



RESEARCH ACTIVITIES

U.S. Department of Health and Human Services • No. 359, July 2010

Highlights

Topics

Patient Safety and Quality . . . 2

**Outcomes and Effectiveness
Research 6**

Pharmaceutical Research . . . 9

HIV/AIDS Research 11

Elderly/Long-Term Care . . . 12

Child/Adolescent Health . . . 12

**Health Information
Technology 13**

Regular Features

Agency News and Notes . . . 15

Research Briefs 17

One in four patients experiences revolving-door hospitalizations

Over a 2-year period, roughly one-quarter of all hospital patients were readmitted for the same conditions that prompted their initial hospitalization, according to the latest data from the Agency for Healthcare Research and Quality.

According to the Federal agency's analysis of data on 15 million patients in 12 States in 2006 and 2007, more than a third of those who had hardening of the arteries, called coronary atherosclerosis, were readmitted at least once to the hospital during the period. Multiple readmissions were also seen for 30 percent of patients with uncomplicated diabetes, 28 percent with high blood pressure, and 21 percent with asthma.

AHRQ also found that:

- Among Medicare patients, 42 percent experienced multiple hospital admissions and 38 percent had multiple emergency department (ED) visits. For Medicaid patients, 23 percent experienced multiple hospital admissions and 50 percent went to the ED more than once.
- About 22 percent of uninsured patients had multiple hospital

readmissions and 38 percent had multiple hospital ED visits but were not admitted.

- Privately insured patients were the least likely to require multiple hospital readmissions (19 percent) or make multiple visits to the ED (29 percent).

While some patients may be readmitted because of the severity and complexity of their underlying condition, research shows that many repeat admissions can be avoided if patients have better outpatient care. Readmissions can also drive up health care costs. These findings are based on data in *Hospital Readmissions and Multiple Emergency Department Visits in Selected States, 2006-2007* (www.hcup-us.ahrq.gov/reports/statbriefs/sb90.pdf). The report uses statistics from the HCUP State Inpatient Databases and HCUP State Emergency Department Databases for 12 States: Arizona, California, Florida, Hawaii, Massachusetts, Missouri, Nebraska, New Hampshire, New York, South Carolina, Tennessee, and Utah. ■

Simplified drug warnings improve patients' understanding of what to do or avoid when given a particular prescription

Drug labels that use simplified language, in some cases with patient-tested icons, can improve the ability of patients to understand warning labels affixed to prescription drug containers, according to a new study. If patients understand drug warnings, they are more likely to take a particular medicine with food or milk, not drive a car if the drug causes drowsiness, or limit their time in the sun, if the label warns against it. These actions are important for avoiding adverse drug reactions. The researchers found that the rate of correct interpretation of drug warnings was lowest (80.3 percent) among those patients shown standard warnings, higher (90.6 percent) for those shown simplified warning text, and highest (92.1 percent) for patients shown simplified text with icons.

Patients with low literacy (below 7th grade reading level) accounted for 20.1 percent of the study

subjects. Low-literacy patients were more likely to be older, black, or have less education than the group as a whole. These patients were 35 percent less likely to correctly interpret standard drug warning labels than those who read at the 9th grade level or higher. Patients with marginal (7th and 8th grade reading levels) or low literacy were two to three times more likely to correctly understand warnings with both simplified text and icons than those with simplified text alone.

The study involved 500 patients seen at 4 outpatient primary care clinics—2 each in Shreveport (Louisiana) and Chicago. The patients were over 18 years old, did not have severe vision or hearing problems, were English-speaking, and were predominantly black women. In each city, 250 patients were equally divided between those seen at an academic general medicine practice and a safety-net community health center. They

were presented with containers with the nine most common drug warnings in standard text, simplified text, or simplified text with icons. Although simplified warning labels helped overcome literacy problems, improved patient counseling by the prescribing clinician or community pharmacist will also be needed to ensure that patients understand how to use the medicines safely, suggest the researchers. Their study was funded in part by the Agency for Healthcare Research and Quality (HS17687).

More details are in “Improving prescription drug warnings to promote patient comprehension,” by Michael S. Wolf, Ph.D., M.P.H., Terry C. Davis, Ph.D., Patrick F. Bass, M.D., M.P.H., and others in the January 11, 2009, *Archives of Internal Medicine* 170(1), pp. 50–56. ■ DIL

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

Gail Makulowich
Managing Editor

David I. Lewin, Karen Fleming-Michael,
Mark W. Stanton, Kevin Blanchet
Contributing Editors

Joel Boches
Design and Production

Karen Migdail
Media Inquiries

Also in this issue:

Identifying high-quality bariatric surgery centers, page 6

Growing use of broad-spectrum antibiotics, page 9

Procedure sedation problems among children, page 12

Remote monitoring of intensive care unit patients, page 14

Prevention of Alzheimer's disease, page 17

Health plans vary widely in the prescribing of antibiotics

Unnecessary antibiotic use continues to be a problem in the United States, particularly when it comes to treating acute respiratory tract infections. Up to half of all patients with this condition receive antibiotics, although only a small number of cases are actually bacterial (instead of viral) infections that respond to antibiotics. A new study finds that antibiotic prescribing varies substantially among commercial health plans. Armed with such information, researchers can target high-prescribing health plans with quality improvement programs aimed at reducing antibiotic use, suggest the study authors.

They analyzed data submitted by 229 commercial health plans participating in the 2005 Healthcare Effectiveness Data and Information Set. These plans represent 42.9 million enrollees, with children comprising 27 percent. The researchers calculated the rate of each plan's antibiotic utilization per member per year (PMPY) from pharmacy claims billed for patients up to age 64. The researchers also estimated the costs associated with antibiotic therapy.

The average rate of antibiotic use was 0.88 prescription fills PMPY. However, this use varied widely among plans, ranging from 0.64 antibiotic fills PMPY at the 5th percentile of plans to 1.08 fills PMPY

at the 95th percentile of plans. Antibiotic prescription rates also varied by age and sex, with the most fills (0.24 fills PMPY) for males aged 0-9 years. Overall, just under half (47 percent) of all antibiotics dispensed across health plans were of the broad-spectrum variety. Interestingly, higher antibiotic use rates were found for plans with the highest "excellent" accreditation status and for plans with a smaller percentage of board-certified physicians. The researchers also observed regional differences in antibiotic use, with plans located in the South having a 21 percent higher rate of use and those in the Northeast the lowest at 9 percent. Antibiotic costs averaged \$49 PMPY. The researchers estimated that a health plan with 250,000 members at the 90th percentile of antibiotic costs could save \$4.1 million annually if it reduced its antibiotic costs to the 25th percentile. The study was supported in part by the Agency for Healthcare Research and Quality (HS13915).

See "Variation in outpatient antibiotic prescribing in the United States," by Michael A. Steinman, M.D., Katherine Y. Yang, Pharm.D., M.P.H., Sepheen C. Byron, M.H.S., and others in the December 2009 *American Journal of Managed Care* 15(12), pp. 861-868. ■ KB

Physicians' reasons for deviating from quality guidelines are usually justified

A variety of best practice guidelines contribute to improved quality of care. There are times, however, when physicians deviate from these guidelines in the care and treatment of a particular patient. Some electronic health record (EHR) systems notify physicians when this takes place and allow them to indicate their reasons for making an exception to recommended practices (quality measures). A new study finds that in the vast majority

of cases, the exceptions made by physicians are considered appropriate. Researchers studied data from an internal medicine practice located in a large city and affiliated with an academic medical center. All of the 39 physicians who worked at the practice used an EHR system. Whenever a quality measure was unaddressed in a patient, the EHR system alerted the physician to the discrepancy. At this time, explanations could be entered as to

why the measure was not met. A panel of medical experts reviewed all cases where physicians made an exception to 1 or more of 16 chronic disease and prevention quality measures. Physicians were then provided feedback regarding their exception decision and allowed to change their management of the patient.

During the 7-month study, there were 650 medical exceptions. Medical reasons were not provided in 36 of these instances. The expert

continued on page 4

Note: Only items marked with a single (*) asterisk are available from the AHRQ Clearinghouse. Items with a double asterisk (**) are available from the National Technical Information Service. See the back cover of *Research Activities* for ordering information. Consult a reference librarian for information on obtaining copies of articles not marked with an asterisk.

Quality guidelines

continued from page 3

panel found that 93.6 percent of the remaining 614 exceptions were deemed medically appropriate. Only 3.1 percent were considered inappropriate. The panel was uncertain as to the appropriateness of the remaining exceptions.

Inappropriate exceptions were most frequently reported for heart disease, diabetes, and prevention services. After receiving feedback on their exception decisions, physicians changed the way they managed the patient in 42 percent of these cases (8 out of 19). The study was supported in part by the Agency for Healthcare Research

and Quality (HS17163 and HS15647).

See “Frequency of inappropriate medical exceptions to quality measures,” by Stephen D. Persell, M.D., M.P.H., Nancy C. Dolan, M.D., Elisha M. Friesema, B.A., and others in the February 16, 2010 issue of *Annals of Internal Medicine* 152(4), pp. 225-231. ■ KB

Adequate financial bonuses and peer support motivate providers to adhere to evidence-based treatment guidelines

Providers vary in their adherence to evidence-based clinical guidelines for treating different medical conditions. Mere dissemination of clinical guidelines does not assure physician adherence. Personal and systemwide factors often predispose providers toward greater or less adherence to evidence-based treatment guidelines. A new study found that primary care providers who perceived the financial bonus they received for performing recommended practices was adequate (financial salience) were nearly four times more likely to follow treatment guidelines. Also, those who perceived peer support in the patient-care process were twice as likely to follow recommended clinical guidelines for four conditions studied.

Provider perceptions of the health maintenance organization's threat to their clinical autonomy and control were associated with less guideline adherence, according to a team of researchers led by Anthony C. Waddimba, M.D., of Boston University. The researchers surveyed 186 primary care providers about their attitudes associated with adherence in a managed care setting that had implemented a pay-for-performance (P4P) initiative with explicit financial

bonuses for guideline adherence and a punitive financial withhold for nonadherence. One-third of the participants had received a P4P bonus by the time of the survey. Factors measured by the survey included personal attitudes, subjective/social norms, perceived behavior control, and physician characteristics.

Clinical guideline adherence was computed as the percentage of services delivered out of those expected according to the guideline for each of four conditions: asthma, otitis media, sinusitis, and diabetes. For example, the diabetes care guideline required urine microalbumin screening, two annual glycohemoglobin tests, one annual LDL cholesterol assay, influenza vaccination, and an annual dilated eye exam. Across the four clinical conditions, the mean guideline adherence rate was 59 percent in 2001 and 55 percent in 2005. This study was supported by the Agency for Healthcare Research and Quality (HS16832).

See “Provider attitudes associated with adherence to evidence-based clinical guidelines in a managed care setting,” by Dr. Waddimba, Mark Meterko, Ph.D., Howard B. Beckman, M.D., and others in the February 2010 *Medical Care Research and Review* 67(1), pp. 93-116. ■ MWS

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 psnet.ahrq.gov.

Community health center collaboratives improve care quality but have little impact on disparities

Recently enacted health care reform legislation increases funding for community health centers (CHCs), which will nearly double the number of patients seen by the centers over the next 5 years. CHCs already care for more than 15 million Americans, many of whom belong to groups receiving care of lower quality. In order to eliminate health disparities and improve quality of care in CHCs, the Health Resources and Services Administration developed Health Disparities Collaboratives (HDCs). These collaboratives improve overall quality of CHC care, but have little impact on care disparities at the centers, reveals a new study.

The researchers studied 44 CHCs participating in HDCs for

asthma, diabetes, or hypertension as well as 20 “external control” CHCs to determine whether HDCs reduced disparities in quality by race/ethnicity or insurance status in CHCs nationally. Over the 1-year period of the quality improvement collaborative, overall quality of care significantly improved because of the collaboratives. The 6.5 percent Hispanic-white disparity in quality of asthma care was eliminated. However, there were no other improvements in racial/ethnic or insurance disparities for any other condition.

Over 10,000 patients were included in the study: 3,887 with asthma, 2,904 with diabetes, and 3,362 with hypertension. The collaboratives studied bring CHCs together to learn and disseminate

quality improvement techniques developed by the Institute for Healthcare Improvement. The findings suggest that approaches specifically targeting racial/ethnic and insurance disparities should be included as part of broad quality improvement initiatives. This study was supported by the Agency for Healthcare Research and Quality (HS13653).

See “Impact of health disparities collaboratives on racial/ethnic and insurance disparities in U.S. community health centers,” by Dr. Hicks, James O’Malley, Ph.D., Tracy A. Lieu, M.D., M.P.H., and others in the February 8, 2010 *Archives of Internal Medicine* 170(3), pp. 279-286. ■ MWS

Patients at small urban hospitals are more likely to suffer from pressure sores than those at small rural hospitals

Earlier studies have shown better patient safety outcomes and lower adverse event rates at rural hospitals compared with their urban counterparts. However, such studies usually compare larger, teaching hospitals in urban areas with smaller, rural hospitals. Now, a new study has evened the playing field by focusing exclusively on small urban and rural hospitals with fewer than 100 beds. It found that observed rates of patient safety problems were higher for small urban hospitals compared with small rural hospitals. However, after adjusting for patient and hospital characteristics, most of these differences disappeared, with the exception of decubitus ulcers (pressure sores due to not being regularly turned in the bed or wheelchair). In this case, small urban hospitals had significantly worse outcomes for this condition than small rural hospitals.

Researchers used data from an annual national survey of hospitals as well as data from a sample of hospital discharge information to examine patient safety outcomes at 185 small rural and 107 small urban hospitals. They used patient safety indicator (PSI) software developed by the Agency for Healthcare Research and Quality (AHRQ) to examine nine

common patient safety outcomes at the hospitals. These included such things as anesthesia complications, postoperative hemorrhage, and decubitus ulcer.

Rates for the nine PSIs were higher for the small urban hospitals than for small rural hospitals. Patients admitted to small urban hospitals had significantly higher risks for decubitus ulcer, infections due to medical care, and accidental puncture or laceration. Those admitted to small rural hospitals were at greater risk for anesthesia complications. However, after the researchers adjusted for relevant hospital and patient characteristics, many of these differences disappeared. Only patients admitted to small urban hospitals were found to have a higher risk for decubitus ulcer. This may be due to the higher rates of surgical and emergency admissions found at these urban hospitals, suggest the researchers. Their study was supported in part by AHRQ (HS15009).

See “Patient safety outcomes in small urban and small rural hospitals,” by Smruti Vartak, M.P.H., Marcia M. Ward, Ph.D., and Thomas E. Vaughn, Ph.D., in the *Journal of Rural Health* 26, pp. 58-66, 2010. ■ KB

Study suggests caution in interpreting impact of nurse staffing levels on postsurgical complication rates

For the past few years, hospitals have kept a keen eye on reducing a set of complications that can arise after surgeries, such as pneumonia, septicemia, urinary tract infections, thrombophlebitis, fluid overload, and pressure ulcers. This increased scrutiny is due in part because Medicare does not reimburse hospitals for the costs of treating hospital-acquired complications. In some studies, boosting nurse staffing levels has been shown to improve care safety and quality in many areas. However, a new study, using the present-on-admission indicator to rule out patients who in fact had the condition when they were admitted, found that upping the

number of registered nurses (RNs) did not significantly affect postsurgical complication rates.

Barbara A. Mark, Ph.D., R.N., F.A.A.N., of the University of North Carolina, Chapel Hill, and a colleague strongly suggest that hospitals view these results cautiously. One explanation for the results may be that hospitals with ample RNs on staff may be better able to detect and treat complications quickly. Other explanations for the surprising results may be because the researchers' methods relied on administrative data, which can be inaccurately or incompletely coded and there may have been unmeasured aspects of patient risk that were not fully captured.

Given Medicare's new rule, there is likely to be increased demand for RNs to document a complete assessment of patients' clinical status upon admission and nursing workload is likely to increase, note the authors. Their findings were based on analysis of 1996 to 2001 data from 283 acute care hospitals in California. The study was funded in part by the Agency for Healthcare Research and Quality (HS10153).

See "Nurse staffing and postsurgical complications using the present on admission indicator," by Dr. Mark and David W. Harless, Ph.D., in the February 2010 *Research in Nursing and Health* 33(1), pp. 35-47. ■ KFM

Outcomes and Effectiveness Research

Patient outcomes are better than hospital volume for identifying high-quality bariatric surgery centers

Surgery to help severely obese patients lose weight (bariatric surgery) is a rapidly growing field. Hospital accreditation programs and insurers have used a hospital's volume of such operations to identify high-quality bariatric surgery centers. However, a new study recommends that accreditation groups and insurers switch to direct measurement of outcomes, such as morbidity (problems following bariatric surgery), in evaluating the quality of these centers. Examples of morbidities include respiratory failure, collapsed lungs, heart attacks, kidney failure, and shock.

Using morbidity, adjusted for patient risk factors for postsurgical problems, to rank hospitals during an initial 2-year period predicted a 4.5-fold difference in risk-adjusted morbidity between the best-performing and worst-performing quartile of hospitals during a 2-year followup period. Ranking hospitals based only on their volume of bariatric surgeries predicted only a 1.9-

fold difference in risk-adjusted morbidity between the best-performing and worst-performing quartiles. Risk-adjusted morbidity accounted for 83 percent of hospital-level variation in morbidity compared with only 21 percent of this variation using procedure volume.

The researchers used data from the State Inpatient Database for New York, 2003–2006, which is maintained as part of the AHRQ Healthcare Cost and Utilization Project. The researchers identified all adults who underwent gastric bypass surgery in New York State during this period. They calculated volumes of gastric bypass surgeries and rates of risk-adjusted morbidities at each hospital for 2003–2004. The hospitals were divided into quartiles based on either volume or morbidity during the initial 2-year period, and the researchers calculated risk-adjusted morbidity rates during 2004–2006 for each quartile. The study

continued on page 7

Bariatric surgery centers

continued from page 6

was funded in part by the Agency for Healthcare Research and Quality (HS17765).

More details are in “Identifying high-quality bariatric surgery centers: Hospital volume or risk-

adjusted outcomes?” by Justin B. Dimick, M.D., M.P.H., Nicholas H. Osborne, M.D., Lauren Nicholas, Ph.D., and others in the December 2009 *Journal of the American College of Surgeons* 209(12), pp. 702–706.

■ DIL

New approach reduces microemboli responsible for neurologic injury following open-heart surgery

Approximately 427,000 patients undergo open-heart surgery every year in the United States. Cardiopulmonary bypass (CPB), use of a heart-lung machine to take over the function of the heart and lungs during open-heart surgery, is commonly used to provide circulatory support during these procedures. Patients undergoing cardiac surgery are at significant risk for neurological injury. The principal mechanism of neurological injury in this setting is microemboli, which cause inflammation and reduced blood flow to the brain. However, using a quality improvement approach, a multidisciplinary heart surgery team modified CPB technique and technology that was linked to an 87.9 percent reduction in median microemboli in the outflow of the CPB circuit and a 77.2 percent reduction in microemboli in the brain. Changes in surgical

technique also resulted in only incidental embolic episodes.

To improve the CPB circuit and reduce microemboli, researchers associated with the Northern New England Cardiovascular Disease Study Group systematically investigated various studies in the literature on the effect of different techniques and technologies on reducing microemboli during open-heart surgery. They used this knowledge plus the local context of care to improve the care quality of open-heart surgery.

The leading source of emboli during surgery is from the CPB circuit. Gaseous microemboli may enter the cardiopulmonary circuit from cannulation sites (where flexible tubes are inserted into the arteries) and are subsequently infused into the patient’s arterial circulation through the outflow of the CPB circuit. To detect the presence of microemboli, the researchers studied a group of 169

patients between the ages of 40 and 89 who were undergoing nonemergency coronary artery bypass grafts. Using Doppler ultrasound, they measured blood flow velocity and microemboli every 8 milliseconds in the cerebral arteries and the inflow and outflow of the CPB circuit. Based on their reduction in microemboli, the researchers conclude that the source of microemboli may be eliminated in most cases by the redesign of the CPB circuit and modification of surgical and CPB techniques. Their study was partly supported by the Agency for Healthcare Research and Quality (HS15663).

See “Detection and elimination of microemboli related to cardiopulmonary bypass,” by Robert C. Groom, M.S., C.C.P., Reed D. Quinn, M.D., Paul Lennon, M.D., and others in *Circulatory Cardiovascular Quality Outcomes* 2, pp. 191-198, 2009. ■ MWS

Implantable heart defibrillator is effective in reducing deaths among older heart failure patients

Use of implanted cardioverter–defibrillators (ICDs) reduced 3-year mortality by nearly 30 percent among Medicare patients with heart failure, found a new study. At the end of 1 year, heart failure patients who received ICDs experienced lower mortality than those who did not (19.8 vs. 27.6 percent). At 3 years, patients who received ICDs had a cumulative mortality of 38.1 percent compared with 52.3 percent for those not receiving the devices. The researchers found no significant difference in mortality

outcome based on age (65 to 74 years vs. 75 to 84 years), sex, and cause of heart failure.

They observed a beneficial effect of ICDs among patients with poor left ventricle function, a measure of the heart’s pumping power (left ventricular ejection fraction [LVEF] less than 30 percent) and those who were discharged on an angiotensin-converting enzyme inhibitor or an angiotensin receptor blocker and a beta-blocker. The researchers conducted the study, because

continued on page 8

Heart defibrillator

continued from page 7

earlier randomized clinical trials underrepresented patients aged 65 years or older, who make up more than 70 percent of the heart failure population. To study this age group, the researchers used data from two heart failure registries and long-term outcome data from Medicare claims files. The analysis was conducted on data from 4,685 older patients with heart failure who were eligible for ICD therapy and discharged alive, and who had LVEF of 35 percent or less.

Because retrospective studies do not routinely collect data on health status and quality of life, the researchers call for prospective studies to judge the clinical effectiveness of ICDs and the impact of health status on the decision to use ICD therapy. Their study was funded in part by the Agency for Healthcare Research and Quality (HS16964).

More details are in “Clinical effectiveness of implantable cardioverter-defibrillators among Medicare beneficiaries with heart failure,” by Adrian F. Hernandez, M.D., M.H.S., Gregg C. Fonarow, M.D., Bradley G. Hammill, M.S., and others in the January 2010 *Circulation: Heart Failure* 3(1), pp. 7–13. ■ *DIL*

Body fat distribution in obese trauma patients is not linked to increased inflammation, infections, or mortality

The distribution of body fat, whether predominantly just below the skin (subcutaneous) or predominantly around the internal organs (visceral), is not associated with increased inflammation or poorer outcome in trauma patients, according to a new study. Previous research had indicated that visceral obesity was linked to chronic, low-grade inflammation and such diseases as high blood pressure, diabetes, and stroke. The new study of 281 obese trauma patients (140 with predominantly visceral body fat and 141 with predominantly subcutaneous fat) found no significant difference between the two groups in terms of inflammatory cytokines in the blood (interleukins 1, 2, 4, 6, 8, 10, and tumor necrosis factor).

However, patients with more subcutaneous body fat had significantly higher white blood cell counts.

Clinical outcomes (such as multiorgan dysfunction scores, infection rates, or rates of adult respiratory distress syndrome) and mortality rates were not significantly different between the two groups. The findings suggest that the acute inflammation related to traumatic injury appears to overwhelm the chronic inflammation of obese individuals, note the researchers.

Their study was based on analysis of data on 281 obese patients out of 976 trauma patients who were treated at the Vanderbilt University Medical Center intensive care unit (ICU) and had computed tomography (CT) scans of their

abdomen and pelvis. Subcutaneous fat was measured from comparable CT images as the area of fat between the skin and the abdominal wall muscles, and visceral fat was the area of fat within the abdominal wall. A blood sample was collected 48 hours after admission to the ICU to measure cytokines and white blood cell count. The study was funded in part by the Agency for Healthcare Research and Quality (T32 HS13833).

More details are in “Visceral adiposity is not associated with inflammatory markers in trauma patients,” by Bryan Collier, D.O., Lesly Dossett, M.D., M.P.H., Jason Shipman, M.D., and others in the January 2010 *Journal of Trauma Injury, Infection, and Critical Care* 68(1), pp. 57–61. ■ *DIL*

Performance measures requiring antibiotics for pneumonia have not boosted antibiotic use in nonpneumonia patients

In 2002, national performance measures were established for the treatment of pneumonia, including the requirement that patients receive antibiotics within 4 hours of hospital arrival. Since then, there has been concern that emergency departments (EDs) have increased their prescribing of antibiotics to patients who do not have pneumonia.

Recent findings, however, suggest that such concerns may be unfounded.

Researchers looked at patients presenting with symptoms of pneumonia during 4 winter seasons (November through February) at 13 EDs affiliated with academic medical centers. Fifty visits were randomly selected for each month, for a total of 200 visits

continued on page 9

Antibiotics use

continued from page 8

sampled per hospital per year for 2 years to identify trends in antibiotic prescribing. The data were collected as part of the Improving Antibiotic Use in Acute Care Treatment Trial. As part of this trial, eight of the hospital EDs received both patient and physician educational interventions on how to reduce the overuse of antibiotics.

A total of 6,476 patient visits were analyzed. All patients arrived at the ED with a cough and were discharged with a diagnosis of nonpneumonia acute respiratory infection. Antibiotics were prescribed in 6.1 percent of these visits. When adjustments were made for factors such as patient demographics and ED

length of stay, no increase was observed in the administration of antibiotics. There was a statistically significant decrease in antibiotic use in EDs located at hospitals with educational interventions aimed at reducing inappropriate antibiotic use for colds, upper respiratory tract infections, and bronchitis during the winter months. The study was supported in part by the Agency for Healthcare Research and Quality (HS13915).

See “ED antibiotic use for acute respiratory illnesses since pneumonia performance measure inception,” by Christopher Fee, M.D., Joshua P. Metlay, M.D., Ph.D., Carlos A. Camargo, Jr., M.D., Dr.P.H., and others in the 2010 *American Journal of Emergency Medicine* 28, pp. 23-31. ■ KB

Pharmaceutical Research

Unlike the United Kingdom, the United States has boosted its use of broad-spectrum antibiotics for respiratory infections

Antibiotics are often prescribed for acute nonspecific respiratory infections (ARIs), which are typically caused by viruses that are not susceptible to antibiotics. The large volume and types of antibiotics used in ambulatory settings have contributed to the growing public health problem of drug resistance. The use of so-called broad-spectrum antibiotics, which are effective against a range of pathogens, has also contributed to drug-resistant infections. To combat this problem, both the United States (U.S.) and the United Kingdom (U.K.) have waged public health campaigns to reduce levels of antibiotic prescribing. Overall, antibiotic use has declined both in the U.S. and the U.K. However, while the U.K. continues its low use of broad-spectrum antibiotics, prescribing of these drugs has increased in the U.S., according to a new study.

To determine trends in antibiotic and broad-spectrum antibiotic drug prescribing in the U.K., researchers examined 1.3 million adult and 1.1 million child outpatient ARI visits between 1990 and 2004. For U.K. adults, 71 percent of ARI visits were associated with an antibiotic prescription in 1990, dropping to 59 percent by 2004. For children, the comparable figures were 46 percent in 1990 and 31 percent in 2004. For each successive year, both adults and children experienced a significant decrease in the probability of antibiotic prescribing. With respect to broad-spectrum antibiotic drugs, the prescription rate for adults in 1990 was 3.8 prescriptions per 1,000 person years; by 2004, it fell to 2.9 prescriptions per 1,000 person years. For children, the comparable rates were 5.2 in 1990, dropping to 2.2 in 2004.

In contrast, broad-spectrum antibiotic use for adult and child

ARIs in the U.S. more than doubled during the 1990s and continues to increase. The researchers attribute these differences, in part, to differences in health care delivery systems. The U.K. strategy emphasized strong central leadership with explicit priorities emphasizing societal benefit and support by robust financial and regulatory incentives. This study was supported in part by the Agency for Healthcare Research and Quality (HS16946).

See “Reduced antibiotic prescribing for acute respiratory infections in adults and children,” by Sharon B. Meropol, M.D., M.S.C.E., Zhen Chen, Ph.D., and Joshua P. Metlay, M.D., Ph.D., in the October 2009 *British Journal of General Practice* pp. e321-e328. ■ MWS

Extended use of antiviral drugs found to be safe and effective in preventing symptomatic influenza

Two drugs used to combat the effects of the influenza virus are both safe and efficacious, a new study finds. The drugs (oseltamivir and zanamivir) keep the virus from spreading within the body by inhibiting the enzyme neuraminidase. The virus uses this enzyme to break out of infected cells after multiplying within them, explains Nayer Khazeni, M.D., M.S., of Stanford University Medical Center.

She and colleagues conducted a systematic review of studies of the safety and efficacy of the two neuraminidase inhibitors (NAIs). They combined results from seven placebo-controlled, double-blind studies (neither participant nor investigator know what drug/placebo is given) involving 7,021 participants who received one of the NAIs or a placebo for longer than 4 weeks. Overall, the drugs reduced the relative frequency of symptomatic influenza by three-fourths, preventing about 1 case in every 25 people who received them. The drugs did not prevent asymptomatic influenza virus infection. There was an increased risk for nausea and vomiting with extended use of oseltamivir. However, there was no increase in other

adverse events with use of currently recommended prophylactic doses of oseltamivir or zanamivir.

This is important news, given the high prevalence of oseltamivir resistance among currently circulating seasonal influenza A virus strains and reports of oseltamivir-resistant influenza A (H5N1) virus strains. In fact, the governments of the United States, the United Kingdom, and Canada recently announced plans to add millions of doses of zanamivir to their antiviral stockpiles. Because the original studies included only persons with competent immune systems of white or Japanese descent, future studies should include participants from other racial or ethnic groups, the researchers suggest. Their study was funded in part by the Agency for Healthcare Research and Quality (HS18003).

More details are in “Systematic review: Safety and efficacy of extended duration antiviral chemoprophylaxis against pandemic and seasonal influenza,” by Dr. Khazeni, Dena M. Bravata, M.D., M.S., Jon-Erik C. Holty, M.D., M.S., and others in the *Annals of Internal Medicine* 151(7), pp. 464–473, 2009. ■ DIL

Epilepsy drugs do not appear to increase suicide risk in patients with bipolar disorder

Patients with bipolar disorder, a mood disorder of fluctuating manic episodes and deep depression, often take lithium to smooth out their moods. Some also benefit from taking drugs normally taken by people with epilepsy. Antiepileptic drugs commonly used in bipolar patients include gabapentin, divalproex, and felbamate, as well as others. Recently, the U.S. Food and Drug Administration issued warnings about the increased risk of suicide related to the use of these drugs. However, a new study shows that antiepileptic drugs do not increase the risk of suicide in patients with bipolar disorder.

Researchers used health care claims data from a large, commercially available database

representing 47 million insured individuals. Information included such things as medical, specialty, and pharmacy paid claims from more than 85 managed care plans across the nation. A total of 47,918 patients with a diagnosis of bipolar disorder were identified. Of these, 1,226 had at least 1 suicide attempt.

A suicide attempt rate of 13 per 1,000 person-years was calculated for bipolar patients treated with an antiepileptic drug. This was the same rate calculated for bipolar patients not treated with an antiepileptic or lithium. The researchers did find that the rate of suicide attempts was significantly higher before patients received treatment than after treatment. Suicide attempt rates were 72 per 1,000 person-years in untreated

patients vs. 13 per 1,000 person-years in treated patients. In the absence of other treatment with an antidepressant, antipsychotic, or other antiepileptic drug, antiepileptic drugs reduced by fivefold the risk of a suicide attempt compared with untreated patients (3 per 1,000 person-years vs. 15 per 1,000 person-years). The study was supported in part by the Agency for Healthcare Research and Quality (HS16973).

See “Relationship between antiepileptic drugs and suicide attempts in patients with bipolar disorder,” by Robert D. Gibbons, Ph.D., Kwan Hur, Ph.D., C. Hendricks Brown, Ph.D., and J. John Mann, M.D., in the December 2009 *Archives of General Psychiatry* 66(12), pp. 1354-1360. ■ KB

HIV patients are at risk for being prescribed wrong drug combinations

In the last 10 years, the number of antiretroviral medications used to treat HIV/AIDS has increased dramatically. With so many drugs and numerous combination therapy regimens now available, the risk of prescribing errors has risen. Agency for Healthcare Research and Quality (AHRQ) researchers Fred J. Hellinger, Ph.D., and William E. Encinosa, Ph.D., have found that patients with HIV disease in 2005 were three times as likely to experience wrong drug combinations compared with 1999 and 2000.

They used commercially available inpatient, outpatient, physician, and prescription drug claims data to study two time periods: 1999-2000 and 2005. By 2005, physicians were using the common practice of boosting, whereby a drug in the protease inhibitor (PI) class would be combined with low-dose ritonavir (another PI) to increase its effectiveness. The researchers focused on claims for HIV drug combinations not recommended by the U.S. Department of Health and Human Services Panel on Antiretroviral Guidelines for Adults and Adolescents.

During 1999-2000, giving a PI with the lipid-lowering drug simvastatin was the most common

prescribing error, occurring in 1 percent of all patients. Giving these two drugs together can cause an increased risk for muscle problems caused by simvastatin. By 2005, this type of prescribing error had decreased to only 0.4 percent of patients, and the most common error was that of receiving particular protease inhibitors without the boosting agent ritonavir. This occurred in 5.3 percent of patients. In 1999 or 2000, the risk of an inappropriate drug combination was 1.9 percent. By 2005, this had increased to 5.9 percent. These findings underscore the vigilance physicians now need to use when it comes to prescribing combination antiretroviral therapy and selecting appropriate drugs to use together. The goal is to minimize adverse reactions while maximizing the potential to control HIV disease progression.

More details are in "The cost and incidence of prescribing errors among privately insured HIV patients," by Drs. Hellinger and Encinosa, in the 2010 *Pharmacoeconomics* 28(1), pp. 23-34. Reprints (AHRQ Publication No. 10-R044) are available from AHRQ.* ■ KB

Hospitalization rates have declined over 5 years for patients with HIV infection, but disparities still exist

Since the introduction of highly active antiretroviral therapy, the annual rate of hospitalizations has declined consistently for patients infected with HIV, according to a new study. Nevertheless, women, blacks, patients infected through intravenous drug use (IDU), and older patients are still hospitalized more often than other patients with HIV. The annual rate of inpatient hospitalizations for adult patients with HIV decreased from 35 per 100 persons in 2002 to 27 per 100 persons in 2007. In 2002, 19.3 percent of patients had one or more hospital admissions, dropping to

14.8 percent by 2007. The percentage of patients hospitalized more than once during the year fell from 7.8 in 2002 to 5.4 in 2007.

Over the study period, hospitalization rates were 23 percent higher among women than men, 2.5- to 4.6-fold higher among patients with lower CD4 lymphocyte cell counts (indicating greater HIV disease progression), and 45 percent higher for patients over 50 years old or who were infected through IDU. Patients covered by Medicare, Medicaid, or a combination of the two were 2.2- to 2.4-fold more likely to be

hospitalized than patients with private insurance.

The mean number of inpatient days for those hospitalized was more stable: 13.2 days in 2000 and 13.1 days in 2007. Again, women, patients 50 years old or older, black and Hispanic patients, and intravenous drug users had more inpatient days per year than other patients with HIV.

The study involved 10 HIV clinical care sites that are part of the HIV Research Network. De-identified data were collected from the beginning of 2002 through the end of 2007 from approximately

continued on page 12

HIV hospitalization rates

continued from page 11

29,000 patients over age 18 years with HIV infection. Among these patients, 10,097 were hospitalized at least once during the study period, for a total of 15,156 hospitalizations. The study was

funded in part by the Agency for Healthcare Research and Quality (AHRQ Contract No. 290-01-0012).

More details are in “Inpatient health services utilization among HIV-infected adult patients in care 2002–2007,” by Baligh R. Yehia,

M.D., John A. Fleishman, Ph.D., Perrin L. Hicks, M.P.H., and others in the March 1, 2010, *Journal of Acquired Immune Deficiency Syndrome* 53(3), pp. 397–404. Reprints (AHRQ Publication No. 10-R046) are available from AHRQ.* ■ *DIL*

Elderly/Long-Term Care

Elderly lung cancer patients experience more adverse events during chemotherapy than younger patients

Non-small-cell lung cancer (NSCLC) is primarily a disease of older persons, with 47 percent of patients being at least 70 years or older at the time of diagnosis. NSCLC causes 80 percent of lung cancer deaths and in one-half of such cases, the cancer has spread to other organs by the time of diagnosis. Chemotherapy can improve survival for NSCLC patients and it may have acceptable adverse event (AE) rates. However, a new study shows that elderly patients suffer more AEs than younger patients.

In the study of 1,371 patients with advanced NSCLC, 72 percent of those younger than 55 received chemotherapy, while only 47 percent of those aged 75 and older received chemotherapy. Older patients were more likely to experience AEs during treatment than younger patients. The highest AE incidence was among 65- to 74-year-olds, who suffered nearly twice as many AEs as patients 55 and younger. For the subset of AEs particularly related to chemotherapy use—neuropathy (disturbed nerve function), fever with neutropenia (low white cell count, predisposing one to infection), and sepsis—the

highest rates were also observed in the 65 to 74 age category. By contrast, pretreatment AE rates were lower among those 75 and older (9.2 percent) than among those 55 and younger (18.6 percent). This probably reflected selection of the fittest elders for treatment.

An unanswered question is whether the increased AEs associated with chemotherapy among the oldest patients were offset by improvement in their disease symptoms to provide a net positive effect on quality of life. The researchers conclude that the tradeoff between the increased AEs associated with chemotherapy and reduced disease-related symptoms is a prime example of the need to include patient preferences in medical decisionmaking. This study was supported in part by the Agency for Healthcare Research and Quality (HS16094).

See “Adverse events among the elderly receiving chemotherapy for advanced non-small-cell lung cancer,” by Elizabeth A. Chrischilles, M.S. Ph.D., Jane F. Pendergast, Ph.D., Katherine I. Kahn, M.D., and others in the February 1, 2010 *Journal of Clinical Oncology* 28(4), pp. 620-627. ■ *MWS*

Child/Adolescent Health

Nearly 9 percent of children experience agitation during sedation for nonsurgical procedures

Agitation, thrashing movements requiring restraint, is a known risk of procedural sedation and analgesia (PSA) in children. Although agitation may indicate patient

discomfort and compromise procedural success, no formal studies have previously been done on its rate of incidence. During 5,045 nonsurgical procedures performed in a pediatric hospital,

433 (8.6 percent) children experienced agitation, according to a team of researchers led by Dr. Jenifer R. Lightdale, M.D., of the Children’s Hospital of Boston.

continued on page 13

Pediatric sedation

continued from page 12

Reports of agitation were based on nursing documentation that described the child as “agitated,” “struggling,” “requiring restraint,” etc.

Most children (81 percent) were undergoing PSA for imaging procedures, particularly MRI. Other procedures included in the study were a variety of invasive imaging procedures as well as nonimaging procedures, both painful and nonpainful, such as fracture splinting and electroencephalography. Among

children undergoing complete, uninterrupted procedures, there was a higher adverse event rate if they were found to be agitated (6.2 percent) than if they were not (2.3 percent).

Adverse events, most of which were not considered serious, included vomiting (0.86 percent) and waking before the end of the procedure (2.36 percent). School-aged children of both sexes appeared at risk for agitation during nonpainful procedures, especially if they were taking many medications. Children were also at higher risk if the sedation level ultimately achieved was not as deep as the

targeted level, if PSA regimens involved two sedatives, or if midazolam and fentanyl were used, especially in high doses. The procedures studied came from a complete database of all procedures occurring with PSA at a large pediatric tertiary care hospital during 2003. The study was funded by the Agency for Healthcare Research and Quality (HS13675).

See “Agitation during procedural sedation and analgesia in children,” by Dr. Lightdale, Clarissa Valim, M.D., Lisa B. Mahoney, B.S., and others in *Clinical Pediatrics* 49(1), pp. 35-42, 2010. ■ MWS

Health Information Technology

Computerized provider order entry significantly reduces medication errors in an ambulatory setting

Computerized provider order entry (CPOE) has been shown to improve patient safety by reducing medication errors and subsequent adverse drug events in inpatient settings. It can also achieve this in ambulatory settings, according to a new study. Investigators found that use of a CPOE system in a multispecialty group practice reduced the medication errors from 18.2 percent to 8.2 percent—a reduction of 70 percent.

The greatest reductions in the odds of medication error were due to fewer errors of illegibility (97 percent), followed by inappropriate abbreviations (94 percent), and missing information (85 percent). Despite the CPOE system’s lack of clinical decision support (CDS) alerts, reductions in the odds of drug-disease interaction (79 percent) and drug-drug interaction (76 percent) errors were significant. Also significant was a reduction in the odds of wrong medication strength (81 percent).

CPOE was associated with a significant 57 percent reduction in the odds of an error occurring that did not cause harm to the patient. The reduction in the odds of an error occurring that did cause harm was not significant, probably due to the small number of errors

in this category, note Emily Beth Devine, Ph.D., of the University of Washington, and coinvestigators. Their study was conducted in a setting of 400 providers caring for 250,000 patients in 14 locations and 60 clinics. The providers, evenly distributed between primary care and specialty providers, together wrote over 2.7 million prescriptions during 2008. The homegrown, basic CPOE system used in the study is Web-based, uses point-and-click functionality, and integrates e-prescribing into an existing electronic health record. For the study, 10,169 prescriptions were evaluated.

The researchers concluded that even a basic CPOE system, without CDS alerts, can have a favorable impact on medication safety. Their study was supported by the Agency for Healthcare Research and Quality (HS15319 and HS14739).

See “The impact of computerized provider order entry on medication errors in a multispecialty group practice,” by Dr. Devine, Ryan N. Hansen, Pharm.D., Jennifer L. Wilson-Norton, M.B.A., and others in the January 2010 *Journal of the American Medical Informatics Association* 17, pp. 78-84. ■ MWS

Physicians support health information exchange but are concerned about paying monthly fees

One of the most significant and promising trends in health care information technology is the emergence of health information exchange (HIE). HIE is the electronic movement of health-related information among organizations according to nationally recognized standards. The benefits ascribed to HIE include increased quality due to better information and reduced costs due to the avoidance of duplicate testing. A recent survey of 1,043 Massachusetts physicians found that 86 percent felt that HIE will have a positive effect on care quality, 76 percent reported that HIE will have a positive effect on time savings, and 70 percent felt that HIE will have a somewhat or very positive effect on reducing health care costs.

However, only slightly more than half (54 percent) of the

providers said they would be willing to pay on a monthly basis for access to HIE, and only 37 percent of providers said they would be willing to pay a fee of \$150 per month. Physicians in medium-sized practices were more likely to be willing to pay than those in either large or small practices. In general, physicians in medium-sized practices had the most positive attitudes toward HIE, while physicians in large and small practices had less positive attitudes. The researchers suggest that physicians in large practices may already receive some of the benefits of HIE since many of their patients are referred by other physicians in the same practice.

Primary care providers reported more positive attitudes than specialists. This may be a reflection of the differences between providing ongoing care

and episodic care, note the researchers. The major unanswered question is how HIE will be financed. Nearly half of the physicians in the survey were unwilling to pay any fee at all. This suggests that HIE business models that rely on large fees paid by providers may face significant challenges. This study was supported by the Agency for Healthcare Research and Quality (HS15397).

See “Physician attitudes toward health information exchange: Results of a statewide survey,” by Adam Wright, Ph.D., Christine Soran, Chelsea Jenter, M.P.H., and others in the January/February 2010 *Journal of the American Medical Informatics Association* 17, pp. 66-70. ■ MWS

No additional benefit seen with remote offsite monitoring of ICU patients

Ideally, hospital intensive care units (ICUs) should have 24/7 coverage provided by specialists called intensivists. However, a shortage of these physicians is making it difficult for hospitals to manage their ICUs effectively. As a result, hospitals are resorting to the use of telemedicine. With this approach, intensivists can manage the care of patients in several ICUs at the same time from a remote location. Yet, these tele-ICUs are not associated with a reduction in overall hospital mortality for patients, concludes a new study.

Researchers studied the impact of tele-ICU patient management in six ICUs located in five hospitals that were part of a large health care system. They collected data on 2,034 patients who received traditional ICU care prior to the implementation of the tele-ICU monitoring system and 2,108 patients studied after the system was in place and being used.

Hospital mortality rates were 12 percent during the preintervention and 9.9 percent during the postintervention period. However, after researchers adjusted for the patients’ severity of illness, no significant differences in hospital mortality were associated with the tele-ICU intervention. There was an improved survival rate in sicker patients cared for under the tele-ICU intervention, but no improvement or worse outcomes in less sick patients. Hospital or ICU length of stays did not significantly change between the pre- and post-intervention periods. The researchers suggest the findings may be attributable to low decisional authority granted to the tele-ICU as well as to varied effects across different types of patients. Since tele-ICU interventions require substantial resource and infrastructure investment, more research is needed on the potential outcomes and costs associated with this

continued on page 15

ICU patients

continued from page 14

new approach to caring for critically ill patients, conclude the researchers. Their study was supported in part by the Agency for Healthcare Research and Quality (HS15234).

See “Association of telemedicine for remote monitoring of intensive care patients with mortality, complications, and length of stay,” by Eric J. Thomas, M.D., M.P.H., Joseph F. Lucke, Ph.D., Laura Wueste, R.N., and others in the December 23, 2009 *Journal of the American Medical Association* 302(24), pp. 2671-2678. ■ KB

Agency News and Notes

Hospital heart attack deaths plummet

The overall proportion of hospital patients who died in the hospital after a heart attack fell by 37 percent between 2000 and 2007, according to the latest data from the Agency for Healthcare Research and Quality (AHRQ). The rate fell from 106 per 1,000 patients to 67 per 1,000 patients during the period.

Medicare patients experienced the largest decline (37 percent) and Medicaid patients the smallest (27 percent). While the privately insured and uninsured rates fell at a similar pace (32 percent), the uninsured were much more likely

to die from a heart attack (93 versus 67 deaths per 1,000 heart attack admissions). The Agency also found that:

- From 2000 to 2007, Midwestern hospitals went from having the highest heart attack death rate in the country to the lowest (from 112 to 63 deaths per 1,000 heart attack admissions).
 - Western hospitals moved into the number 1 spot for heart attack deaths in 2007 (71 deaths per 1,000 heart attack admissions). In 2000, they were second-highest.
- The death rate from heart attacks fell the most in hospitals with 500 beds or more, and by 2007 was almost 1.5 times lower than that of hospitals with fewer than 100 beds (60 versus 87 deaths per 1,000 heart attack admissions).

These findings are based on data from page 55 in AHRQ's *2009 Healthcare Quality Report* (www.ahrq.gov/qual/qdr09.htm), which tracks the health care system through quality measures. ■

Using bar-code technology with eMAR reduces medication administration and transcription errors

Using bar-code technology with an electronic medication administration record (eMAR) substantially reduces transcription and medication administration errors, as well as potential drug-related adverse events, concludes a new study funded by the Agency for Healthcare Research and Quality (HS14053). Bar-code eMAR is a combination of technologies that ensures that the correct medication is administered in the correct dose at the correct time to the correct patient. When nurses use this combination of technologies, medication orders appear electronically in a patient's chart after pharmacist approval.

Alerts are sent to nurses electronically if a patient's medication is overdue. Before administering medication, nurses are required to scan the bar codes on the patient's wristband and then on the medication. If the two don't match the approved medication order,

or it is not time for the patient's next dose, a warning is issued.

Researchers at Brigham and Women's Hospital in Boston compared 6,723 medication administrations on hospital units before bar-code eMAR was introduced with 7,318 medication administrations after bar-code eMAR was introduced. Having bar-code eMAR technologies in place was associated with reductions in errors related to the timing of medications, such as giving a medicine at the wrong time, and nontiming medication administration, such as giving a patient the wrong dose.

The researchers documented a 41 percent reduction in nontiming administration errors and a 51 percent reduction in potential drug-related adverse events associated with this type of error. Errors in the timing

continued on page 16

Bar-code technology

continued from page 15

of medication administration, meaning a patient was given medication an hour or more off schedule, fell by 27 percent. No transcription errors or potential drug-related adverse events related to this type of error occurred. The findings have important implications because bar-code eMAR technology is being

considered as a 2013 criterion for meaningful use of health information technology under the American Recovery and Reinvestment Act of 2009.

More details are in “Effect of bar-code technology on the safety of medication administration,” by Eric G. Poon, M.D., M.P.H., Carol A. Keohane, B.S.N., R.N., Catherine S. Yoon, M.S., and others in the May 6, 2010 *New England Journal of Medicine* 362(18), pp. 1698-1707. ■

Disparities widen in the use of asthma medications

The gap between the proportion of black and white Americans with asthma who took an inhaled or oral medicine daily to prevent attacks grew wider between 2003 and 2006, according to the latest data from the Agency for Healthcare Research and Quality. The Agency found that there was no significant difference in the use of daily asthma medicine between the two groups in 2003 (29 percent of black Americans compared with 30 percent of white Americans). By 2006, the proportion of blacks who reported taking daily asthma medicine had fallen to 25 percent, while 34 percent of whites reported taking it.

According to other findings in the analysis:

- The gap between Hispanic and white asthma sufferers who reported daily use of medicine also widened from 2003 to 2006. Roughly 28 percent of Hispanics and 31 percent of whites reported taking medicine daily for asthma in 2003. In 2006, the number of Hispanics taking the drugs declined to 23 percent, while the number of whites taking them increased to 35 percent.
- From 2003 to 2006, the gap in use of asthma medications closed between higher- and lower-income people who took asthma medications.
- During the same period, the gap closed between people who didn't

finish high school and those with higher levels of education.

Asthma attacks can interrupt normal daily activities by causing wheezing, coughing, shortness of breath, chest pain, difficulty talking, and other problems. Daily long-term medication to control the disease is necessary to prevent attacks for all people with persistent asthma. These findings are based on data from pages 74 and 75 in the 2009 *National Healthcare Disparities Report* (www.ahrq.gov/qual/qdr09.htm), which examines the disparities in Americans' access to and quality of health care, with breakdowns by race, ethnicity, income, and education. ■

Doctors remain remiss in advising overweight patients about healthy eating

Only about half of obese American adults were advised by their doctors to cut down on fatty foods in 2006, a rate that had not significantly changed since 2002, according to the latest data from the Agency for Healthcare Research and Quality.

The Agency's survey also found that:

- Obese black and Hispanic adults were less likely than whites to receive advice on food consumption (45 percent and 42 percent, respectively, compared with 52 percent).
- Poor obese adults were less likely than poor higher-income adults to be advised to cut down on high-fat, high-cholesterol foods, regardless of race or ethnicity (43 percent vs. 57 percent).

- Obese adults who did not finish high school also were less likely than those with a college education to be advised to cut down on fat (46 percent vs. 53 percent).

Fatty foods add to weight gain and can clog arteries, thereby increasing a person's risk of heart attack or stroke. Black and Hispanic adults have higher obesity rates than whites, as do poor adults and those with limited education. These findings are based on data from pages 77 to 79 in the 2009 *National Healthcare Disparities Report* (www.ahrq.gov/qual/qdr09.htm), which examines the disparities in Americans' access to and quality of health care, with breakdowns by race, ethnicity, income, and education. ■

Evidence inconclusive regarding prevention of Alzheimer's disease and cognitive decline

The authors of a new evidence report from the Agency for Healthcare Research and Quality concluded there is currently insufficient evidence to identify which factors or interventions may increase or decrease the risks of developing Alzheimer's disease or other cognitive declines. Duke Evidence-based Practice Center researchers reviewed 25 systematic reviews and 250 primary research studies for a State-of-the-Science

Conference on the prevention of Alzheimer's disease and cognitive decline. The April 26-28, 2010 conference was held by the National Institutes of Health's Office of Medical Applications and Research. Some studies suggest that diabetes, certain alleles of the apolipoprotein E gene, smoking, and depression increase the risk of Alzheimer's disease and cognitive decline. Other studies suggest cognitive engagement and physical

activity decrease risks. With the exception of the apolipoprotein E gene, however, evidence supporting these findings tended to be weak. The degree to which these factors modified risk was typically small to moderate for Alzheimer's disease and small for cognitive decline. For details, see *Preventing Alzheimer's Disease and Cognitive Decline* at www.ahrq.gov/downloads/pub/evidence/pdf/alzheimers/alzscog.pdf. ■



Follow AHRQ News on Twitter

AHRQ uses Twitter to broadcast short health messages (“tweets”) that can be accessed by computer or mobile phone. You can follow AHRQ’s news releases on twitter at <http://twitter.com/AHRQNews>.

To view all of AHRQ’s social media tools, including e-mail updates, podcasts, and online videos, go to www.ahrq.gov/news/socialmedia.htm.

Research Briefs

Bernstein, S. L. (2009). “The clinical impact of health behaviors on emergency department visits.” (AHRQ grant HS18601). *Academic Emergency Medicine* 16, pp. 1054-1059.

The emergency department (ED) represents an ideal clinical laboratory to study the epidemiology of risky health behaviors and design interventions to modify them. ED patients drink, smoke, use illicit drugs, have unsafe sex, and sustain injuries more than the general population. Use of licit and illicit substances constitutes the largest single modifiable set of health risks among ED patients. Alcohol accounts for 7.9 percent of all ED

visits and tobacco accounts for 4.9 percent of all adult ED visits. In 2006, there were 1.74 million visits related to illicit and prescription drugs. The author discusses future challenges in ED research in health behaviors. He briefly reviews some problems with secondary prevention programs. Finally, he discusses models of health behavior, challenges in dissemination and implementation of ED-based interventions, and multimodal interventions.

Billinger, M. E., Olivier, K. N., Viboud, C., and others. (2009, October). “Nontuberculous mycobacteria-associated lung disease in hospitalized persons,

United States, 1998-2005.” *Emerging Infectious Diseases* 15(10), pp. 1562-1569. Reprints (AHRQ Publication No. 10-R038) are available from AHRQ.*

Clinical and laboratory-based studies since the 1980s have shown an increased prevalence of persons with nontuberculous mycobacteria-associated lung disease. Using data from the Agency for Healthcare Research and Quality’s Healthcare Cost and Utilization Project, the researchers estimated the prevalence, demographic characteristics, and trends of pulmonary nontuberculous mycobacteria (NTM)-associated hospitalizations. The data were

continued on page 18

Research briefs

continued from page 17

from 11 States with continuous reporting from 1998 to 2005. Among persons older than 70 years of age, the relative prevalence was higher for women than for men. The prevalence for persons 70-79 years of age compared with those 40-49 years of age was 15-fold higher for women and 9-fold higher for men. Annual prevalence increased significantly among men and women in Florida (3.2 percent and 6.5 percent, respectively), and among women in New York (4.6 percent).

Broderick, K. B., Ranney, M. L., Vaca, F. E., and others. (2009). "Study designs and evaluation models for emergency department public health research." (AHRQ grant HS17526). *Academic Emergency Medicine* 16, pp. 1124-1131.

This article is a product of the 2009 Academic Emergency Medicine consensus conference titled "Public Health in the ED: Surveillance, Screening, and Intervention." The authors reported on the findings of a conference workshop intended to review study designs and evaluation models specific to ED-based public health research. They reviewed concepts related to ED-based public health research such as study designs, participant selection and retention, and measurement and analyses. The key concepts raised in discussion of these topics are framed within a broader goal of educating researchers and providing a more focused foundation for performing high-quality ED-based public health research. The authors also formulated a set of 10 study design and program evaluation recommendations for future ED-based public health research.

Carlson, J. N., Mayrose, J., and Wang, H. E. (2010, January-March). "How much force is required to dislodge an alternate airway?" (AHRQ grant HS13628). *Prehospital Emergency Care* 14(1), pp. 31-35.

Airway management is a core intervention in the resuscitation of out-of-hospital critically ill patients. While most advanced-level practitioners provide airway management using endotracheal intubation (ETI), many newer airway devices provide alternatives to ETI. A key task in ETI is securing the endotracheal tube (ETT) to prevent inadvertent dislodgment, a potentially catastrophic event. To prevent this from happening, practitioners typically secure the ETT in place using adhesive tape or a commercial tube holder. The researchers tested a standard ETT against three newer airway devices to determine which one took the most force to dislodge. Three of the devices—the standard ETT, the King laryngeal tube airway, and the laryngeal mask airway—required similar dislodgment force. The esophageal-tracheal Combitube (ETC) required almost twice as much dislodgment force as the ETT.

Clancy, C. M. (2009, December). "Physician leadership for high-quality care." *Chest* 136(6), pp. 1452-1454. Reprints (AHRQ Publication No. 10-R043) are available from AHRQ.*

As policymakers grapple with reforming the U.S. health care system, a common theme is the urgent need to assure that all Americans receive high-quality, affordable care. An article in the same issue of *Chest* provides a clear summary of the Medicare physician quality reporting initiative (PQRI) for chest

physicians. This presents an important opportunity for physician leadership, notes the author, director of the Agency for Healthcare Research and Quality. Physicians will need to work together to address issues ranging from reconciling different values from different sources to the incorporation of standard data collection at the point of care. Transitioning from leisurely to rapid improvements will require timely feedback, clinical decision support, and broad engagement by physicians and organizations to design systems and strategies that encourage and reinforce a culture of learning.

Dellon, E. P., Shores, M. D., Nelson, K. I., and others. (2009, December). "Caregivers' perspectives on decisionmaking about lung transplantation in cystic fibrosis." (AHRQ grant HS10397). *Progress in Transplantation* 19(4), pp. 318-325.

Cystic fibrosis is the most common lethal genetic disease among whites. Lung transplantation is a therapeutic option that may improve survival and quality of life for selected patients. The researchers' objective was to describe the current decisionmaking process for lung transplantation from the perspective of caregivers of patients who faced the transplant decisions before dying of complications of cystic fibrosis (9 patients) or lung transplantation (19 patients). They interviewed 28 caregivers (mostly mothers) of patients with cystic fibrosis who received care at their center and died between 1996 and 2006. Ten caregivers reported that the patient did not fully understand the alternatives. Five thought that

continued on page 19

Research briefs

continued from page 18

the patient did not fully understand potential risks. Thirteen reported that the patient thought that declining transplantation was not an option.

Do, Y. K., Carpenter, W. R., Spain, P., and others. (2010). “Race, healthcare access and physician trust among prostate cancer patients.” (AHRQ grant HS10861). *Cancer Causes Control* 21, pp. 31-40.

Prostate cancer mortality is more than twice as high for black men as it is for white men in the United States. A previous study had suggested that health care access, not culturally biased attitudes or lack of knowledge, is the key factor to explain black-white disparities in prostate cancer care. The researchers examined the relationship between physician trust and health care access among black and white prostate cancer patients. Their survey included 1,370 interviews with 474 patients over 3 time periods. They found that black men had generally lower levels of trust in their physician than white men. However, much of this effect can be explained by substantially lower trust levels within the subgroup of black men who reported having failed to seek medically necessary care, note the authors.

Haukoos, J. S., Mehta, S. D., Harvey, L., and others. (2009). “Research priorities for human immunodeficiency virus and sexually transmitted infections surveillance, screening, and intervention in emergency departments: Consensus-based recommendations.” (AHRQ grant HS17526). *Academic*

***Emergency Medicine* 16(11), pp. 1096-1102.**

The journal *Academic Emergency Medicine* convened a consensus conference on “Public Health in the ED: Surveillance, Screening, and Intervention” as part of its 2009 annual meeting. The authors describe the results of a conference breakout session on HIV and sexually transmitted infections (STIs) in the emergency department (ED). They used a four-step group technique that involved the generation, sharing, and discussion of ideas related to the problem, followed by voting and ranking to prioritize the ideas relative to the objective. The 21 session participants agreed on 11 priority knowledge gaps and 14 research questions as the highest ranked research priorities. The overarching themes of the research priority questions were related to effectiveness, sustainability, and integration of HIV and STI prevention in the ED.

Haukoos, J. S. and Lyons, M. S. (2009). “Idealized models or incremental program evaluation: Translating emergency department HIV testing into practice.” (HS17526). *Academic Emergency Medicine* 16(11), pp. 1044-1048.

In 2006, the Centers for Disease Control and Prevention revised their recommendations for performing HIV testing with a significant focus on emergency departments (EDs). Going back over the last 2 decades, the authors show, through a systematic search of several publication search engines, that ED-related HIV research efforts have increased considerably. They also discuss three articles in the same issue that describe different aspects of performing HIV testing in EDs. In discussing the next steps in

translating HIV testing into practice for all EDs, the authors emphasize the need for substantial external administrative, financial, and political support. They conclude that incremental investigation and implementation are the best ways to proceed in expanding HIV testing in EDs.

Lazar, A. J. (2010, February). “Two takeaways for hospitals.” *Modern Healthcare*.

Two takeaways for hospitals already are certain: costs must be managed, and daily operations need to be redesigned to focus on higher quality and better outcomes. Most U.S. hospitals have 200 or fewer beds and do not resemble the highly integrated systems, like Kaiser Permanente, that are often held up as models. Hospitals must use evidence-based data to improve outcomes and reduce readmissions and the Agency for Healthcare Research and Quality (AHRQ) has taken a leading role in offering tools to achieve these results. An AHRQ-funded Project RED (Re-engineered discharge) has transformed the way patients are discharged. The protocol developed from this project reduces readmissions and lowers costs. To address uncertainties about which treatment or intervention works best for patients, Congress created AHRQ’s Effective Health Care Program in 2003. It highlights the pros and cons of different treatment options for a given condition. This type of analysis is known as comparative effectiveness research.

Mukamel, D. B., Glance, L. G., Dick, A. W., and Osler, T. M. (2010, February). “Measuring quality for public reporting of health provider quality: Making it meaningful to patients.”

continued on page 20

Research briefs

continued from page 19

(AHRQ grant HS16737). *American Journal of Public Health* 100(2), pp. 264-269.

Measuring the performance of medical care providers has become an important facet of the American health care system over the last 20 years. The accuracy of quality measures depends on a number of factors, including the use of shrinkage estimators rather than the traditional, nonshrinkage estimators. The researchers examined the advantages and disadvantages of shrinkage and nonshrinkage estimators from the perspective of a patient faced with choosing a local provider. In considering the quality of a provider, the nonshrinkage estimator is the mean for all patients treated by that provider; the shrinkage estimator is a weighted average of the unshrunk estimator and the average outcome rate calculated over all providers. The authors criticize the shrinkage estimator for its assumption that all providers are similar and for inaccurate interpretation of data comparing the mortality rates of six hospitals. They conclude that use of the shrinkage estimator may not serve the needs of individual patients.

Mularski, R. A., Campbell, M. L., Asch, S. M., and others. (2010, March). "A review of quality of care evaluation for the palliation of dyspnea." (AHRQ Contract No. 290-05-0034). *American Journal of Respiratory Critical Care Medicine* 181(6), pp. 534-538.

Evaluation and management of dyspnea requires recognizing patients at risk for dyspnea and regularly assessing and characterizing the patient

experience at clinical interactions. As part of an Agency for Healthcare Research and Quality symposium, the authors performed a dyspnea quality measure review. They sought to identify any publicly available process and outcome quality indicators. Only 5 operationalized quality measures, 14 quality indicators, and a number of other quality statements about recommended care for dyspnea could be identified. Dyspnea quality measurement and quality improvement efforts will likely expand in future years. The current field is young and most proposed dyspnea quality measures lack data on reliability, validity, and feasibility. The authors call for more research to understand the most appropriate symptom assessment instruments and how these link to patient-centered priorities for intervention.

Pincus, H. A. (2009). "From PORT to policy to patient outcomes: Crossing the quality chasm." (AHRQ grant HS16097). *Schizophrenia Bulletin* 36(1), pp. 109-111.

The reports from the Agency for Healthcare Research and Quality's Schizophrenia Patient Outcomes Research Team provide guidance on evidence-based clinical practice. In addition, a report from the Institute of Medicine (IOM) documents gaps in behavioral health care between the care Americans should be receiving and the care they are receiving. The IOM report also provides a set of aims, principles, and strategies to improve the quality of the mental health care system. The author offers a framework for applying these elements and suggests a series of additional steps. These steps include: making consumers, policy leaders, administrators, clinicians,

and researchers part of the process; transforming guidelines into valid performance measures that can be feasibly measured; applying measures at multiple levels (consumer, clinical, etc.); applying strategies to improve performance more widely at the point of care; and evaluating the effectiveness of guidelines, measures, and quality improvement strategies.

Resnick, B. Galik, E., Pretzer-Aboff, I., and others. (2009). "Treatment fidelity in nursing home research: The Res-Care Intervention Study." (AHRQ grant HS13372). *Research in Gerontological Nursing* 2(1), pp. 30-38.

Increasingly, investigators are addressing treatment fidelity when reporting research on interventions to change behavior. An intervention can be said to satisfy treatment fidelity requirements if the treatment provided is consistently given to all participants randomized to treatment, there is no evidence of non-treatment-related effects, and the intervention is true to the theories and goal underlying the research. The researchers describe how treatment fidelity was comprehensively evaluated in a two-tiered motivational intervention, the Res-Care Intervention Study, focused on restorative care interventions in 12 nursing homes. Six homes were exposed to the intervention and six received a placebo control intervention. The Res-Care Intervention was focused on teaching nursing assistants how to motivate residents to engage in restorative care activities. There was some evidence of treatment fidelity across the five areas of design, training, delivery, receipt, and enactment.

continued on page 21

Research briefs

continued from page 20

Schroy, P. C., Glick, J. T., Robinson, P., and others. (2009). "A cost-effectiveness analysis of subject recruitment strategies in the HIPAA era: Results from a colorectal cancer screening adherence trial." (AHRQ grant HS13912). *Clinical Trials* 6, pp. 597-609.

Changes in regulation as a result of the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule have made it more difficult to recruit subjects for clinical trials. The researchers evaluated three methods to recruit subjects for a trial on the impact of a computer-based decision aid on shared decisionmaking and patient adherence to colorectal cancer screening. The methods were: (1) a provider-initiated electronic referral opt-in (Click) method, (2) a provider-mediated referral letter opt-in (Letter) method, and (3) an investigator-initiated coordinator-mediated direct contact opt-out (Call) method. The Call method yielded substantially higher accrual rates (188 out of 531 subjects) than either the Click method (12 of 72) or the Letter method (17 of 816). The average cost per patient enrolled for the Call method was \$156. This was competitive with the Click method (\$129) and much lower than the Letter method (\$1,967).

Schultz, D., Seid, M., Stoto, M. A., and Burstain, J. M. (2010). "The Agency for Healthcare Research and Quality's Children's Health Research Portfolio." (AHRQ Contract No. 282-00-0005). *Maternal and Child Health* 14, pp. 1-8.

The purpose of this study was to evaluate the Agency for Healthcare Research and Quality's (AHRQ's) children's health activities and determine the extent to which they reflected AHRQ's portfolios of research and resulted in publications in the peer-reviewed literature. The review assessed AHRQ-funded children's activities for the period 1990-2005 and related publications for the period 1996-2002. The evaluation showed that AHRQ's child health portfolio has changed over time with an increase in activities related to patient safety and health information technology, reflecting trends at AHRQ as a whole. Furthermore, AHRQ has contributed a substantial body of new knowledge as a result of its funding for children's health activities. The analysis also suggested that AHRQ's children's health activities have successfully disseminated research findings and new knowledge.

Zivin, K., Madden, J. M., Graves, A. J., and others. (2009, December). "Cost-related

medication nonadherence among beneficiaries with depression following Medicare Part D." (AHRQ grant HS10391). *American Journal of Geriatric Psychiatry* 17(12), pp. 1068-1076.

Despite increased prescription drug coverage with Medicare Part D, overall rates of cost-related nonadherence (CRN) and spending less on basic needs improved only somewhat since its implementation. Using data from the Medicare Current Beneficiary Surveys of 2004-2006, the researchers determined changes in CRN and forgoing basic needs to pay for drugs among Medicare beneficiaries with and without depressive symptoms before and after Part D implementation. The unadjusted, weighted annual prevalence of CRN among beneficiaries with depressive symptoms was 27 percent in 2004 and 2005, and 24 percent after Part D implementation in 2006, compared with 13 percent, 12 percent, and 9 percent, respectively, among beneficiaries without depressive symptoms. The annual prevalence of spending less on basic needs among depressed beneficiaries was 22 percent in 2004, 23 percent in 2005, and 19 percent in 2006, compared with 8 percent, 9 percent, and 5 percent, respectively, among beneficiaries without depressive symptoms. ■



Healthcare 411

Are you looking for health-related news you can listen to at your convenience at home or on the go?

AHRQ's Healthcare 411 is your reliable audio news program, based on the latest research and available when and where you need it!

Listen to:

- 60-second radiocasts with tips for health care consumers
- 10-minute audio podcasts featuring longer, more in-depth interviews with experts who provide evidence-based information on today's critical health care topics

Log on and listen at www.healthcare411.ahrq.gov. Or subscribe and we'll send stories directly to your computer or personal media player.

Get your medical information—when and where you're ready to hear it—on-demand with Healthcare 411.

Subscribe to AHRQ's Electronic Newsletter

AHRQ's free notification service brings news and information to your e-mail inbox! This service allows subscribers to receive automatic e-mail updates about AHRQ's research, data, publications, events and meetings, and many other announcements.

You also can **customize your subscription** and receive other AHRQ topics of interest.

To subscribe:

1. Go to www.ahrq.gov and select "E-mail Updates" next to the red envelope icon.
2. Enter your e-mail address.
3. On the "Quick Subscribe" page, select *AHRQ Electronic Newsletter* under the "AHRQ News and Information" heading.



Questions? Please send an e-mail to Nancy.Comfort@ahrq.hhs.gov.

AHRQ's Home Page Has a New Look

AHRQ's home page (www.ahrq.gov) has been refreshed based on user feedback to make it more visually appealing and easier to navigate. If you have any questions or specific feedback, please send an e-mail to: AHRQWebsite@ahrq.hhs.gov

The screenshot displays the AHRQ website home page with the following sections:

- Header:** Agency for Healthcare Research and Quality (AHRQ) Home, U.S. Department of Health & Human Services, www.ahrq.gov, www.hhs.gov, Search AHRQ, and E-mail Updates.
- Navigation:** AHRQ Home, Questions?, Contact Us, Site Map, What's New, Browse, Información en español.
- Left Sidebar:** AHRQ Home, Clinical Information, Consumers & Patients, Funding Opportunities, Data & Surveys, Research Findings, Priority Populations, Quality & Patient Safety, Health IT, Public Health Preparedness.
- Main Content:** American Recovery and Reinvestment Act banner, RECOVERY.gov logo, and a large image of a globe.
- Index:** Search Tips, A-Z Index, and Text Size options.
- AHRQ For You:** For Consumers & Patients, For Clinicians & Providers, For Researchers, For Policymakers, For Purchasers & Payers.
- Public Service Ads:** 10 Questions You Should Ask Real Men Wear Gowns Superheroes.
- Bookmark & Share:** Share by E-mail, Blogger, Del.icio.us, Digg, Facebook, Reddit, StumbleUpon, Twitter, Social Media Tools.
- News & Events:** Dr. Clancy Same-Day Surgery: What You Should Know, National Advisory Council To Meet April 9, New Study Details High Rates of Rehospitalizations and Emergency Pain Treatment of Sickle Cell Disease.
- Publications:** Effectiveness of Isosorbide Dinitrate and Hydralazine in Racial/Ethnic Subgroups With Heart Failure, Core-Needle & Open Surgical Biopsy for Diagnosis of Breast Lesions.
- About AHRQ:** Mission & Budget, Grants On Line Database (GOLD), Strategic Plan, Organization & Contacts, Map & Directions, Job Vacancies, Other HHS Agencies, Information Policies.
- Footer:** American Recovery and Reinvestment Act, Using Blood Thinners Safely, Health Care Innovations Exchange, Data Resources, Effective Health Care, Advancing Excellence in Health Care, AHRQ Home | Questions? | Contact AHRQ | Site Map | Accessibility | Privacy Policy | Freedom of Information Act | Disclaimers, U.S. Department of Health & Human Services | The White House | USA.gov: The U.S. Government's Official Web Portal, Agency for Healthcare Research and Quality • 540 Gaither Road Rockville, MD 20850 • Telephone: (301) 427-1364.

<http://www.ahrq.gov>

**U.S. Department of
Health and Human Services**

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. 10-RA010
July 2010

ISSN 1537-0224

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**