



Research Activities



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Agency for Healthcare Research and Quality

Highlights

Departments

- 2 Women's Health**
- 6 Patient Safety and Quality**
- 11 Child/Adolescent Health**
- 12 Pharmaceutical Research**
- 13 Medical Expenditure Panel Survey**
- 16 Outcomes/Effectiveness Research**
- 16 Primary Care Research**
- 17 Acute Care/Hospitalization**

Regular Features

- 19 Agency News and Notes**
- 20 Announcements**
- 20 Research Briefs**

Obesity surgery complication rates are higher over time

Four of every 10 patients who have obesity surgery (also known as bariatric or weight loss surgery) develop a complication within 6 months of leaving the hospital. This new study by the Agency for Healthcare Research and Quality (AHRQ), based on insurance claims data, is the most extensive to date on postsurgical complications from obesity operations.

AHRQ researchers William Encinosa, Ph.D., Didem Bernard, Ph.D., and Claudia Steiner, M.D., M.P.H., found that the complication rate among privately insured, nonelderly patients receiving obesity surgery increased from 21.9 percent while they were still hospitalized to 39.6 percent by the end of the 180-day study period.

The five most common complications were dumping syndrome, which includes vomiting, reflux, and diarrhea (nearly 20 percent); anastomosis complications (complications resulting from the surgical joining of the intestine and stomach), such as leaks or strictures (12 percent); abdominal

hernias (7 percent); infections (6 percent); and pneumonia (4 percent). The overall death rate for the entire 180-day postoperative period studied was low—0.2 percent.

Complications from obesity surgery also increased costs. Medical care spending averaged \$36,542 for obesity surgery patients who experienced a complication up to 180 days after surgery, including their initial hospital stay; spending for patients without complications averaged \$25,337. In addition, medical care spending for patients who had to be readmitted because of a complication during the 180-day period averaged \$65,031 compared with \$27,125 for those who did not have to be hospitalized again.

Most studies of complications from obesity surgery have been limited to those that occur before hospital discharge or, at the most, up to 30 days post-discharge. As noted, the new study extends the observation period up to 180 days—6 months—after hospital discharge.

continued on page 2

Obesity surgery

continued from page 1

The researchers also analyzed differences between 30-day and 180-day postoperative complication rates. They found that 10.8 percent of patients who had not experienced a complication within 30 days did so in the following 150 days. During this same 30-day

period, the proportion of patients who had to be readmitted to hospitals with complications increased by 50 percent—from 4.8 percent to 7.2 percent.

These findings were based on claims for hospital care and outpatient care for 5.6 million enrollees under age 65 in employer-sponsored health plans for 45 large employers in 49 States

for 2001 and 2002. The claims data included information on 2,522 bariatric procedures.

More details are in “Healthcare utilization and outcomes after bariatric surgery,” by Drs. Encinosa, Bernard, and Steiner, in the August 2006 *Medical Care* 44(8), pp. 706-712. Reprints (AHRQ Publication No. 06-R068) are available from AHRQ.* ■

Women's Health

Complications from chemotherapy in women with breast cancer are greater than previously estimated

Sixteen percent of women who underwent chemotherapy for breast cancer experienced serious adverse effects requiring emergency care or hospitalization, according to a new study supported in part by the Agency for Healthcare Research and Quality (HS10803). Most of the adverse events were related to serious complications caused by the toxicity

of the drugs. These complications, which included anemia, dehydration, and reduced production of white blood cells, also increased the costs of care.

The study is the first to analyze the risks of serious adverse effects from intravenous chemotherapy in women under age 65 since medications to treat the complications of chemotherapy became more available, the report's authors said. Michael J. Hassett, M.D., with the Harvard-affiliated Dana-Farber Cancer Institute, and colleagues found that the odds of experiencing a serious adverse effect increased by 20 percent per month for each additional month of chemotherapy administered to women after their initial breast cancer diagnosis. Women who received chemotherapy were more likely than women who did not to visit the emergency room or be hospitalized (61 percent vs. 42 percent).

More than 8 percent of the women who had chemotherapy were seen in the emergency room or were hospitalized for infection and fever. The proportion of women treated for other chemotherapy-related problems included:

- Neutropenia or thrombocytopenia – disorders that reduce the production of white blood cells or platelets – 5.5 percent
- Electrolyte disorders, such as dehydration – 2.5 percent
- Nausea or diarrhea – 2.4 percent
- Fatigue, dizziness, and related conditions – 2 percent
- Deep venous thrombosis or pulmonary embolism – 1.2 percent

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continued on page 3

Chemotherapy complications

continued from page 2

- Malnutrition – just under 1 percent

Expenditures for the hospital and emergency room care of each of the women adversely affected by chemotherapy averaged \$10,000 more a year than expenditures for the same services for those women who underwent chemotherapy but did not have a serious complication. For chemotherapy patients who had adverse events, their annual medical expenditures

for all causes averaged \$13,000 more for hospital care, \$406 more for emergency room visits, \$16,000 more for outpatient care, and \$1,900 more for prescription drugs than did the expenditures for the chemotherapy patients who did not experience serious complications.

Details are in “Frequency and cost of chemotherapy-related serious effects in a population sample of women with breast cancer,” by Dr. Hassett, A. James O’Malley, Juliana R. Pakes, and others in the August 16, 2006 *Journal of the National Cancer Institute* 98, pp. 1108-1117. ■

Minority women are nearly twice as likely as white women to not receive needed postoperative treatments for early-stage breast cancer

A new study underscores the many missed opportunities to optimize outcomes among women with early-stage breast cancer, especially minority women. Following surgery for early-stage breast cancer, minority women were nearly twice as likely as white women to not receive recommended treatments, even after taking into account important clinical (such as cancer stage and coexisting medical conditions), demographic (age), and care access (such as insurance and referral to a medical oncologist) factors that might affect treatment. While necessary to reduce treatment disparities, oncology referrals are not sufficient to ensure women’s receipt of efficacious adjuvant treatment following surgery, conclude the researchers who conducted the study. They reviewed all inpatient and outpatient medical records of 677 women who underwent surgery for early-stage breast cancer in 1999 and 2000 at 6 New York City hospitals. They defined stage 1A cancer as a tumor less than 1 cm with good prognostic features.

One-fifth (21 percent) of all women, but nearly twice as many minority women, did not receive appropriate adjuvant therapy: 16 percent of whites, 34 percent of blacks, and 23 percent of Hispanics. Among the 396 women who underwent breast-conserving surgery, 73 percent of black women versus 84 percent of other women received recommended postoperative radiation. Among the 126 women with greater than stage 1A estrogen receptor-negative tumors, black women were less likely than other women to receive chemotherapy (67 vs. 78 percent). Among the 421 women with greater than stage 1A hormone-receptor-positive tumors, black and Hispanic women were less likely than other women to receive anti-estrogen therapy such as tamoxifen (71 and 75 percent, respectively, vs. 80 percent). Among women who could benefit from systemic treatment, 82 percent referred to a medical oncologist received it compared with 32 percent of nonreferred women. The study was supported in part by the Agency for Healthcare Research and Quality (HS10859).

See “Missed opportunities: Racial disparities in adjuvant breast cancer treatment,” by Nina A. Bickell, M.D., M.P.H., Jason J. Wang, Soji Oluwole, M.D., and others, in the March 20, 2006 *Journal of Clinical Oncology* 24(9), pp. 1357-1362. ■

Also in this issue:

Prevalence, impact, and disclosure of domestic violence, see page 4

Impact of work hours and caregiving on nurses, see page 7

Hospital pharmacy medication dispensing errors, see page 9

Medications and drug interactions, see page 12

Lifestyle and risk of nursing home admission, see page 16

Computed tomography and diagnosis of acute appendicitis, see page 18

Studies examine the prevalence, impact, and disclosure of domestic violence among women

From one-fourth to one-half of women will be victimized by intimate partner violence (IPV) in their adult lifetime. Although many abused women seek care in emergency departments (EDs), their abuse is rarely identified. Depending on IPV type, 11 to 21 percent of women are abused by more than one partner. The abuse lasts from less than 1 year to 5 years for most women; however, for 5 to 13 percent of women the duration is over 20 years, according to a new study. Women who have been victimized by IPV suffer poorer general health, inferior physical and mental health status, and greater depression and social isolation than women who have not been victims of IPV, concludes a second study. Both studies were supported by the Agency for healthcare Research and Quality (HS10909). Another AHRQ-supported study (HS11096) shows that use of computer prompts to ED physicians increases discussion of domestic violence when abused women seek care in the ED. All three studies are summarized here.

Thompson, R.S., Bonomi, A.E., Anderson, M., and others. (2006, June). "Intimate partner violence: Prevalence, types, and chronicity in adult women."

American Journal of Preventive Medicine 30(6), pp. 447-457.

Researchers conducted a telephone survey of a random sample of 3,429 women age 18 to 64 years who were predominantly white, educated, and employed, and who were enrolled in a large U.S. HMO from 2003 to 2005. They found that nearly half (44 percent) of women had suffered from some type of IPV in their adult lifetime (34 percent from physical/sexual abuse, and 35 percent from non-physical abuse such as anger, threats, or controlling behavior). Nearly 8 percent of women suffered from some type of IPV in the previous year and 15 percent in the past 5 years. Also, 45 percent of abused women suffered from more than one type of IPV.

Depending on IPV type, between 11 and 21 percent of women were abused by more than one partner and the median duration of abuse was less than 1 year to 5 years. However, average duration of IPV ranged from 4 years for forced sex to 8 years for controlling behavior. What's more, 15 percent of abused women were abused by 2 or more partners and 14 to 53 percent of them, depending on type of abuse, suffered from 20 or more abusive events. One-third to one-half of abused women suffered from a single episode or less than a year of

physical abuse or threats, yet 5 to 13 percent of women suffered from abuse for over 20 years.

Domestic abuse was severe in many cases. Nearly two-thirds (61 percent) of abused women rated physical violence as moderately to extremely violent while the figures for forced sexual intercourse or forced sexual contact were 45 percent and 36 percent, respectively. Finally, women who were chronically exposed to a partner's threats or anger (63 percent) or cowed by controlling behavior (31 percent) rated the abuse as moderately to extremely violent. Women were more likely to suffer from domestic abuse if they were younger, had lower income, were single mothers, or had been abused as children.

Bonomi, A.E., Thompson, R.S., Anderson, M., and others. (2006, June). "Intimate partner violence and women's physical, mental, and social functioning." American Journal of Preventive Medicine 30(6), pp. 458-466.

Women's physical, social, and mental functioning can decline dramatically in the wake of domestic violence. Compared with women who had never suffered from domestic abuse, women who had been abused recently (past 5

continued on page 5

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Domestic violence

continued from page 4

years) had much lower vitality and mental health scores, and were 2.4 times more likely to be depressed and 2.7 times more likely to be severely depressed. These women were also less likely to be socially involved, less trusting of people in the community where they resided, and reported more symptoms of poor health. Women who were abused over 5 years ago were also at increased risk for poorer health, but the effects were less pronounced.

When health effects by type of IPV were examined, women with recent physical and/or sexual IPV had substantially lower physical, social, and mental health functioning scores. They were also 4 times as likely to be severely depressed and nearly 3 times as likely to report fair or poor health. They were also less likely to be socially involved or to trust community members. Women who suffered from recent non-physical abuse (threats, put-downs, controlling behavior) had similar but less severe reduced health and functioning as victims of physical/sexual abuse.

The impact of IPV on health followed a logical time trend over a woman's adult years with more pronounced health effects

associated with more recent abuse. Finally, when the association of IPV with health habits and behaviors was examined, it was found that women experiencing recent IPV were more likely to be current or former smokers or have engaged in risky behaviors and heavy or binge drinking in the past year.

Rhodes, K.V., Drum, M., Anliker, E., and others. (2006, June). "Lowering the threshold for discussion of domestic violence." *Archives of Internal Medicine* 166, pp. 1107-1114.

Potential opportunities to intervene in cases of domestic violence (DV) are often missed, because clinicians are reluctant to bring up the issue with women they suspect may have been abused. Also, fear and shame make abused women unlikely to volunteer such information unless specifically asked. This recently published AHRQ-funded study evaluated the use of computer screening for DV. The authors found that allowing the patient to self-disclose DV risk as a part of a computer-based health risk assessment, with a prompt to the physician, increased discussions about DV between health care providers and women patients; however, it did not guarantee that DV was addressed during ED encounters.

The researchers randomized nonemergency female patients (age 18 to 65 years) who visited two EDs to two groups. One group took a self-administered computer-based health risk assessment. Depending on the women's answers, the computer prompted ED clinicians to ask women about DV. The other group received usual care. The researchers videotaped all ED visits and measured rates of DV discussion, disclosure, and services. Nearly 900 women were audiotaped and completed an exit questionnaire.

Based on their exit questionnaire, 26 percent of women in the urban ED and 21 percent in the suburban ED were currently at risk for current DV. In the urban ED, the computer prompt increased rates of DV discussion (56 vs. 45 percent of usual care visits), disclosure of DV (14 vs. 8 percent), and DV-related services provided (8 vs. 4 percent). Women at the suburban ED and those with private insurance or higher education were less likely to be asked about DV. Only half of cases (48 percent) in which ED providers received a prompt about a woman's potential DV risk led to discussions about DV. Yet both inquiries about and disclosures of abuse were associated with higher patient satisfaction with care. ■

Elderly women are more likely than men to die after coronary bypass surgery

Elderly women are more likely than elderly men to die after coronary artery bypass graft surgery (CABG), possibly due to the greater number of postoperative infections suffered by women. A new study found that 16 percent of elderly women compared with 10 percent of elderly men hospitalized for CABG developed an infection during their hospital stay. Greater infection rates among women persisted regardless of age, race, type of admission, hospital

volume of CABG surgeries, or presence of other medical conditions.

Overall, CABG patients who developed an infection were 3 times as likely to die in the hospital as those without an infection (12 vs. 4 percent), while twice as many died within 30 days of surgery (9 vs. 4.5 percent). Mortality within the 100-day period after

continued on page 6

Coronary bypass surgery

continued from page 5

CABG surgery was 16.5 percent for those with an infection compared with 6.2 percent for those without an infection. Men who developed an infection were 3 times more likely to die than men without an infection. On the other hand, women who developed an infection were 1.8 times more likely to die than uninfected women.

The unadjusted excess number of deaths due to female sex in the group of CABG patients studied was 95, which decreased to 4 after adjustment for postoperative infection. Thus, 96 percent of the excess deaths in women could be explained by the underlying differences in infection between men and women. Among all patients, respiratory tract infections were most common (7.4 percent of patients), followed by

urinary tract infections (4.7 percent), and digestive tract infections (2.2 percent). The overall prevalence of infection increased with hospital length of stay, from 2.6 percent among those who spent less than 5 days in the hospital to 33.4 percent among those with stays of more than 12 days. These findings were based on a study of 9,218 Michigan Medicare beneficiaries hospitalized for CABG. The study was supported in part by the Agency for Healthcare Research and Quality (HS11540).

See "Contribution of infection to increased mortality in women after cardiac surgery," by Mary A. Rogers, Ph.D., Kenneth M. Langa, M.D., Ph.D., Catherine Kim, M.D., M.P.H., and others in the February 27, 2006 *Archives of Internal Medicine* 166, pp. 437-443. ■

Patient Safety and Quality

Studies examine the safety climate and teamwork in hospital operating rooms

Medical errors in the operating room (OR), such as wrong-site or wrong-procedure surgeries, retained sponges in the body, unchecked blood transfusions, and mismatched organ transplants, can be catastrophic. Not surprisingly, a growing number of hospitals are developing patient safety initiatives aimed at creating a safe OR culture. In fact, the Joint Commission on Accreditation of Healthcare Organizations is proposing a requirement that all hospitals routinely measure their safety culture beginning in 2007.

The safety climate in surgical departments varies widely among hospitals, according to a new study. This climate can be validly measured, serving as a benchmark for hospitals to gauge their safety

performance. A second study reveals that staff disagree about the level of teamwork in the OR, a critical safety element. Both studies were based on a survey of OR personnel at 60 hospitals in a health system in 16 States. The studies, supported by the Agency for Healthcare Research and Quality (HS14246 and HS11544) and conducted by Johns Hopkins University investigators, are briefly discussed here.

Makary, M.A., Sexton, J.B., Freischlag, J.A., and others. (2006, May). "Patient safety in surgery." *Annals of Surgery* 243(5), pp. 628-635.

This survey of 2,135 OR medical personnel at 60 hospitals in 16 States revealed that the OR safety climate varied greatly among

hospitals. The research team developed a surgery-specific Safety Attitudes Questionnaire (SAQ), which demonstrated high face validity and internal consistency. The SAQ measured six domains of safety: teamwork climate, safety climate, job satisfaction, perceptions of management, stress recognition, and working conditions. The researchers calculated the average of seven safety climate scale scores of the validated survey to obtain provider ratings of the OR safety climate.

Three scale items asked if OR personnel were encouraged to report patient safety concerns, whether the culture made it easy to learn from others' mistakes, and whether medical errors were

continued on page 7

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.

Operating room teamwork

continued from page 6

handled appropriately. The four other scale items asked whether individuals knew the proper channels to direct safety questions was received, whether they received appropriate feedback about performance, whether they would feel safe being treated there as a patient, and whether it was difficult to discuss mistakes.

The percentage of frontline providers reporting a good safety climate ranged from about 45 percent for surgical technicians to about 55 percent among staff surgeons. However, scores varied widely among hospitals. The percentage of OR personnel who reported a good safety climate in each hospital ranged from 16.3 to 100 percent. The researchers conclude that OR safety culture can be measured using the safety climate scale of the SAQ.

Makary, M.A., Sexton, J.B., Freischlag, J.A., and others.

(2006, May). "Operating room teamwork among physicians and nurses: Teamwork in the eye of the beholder." *Journal of the American College of Surgeons* 202, pp. 746-752.

While OR personnel agree about the safety climate of the OR, they disagree about the level of teamwork in the OR, which is a critical component of patient safety. Nurses and doctors have quite different views, according to this survey of OR personnel at 60 hospitals. The researchers used the SAQ to rate their own peers and each other using a 5-point Likert scale (1 equal to very low and 5 equal to very high).

Ratings of teamwork (collaboration and communication) differed substantially by OR caregiver type. Surgeons rated the teamwork of other surgeons high or very high 85 percent of the time. Similarly, anesthesiologists rated teamwork among anesthesiologists very high and certified registered nurse anesthetists (CRNAs) rated other CRNAs very well (scores

were 95.8 and 92.7 percent, respectively). In fact, surgeons perceived that everyone in the OR was doing a good job in terms of teamwork, yet nurses rated their collaboration with surgeons high or very high only 48 percent of the time.

Post-survey feedback discussion revealed that nurses often describe good collaboration as having their input respected. In contrast, physicians often describe it as having nurses who anticipate their needs and follow instructions. The traditional hierarchy of surgery has discouraged nurses from speaking up to surgeons, whom nurses often perceive as unapproachable.

Each member of the OR team should be encouraged to raise issues that could lead to patient harm, suggest the researchers. They recommend the use of presurgical briefings and postoperative debriefings, a method adopted at Johns Hopkins Hospital. Briefings are led by a well-respected surgeon to promote communication through improved teamwork. ■

Long work hours and family caregiving affect nurses' hospital performance

Each of the 5 million patients admitted to hospital critical care units in an average year will suffer at least one problem due to a medical error that could have been prevented. The long work hours of critical care nurses may play a role in some of these errors, suggests a new study. The stress and fatigue of caregiving for family members at home may also hinder the performance of hospital staff nurses at work, concludes a second study. Both studies were supported by the Agency for Healthcare

Research and Quality (HS11963) and are summarized here.

Scott, L.D., Rogers, A.E., Hwang, W-T., and Zhang, Y. (2006, January). "Effects of critical care nurses' work hours on vigilance and patients' safety." *American Journal of Critical Care* 15(1), pp. 30-37.

Critical care nurses must notice and quickly respond to subtle changes in the condition of their seriously ill, often unstable, patients in order to minimize errors and patient harm. Working

overtime and/or extended shifts reduces their vigilance and patient safety, concludes this study. More than one-quarter (27 percent) of the nurses reported making at least one error, and more than one-third (38 percent) reported making at least one near-error during the 28-day study period. The risk for making an error almost doubled when the nurses worked 12.5 or more consecutive hours. Working more than 40 hours per week increased both errors and near-errors.

continued on page 8

Hospital performance

continued from page 7

Although 44 percent (2,613) of the 6,017 work shifts studied were scheduled for 12 hours or more, 67 percent (4,053) exceeded 12 hours. Almost two-thirds of the critical care nurses struggled to stay awake at least once during the study period, and 20 percent fell asleep at least once during their work shift. The risk of falling asleep at work almost doubled when shifts exceeded 8 hours and more than doubled when shifts were longer than 12 hours. Surprisingly, there was no association between decreased vigilance (struggling to stay awake or falling asleep) and increased risk of errors.

These findings support the Institute of Medicine's recommendations to minimize the use of 12-hour shifts and to limit nurses' work hours to no more than 12 consecutive hours during a 24-hour period. The findings were obtained from 14-day logbooks filled out by 502 critical care nurses. They detailed the hours worked, the time of day worked, overtime hours, days off, and sleep-wake patterns, as well as

difficulties in remaining awake while on duty. They also described any errors or near errors that might have occurred.

Scott, L.D., Hwang, W-T., and Rogers, A.E. (2006, February). "The impact of multiple care giving roles on fatigue, stress, and work performance among hospital staff nurses." *Journal of Nursing Administration* 36(2), pp. 86-95.

Hospital staff nurses providing elder care at home are more fatigued, sleep-deprived, and likely to make errors at work than other nurses. In this study, a total of 398 staff nurses filled out daily logbooks over a 4-week period. They used a visual analog scale to rate their daily perceptions of physical and mental fatigue and stress, and to note any errors or near-errors they made. Nurses who provided care to family members were more sleepy and stressed than nurses without home caregiving responsibilities. Nurses who were providing care for both dependent children and elderly adults reported the most sleepiness, physical

fatigue, and mental fatigue over the 4-week study period.

One-quarter of the nurses caring for elderly relatives obtained 5.75 hours or less of sleep on work days and were over twice as likely to make an error at work (the majority were medication-related). However, elder care was not associated with the risk of making near errors. These findings underscore the importance that all nurses get adequate sleep, especially those who engage in caregiving roles both at home and work.

Those caring for relatives at home worked more hours per shift compared with nurses with no care dependents at home (an average of 11.54 vs. 10.96 hours). This may reflect the financial strain and economic burden that is often embedded in the family caregiving experience. Extended work shifts with short off-duty periods do not allow for commuting time, recovery sleep, or time to take care of domestic responsibilities. The resulting sleep loss may explain the connection between providing elder care at home and the likelihood of nurses making an error at work. ■

Pharmacists help identify patient safety and quality issues by clarifying prescriptions

Pharmacists commonly call primary care doctors to clarify ambiguities in prescription medication type, dosage, instructions, and/or amount. In a new study, one-fifth (21 percent) of these callbacks involved clarifications of dosage (dosage was unclear or missing). Such callbacks may have prevented serious patient problems due to inappropriate dosing. Medication types that most often required clarification were gastrointestinal (21.7 percent), cardiovascular (13.9 percent), and analgesic/anesthetic (13.2 percent) agents.

Other callbacks addressed administrative issues such as prior drug authorization (37 percent) and drug formularies (26 percent). The time spent resolving these problems can result in delayed therapy or patient compliance errors due to changes in medication

frequency or dosage. Frequent formulary changes are also confusing for clinicians, as they struggle to prescribe formulary-approved medications for their patients.

Researchers at the University of Colorado Health Sciences Center suggest use of electronic prescribing systems, readily accessible and accurate medication formulary lists, and including indications for drug therapy on the prescription to ensure patient safety. Their findings were based on a study of 22 primary care practices participating in a patient safety study. Callbacks from pharmacies were logged for 2 weeks to determine the reasons for callbacks, the drug classes involved, whether issues were resolved on the same

continued on page 9

Safety and quality issues

continued from page 8

day of the call, and variability of callbacks among practice types. Practices recorded 567 clarification calls during the 2-week period. Residency practices averaged more issues per call. The study was supported by the Agency for Healthcare Research and Quality (HS11878).

See “Pharmacy clarification of prescriptions ordered in primary care: A report from the applied strategies for improving patient safety (ASIPS) collaborative,” by Laura B. Hansen, Pharm.D., Douglas Fernald, M.A., Rodrigo Araya-Guerra, and others, in the January 2006 *Journal of the American Board of Family Medicine* 19(1), pp. 24-30. ■

Hospital pharmacy medication dispensing is highly accurate, but still inadequate

According to a new study, over 99 percent of medication doses leaving a hospital pharmacy were free from errors. However, given the huge volume of medications dispensed by hospital pharmacies, even the low 0.75 percent error rate found in the study translates into a large number of medication errors, many of which had the potential to harm patients. While the hospital pharmacy medication dispensing accuracy rate is impressive, according to the researchers who conducted the study, it is still inadequate. By directly observing the hospital pharmacy’s medication dispensing process, researchers found that 3.6 percent (5,075) of 140,755 medication doses filled by the pharmacy over a 7-month period contained errors. The hospital pharmacist detected only 79 percent (4,016) of these errors during routine verification. Thus, 0.75 percent (1,059) of doses filled

would have left the pharmacy with undetected errors.

Of these undetected errors, 23.5 percent (249) were potential adverse drug events (ADEs), of which 70 were serious and 2 were life-threatening. The most common potential ADEs were incorrect medications (36 percent), incorrect strength (35 percent), and incorrect dosage form (21 percent). A physician panel deemed 26 medication dispensing errors to be potentially life-threatening, such as a medication with adult dosage strength dispensed to the neonatal intensive care unit.

Of the four dispensing processes evaluated, automated dispensing cabinet fill had the highest number of errors (4.2 percent), whereas the cart fill process had the highest error rate (6 percent). The automated dispensing cabinet accounts for two-thirds of doses dispensed from the pharmacy, and the filling and checking of these

medications is a high-volume and repetitive task, which can lead to a high number of errors. During cart fill, pharmacy staff work with multiple medications that are different for each patient, usually medications that are not routinely dispensed—factors that may contribute to errors. In contrast, first dose fill and controlled substances fill had lower error rates, perhaps due to their smaller volume. The study was supported in part by the Agency for Healthcare Research and Quality (HS14053).

See “How many hospital pharmacy medication dispensing errors go undetected?” by Jennifer L. Cina, Pharm.D., Tejal K. Gandhi, M.D., M.P.H., William Churchill, M.S., R.Ph., and others, in the February 2006 *Journal on Quality and Patient Safety* 32(2), pp. 73-80. ■

Studies examine the source of diagnostic errors in thyroid and lung cancers

The diagnosis of thyroid cancer is usually based on the pathologist’s evaluation of cell and tissue samples obtained through fine needle aspiration (FNA) and surgical excision of the thyroid gland. When the diagnoses

from both samples do not agree, root cause analysis determines whether the source of error is sampling (diagnostic material was obtained in one but not the other sample) or interpretation (diagnostic material is present in

both samples but misinterpreted in one sample). One-fourth of patients with thyroid cancer are misdiagnosed as not having cancer due to errors in specimen quality and misinterpretation of thyroid

continued on page 10

Thyroid and lung cancers

continued from page 9

gland fine-needle aspiration samples, according to a new study. A second study found that pathologists at one hospital are more likely to agree with one another than those from different hospitals on the cause of diagnostic error in pulmonary specimens sent for lung cancer diagnosis. Both studies were supported by the Agency for Healthcare Research and Quality (HS13321) and led by Stephen S. Raab, M.D., of the University of Pittsburgh. They are discussed here.

Raab, S.S., Vrbic, C.M., Grzybicki, D.M., and others. (June, 2006). "Errors in thyroid gland fine-needle aspiration." *American Journal of Clinical Pathology* 125, pp. 873-882.

The use of FNA to biopsy the thyroid gland has improved the care of patients with thyroid gland nodules. Yet, FNA has higher false-positive and false-negative error rates than other specimen types. This study revealed that over one-third of patients were incorrectly diagnosed. Twenty-five percent of patients who underwent FNA were diagnosed as cancer-free, when they had cancer (false-negative diagnosis). Nearly 10 percent of patients who did not have cancer were diagnosed with cancer (false-positive diagnosis).

Researchers performed more detailed analyses of thyroid gland aspirates obtained over a 2-year period. Surgical pathology follow-up was obtained in 364 patients. Based on examination of the original thyroid gland FNA reports, the diagnoses were reclassified

independently by two study investigators as benign, atypical, adenoma, or malignant. The goal of the study was to determine whether FNA could accurately classify lesions into 1 of 2 categories: lesions that could be excised (including carcinomas and all neoplasms) and those that did not need to be excised (benign, nonneoplastic lesions).

About 5 patients per month had a thyroid gland lobectomy for a benign condition or a delay in diagnosis for a malignant condition due to failure to correctly diagnose their condition. Most diagnostic errors involved poor sampling or interpretation. To improve diagnostic accuracy at their hospital, the researchers increased the number of pathologist-performed (instead of clinician-performed) FNAs and required immediate interpretation of clinician- and radiologist-performed FNAs. They also adopted strict use of specimen adequacy criteria that are based on optimally adequate specimens rather than minimally adequate specimens. Finally, they cautioned clinicians not to interpret inadequate specimens.

Raab, S.S., Meier, F.A., Zarbo, R.J., and others. (June, 2006). "The 'big dog' effect: Variability assessing the causes of error in diagnoses of patients with lung cancer." *Journal of Clinical Oncology* 24(18), pp. 2808-2814.

As many as 15 percent of patients with a lung mass are misdiagnosed due to pathology errors. However, pathologists often disagree on the cause of errors in interpreting lung specimens sent for cancer diagnosis. Pathologists at one hospital are more likely to

agree with one another about the cause of a lung pathology error than pathologists from different hospitals, according to this study. This is partly due to the status of the pathologists in a given hospital, suggest the researchers. They attribute intra-hospital agreement and lack of inter-hospital agreement to the "Big Dog" effect.

Senior experienced pathologists at each hospital serve as the final arbitrator for error cause, and use different methods and approaches to decide whether discrepancies exist and their causes. Most hospitals have only one "Big Dog" to whom other pathologists ("Little Dogs") defer diagnostic judgment, explaining the greater agreement among pathologists at the same hospital. Yet, when "Big Dogs" at one hospital are confronted with differing assessments from "Big Dogs" at other hospitals, they remain reluctant to change their opinions. In this study, the locally dominant pathologists in every case did not significantly change their assessments.

The investigators asked pathologists from 6 institutions to review the slides of 40 patients who had a false-negative diagnosis of a lung specimen (the specimen was diagnosed as noncancerous when it was cancerous). They were asked to attribute the diagnostic error to clinical sampling (diagnostic material was obtained in one but not the other sample) or interpretation (the pathologist failed to identify the salient diagnostic features of the sample). Agreement about the source of diagnostic error among pathologists at the same hospital was better than agreement between pathologists from different hospitals. ■

Child/Adolescent Health

Moderately premature infants born at 30 to 34 weeks gestation tend to suffer substantial health problems

Nearly 4 percent of infants in the United States are born moderately premature (30 to 34 weeks gestation). These infants tend to suffer more significant health problems in the hospital after birth than full-term infants (37 weeks or greater), according to a new study. Researchers found that nearly 46 percent of moderately premature infants received assisted ventilation after birth, and 3 percent still required supplemental oxygen at 36 weeks. Within 3 months of discharge, 11 percent of these infants were readmitted to the hospital. Hospital readmission was more likely among male infants and those with chronic lung disease.

In a study supported by the Agency for Healthcare Research and Quality (HS10131), researchers analyzed health outcomes of 850 moderately premature infants born at 10 hospitals in California and Massachusetts from 2001 to 2003. (Admission to the neonatal intensive care unit is mandatory for all babies born at less than 35 weeks gestation at these 10 hospitals.) They also examined responses to telephone interviews with 677 families of the infants 3 months after hospital discharge.

The study did not include a comparison group of full-term infants. However, the 45.7 out of 1,000 moderately premature infants in this study who received assisted ventilation is more than 4 times the 10.4/1,000 rate other studies have found in term infants. Also, pneumothorax rates have been reported in full-term infants as 0.17 to 0.70/1,000 live births compared with 1.6/1,000 among the premature infants in this study. Meningitis rates were also higher among this group than have been reported in full-term infants. Also of note, a birthweight of 2,000 g (about 4.5 lbs) or more did not protect these moderately premature infants against the need for assisted ventilation or hospital readmission. Thus, babies whose weight might lead many clinicians to consider them to be “big premies” nonetheless experience considerable health problems, note the researchers. They suggest that treatment guidelines not group all babies less than 37 weeks gestation into a single category.

See “Unstudied infants: Outcomes of moderately premature infants in the NICU,” by Gabriel J. Escobar, Marie C. McCormick, John A. Zupancic, and others, in the July 2006 *Archives of Disease in Childhood: Fetal and Neonatal Edition* 91(4), pp. F238-F244. ■

Twice as many minority children than white children with special health care needs do not receive needed vision care

Nearly 6 percent of U.S. children with special health care needs (CSHCN) do not receive needed eyeglasses or vision care. However, black, Latino, and multiracial CSHCN are 2 to 3 times more likely to have an unmet need for vision care than whites (8.9, 10, and 14.3 percent vs. 4.1 percent). American Indian or Alaskan Native CSHCN are one-fifth as likely to have an unmet need for vision care than white CSHCN. These racial/ethnic differences in unmet needs remained after controlling for differences in health status and other child and family

characteristics such as insurance and income.

Risk of unmet needs among CSHCN was influenced by type of insurance coverage, type of health care provider, and other factors. Compared with privately insured CSHCN, uninsured CSHCN had nearly twice the risk of an unmet need for vision care, whereas Medicaid and State Children's Health Insurance Program recipients had decreased risks. CSHCN in homes with lower household income, in which an adult had stopped working (often to care for the child), and with more children were more likely to have

unmet needs. Also, CSHCN with some impaired functioning were more likely to have unmet needs than unimpaired CSHCN.

Special needs children whose usual care provider was a generalist physician, nurse practitioner, or physician assistant were more likely to have an unmet need for vision care than children whose usual care provider was a pediatrician. Also CSHCN were more likely to have an unmet need if their providers were not culturally competent, if their schools (which often screen for vision problems) and providers

continued on page 12

Vision care

continued from page 11

communicated poorly with one another, and their parents did not know about the quality of school-provider communication. More physician visits were associated with lower risk of an unmet need. These findings were based on

analysis of 2000-2002 data from the National Survey of Children with Special Health Care Needs on a sample of 14,070 CSHCN who needed eyeglasses or vision care in the previous year. The study was supported in part by the Agency for Healthcare Research and Quality (HS14022).

More details are in "Racial and ethnic differences in unmet need for vision care among children with special health care needs," by Kevin C. Heslin, Ph.D., Richard Casey, M.D., Magda A. Shaheen, M.D., Ph.D., and others, in the June 2006 *Archives of Ophthalmology* 124, pp. 895-902. ■

Pharmaceutical Research

Studies examine the practice of prescribing medications to outpatients that can dangerously interact with one another

Many patient problems caused by medications, or adverse drug events, are due to dangerous interactions of coprescribed medications. A new study reveals that one-third of primary care patients are prescribed drugs that strengthen the blood-thinning effect of the anticoagulant warfarin. This increases a patient's risk of internal bleeding; however, using computerized drug interaction alerts can reduce such dangerous prescribing. A second study shows that between 18 and 28 percent of primary care patients are prescribed a drug that can adversely interact with warfarin or three other commonly used drugs. Both studies involved the HMO Research Network's Center for Education and Research in Therapeutics (CERTS), which is supported by the Agency for Healthcare Research and Quality (HS11843), and are summarized here.

Feldstein, A.C., Smith, D.H., Perrin, N., and others. (2006, May). "Reducing warfarin medication interactions." *Archives of Internal Medicine* 166, pp. 1009-1015.

This study found that nearly a third of outpatients taking the

anticoagulant warfarin were also prescribed another drug that dangerously increased its blood-thinning effect. Yet, when primary care doctors received computer alerts to such drug-drug interactions at the time of prescribing, the warfarin-interacting medication prescription rate was reduced by 15 percent.

The study included 239 primary care providers at 15 primary care clinics and 9,910 patients taking warfarin. All clinics received electronic medical record alerts for the coprescription of warfarin and one of five interacting medications (acetaminophen, nonsteroidal anti-inflammatory medications, fluconazole, metronidazole, and sulfamethoxazole). Seven clinics also received group academic detailing (a 40-minute educational session to a small group of clinicians about the clinical risks of coprescribing drugs that interact with warfarin, computerized alerts, and tools for later reference).

Coinciding with the alerts, there was an immediate and continued reduction in the warfarin-interacting medication prescription rate from 3,294 to 2,804 per 10,000 warfarin users per month. This was an overall decline of 15 percent over a 12-month period. Group

academic detailing did not enhance the effectiveness of the computerized alerts. However, well-constructed alerts may be self-explanatory. They may provide the just-in-time training thought to be key to improving prescribing practice, explain the researchers.

Lafata, J.E., Schultz, L., Simpkins, J., and others. (2006, June). "Potential drug-drug interactions in the outpatient setting." *Medical Care* 44(6), pp. 534-541.

This study found that from 7 to 28 percent of outpatients who were prescribed one of four drugs (warfarin, digoxin, cyclosporine, or lovastatin/simvastatin) were also prescribed another drug that put them at risk for a potentially dangerous drug-drug interaction. When extrapolated to the U.S. insured adult population, an estimated 1.3 to 2.7 million adults are dispensed a potentially interacting pair of medications. For example, prescribing nonsteroidal anti-inflammatory medications or amiodarone with warfarin can increase the risk of internal bleeding. The risk of an irregular heart beat (cardiac arrhythmia) is

continued on page 13

Adverse drug events

continued from page 12

heightened when amiodarone or erythromycin are coprescribed with digoxin. Kidney toxicity can result when erythromycin or rifampin are prescribed with cyclosporine. Myopathy (progressive muscle weakness) can strike when cyclosporine or erythromycin are added to lovastatin or simvastatin.

In this study, 7 to 18 percent of primary care patients were coprescribed interacting drugs on the same day, and 18 to 28 percent were coprescribed interacting drugs during the “days supply,” that is, the time period for which the patient had the other medication available. The findings were based on an examination of coprescribing over a 1-year period for 67,820 insured

adults who were prescribed 1 of the 4 drugs studied and receiving care from one of the primary care clinics that were part of the HMO CERTS. The researchers used sample-based estimates to project the rate of dangerous coprescribing involving the four medications at a national level. ■

Medical Expenditure Panel Survey

Studies highlight the value of the Medical Expenditure Panel Survey to inform trends in care costs, coverage, use, and access

The Medical Expenditure Panel Survey (MEPS) is an ongoing national survey of medical care costs, coverage, use, and access, which is sponsored by the Agency for Healthcare Research and Quality. The MEPS consists of a family of three interrelated surveys: the Household Component, the Medical Provider Component, and the Insurance Component. The MEPS provides annual national estimates of health care use, medical expenditures, sources of payment, and insurance coverage for the U.S. civilian noninstitutionalized population. It also provides estimates of health status, demographic characteristics, employment, and access to health care. Estimates can be made available for individuals, families, and various subgroups.

MEPS data can also be used to study factors that determine the use of medical care services and expenditures; changes in the provision of health care in relation to social and demographic factors such as employment or income; the health status and satisfaction with healthcare of individuals and families; and the health needs of

specific population groups such as the elderly and children. A special May 2006 issue of *Medical Care* 44(5 Suppl.) features nine original articles that demonstrate the utility of MEPS to inform trends in medical care costs, coverage, use, and access. Following are brief summaries of the introduction and nine articles that appear in the issue:

Cohen, S.B., and Buchmueller, T. “Trends in medical care costs, coverage, use, and access: Research findings from the Medical Expenditure Panel Survey,” pp. 1-3.

This introduction summarizes the nine articles in the journal issue. The first set of articles illustrates the capacity of the MEPS to address important policy issues related to the availability and take-up of employment-related health insurance coverage. The next set of articles demonstrates the unique features of MEPS for studying the behavior and characteristics of individuals who experience high medical costs. The final article in this special issue evaluates the reliability of self-

reports of recovery from disability in the MEPS Household Component. All of the articles illustrate recent research efforts using MEPS data to aid development, implementation, and evaluation of policies and practices addressing health care and health behaviors. They also represent AHRQ’s emphasis on research initiatives that yield findings that can be translated into practice to improve the quality, safety, efficiency, and effectiveness of health care.

Cooper, P.F., Simon, K.I., and Vistnes, J. “A closer look at the managed care backlash,” pp. 4-11.

Much has been written about the consumer backlash against managed care, but limited empirical evidence is available. These investigators analyzed data from the MEPS Insurance Component (MEPS-IC) to understand trends in enrollment in health maintenance organizations (HMOs) between 1997 and 2003. Consistent with anecdotal evidence and previous studies, the

continued on page 14

MEPS studies

continued from page 13

researchers documented a decline in HMO enrollment since 1996. HMO enrollment rates fell from about 32 percent to 26 percent between 1997 and 2003, with most of the decline occurring after 2001. This overall trend, however, masked interesting differences by firm size. MEPS-IC data revealed a decline in the HMO enrollment rate for large employers starting in 1998, which was driven by employees shifting to preferred provider organization coverage. However, this was offset by an increase in the HMO enrollment rate by employees of small firms. Nevertheless, when workers were given a choice between an HMO and other plan types, they increasingly opted for the non-HMO plan.

Bernard, D.M., and Selden, T.M. "Workers who decline employment-related health insurance," pp. 12-18.

Families of workers who decline employment-related health care coverage represent a substantial share of the uninsured and publicly insured population in the United States. The authors of the paper used MEPS data from 2001 to 2002 to focus on these families. They found that a majority of children from low-income families whose parents declined insurance obtained coverage through public programs. However, nearly all adults who declined employer-sponsored coverage were uninsured. The differences in availability of public insurance had important implications for access to care. Decliners who took up public insurance were as likely as individuals with employer-sponsored insurance and significantly more likely than uninsured decliners to report a

usual source of care and at least one doctor visit during the year. Families turning down employer-sponsored coverage were more likely to face higher medical expenditure burdens as a percentage of income and to have financial barriers to care. They also tended to rely heavily on the safety net of public coverage and uncompensated care.

Selden, T.M., and Hudson, J.L. "Access to care and utilization among children: Estimating the effects of public and private coverage," pp. 19-26.

Despite concerns that conventional estimates overstate the impact of insurance coverage on care access and use, this study of children suggests that the reverse may be true. The magnitude of the impact of coverage on children's care access and use underscores the importance of reducing uninsurance among children, note the researchers. They pooled MEPS data from 1996 to 2002 to estimate the impact of insurance coverage on children's access to and use of care. They found, as previous studies have found, that public and private coverage were both associated with large increases in care access and use. The large differences between public and private coverage were reduced (and often reversed) when they controlled for other characteristics of children and their families. The effect of coverage on care access and use was substantially greater using instrumental variables estimates compared to conventional estimates across a wide range of access and use measures.

Banthin, J.S., and Miller, G.E. "Trends in prescription drug expenditures by Medicaid enrollees," pp. 27-35.

The double-digit growth in Federal spending on prescription medications has consumed an increasingly large portion of Medicaid budgets. This study used MEPS data to identify trends between 1996 and 1997 and 2001 and 2002 in Medicaid drug use and expenditures. The researchers examined specific therapeutic drug classes and subclasses to identify the fastest growing categories of drugs. They found evidence of the rapid take-up of new drugs as well as rapid growth in expenditures for antidepressants, antipsychotics, antihyperlipidemics, antidiabetic agents, antihistamines, COX-2 inhibitors, and proton pump inhibitors. In some cases, these increases were the result of higher expenditures per user and in others cases, the result of an increase in the number of people using the medications. Medicaid programs may want to reassess their cost-containment policies in light of the rapid take-up of new drugs, suggest the researchers.

Miller, G.E., and Hudson, J. "Children and antibiotics: Analysis of reduced use," pp. 36-44.

This study used MEPS data to examine trends in antibiotic use among children from 1996 to 2001, a period that followed the launch of national campaigns to promote the appropriate use of antibiotics. It also examined how changes in ambulatory visits and prescribing contributed to these trends. From 1996 to 2002, children's use of antibiotics sharply declined by 8.5 percent overall and 5.1 percent for respiratory tract infections. The apparent response to campaigns to reduce inappropriate antibiotic use was widespread, as reductions in use were found in all subgroups of children examined. However, the decline in overall antibiotic use for

continued on page 15

MEPS studies

continued from page 14

white children was more than double the decline for black or Hispanic children.

Cohen, S.B., Ezzati-Rice, T., and Yu, W. "The utility of extended longitudinal profiles in predicting future health care expenditures," pp. 45-53.

A small proportion of the U.S. population accounted for a large share of the \$810.7 billion in estimated U.S. health care expenses in 2002. This study used MEPS longitudinal data to examine the capacity of alternative models to predict the likelihood of an individual incurring high levels of medical expenditures in a subsequent year. A predictive model that only included medical expenditures from the prior year performed quite well. This model correctly classified half of the 2000-2001 MEPS panel in the top decile of health care expenditures in 2001. Another model that covered health care expenditures for 2 years prior to the target year revealed only marginal gains at best in predictive capacity.

Fleishman, J.A., Cohen, J.W., Manning, W.G., and Kosinski, M. "Using the SF-12 health status measure to improve predictions of medical expenditures," pp. 54-63.

Self-reported health status is useful in predicting future medical expenditures, conclude the authors of this study. The researchers used data from the 2000-2001 MEPS panel, which included the SF-12 Health Survey of physical and emotional functioning. Over 5,000

people completed the SF-12 health status questionnaire and were interviewed about their demographic characteristics and selected chronic conditions. The researchers also examined data on medical expenses incurred subsequent to the interview. Adding data on self-reported health from the SF-12 improved the prediction of medical expenditures. In a model including demographic characteristics, chronic medical conditions, and previous expenditures, adding the SF-12 considerably increased the ability of the model to predict future medical expenditures.

Kirby, J.B., Taliaferro, G., and Zuvekas, S.H. "Explaining racial and ethnic disparities in health care," pp. 64-72.

This article demonstrates the capacity of the MEPS to help explain racial and ethnic disparities in health care. The researchers linked data from the 2000 and 2001 MEPS to detailed neighborhood characteristics from the Census Bureau and local provider supply data from the Health Services Resource Administration. They found that insurance status and socioeconomic differences explained a significant portion of racial and ethnic disparities in health care. Also, neighborhood racial and ethnic composition accounted for a large portion of disparities in care access (use of ambulatory care during the year). The study also found substantial variation in the level of disparities among different groups of Hispanics. What's more, language differences helped explain observed

disparities in the access measures used in the study.

Hill, S.C., and Pylypchuk, Y. "Reports of fewer activity limitations: Recovery, survey fatigue, or switching respondent?," pp. 73-81.

Researchers can be confident in reports of recovery from activity limitations in the MEPS, especially when disability status is self-reported, conclude the authors of this study. They assessed the reliability of reported recovery from activity limitations elicited from two types of questions using the second panel of MEPS. The questions asked about limitations in activities of daily living (ADLs) such as dressing and feeding oneself, and instrumental activities of daily living (IADLs), such as shopping and doing housework. Within an interview, they found substantial reliability for both ADLs and IADLs. Individuals with more severe disabilities were less likely to report functional recovery, which is consistent with accurate reporting. Controlling for disability severity, type of respondent (self- and proxy-response) affected reported recovery.

Editor's Note: A limited number of single copies of *Medical Care* 44(5 Suppl.) are available from AHRQ (AHRQ Publication No. OM-06-0074).* ■

Outcomes/Effectiveness Research

Modifying unhealthy habits in middle age may reduce the likelihood of nursing home admissions later in life

Middle-aged adults who make lifestyle changes such as quitting smoking, boosting activity levels, and controlling their hypertension may reduce their future risk of nursing home admission. Researchers tracked a nationally representative sample of middle-aged (45 to 64 years at baseline) and elderly people (65 to 74 years at baseline) surveyed in the National Health and Nutrition Examination Survey between 1971 and 1975 and tracked in the Epidemiologic Follow-up Study until 1992. Over the 20-year followup period, 6.5 percent of middle-aged and nearly 25 percent of elderly respondents had one or more nursing home admissions. Researchers examined which lifestyle-related risk factors identified by major national disease prevention guidelines (smoking, inactivity, obesity, elevated blood pressure, elevated total cholesterol level, and diabetes mellitus) were linked to later nursing home admissions.

All of these lifestyle-related factors, except total cholesterol level, were associated with higher risk of later nursing home admission in one or both age groups. However, the risk was higher in middle-aged than elderly people. In those age 45 to 64 years at

baseline, diabetes more than tripled the risk of nursing home admission. Smoking, inactivity, and elevated systolic blood pressure increased the risk by 56, 40, and 35 percent, respectively.

Obesity was a risk factor for those age 65 to 74 years at baseline, but was not statistically significant for middle-aged adults. People with two lifestyle-related factors were at greatly increased risk, especially if one was diabetes. Given the prevalence of these risk factors among the middle-aged population, simple lifestyle changes could dramatically reduce nursing home admissions. For example, more than half of middle-aged respondents were inactive; more than 40 percent had high blood pressure; and 38 percent were smokers. The study was supported in part by the Agency for Healthcare Research and Quality (HS11477).

More details are in "Lifestyle-related risk factors and risk of future nursing home admission," by Elmira Valiyeva, Ph.D., Louise B. Russell, Ph.D., Jane E. Miller, Ph.D., and Monika M. Safford, M.D., in the May 8, 2006 *Archives of Internal Medicine* 166, pp. 985-990. ■

Primary Care Research

Only half of older people with diabetes receive ACE inhibitors or angiotensin receptor blockers to prevent cardiac problems

Angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) reduce the likelihood that older people with diabetes will suffer from cardiovascular events such as stroke and heart attack, as well as kidney failure, yet only about half of these patients receive them. In addition, some key cardiovascular risk factors which would warrant the use of ACE inhibitors and ARBs are being missed, according to a national survey supported by

the Agency for Healthcare Research and Quality (T32 HS00020).

Allison B. Rosen, M.D., M.P.H., Sc.D., of the University of Michigan Health Systems, studied 742 people with diabetes who were 55 years and older and completed the nationally representative National Health and Nutrition Examination Survey each year from 1999 to 2002. She examined the prevalence of guideline indications for use of ACE inhibitors and ARBs. These

included albuminuria (excess protein in the urine, indicative of kidney disease); cardiovascular disease (ranging from heart failure to angina, heart attack, stroke, and coronary artery disease); hypertension; and other cardiac risk factors (high cholesterol and smoking).

Overall, 92 percent of those surveyed had guideline indications for these medications. When additional cardiac risk factors were considered, the entire group of

continued on page 17

ACE inhibitors

continued from page 16

people with diabetes had indications for ACE inhibitors or ARBs; yet only 43 percent received them. Hypertension was associated with higher rates of use, while

albuminuria and preexisting cardiovascular disease were not. Dr. Rosen suggests expanding indications for ACE inhibitors or ARBs to include all older individuals with diabetes regardless of their risk factors.

More details are in “Indications for and utilization of ACE inhibitors in older individuals with diabetes,” by Dr. Rosen, in the April 2006 *Journal of General Internal Medicine* 21, pp. 315-319. ■

Primary care physicians often prescribe antiviral medications inappropriately or fail to prescribe them when needed

Influenza is responsible for up to 226,000 excess hospitalizations and 36,000 deaths each year in the United States. Flu shots can reduce influenza infections, but vaccination rates remain low. Influenza-specific antiviral medications reduce flu-related symptoms, hospitalizations, and deaths, but are rarely used. For example, a new study, supported by the Agency for Healthcare Research and Quality (HS14420 and HS14563), found that primary care physicians prescribed antiviral medications to only 15 percent of patients diagnosed with influenza. In addition, 30 percent of antiviral prescriptions were inappropriate and 24 percent of patients who met the criteria for antiviral medications did not receive them.

Researchers retrospectively analyzed visits by adults to nine primary care clinics during influenza seasons from October 1, 2000 to May 31, 2004, with a claims diagnosis of influenza (535 people) or with an electronic antiviral prescription (25 people). They defined appropriate antiviral prescribing as the patient having flu symptoms for 2 or fewer days, fever, and any two of the following: headache, sore throat, cough, or myalgias (muscle pain).

The clinical factors associated with antiviral prescribing were not surprising, such as shorter

symptom duration (2 vs. 3 days), higher temperatures (37.8 vs. 36.9 degrees C), more myalgias, and more influenza testing. For example, doctors prescribed antiviral medications more often to patients who had myalgias (37 percent) compared with those who did not (18 percent). Doctors also prescribed antiviral medication more often to patients who received an influenza test (67 percent) compared with patients who did not (28 percent).

Non-clinical factors such as race and ethnicity also influenced prescribing. Doctors prescribed antiviral medications more often to blacks (44 percent) and patients of other races or ethnicities (67 percent) than to whites (20 percent) or Hispanics (20 percent). Physicians prescribed amantadine in 10 visits, rimantadine in 9 visits, oseltamivir in 21 visits, and zanamivir in none of the visits.

More details are in “Appropriateness of antiviral prescribing for influenza in primary care: A retrospective analysis,” by Jeffrey A. Linder, M.D., M.P.H., Joseph C. Chan, B.S., and David W. Bates, M.D., M.Sc., in the June 2006 *Journal of Clinical Pharmacy and Therapeutics* 31, pp. 245-252. ■

Acute Care/Hospitalization

Older veterans need to become more actively involved in hospital discharge planning for their post-hospital needs

Hospital discharge planning is important to help patients and their loved ones prepare for life after hospitalization. Veterans, like other patients, are being discharged from the hospital earlier than before, and have more post-discharge health needs. Yet,

according to a new study, few older veterans are prepared to handle health changes and care needs following hospital discharge. Only a handful of veterans tried to become more involved in discharge planning activities for themselves

or their loved ones during their hospital stays.

Few veterans linked their post-discharge outcomes to the hospital discharge planning process. Yet, hospital discharge personnel can advise older veterans about what to

continued on page 18

Hospital discharge planning

continued from page 17

expect in health changes after a serious hospitalization. They can also advise them when to seek care, suggests Michigan State University researcher, William D. Corser, Ph.D., R.N., C.N.A.A. His study was supported by the Agency for Healthcare Research and Quality (HS10792). He interviewed 165 predominantly white older veterans

(age 59-89 years) by telephone about their outcome experiences after discharge from an urban Veterans Administration hospital.

Few of the veterans mentioned actively working to address their new health needs or felt equipped to work through the system to do so. Many expressed concern about access to treatment, lack of follow-up, scheduling hassles, communication with health care professionals, or other billing and/or transportation problems.

They also talked about personal adjustments in self-care and their uncertainty about whether or how to contact health care professionals for new needs. These needs ranged from falls, new symptoms, and worsened condition to new equipment needs.

See "The perceptions of older veterans concerning their postdischarge outcome experiences," by Dr. Corser, in the May 2006 *Applied Nursing Research* 19, pp. 63-69. ■

Studies examine use of computed tomography and risk of rupture in acute appendicitis

Computed tomography (CT) scans are being increasingly used to diagnose patients with suspected acute appendicitis. While use of CT scans does not harm patients with acute appendicitis, one study found that it does not translate to better overall outcomes and can delay surgery. A second study found that the risk of rupture in acute appendicitis, which can lead to serious infection or death, rises from 0 percent at 12 hours of untreated symptoms to 5 percent after 36 hours of untreated symptoms. Both studies were supported by the Agency for Healthcare Research and Quality (HS09698) and are summarized here.

Menes, T.S., Aufses, A., Rojas M., and Bickell, N.A. (2006, April). "Increased use of computed tomography does not harm patients with acute appendicitis." *The American Surgeon* 72, pp. 326-329.

These investigators examined the use of CT, delay in time to surgery as a result of CT use, and rupture rates in patients with appendicitis who underwent

surgery in two periods: Phase 1, 1996 through 1998 (prior to common use of CT in these patients) and Phase 2, 2001 through 2002. CT was performed in 18 percent of the Phase 1 group compared with 62 percent in the Phase 2 group.

In the Phase 1 group, patients undergoing CT had a large delay to surgery compared with those without CT (18.6 hours vs. 7 hours). In the Phase 2 group, time to surgery was reduced to a median of 12 hours with CT, but still took twice as long (6 hours without CT). CT was also more accurate in the latter group with fewer false-negative and equivocal studies.

Overall, 35 percent of patients in Phase 1 who underwent a CT scan had a perforated appendix compared with 12 percent of non-CT patients. In Phase 2, 23 percent of patients who had CT scans had a ruptured appendix compared with 19 percent of non-CT patients. Over time with increased experience and efficiency, use of CT scans was not associated with increased time to surgery or higher rupture rates. Yet, the small percentage of patients with false-negative scans (that incorrectly

showed no appendicitis) continued to experience longer time to surgery and higher rates of rupture. The researchers concluded that CT did not harm but did not translate to better overall outcomes for patients with acute appendicitis.

Bickell, N.A., Aufses Jr., A.H., Rojas, M., and Bodian, C. (2006, March). "Time and risk of rupture in appendicitis." *Journal of the American College of Surgeons* 202, pp. 401-406.

In 2000, 13 percent of patients hospitalized with acute appendicitis suffered a ruptured appendix. A ruptured appendix puts patients at risk for peritonitis (infection of the lining of the stomach and pelvis), sepsis (bloodstream infection), and death. Researchers conducted a retrospective chart review of 219 patients with appendicitis and found that rupture risk was 2 percent or less in patients with less than 36 hours of untreated symptoms prior to surgery. For patients with untreated symptoms beyond 36 hours, the risk of rupture rose to and remained steady at 5 percent for each

continued on page 19

Computed tomography scans

continued from page 18

ensuing 12-hour period. Risk of rupture was greater in patients with 36 hours or more of untreated symptoms, who were 65 years or older, who had a fever over 38.9 degrees C, or who had tachycardia (a heart rate of 100 beats or more per minute).

The time between first physician examination and treatment was shorter among patients who arrived at the emergency department

compared with patients who first saw a physician outside the hospital (a median of 7.1 vs. 10.9 hours). Patients for whom a physician's leading diagnostic impression was appendicitis had shorter times to operation compared with patients with an uncertain diagnosis (6.3 vs. 11.3 hours). Patients sent for a CT scan waited longer for surgery compared with patients who did not receive a CT scan (18.6 vs. 7.1 hours). Over half of patients (57 percent) did not arrive at the hospital until they experienced

symptoms for at least 24 hours, and 42 percent did not undergo an operation within the first 48 hours of their symptoms. The rupture rate was 16 percent, similar to other hospital-based reports. The researchers conclude that increasing time between symptom onset and treatment may boost a patient's risk of rupture and recommend that physicians be cautious about delaying surgery beyond 36 hours from symptom onset in patients with acute appendicitis. ■

Agency News and Notes

U.S. hospitals treat many uninsured victims of car crashes, violence, and other injuries

Hospital stays for the uninsured are more likely to be for treatment of injuries compared with the stays of privately insured patients, according to a new report from the Healthcare Cost and Utilization Project (HCUP) of the Agency for Healthcare Research and Quality (AHRQ). The report also found that:

- Injuries accounted for 11.3 percent of the 1.7 million uninsured hospital admissions in 2003—roughly 192,000 cases. This rate was almost 3 times the rate for privately insured patients.
- Mental health and mood disorders accounted for nearly 11 percent of uninsured hospital stays. In fact, mood disorders, such as depression and bipolar disorder, as well as alcohol abuse and substance abuse ranked among the top 10 reasons for hospitalizing the uninsured.
- Asthma and diabetes—chronic conditions that can be controlled with good quality primary care—

also ranked high among uninsured hospital patients.

- Only childbirth surpassed all these conditions as the leading reason for admitting uninsured patients to hospitals. Roughly one in five uninsured hospital stays were for women giving birth.

These and other statistics are presented in *Conditions Related to Uninsured Hospitalizations, 2003, HCUP Statistical Brief No. 8*, available at www.hcup-us.ahrq.gov/reports/statbriefs.jsp. The report uses statistics from HCUP's Nationwide Inpatient Sample, a database of hospital inpatient stays that is nationally representative of 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. ■

Job-related health insurance premiums vary widely between States

Health insurance premium costs for job-related family coverage varied by as much as \$4,000 a year between the most expensive and least expensive State in 2004, according to new data from the Agency's Medical Expenditure Panel Survey (MEPS).

The most expensive average cost for family coverage — \$11,742 — was in the District of Columbia and the least — \$7,800 — was in North Dakota. The national average cost

for family coverage was \$10,006. Health insurance premiums can be paid totally by the employer or by the employee, or the cost can be shared by both parties. Family policies cover employees and eligible family members.

The four other most expensive states for family coverage were New Jersey (\$11,425), New Hampshire (\$11,156), Connecticut (\$11,035), and Maine (\$10,823).

The four other least expensive states for family coverage were Arkansas (\$8,383), Hawaii (\$8,580), Utah (\$8,654), and Idaho (\$8,908).

For more information, see *State Differences in the Cost of Job-Related Health Insurance, 2004, MEPS Statistical Brief #135* and the MEPS Insurance Component Tables on the MEPS Web site at www.meps.ahrq.gov/. ■

Announcements

A new AHRQ report examines how U.S. health care expenses are distributed

A new *Research In Action* publication focuses on the patterns of spending on health care throughout the United States. Health care spending is distributed unevenly across individuals, different segments of the population, specific diseases, and payers. For example, analysis of health care spending shows that the 5 percent of the population who spent the most on health care accounted for 49 percent of total health care expenses in 2002. The 50 percent of the population with the lowest expenses accounted for only 3 percent of overall spending. Further detailed analyses of these spending patterns,

how they change over time, and how they affect different payers such as Medicare, Medicaid, private insurers, employers, and consumers convey important information on how to best target efforts to contain rapidly rising health care costs. Much of the information included in this report comes from AHRQ's Medical Expenditure Panel Survey. For more information, see *The High Concentration of U.S. Health Care Expenditures* at <http://www.ahrq.gov/research/ria19/expendria.htm>. Printed copies are also available directly from AHRQ (AHRQ Publication No. 06-0060).* ■

Research Briefs

Barkin, S.L., Scheindlin, B., Brown, C., and others. (2005, November-December). "Anticipatory guidance topics: Are more better?" (AHRQ grant HS10913). *Ambulatory Pediatrics* 5(6), pp. 372-376.

According to this study, pediatricians may need to limit the total number of topics discussed in

a single visit so as not to overload parents with information. Researchers examined anticipatory guidance discussions between physicians of 26 practices and 861 parents of children age 2 to 11 years who were seen for a well-child visit. Immediately after the visit, parents and providers completed surveys to record what

anticipatory guidance topics were discussed. The parents were asked by telephone 1 month later what they recalled discussing during the well-child visit.

Providers reported discussing the topics of nutrition, use of car restraints, dental care, and reading

continued on page 21

Research briefs

continued from page 20

aloud to children most often (72 to 93 percent). They discussed regular exercise, firearms, and media use at least half of the time. About 20 percent of providers discussed four or fewer topics, 53 percent addressed between five and eight topics, and 29 percent discussed nine or more topics. Parents agreed with providers 72 to 90 percent of the time on topics discussed during the visit. However, parental recall decreased significantly when nine or more topics were discussed. The same trend existed 1 month later.

Freed, J.R., Marcus, M., Freed, B.A., and others (2005, October). "Oral health findings for HIV-infected adult medical patients from the HIV cost and services utilization study." (AHRQ Grant HS08578). *Journal of the American Dental Association* 136, pp. 1396-1405.

A new study from the HIV Cost and Services Utilization Study (HCSUS), found that most adult patients with HIV rated their oral health as at least "good," but 12 percent rated it as "poor." Dry mouth, often caused by HIV-related conditions and medications, was the most commonly reported symptom (37 percent of patients). Two-thirds (65 percent) of those who were receiving medical care at the time of the study reported having a usual source of dental care. About half (52 percent) had dental insurance; 29 percent had dental coverage under Medicaid; and 23 percent had coverage from private insurance. About 18 percent of patients with HIV had not revealed their HIV status to the dentist they usually saw. More than 60 percent of those with HIV had visited a dentist in the preceding 12 months. However, 13 percent had not visited a dentist in 2 to 5 years,

and 9 percent had not seen a dentist in more than 5 years.

One-fourth of patients with HIV said they needed dental care, but had not received it. The majority were satisfied with the dental care they received. Although 84 percent felt they could trust their own dentists to keep their HIV status confidential, 8 percent did not trust their dentist to do so and 8 percent were unsure.

Lambert, B.L., Lin, S-J., and Tan, H.K. (2005). "Designing safe drug names." (AHRQ grant HS11609). *Drug Safety* 28(6), pp. 495-512.

Confusion among drug names that look and sound alike contributes to medication errors in community pharmacies. The authors of this paper outline a systematic approach to the design of safe drug names that will not be confused with existing names. They identify and define the most important constraints (both technical and legal/regulatory) and objectives (such as meaning, memorability, and pronounceability) that a drug name must satisfy. They also critique methods for evaluating a given name with respect to each safety objective and constraint.

Marcus, M., Yamamoto, J.M., Der-Martirosian, C., and others. (2005, October). "National estimates of out-of-pocket dental costs for HIV-infected users of medical care." (AHRQ Grant HS08578). *Journal of the American Dental Association* 136, pp. 1406-1414.

A new study from the HIV Cost and Services Utilization Study (HCSUS), found that the out-of-pocket costs for U.S. dental care in 1996 were \$157 per person at the poverty level and \$229 for people with higher incomes. Patients with HIV averaged \$152 in out-of-

pocket costs for dental care in 1996, with 135,000 patients spending a total of \$20.5 million on dental care. White patients with HIV spent an average of \$220, Hispanics \$101, and blacks \$55. Those who received dental care from private dentists spent \$232 compared with \$7 spent by those who received care in AIDS clinics.

Patients with HIV who had private dental insurance spent \$213 annually, while those without insurance and not eligible for Medicaid spent \$246. People living in States with adult Medicaid dental benefits spent an average of \$47 out of pocket compared to \$84 spent by those living in States without such benefits.

McNamara, P. (2006, February). "Foreword: Payment matters? The next chapter." *Medical Care Research and Review* 63(1S), pp. 5S-10S.

The Agency for Healthcare Research and Quality joined with the journal *Medical Care Research and Review* and a team of guest editors in an experiment to expedite the transfer of research on quality-based payment to public and private purchasers. The effort involved aggressive, systematic outreach to research teams across the country in an attempt to identify early findings, some based on partial data, appropriate for peer review and translation. This paper is the foreword to the journal supplement featuring the findings contributed by five research teams. The supplement also includes commentaries from employers, providers, and policy makers. The commentators were asked to interpret the new findings from their particular perspective and, more broadly, share their views on the advantages and disadvantages of this particular research-to-practice experiment of identifying,

continued on page 22

Research briefs

continued from page 21

distilling, and packaging early findings. Reprints (AHRQ Publication No. 06-R050) are available from AHRQ.*

McNamara, P. (2006, June). “Purchaser strategies to influence quality of care: From rhetoric to global applications.” *Quality and Safety in Health Care* 15, pp. 171-173.

The global purchaser community knows little about the quality of health goods and services it buys. However, this is slowly starting to change. This paper describes and gives examples of three types of purchasers’ strategies to influence the quality and safety of care. These include selective contracting based on quality, payment differentials based on quality, and sponsorship of comparative provider report cards. The ultimate goal of the authors is to encourage thoughtful discussion about whether or not one or more purchaser strategies might support a particular country’s goals to improve care. They include experiences from both developed and developing countries to provide a broad perspective and facilitate the discussion. Reprints (AHRQ Publication No. 06-R051) are available from AHRQ.*

Rogers, G., Alper, E., Brunelle, D., and others. (2006, January). “Reconciling medications at admission: Safe practice recommendations and implementation strategies.” (AHRQ Grant HS11928). *Journal on Quality and Patient Safety* 32(1), pp. 37-50.

This article describes how several groups in the State of Massachusetts adopted a set of safe practices for reconciling

medications during hospital admission. Reconciling medication is a formal process for creating a complete and accurate list of all pre-admission medications for each patient and comparing the physician’s admission, transfer, and/or discharge medication orders against that list. Medication discrepancies are brought to the attention of the physician and, if appropriate, changes are made to the orders and are documented.

The reconciling process was tested at 50 Massachusetts acute care hospitals. The 20 hospitals submitting baseline data had an average of 59 percent of medications unreconciled prior to implementing this safe practice recommendation. About 20 percent of the hospitals demonstrated success in spreading the practice throughout most of their organization within the 18-month time period, and 64 percent reported on the survey that they had a standardized reconciling form in use. Three hospitals that consistently followed the protocol averaged an 85 percent reduction in unreconciled medications over a 10-month period.

Sexton, J.B., Helmreich, R.L., Neilands, T.B., and others. (2006). “The safety attitudes questionnaire: Psychometric properties, benchmarking data, and emerging research.” (AHRQ grant HS11544). *BMC Health Services Research* 6. (www.biomedcentral.com/1472-6963/6/44)

The authors of this study analyzed the reliability of the Texas Safety Attitudes Questionnaire (SAQ) to assess providers’ perceptions of six patient safety-related areas. These included teamwork climate, safety climate, perceptions of management, job satisfaction, working

conditions, and stress recognition. The researchers analyzed questionnaire responses by 10,843 health care providers from 3 countries in numerous clinical areas (including critical care units, operating rooms, inpatient setting, and ambulatory clinics). The SAQ demonstrated good psychometric properties. The researchers conclude that health care organizations can use the survey to measure caregiver attitudes about certain patient safety-related domains. They can also use the SAQ to compare themselves with other organizations, to prompt interventions to improve safety attitudes, and to measure the effectiveness of these interventions.

Singh, H., Petersen, L.A., and Thomas, E.J. (2006, June). “Understanding diagnostic errors in medicine: A lesson from aviation.” (AHRQ grant HS11544). *Quality and Safety in Health Care* 15, pp. 159-164.

Diagnostic errors in medicine are common, harmful to patients, and costly. Preliminary research suggests that diagnostic errors have both cognitive and systems origins. Situational awareness, a model that is primarily used in aviation human factors research, can encompass both the cognitive and the systems roots of such errors, assert the authors of this paper. They illustrate the applicability of this model through analysis of a patient whose diagnosis of spinal cord compression was substantially delayed. They suggest that it is possible that use of such a model in medicine could help reduce errors in diagnosis and lead to significant improvements in patient care. They suggest more research, including the measurement of situational awareness and correlation with health outcomes.

continued on page 23

Research briefs

continued from page 22

Thomas, E.J., Sexton, J.B., Lasky, R.E., and others. (2006, March). "Teamwork and quality during neonatal care in the delivery room." (AHRQ Grant HS11164). *Journal of Perinatology* 26, pp. 163-169.

The authors of this article indicate that certain teamwork behaviors (communication, management, and leadership) correlate with the quality of neonatal resuscitation in the delivery room. Although these

correlations do not confirm a causal relationship, the teamwork behaviors may be used to train providers on how to prevent and manage neonatal resuscitation errors.

Researchers used independent observers to view recorded videos during the resuscitation of infants born by cesarean section and measure 10 teamwork behaviors and compliance with Neonatal Resuscitation Program (NRP) guidelines. All 132 clinical teams exhibited the behaviors of information sharing and inquiry

and all but 1 team demonstrated vigilance and workload management. Factor analysis identified communication (information sharing and inquiry), management (workload management and vigilance), and leadership (assertion of opinion, sharing of intentions, assigning of tasks) as weakly but significantly correlated with independent assessments of NRP compliance and an overall rating of quality of neonatal resuscitation care. ■

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