxiety symptoms. These findings may be explained in part by the primary care

providers' tendency to refer more severely ill patients to psychiatrists, the authors suggest.

Compared with primary care providers' patients, psychiatrists' patients were also more likely to continue taking their antidepressants for more than 3 months. This may be because of the differences in the type of patients the providers see or the psychiatrists' ability to keep patients engaged in antidepressant therapy. Psychiatrists' patients also tended to receive higher doses of antidepressants than primary care providers' patients. This conservative approach by primary care providers may be because of side effects associated with older tricyclic antidepressants. This study was funded in part by the Agency for Healthcare Research and Quality (HS16097).

See "National patterns in antidepressant treatment by psychiatrists and general medical providers: Results from the National Comorbidity Survey Replication," by Ramin Mojtabai, M.D., Ph.D., M.P.H., and Mark Olfson, M.D., M.P.H., in the July 2008 *Journal of Clinical Psychiatry* 69(7), pp. 1064-1074. ■

American College of Rheumatology issues recommendations on prescribing drugs for rheumatoid arthritis

Individuals who are diagnosed with rheumatoid arthritis are often prescribed drugs that suppress the immune system and slow the progression of joint damage that the disease causes. Called

disease-modifying antirheumatic drugs (DMARDs), they can be taken by mouth or injection. Oral medications can be combined with one another or with injected DMARDs. Biologic DMARDs are a

subset of the DMARDs; they are specialized proteins that suppress the immune system in a more targeted manner. Because biologic DMARDs are increasingly being used, the

continued on page 18

Rheumatoid arthritis

continued from page 17

American College of Rheumatology (ACR) updated its previous recommendations for the use of DMARDs, last issued in 2002.

Researchers first completed a systematic literature review of scientific evidence. Following the five areas prespecified by the ACR, they examined indications for use, monitoring for side effects, assessing the clinical response, the roles of cost and patient preferences in decisionmaking, and the need for tuberculosis (TB) screening with use of biologic DMARDs. Using this information, a core expert panel developed recommendations that a task force panel then critiqued and rated. They examined indications for starting or resuming five oral DMARDs

(hydroxychloroquine, leflunomide, methotrexate, minocycline, and sulfasalazine) and five biologic DMARDs (abatacept, adalimumab, etanercept, infliximab, and rituximab). Drug contraindications—including infectious diseases, pregnancy, surgery, cardiac, hematologic, cancer, liver, renal, and neurologic adverse events—were also examined.

Recommendations included obtaining a baseline blood count, liver transaminase levels, and serum creatinine levels for any patient receiving DMARDs. Immunizations for influenza and pneumococcal vaccinations were recommended before starting most of these drugs. Patients about to embark on biologic DMARDs should also be screened for latent TB infection because of a higher

incidence of TB following therapy with certain DMARDs.

This study was funded in part by a grant to the University of Alabama Center for Education and Research on Therapeutics (CERT) from the Agency for Healthcare Research and Quality (HS10389). For more information on the CERTs program, please visit www.ahrq.gov/clinic/certsovr.htm.

See “American College of Rheumatology 2008 recommendations for the use of nonbiologic and biologic disease-modifying antirheumatic drugs in rheumatoid arthritis,” by Kenneth G. Saag, M.D., M.Sc., Gim Gee Teng, M.D., Nivedita M. Patkar, M.D., M.S.P.H., and others in the June 15, 2008 *Arthritis & Rheumatism* (Arthritis Care & Research) 59(6), pp. 762-784. ■

Outcomes/Effectiveness Research

Study validates American Joint Committee on Cancer's survival rates for stage IV melanoma

Patients who are diagnosed with stage IV melanoma (skin cancer) typically live less than a year, according to the 2002 American Joint Committee on Cancer (AJCC) staging system. A new study validated the AJCC system by using the center's melanoma database. A database search found 589 patients who were diagnosed with stage IV disease at the center from July 1997 to March 2006. Consistent with the literature, the median survival length for these patients was 9 months with a 1-year survival rate of 39 percent and a 5-year rate of 9 percent.

The study found several factors that appear to affect survival rates. Older age at the time of diagnosis

was associated with poorer survival rates. This finding had not been observed in prior studies. High levels of lactate dehydrogenase, an enzyme that can be measured to determine tissue damage, were associated with poor survival rates. A greater number of organs affected by the cancer also indicated a poor prognosis.

The number of metastases, or additional tumors indicating the cancer's spread, was a strong predictor of survival. Patients with one metastasis lived a median of 23 months, while patients who had more than one affected site lived just 8 months. These findings on metastases may be useful in

developing future staging systems, the authors suggest. However, they caution that advances in imaging technology may create challenges in determining the difference between true metastases and imaging artifacts. This study was funded in part by the Agency for Healthcare Research and Quality (T32 HS00066).

See “A single-institution validation of the AJCC staging system for stage IV melanoma,” by Heather B. Neuman, M.D., Ami Patel, B.A., Nicole Ishill, M.S., and others in the July 2008 *Annals of Surgical Oncology* 15(7), pp. 2034-2041. ■

Families of liver transplant recipients age 5 and older have higher stress levels than either families of younger liver transplant recipients or a control group

Children receive 12-15 percent of all liver transplants in the United States. With 10-year survival rates approaching 80 percent, the expectation is that these children will lead healthy lives, performing everyday activities free from the burden of chronic illness. Analysis of health-related quality of life (HRQOL) in these patients is an initial step in determining if these expectations are being fulfilled. The first HRQOL study of children with liver transplants that also examined family function was conducted by a team of researchers led by Estella M. Alonso, M.D., of Children's Memorial Hospital in Chicago. They found that family function in the families of older (age 5 and up) and younger (2-5 years of age) liver transplant recipients appeared normal but that the families of the older recipients reported higher levels of stress. Older children had lower scores than a normative sample of children in physical health, general health, parental emotional impact, and disruption of family activities. Younger children scored lower in global health and general health perceptions, but did not differ from controls in physical and psychosocial outcomes.

The researchers performed a multi-center study of 102 children who had survived at least 2 years following transplant surgery. They collected HRQOL data using either the Infant Toddler Quality of Life Instrument (for patients under 5 years of age) or the Child Health Questionnaire Parent Form 50. The Family Assessment Device (FAD), a survey directed to

multiple members of the same family, was administered to families of both older and younger recipients. Family dynamics is an important aspect of functional outcome for children that has not been directly investigated in earlier studies of post-transplant outcomes.

Demographic, but not clinical, variables were significant predictors of HRQOL. For example, children from minority racial groups and those with parents of lower educational status had lower reported HRQOL. Only one post-transplant medical factor, biliary complications, affected family function. This was not considered surprising, since treatment of this condition requires ongoing invasive procedures and is associated with bacterial infection. The researchers speculated that the higher levels of stress experienced by the families of older recipients may be related to patients 5 to 7 years of age having the highest level of dysfunction in the roles scale. This scale measures the family's ability to handle family tasks, including health-related functions. Such tasks may become more of a challenge to the family as the child enters formal education at this age. This research was supported by the Agency for Healthcare Research and Quality (HS13270).

See "Health-related quality of life and family function following pediatric liver transplantation," by Dr. Alonso, Katie Neighbors, Franca B. Barton, and others in *Liver Transplantation* 14(4), pp. 460-468, 2008. ■

Acute Care/Hospitalization

Study finds that specialty cardiac hospitals are similar to general hospitals in providing high-quality care for certain heart patients

The argument for creating specialized cardiac hospitals to treat patients with heart disease is that these hospitals would be more efficient and provide better care for such patients than would general or unspecialized hospitals. However, a new study does not support that argument.

Researchers compared three classes of hospitals (20 hospitals

that performed only cardiac care with 111 competing general hospitals and 48 of *U.S. News & World Report's* top-ranked hospitals for cardiac care) for compliance with best-practice quality measures in the treatment of patients for heart attack (acute myocardial infarction or AMI) or heart failure (HF). They used quality-of-care data that hospitals are required to provide to

the Centers for Medicare & Medicaid Services under a 2003 law—five specific measures of care for patients with AMI and two measures for patients with HF. For each category of measures, the researchers calculated individual and composite scores (the number of patients receiving a particular care divided by the number of

continued on page 20

Heart patients

continued from page 19

eligible patients) for each type of hospital.

Mean scores for all of the measures were high for all of the hospitals; 95 percent of eligible AMI patients and 91 percent of eligible HF patients at the 179 hospitals received the recommended treatments. Differences in a combined measure of cardiac treatment among the three types of hospitals were small, ranging from 93 percent for general hospitals to 94 percent for specialty

cardiac hospitals to 96 percent for those with top-rated cardiac programs. The top-ranked hospitals appeared to perform significantly better than general hospitals on all individual and composite measures, and the study reported no significant differences between the cardiac hospitals and general hospitals. The sample sizes were too small, however, to detect significant differences between the specialty cardiac hospitals and the hospitals with top-ranked cardiac programs. The study was funded in

part by the Agency for Healthcare Research and Quality (HS15571).

More details are in “Do specialty cardiac hospitals have greater adherence to acute myocardial infarction and heart failure process measures? An empirical assessment using Medicare quality measures: Quality of care in cardiac specialty hospitals,” by Ioana Popescu, M.D., M.P.H., Brahmajee K. Nallamothu, M.D., M.P.H., Mary S. Vaughan-Sarrazin, Ph.D., and Peter Cram, M.D., M.B.A., in the July 2008 *American Heart Journal* 156(1), pp. 155–160. ■

Few gene variants associated with acute coronary syndrome are tied to increased deaths among such patients

Many gene variants have been suggested to increase the risk of acute coronary syndrome (ACS)—unstable angina or two specific types of heart attack—but none has been conclusively shown to affect survival following the acute event. A new study, which examined the link between death within 3 years of ACS and the presence in patients of any of 89 genetic variants in 79 genes, found 16 genetic variants potentially associated with increased mortality. Only one gene variant, a variant of insulin receptor substrate 1 (IRS1), had results that remained close to statistical significance after correction for traditional cardiac risk factors and multiple comparisons.

The researchers studied 811 patients with ACS seen at two hospitals in Kansas City, Missouri, from March 2001 through June

2003, who underwent genotyping. The researchers followed them for at least 3 years to record deaths among them. A family history of coronary artery disease or heart attack was found in slightly more than half the patients. Ninety patients died.

Two sets of genetic variants associated with the occurrence of ACS in the study population were not linked with death following ACS. The researchers conclude that retesting 73 of the genetic variants in a larger patient population was not likely to reveal a strong association with post-ACS death risk. Although three of the remaining gene variants (in the ACE, F7, and ICAM1 genes) were previously shown to be protective against the occurrence of ACS, they appeared to increase slightly the risk of death in patients who do develop the condition. Because

IRS1 is a protein that binds to the insulin receptor, the researchers suggest that their findings indicate a need for further study of the mortality-increasing variant of the gene in a larger population of ACS patients, particularly those with diabetes (who would have abnormal blood insulin levels). The study was funded in part by the Agency for Healthcare Research and Quality (HS11282).

More details are in “Investigation of 89 candidate gene variants for effects on all-cause mortality following acute coronary syndrome,” by Thomas M. Morgan, M.D., Lan Xiao, Ph.D., Patrick Lyons, and others, in the July 12, 2008 *BioMedCentral Medical Genetics* 9(66) available at <http://www.biomedcentral.com>. ■

Health Care Costs and Financing

Combination antihypertensive drugs raise out-of-pocket costs for patients

Patients with high blood pressure who use frequently prescribed combination antihypertensive medications pay an average of \$13.38 more per month for their medication, compared with the cost of their medication's generic components, according to a new study. Most patients with hypertension require more than one medication and over 14 percent of all antihypertensive prescriptions are for fixed-dose combination drugs. These drugs, which combine two or more drugs from different therapeutic classes into a single tablet, simplify prescription regimens and may thus increase the likelihood that patients will take their medicines as prescribed. However, many medicines marketed as fixed-dose combinations are available as brand-name drugs alone and are typically considerably more expensive than their generic equivalents. Also, physicians are much more likely to prescribe brand name medicine if they use a combination antihypertensive than a noncombination therapy, explain researchers Atonu Rabbani, Ph.D., and G. Caleb Alexander, M.D.

They studied 27 commonly prescribed combination antihypertensives and found that for 24 of them, there was an average 41 percent increase in out-of-pocket costs. The differences in costs varied considerably, ranging from a decreased cost of \$1.10 to an increased cost of \$60.41. Using data from the Medical Expenditure Panel Survey, the researchers compared out-of-pocket and third-party costs for a 30-day supply of 27 brand name fixed-dose combination

antihypertensives with the sum of the costs for their individual generic components.

In contrast to the higher out-of-pocket costs, the researchers found that total third-party costs were lower with fixed-dose combination medicines for 23 of the 27 drugs examined. The mean decrease in monthly prescription costs was \$20.89 with a combination medicine, reflecting a 32 percent reduction in total monthly prescription costs. In a secondary analysis including both brand name and generic combination antihypertensives, the researchers found a much smaller increase in average out-of-pocket costs (only 2 percent greater, as opposed to 41 percent) for the generic combination medications. Similarly, the total costs for the combination antihypertensives were 14 percent less (compared with 32 percent) than their constituent drugs.

The authors stress the importance of their findings because many patients experience burdensome out-of-pocket costs, antihypertensives are some of the most commonly prescribed prescription drugs, and modest reductions in out-of-pocket costs may be quite meaningful for many poor and elderly patients. This study was supported by the Agency for Healthcare Research and Quality (HS15699).

See "Out-of-pocket and total costs of fixed-dose combination antihypertensives and their components," by Drs. Rabbani and Alexander, in the May 2008 *American Journal of Hypertension* 21(5), pp. 509-513. ■

Emergency Preparedness

Studies evaluate hospital disaster drill tools

The Joint Commission requires hospitals to put their emergency management plans in action by conducting two disaster drills each year. Because there is no validated method to assess hospital disaster preparedness, UCLA Medical Center researcher Amy H. Kaji, M.D., M.P.H., and colleagues examined three of them during a

November 2005 regional disaster drill in Los Angeles to determine how well they worked together. In a second study, Dr. Kaji's team used a drill evaluation tool that the Johns Hopkins University Evidence-based Practice Center developed under a contract with the Agency for Healthcare Research and Quality

(AHRQ). Both studies were funded in part by AHRQ (HS13985).

Kaji, A.H., Langford, V. and Lewis, R.J. (2008 September). "Assessing hospital disaster preparedness: A comparison of an on-site survey, directly observed drill performance, and

continued on page 22

Hospital disaster drill tools

continued from page 21

video analysis of teamwork.”

***Annals of Emergency Medicine* 52(3), pp. 195-201 and 201.e1-201.e12.**

The three methods to assess hospital emergency plans measured different aspects of preparedness for the 6 (of 17) hospitals that agreed to be part of the study. Before the drill, disaster coordinators completed on-site, e-mailed surveys that addressed items such as their emergency plan, training, communication, and supplies. On the day of the simulated disaster—an explosion at a public event—crews videotaped participants from the six hospitals so that a research group, MedTeams, could assess their teamwork skills, including problem solving, structure, and communications. Finally, 32 fourth-year medical student observers

rated participants' performance with an evaluation tool.

The authors found that the on-site survey addressed material and staff concerns. AHRQ's drill evaluation tool examined those items, but also delved into communication and teamwork. The correlation between the drill evaluation tool and the video analysis was the strongest, most likely because they both scrutinize teamwork and communication issues. The researchers suggest their findings could be useful in developing one tool to assess hospital preparedness that reflects teamwork, communications, surge capacity, supplies, and equipment.

Kaji, A.H. and Lewis, R.J. (2008 September). “Assessment of the reliability of the Johns Hopkins/Agency for Healthcare Research and Quality hospital disaster drill evaluation tool.” *Annals of Emergency Medicine*

52(3), pp. 204-210 and 210.e1-210.e8.

In this study, the researchers used the Los Angeles disaster drill as an opportunity to study the AHRQ drill evaluation tool. The tool identifies zones of action during disasters (command, triage, treatment, and decontamination), and observers evaluate participants' performance in those zones using the AHRQ tool. Two hundred items from the tool were coded as having better versus worse preparedness. The authors found the internal reliability of the tool to be high, which indicates its underlying construct may be valid. However, evaluations varied widely among observer pairs. This could have been caused by observers' lack of training, their unfamiliarity with disaster response, or ambiguous items they were asked to score. This variation indicates that either revision of the tool or more in-depth user training is needed. ■

Agency News and Notes

One in 10 adults are being treated for arthritis

Approximately 21 million Americans—9.5 percent of adults 18 and older—either visited or called a doctor for a prescription to reduce arthritis pain in 2005, according to data from the Agency for Healthcare Research and Quality (AHRQ). The most common form of arthritis is osteoarthritis. It is usually associated with aging and most often causes pain and stiffness in the fingers, knees, and hips. A less common form of arthritis is rheumatoid arthritis, occurring when the body's own defense system doesn't work properly, causing pain in the joints and bones. Rheumatoid arthritis may also affect internal organs and systems. AHRQ's data found that in 2005:

- Some 9.5 million adults sought treatment, but women did it more often than men (12 percent vs. 7 percent, respectively).
- More whites sought treatment for arthritis (10.5 percent), followed closely by blacks (just under 10

percent), compared with Hispanics (6 percent) and Asians (4 percent).

- About \$32 billion was spent for arthritis treatments, which included doctor visits (36 percent), hospital care (31 percent), prescription drugs (21 percent), home health care (12 percent), and emergency room visits (less than 1 percent).

These data are taken from the Medical Expenditure Panel Survey, a detailed source of information on the health services used by Americans, the frequency with which they are used, the cost of those services, and how they are paid. For more information, go to *Arthritis: Use and Expenditures among U.S. Noninstitutionalized Population, 2005*, MEPS Statistical Brief #222 at www.meps.ahrq.gov. ■

One in five hospital admissions are for patients with mental disorders

About 1.4 million hospitalizations in 2006 involved patients who were admitted for a mental illness, while another 7.1 million patients had a mental disorder in addition to the physical condition for which they were admitted, according to data from the Agency for Healthcare Research and Quality (AHRQ). The 8.5 million hospitalizations involving patients with mental illness represented about 22 percent of the overall 39.5 million hospitalizations in 2006. AHRQ's analysis found that of the nearly 1.4 million hospitalizations specifically for treatment of a mental disorder in 2006:

- Nearly 730,000 involved depression or other mood disorders, such as bipolar disease.
- Schizophrenia and other psychotic disorders caused another 381,000.
- Delirium—which can cause agitation or inability to focus attention—dementia, amnesia, and other cognitive problems accounted for 131,000.
- Anxiety disorders and adjustment disorders—stress-related illnesses that can affect feeling, thoughts, and behaviors—accounted for another 76,000.
- The remaining roughly 34,000 hospitalizations involved attention-deficit disorder, disruptive behavior, impulse control, personality disorders, or

mental disorders usually diagnosed in infancy or later childhood.

For more information, see *Hospital Stays Related to Mental Health, 2006*, HCUP Statistical Brief #62 (www.hcup-us.ahrq.gov/reports/statbriefs/sb62.pdf). The report uses statistics from the 2006 Nationwide Inpatient Sample, a database of hospital inpatient stays that is nationally representative of inpatient stays in all short-term, non-Federal hospitals. The data are drawn from hospitals that comprise 90 percent of all discharges in the United States and include all patients, regardless of insurance type, as well as the uninsured. ■

Lung cancer rates are dropping but hospitalization rates remain constant

Hospital admissions for lung cancer remained relatively stable – at roughly 150,000 a year between 1995 and 2006 – despite a steady decline in the number of Americans diagnosed with the disease, according to data from the Agency for Healthcare Research and Quality (AHRQ). Admissions have remained constant, in part, because lung cancer patients are surviving longer and undergoing more hospital-related treatments such as chemotherapy and tumor-removal surgery, according to AHRQ experts. Smoking is considered a main cause of lung cancer – the most deadly type of cancer – but the disease can also result from exposure to hazardous substances such as asbestos, radon, pollution, or second-hand smoke, as well as genetic predisposition to the disease. AHRQ's analysis also found that:

- The average hospital cost for a lung cancer patient in 2006 was \$14,200 (about \$1,900 a day). The total cost for all patients was about \$2.1 billion.
- The death rate of hospitalized lung cancer patients was 13 percent—five times higher than the average

overall death rate (2.6 percent) for hospitalized patients.

- Only 2.4 percent of hospitalized lung cancer patients in 2006 were younger than 44. About 63 percent were 65 or older.
- Hospitalizations for lung cancer were far more common in the South (89 admissions per 100,000 persons) than in the Northeast (25 admissions per 100,000 persons).

For more information, see *Hospital Stays for Lung Cancer, 2006*, HCUP Statistical Brief #63 (www.hcup-us.ahrq.gov/reports/statbriefs/sb63.pdf). The report uses statistics from the 2006 Nationwide Inpatient Sample, a database of hospital inpatient stays that is nationally representative of inpatient stays in all short-term, non-Federal hospitals. The data are drawn from hospitals that comprise 90 percent of all discharges in the United States and include all patients, regardless of insurance type, as well as the uninsured. For information from the U.S. Public Health Service on tobacco cessation, go to <http://www.ahrq.gov/path/tobacco.htm>. ■

Announcements

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

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

Measures for this inventory were contributed by: Administration on Aging, AHRQ, Centers for Disease Control and Prevention, Centers for Medicare &

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

Inquiries regarding measure specifications, updates, or others issues should be directed to info@qualitymeasures.ahrq.gov. ■

Research Briefs

Curns, A.T., Steiner, C., Sejvar, J.J., and Schonberger, L.B. (2008, June). "Hospital charges attributable to a primary diagnosis of infectious diseases in older adults in the United States, 1998 to 2004." *Journal of the American Geriatric Society* 56, pp. 969-975.

This study found that hospital charges for the elderly rose nearly 40 percent—from \$31 billion to \$46 billion—between 1998 and 2004. Charges rose from \$865 to \$1,160 for each elderly person hospitalized for an infectious disease. During the same period, the infectious disease hospitalization rate remained relatively stable at 503 hospitalizations for every 10,000 elderly persons. Sustained cost increases of this magnitude have major implications for Medicare, note Claudia Steiner, M.D., M.P.H., of the Agency for Healthcare

Research and Quality (AHRQ), and colleagues. The elderly population is expected to double by 2030 from 35 million to 72 million, and by then, 1 in 5 Americans will be age 65 or older. By 2035, spending by Medicare is projected to increase to 7.5 percent of the U.S. Gross Domestic Product from 2.6 percent in 2004.

The four leading causes of infectious disease hospitalizations during the 6-year period studied were: pneumonia, acute bronchitis, and other lower respiratory tract infections (45 percent); kidney, urinary tract, and bladder infections (14 percent); septicemia or blood poisoning (13 percent); and cellulitis, a bacterial skin infection (9 percent). The findings were based on data from AHRQ's Nationwide Inpatient Sample. Reprints (AHRQ Publication No. 08-R073) are available from AHRQ.*

Glasgow, R.E., Peeples, M., and Skovlund, S.E. (2008, May). "Where is the patient in diabetes performance measures?" (AHRQ grant HS10123). *Diabetes Care* 31(5), pp. 1046-1050.

Care quality measures, an important strategy to enhance quality of care, are often used by employers or consumers to select health plans or in pay-for-performance initiatives. Diabetes performance measures currently do not include behavioral, quality of life, and other patient-centered measures, which have been successfully incorporated in other countries and by the American Association of Diabetes Educators (AADE), note the authors of this paper. They suggest that seven patient-centered and self-management performance measures be included in assessments of diabetes care quality and as a

continued on page 25

Research briefs

continued from page 24

standard part of diabetes quality indicators. The proposed indicators include: patient self-management goal(s), measures of health behaviors (for example, healthy eating, taking medication, physical activity, and smoking status), quality of life, and patient-centered collaborative care.

Hsu, J., Fung, V., Price, M., and others. (2008, April). “Medicare beneficiaries’ knowledge of Part D prescription drug program benefits and responses to drug costs.” (AHRQ grant HS13902). *Journal of the American Medical Association* 299(16), pp. 1929-1936.

The study authors interviewed 1,040 community-dwelling elderly Medicare Advantage beneficiaries in California about their knowledge of cost sharing in Part D. They also asked beneficiaries about their cost-related responses to drug coverage such as cost-coping behaviors and reduced drug adherence. Only 40 percent of beneficiaries were aware that their drug plan in 2006 included a coverage gap, with those who reached the gap during the year more likely to know of its existence. More than one-third (36 percent) of beneficiaries reported at least one of the following responses to drug costs: cost-coping behavior, such as switching to lower-cost medications (26 percent); reduced drug adherence (15 percent); or suffering a financial burden due to drug costs (7 percent).

After accounting for other factors, those with lower household income more often reported a cost response to drug coverage (difference of 14.5 percentage points for those making less than \$40,000 as compared with those making more). Individuals who were unaware of having a coverage

gap more often reported a cost response than those who were aware of the gap (difference of 11.3 percentage points), but made fewer reports of borrowing money or going without necessities to pay for medication (difference of 5.5 percent).

Jasti, H., Mortensen, E.M., Obrosky, D.S., and others, (2008, February 15). “Causes and risk factors for rehospitalization of patients hospitalized with community-acquired pneumonia.” (AHRQ grants HS08282 and F32 HS00135). *Clinical Infectious Diseases* 46, pp. 550-556.

Researchers examined factors associated with rehospitalization for community-acquired pneumonia among 577 patients discharged from 7 Pittsburgh hospitals. Overall, 70 (12 percent) were rehospitalized within 30 days. About 74 percent of rehospitalizations were related to coexisting medical conditions and 20 percent were due to treatment failure for or worsening of pneumonia. Patients with underlying chronic obstructive pulmonary disease and coronary artery disease were two to three times more likely to be rehospitalized than patients without these conditions. The researchers recommend that discharge strategies include vaccination for flu and pneumonia when indicated, clear instructions on correct use of medications, review of signs or symptoms that may suggest worsening of the patient’s underlying medical conditions, and an emphasis on appropriate outpatient followup within a week after discharge if there is a risk for rehospitalization. The study was supported in part by the Agency for Healthcare Research and Quality.

Kilbridge, P.M. and Classen, D.C. (2008, July/August). “The informatics opportunities at the intersection of patient safety and clinical informatics.” (Contract No. 290-04-0016). *Journal of the American Medical Informatics Association* 15(4), pp. 397-407.

In this position paper, the authors recommend several ways to improve adoption of health information technology (IT) systems to enhance patient safety. They recommend that the Federal government, via the Agency for Healthcare Research and Quality (AHRQ), help fund an organization to manage health care data standards to make data and systems interoperable. Because of the cost of implementing health IT systems, they suggest the Federal Government should provide seed money to assist them in purchasing systems. Electronic health record systems should include agile, useful clinical decision support systems to improve currently available systems that frustrate users, causing them to override alerts or disable the systems altogether. These improvements could follow an AHRQ-funded Clinical Decision Support Roadmap that would pinpoint best practices of decision support applications.

The authors recommend that health IT systems undergo a certification process by an agency like the Certification Commission for Health Information Technology to catch potential errors before they harm patients. They suggest that AHRQ further fund its research on informatics incentives in pay-for-performance programs to develop models that improve patient safety and fund safety-related research on personal health records. Finally, the authors recommend that Congress direct AHRQ to fund an aggressive research agenda on the intersection

continued on page 26

Research briefs

continued from page 25

of patient safety and health informatics.

Matheny, M.E., Sequist, T.D., Seger, A.C., and others. (2008 July/August). "A randomized trial of electronic clinical reminders to improve medication laboratory monitoring." (AHRQ grant HS11046). *Journal of the American Medical Informatics Association* 15(4), pp. 424-429.

The researchers studied 20 ambulatory care settings to see if adding electronic alerts about needed lab tests to an electronic health record affected the behavior of 303 primary care physicians for 1,922 patients. From January to June 2004, the study looked for patients who were overdue for at least one laboratory test for potassium or creatinine levels, liver or thyroid function, and therapeutic drug levels for medications such as phenobarbital or phenytoin. Only 5 percent of patients on targeted medications in the study were due for laboratory monitoring. Because compliance rates were already high, researchers found that the electronic alerts issued through an electronic health record did not cause an upswing in laboratory monitoring. High rates of laboratory monitoring may be explained by the fact that the health system used in the study's ambulatory care settings effectively shares information through a clinical data repository and electronic health records to give clinicians a comprehensive picture of patient care, the authors suggest.

Neuman, H.B., Brogi, E., Ebrahim, A., and others. (2008, January). "Desmoid tumors (fibromatoses) of the breast: A 25-year experience." (AHRQ grant T32 HS00066). *Annals of*

***Surgical Oncology* 15(1), pp. 274-280.**

To chart the history of how breast desmoids are handled, researchers reviewed their 25 years of experience with the tumors, examining symptoms, diagnosis, and treatment. They found that all 32 patients who had breast desmoids from 1982 to 2006 had physical signs that were suspicious for cancer. Twenty-eight had lumps the physician could feel, and six had skin dimpling. Of the 16 patients who had mammograms, a mass was detected in 6, but no mass was found in 10. Magnetic resonance imaging, however, detected the mass for all eight patients who underwent it.

To prevent damage of nearby tissue, surgery is the most common treatment for desmoids. Eight of 28 patients for whom followup information was available experienced repeat tumors, which also required surgery in most cases (6 of 8 patients). Therapies to thwart future tumors include nonsteroidal anti-inflammatory drugs (indomethacin and sulindac), hormone therapy (tamoxifen), and cytotoxic therapies, which kill specific cells.

Raab, S., Andrew-Jaja, C., Grzybicki, D.M., and others. (2008). "Dissemination of lean methods to improve pap testing quality and patient safety." (AHRQ grant HS13321). *Journal of Lower Genital Tract Disease* 12(2), pp. 103-110, 2008.

Process redesign can reduce diagnostic errors in Pap smears comparable with some new technologies. In a 1-year case-control study, researchers compared the diagnostic accuracy of Pap tests procured by 5 clinicians prior to implementing a lean process redesign before (5,384 controls) and after its implementation (5,442

cases). The process redesign involved a checklist of procedures for the clinician to obtain and the laboratory technologist to process a cervical tissue sample. Following process redesign implementation, there was a significant decline in the mean proportion of Pap tests lacking the required 10 well-preserved endocervical or squamous metaplastic cells to interpret the cervical sample. Also, two of five clinicians showed a significant decrease in their unsatisfactory Pap test frequency, but results for the overall case group was not significantly lower. Finally, the case group showed a 114 percent increase in newly detected cervical intraepithelial cancer following a previous benign Pap test.

Sampson, M., Shojania, K.G., Garritty, C., and others. (2008). "Systematic reviews can be produced and published faster." (AHRQ Contract No. 290-02-0021). *Journal of Clinical Epidemiology* 61, pp. 531-536.

The value of systematic reviews is influenced by many factors, especially the emergence of new data. The interval between the last date of searching and the availability of the review is a period when the evidence base is at risk of becoming outdated. It is also a time when the results are unavailable to prospective users. The authors studied the currency of systematic reviews at the time of publication to determine typical and achievable times to publication for reviews published in journals. The eligible reviews included in the study consisted of 156 quantitative systematic reviews published between 1995 and 2005. Most (59 percent) were journal-published reviews, 23 percent were Cochrane reviews, and 17 percent were

continued on page 27

Research briefs

continued from page 26

technical reports. The median time from final search to publication was 61 weeks with an interquartile range of 33-87 weeks. The authors recommend that the first quartile of the best performing review type is a reasonable target for those who produce and publish reviews. Thus, the final search would be within 10 weeks of submission, acceptance within 11 weeks of submission, and publication within 12 weeks of acceptance.

Sampson, M., Shojania, K.G., McGowan, J., and others. (2008). "Surveillance search techniques identified the need to update systematic reviews." (AHRQ Contract No. 290-02-0021). *Journal of Clinical Epidemiology* 61, pp. 755-762.

Updating systematic reviews is important for preserving their usefulness to clinicians and researchers. The authors sought to determine the performance characteristics of various search methods and to assess their feasibility as surveillance strategies for those interested in monitoring the biomedical literature for the purpose of updating systematic reviews. The 77 systematic reviews chosen for the study were drawn from major peer-reviewed journals. Of the five surveillance search approaches selected for study, three were subject searches: the optimized Clinical Query, the Core Clinical Journals subset together with the randomized controlled trials (RCT) publication type and the Cochrane Collaboration's Central Register of Controlled Trials. The other two methods were a "related articles" search using PubMed and a "citing reference" search for RCTs. Since none of these methods yielded a

consistently high recall of relevant new evidence, the authors turned to a combination of search strategies. The most successful was a search algorithm based on PubMed's related article search combined with a subject search using clinical queries. It retrieved all relevant new records in 68 cases.

Stahl, J.E., Kreke, J.E., Malek, F.A.A., and others. (2008, June). "Consequences of cold-ischemia time on primary nonfunction and patient and graft survival in liver transplantation: A meta-analysis." (AHRQ grant HS09694). *PLoS ONE* 3(6), p. e2468.

The ability to preserve organs prior to transplant is essential to the organ allocation process. The researchers performed a meta-analysis to determine the impact of cold-ischemia time (CIT) on patient and graft survival in liver transplant. CIT is the time interval that begins when an organ is cooled with a cold perfusion solution after organ procurement surgery and ends when the organ is implanted. After searching MEDLINE, EMBASE, and the Cochrane database, the researchers identified 26 studies that met their criteria. Patient survival was measured at 1, 3, 6, and 12 months following liver transplant. At each survival interval, maximum patient and graft survival occurred with CITs between 7.5 and 12.5 hours. Organ and patient survival were worse for both high and low CITs. This could be due to a disadvantageous combination of patients and organs. Patients receiving organs less than 5 hours from harvest or more than 12.5 hours from harvest were more likely to be sicker than average.

Sussman, A.L., Williams, R.L., Leverence, R. and others. (2008,

July-August). "Self determination theory and preventive care delivery: A research involving outpatient settings network (RIOS Net) study." (AHRQ grant HS13496). *Journal of the American Board of Family Medicine* 21(4), pp. 282-291.

Traditional approaches to improving delivery of preventive care have met with limited success. The researchers conducted a study using self-determination theory (SDT) to clarify clinician-level factors that influence preventive care delivery by examining the psychology of clinician decisionmaking. Using obesity counseling as a case study, they gathered data through a three-stage process involving interviews, focus groups, and mailed surveys. More than 146 clinicians, all members of a primary care research network, took part in the study. Response data were compared to the three principal domains of SDT theory: autonomy, competence, and relatedness. Clinicians expressed a strong sense of autonomy (acting out of personal choice). However, factors both within and external to the clinical setting presented critical barriers to the clinician's sense of competency (ability to achieve a desired outcome) in obesity preventive counseling. The third domain, relatedness (the desire to achieve meaningful relationships and belongingness with one's colleagues) was generally lacking within the practice setting. The authors concluded that, absent effective tools to prevent obesity and opportunities for relevant clinician interactions with colleagues and community members, high levels of clinician autonomy and internal motivation are not sufficient to maintain counseling efforts.

continued on page 28

Research briefs

continued from page 27

Tate, J.E., Simonsen, L., Viboud, C., and others. (2008, May). "Trends in intussusception hospitalizations among US infants, 1993-2004: Implications for monitoring the safety of the new rotavirus vaccination program." *Pediatrics* 121, pp. e1125-e1132.

In 2006, a new vaccine was recommended to immunize U.S. infants against rotavirus, the most common cause of severe gastroenteritis in young children. A previous rotavirus vaccine had been withdrawn in 1999 after it was associated with intussusception, a problem in which a portion of the bowel slides into the next, causing bowel obstruction. Claudia Steiner, M.D., M.P.H., of the Agency for Healthcare Research and Quality, and colleagues examined annual prevaccine intussusception hospitalization rates of bowel obstruction to establish a baseline with which to compare rates after introduction of the new rotavirus vaccine.

Intussusception hospitalization rates declined 25 percent from 1993 to 2004, but have remained stable at about 35 cases per 100,000 infants since 2000. Rates varied nearly 12-fold by week of age during the 6- to 32-week age range for vaccination, and less so by race/ethnicity. Although the downward trend in hospitalization rates might reflect a true reduction in incidence of severe intussusception, it could also reflect changes in management practices, such as greater use of nonsurgical interventions that do not require hospitalization, note the researchers. Reprints (AHRQ Publication No. 08-R071) are available from AHRQ.*

Trentham-Dietz, A., Sprague, B.L., Klein, R., and others.

(2008). "Health-related quality of life before and after a breast cancer diagnosis." (AHRQ grant HS06941). *Breast Cancer Research* 109, pp. 379-387.

Over 2 million women in the United States are living with breast cancer. Improved therapies mean that more women with a breast cancer diagnosis are surviving longer and that issues of quality of life (QOL) merit greater attention. These researchers examined QOL among women before and after diagnosis and whether those changes differed substantially from changes experienced by all women during aging. They compared QOL for 114 women with breast cancer with 2,527 women without breast cancer. QOL was measured by the Medical Outcomes Study Short Form 36 Health Status Survey, which was administered four times between 1991 and 2002. Compared with women without breast cancer, women with breast cancer reported lower scores on physical function, physical role function, bodily pain, general health, vitality, and social function scales. Although average scores, adjusted for age, were 4.5 points lower on the Physical Component Summary scale, there was no difference in the Mental Component Summary scale between women with or without breast cancer.

Uronis, H.E., Currow, D.C., McCrory, D.C., and others. (2008). "Oxygen relief for dyspnoea in mildly- or non-hypoxaemic patients with cancer: A systematic review and meta-analysis." (AHRQ grant T32 HS00079). *British Journal of Cancer* 98, pp. 294-299.

A review of studies on the use of palliative oxygen to relieve breathlessness toward the end of life shows that oxygen failed to relieve the sensation of refractory

dyspnea in cancer patients who would not otherwise qualify for home oxygen therapy (they were mildly- or non-hypoxemic). However, limitations in the data make it difficult to come to firm conclusions on such an important issue. The researchers conducted a systematic review and meta-analysis of studies comparing oxygen therapy (delivered by nasal cannula, mouthpiece, or face mask) with medical air (clean, compressed air) in cancer patients not qualifying for home oxygen therapy. The studies examined the ability of these interventions to improve symptoms of dyspnea at rest or on exertion (6-minute walk).

Based on a review of 204 citations and 54 articles, the researchers found only 4 studies and a total of 134 patients with cancer that qualified for analysis of the benefit of palliative oxygen. Three studies evaluated oxygen versus medical air for relief of dyspnea, and the fourth study evaluated use of Heliox28, a novel agent containing 72 percent helium and 28 percent oxygen versus oxygen and medical air. The overall quality of the studies was poor.

Weech-Maldonado, R., Fongwa, M.N., Gutierrez, P., and Hays, R.D. (2008, April). "Language and regional differences in evaluations of Medicare managed care by Hispanics." (AHRQ grants HS09204 and HS16980). *HSR: Health Services Research* 43(2), pp. 552-568.

Hispanics enrolled in Medicare managed care programs are less positive about their care experiences than are non-Hispanic whites, according to a study that used data from the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Medicare managed care survey. The 2002

continued on page 29

Research briefs

continued from page 28

survey included 125,369 respondents enrolled in 181 Medicare managed care programs nationally. More than half of Hispanics (52 percent) insured through Medicare were enrolled in managed care Medicare programs in 2002, as opposed to standard fee-for-service Medicare. The researchers used survey items about timeliness of care, provider communication, office staff helpfulness, getting needed care, and health plan customer service to compare Hispanics with non-Hispanic whites, and Hispanics who answered the survey's English questionnaire with those who answered the Spanish questionnaire. Additional analyses compared respondents by geographic region, and according to other socioeconomic factors such as education, income, gender, age, and health status. English-speaking Hispanics viewed all aspects of their care worse than whites did, except for provider communications. Their Spanish-speaking counterparts reported more negative care experiences than whites with timeliness of care, provider communications, and office staff helpfulness, but were more satisfied with getting needed care.

Werner, R.M., Goldman, L.E., and Dudley, R.A. (2008, May). "Comparison of change in quality of care between safety-net and non-safety-net hospitals." (AHRQ grant HS16117). *Journal of the American Medical Association* 299(18), pp. 2180-2187.

Safety-net hospitals that predominantly treat poor and underserved patients typically lack the resources necessary to invest in

quality improvement or even to ensure accurate data collection for performance measurement. Researchers examined trends in disparities of care quality between hospitals with high percentages of Medicaid patients (safety-net hospitals) and low percentages of Medicaid patients (non-safety-net hospitals), using publicly available data on hospital performance between 2004 and 2006. Of the 3,665 hospitals studied, safety-net hospitals had worse performance in 2004 and significantly smaller improvement over time than non-safety-net hospitals. Over time, the safety-net hospitals had a lower probability of achieving high performance status. In addition, based on a simulation model, these hospitals were more likely to incur financial penalties due to low performance and were less likely to receive bonuses.

Wu, A.C., Smith, L., Bokhour, B., and others. (2008, March/April). "Racial/ethnic variation in parent perceptions of asthma." (AHRQ grant T32 HS00063). *Ambulatory Pediatrics* 8(2), pp. 89-97.

Researchers interviewed parents of 739 children with persistent asthma in a Medicaid health plan and multispecialty provider group in Massachusetts. Overall, 75 percent, 84 percent, and 89 percent of Latino, black, and white children's parents, respectively, believed their children could be symptom-free most of the time. Also, 43 percent, 44 percent, and 55 percent of Latino, black, and white children's parents, respectively, expected their children should have no emergency room visits or hospitalizations for asthma. These differences held, even after controlling for parental age, gender, and household income.

Black (32 percent) and Latino (38 percent) parents were more likely than white (23 percent) parents to agree that their children did not need as much medicine as the doctor prescribed. Finally, parents of black (18 percent) and Latino children (23 percent) were more likely to have competing family priorities "all of the time" or "most of the time" in addition to their children's asthma compared with parents of white children (8 percent), even after adjusting for income, education, insurance, and other factors.

Xie, X-J., Titler, M.G., and Clarke, W.R. (2008). "Accounting for intraclass correlations and controlling for baseline differences in a cluster-randomised evidence-based practice intervention study." (AHRQ grant HS10482) *Worldviews on Evidence-Based Nursing* 5(2), pp. 95-101.

Cluster-randomized designs have been increasingly used in health care and community-based intervention studies due to administrative convenience, a desire to minimize treatment contamination, and the need to avoid ethical issues that might arise. Yet this approach presents challenges for data analysis. These authors use a pain management intervention study to present two strategies that can be used when analyzing data from a cluster-randomized design—both of which account for baseline differences. One approach involves use of a mixed model, and the other involves a marginal model (using generalized estimating equations). Although the parameter estimates and their standard errors might be comparable for both strategies for certain link functions, the interpretations are quite different

continued on page 30

Research briefs

continued from page 29

and each of the two approaches is suitable for answering different questions. The choice of strategy should be dictated by whether the primary interest is a population or individual.

Zaydfudim, V., Stover, D.G., Caro, S.W., and Phay, J.E. (2008, July). "Presentation of a medullary endocrine neoplasia 2A kindred with Cushing's Syndrome." (AHRQ grant T32 HS13833). *The American Surgeon* 74(7), pp. 659-661.

Medullary thyroid cancer (MTC) is rare, comprising three to five percent of all thyroid cancers, and fewer than 1,000 cases annually. Even rarer is the occurrence of Cushing's syndrome (CS) resulting from ectopic adrenocorticotrophic hormone (ACTH), which is found in only 0.6 percent of all patients with MTC. The authors discuss a case of a 51-year-old woman diagnosed with ectopic ACTH production from an inoperable metastatic MTC to the liver. This is the first case of a medullary endocrine neoplasia (MEN) 2A kindred presenting with CS from ectopic ACTH production by

metastatic medullary thyroid carcinoma. Genetic testing revealed a germ line RET proto-oncogene mutation at codon 609. This same mutation was also found in six other family members. The patient received palliative bilateral laparoscopic adrenalectomies with a significant improvement in her major comorbidities (weakness, exertional dyspnea, hypertension, striae, and hirsutism). This type of surgery allows for symptom reduction in patients that may survive for years even with widely metastatic disease. Five other family members have undergone thyroidectomy with central lymph node compartment dissection; the sixth family member will receive treatment after he reaches the age of five.

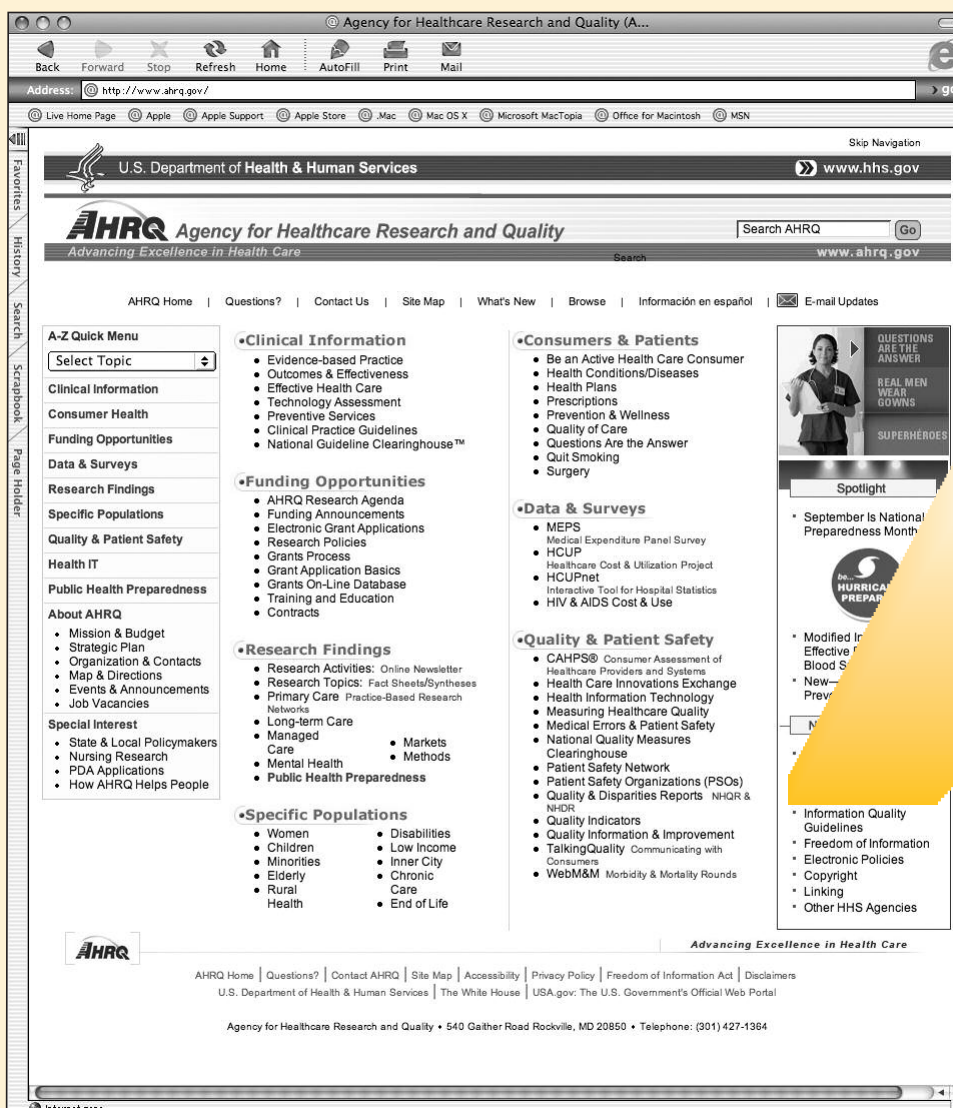
Zhou, X. and Cheng, H. (2008). "A computer program for estimating the re-transformed mean in heteroscedastic two-part models." (AHRQ grant HS13105). *Computer Methods and Programs in Biomedicine* 90, pp. 210-216.

The population of health care costs is typically skewed, heteroscedastic, and may include zero costs. Without proper

accounting for these special distributional features, resulting cost predictions may be biased, and wrong inferences about the distribution of patients' health care costs may be made. The researchers developed a computer program for modeling skewed, heteroscedastic data with zero observations. The program is an implementation of the two-part regression model proposed by Welsh and Zhou. It computes two nonparametric estimators of the mean, their asymptotic standard derivation, estimated confidence interval, and optional bootstrap confidence interval. It can run in both user-friendly interactive mode and more efficient batch mode. It also provides flexibility for users to extend the program to a more general context. The two-part regression model can be generalized by recoding some of the modularized functions. For parameters in the two-part regression model, users can choose from different estimates and/or different numerical approaches. ■

Don't Forget— Visit AHRQ's Web Site

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



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

Healthcare 411

<http://www.ahrq.gov/>

Ordering Information

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

(*) Available from the AHRQ Clearinghouse:

Call or write:

AHRQ Publications Clearinghouse

Attn: (publication number)

P.O. Box 8547

Silver Spring, MD 20907

800-358-9295

703-437-2078 (callers outside the

United States only)

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

hearing impaired only)

To order online, send an e-mail to:

ahrqpubs@ahrq.hhs.gov

() Available from NTIS:**

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

To purchase documents from NTIS, call or write:

National Technical Information Service (NTIS)

Springfield, VA 22161

703-605-6000, local calls

800-553-6847

Note: Please use publication numbers when ordering

To subscribe to *Research Activities*:

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

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

U.S. Department of Health and Human Services

Public Health Service

Agency for Healthcare Research and Quality

P.O. Box 8547

Silver Spring, MD 20907-8547

Official Business

Penalty for Private Use \$300



AHRQ Pub. No. 09-RA003

December 2008

ISSN 1537-0224