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3. The Journal of Permanente Medicine, Inc. (JPM)

1. Clinical Review Article

Title: Determinants of Adherence to Behavior Change Interventions

Authors: William Wright, MD; Sherwin Mosco, MD, MPH; Joel Jaffe, MD; Jane H. C. Hew, MD; Constance Capeless, PA;ホール J. Kreitler, MD

This article discusses the determinants of adherence to behavior change interventions and provides evidence-based strategies to improve patient adherence.

2. Evidence-Based Medicine

Title: The Role of Nutrition in the Prevention and Treatment of Type 2 Diabetes

Authors: Victoria Graham, MD; Alan Halle, MD; Ann Hellerstein, MD; Joseph MacKenzie, PA; John Chen, MD; Anita Dekker, MD; Hobie Taylor, MD, MPH; Elizabeth Miller, PhD

This article reviews the evidence-based strategies for the prevention and management of type 2 diabetes through nutrition interventions.

3. Original Research Article

Title: The Impact of Patient Education on Medication Adherence

Authors: Vittorio Crotti, MD; Julianne Bouvier, MD; Jeffrey Smith, MD; Robert Sheikh, MD; Faisal Khan, MD

This study evaluates the impact of patient education programs on medication adherence and identifies effective strategies for improving adherence.

4. Editorial

Title: The Importance of Integrating Technology in Patient Care

Author: William Wright, MD

This editorial highlights the significance of incorporating technology in patient care to enhance outcomes and patient satisfaction.

5. Guest Editorial

Title: Reflections on the Future of Health Care Delivery

Author: Joel Jaffe, MD

This guest editorial reflects on the evolving landscape of health care delivery and the challenges and opportunities for the future.

6. Book Review

Title: The Art and Science of Medicine

Author: Vittorio Crotti, MD

This book review offers insights into the art and science of medicine, emphasizing the need for a holistic and evidence-based approach.

7. Letter to the Editor

Title: Comments on the Need for Integrated Care Systems

Author: Julianne Bouvier, MD

This letter responds to the need for integrated care systems and advocates for a comprehensive approach to patient care.

8. Image of the Month

Title: The Healing Power of Art

Author: William Wright, MD

This image highlights the therapeutic benefits of art and its role in patient care.

9. News and Notes

Title: Updates on Recent Research and Developments

Author: Vittorio Crotti, MD

This section provides updates on recent research and developments in the field of medicine, including advancements in technology and patient care.

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Author: William Wright, MD

This calendar lists important conferences and meetings related to medicine, allowing readers to stay informed and plan their participation.

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Author: Vittorio Crotti, MD

This announcements section highlights upcoming events, workshops, and opportunities for professional development and networking.

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Title: Medical Crossword Challenge

Author: William Wright, MD

This crossword puzzle offers a fun and interactive way to test knowledge in various medical specialties.

13. Book Reviews

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Author: Vittorio Crotti, MD

This section provides reviews of recent books in the field of medicine, covering a range of topics and perspectives.


Title: Year-End Summary of Activities

Author: William Wright, MD

This annual report summarizes the activities, achievements, and developments of the past year, offering insights into the organization's growth and impact.

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Title: The Importance of Patient-Centered Care

Author: William Wright, MD

This editorial emphasizes the importance of patient-centered care in enhancing patient satisfaction and outcomes.

16. Letter to the Editor

Title: Comments on the Need for Collaboration

Author: Vittorio Crotti, MD

This letter advocates for increased collaboration among healthcare professionals to improve patient care.

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This editorial continues to emphasize the importance of patient-centered care in enhancing patient satisfaction and outcomes.
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Editorial Office: *The Permanente Journal* 500 NE Multnomah St, Suite 100, Portland, Oregon 97232 Phone: 503-813-4387; Fax: 503-813-2348 E-mail: permanente.journal@kp.org www.kp.org/permanentejournal

Distribution: If you have any questions regarding distribution of this journal, contact 503-813-2623 or e-mail: permanente.journal@kp.org.

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Dear Editor,

In the Fall 2005 issue Roundtable Discussion: Transfer of Successful Practices, in the section: On The Permanente Journal as a Connector, Arthur Huberman, MD, mentioned: “TPJ may be most useful as an adjunct to help connect people, to raise awareness of things that can be used. Some people just need to read something and then they go do it, some people need to talk to others, and some people need to go see it.” Tom Janisse, MD, responded, “Yes, and journal articles have also been used as support devices for transfer when they are used as data or evidence and added in reference lists.”

I can add a personal experience supporting this. In getting our psychiatrists to embrace group visits for patients getting stabilized on meds—not just “clinics,” which are corrals from which patients are picked off one at a time, but truly interactive groups in which patients help each other identify acute changes and successes while getting settled into one of our chronic care pathways—one of the decisive validators I used was the TPJ series on group medical visits, which brought not just evidence but prestige and authority into the recipe. (Thank you!) The other decisive factor was the promise of a clinician who does group work regularly as a coleader.

Betram Barth, LCSW
Kaiser Permanente
Sacramento Medical Center
Department of Psychiatry

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Myocardial damage from heavy alcohol intake can cause the heart failure (HF) syndrome, but the role of lighter alcohol intake to HF has rarely been studied. We examined the risk of HF hospitalization among 126,236 subjects who supplied data about alcohol during health examinations from 1978 to 1985. Among 2594 subjects who were subsequently hospitalized for HF, record review established an association between coronary artery disease (CAD) and HF (CAD-HF) in 1559 patients. Among the remaining 1035 subjects who had HF (non-CAD-HF), we attempted determination of predictor etiologic and contributory factors. Analyses used Cox models that were controlled for seven covariates, with usual alcohol intake studied categorically compared with that in subjects who did not drink alcohol. Heavier drinkers (≥3 drinks/day) but not light to moderate drinkers had increased risk of non-CAD-HF; eg, relative risk for subjects who reported ≥6 drinks/day was 1.7 (95% confidence interval 1.1 to 2.6). This association of non-CAD-HF with heavy drinking was limited to subsets with cardiomyopathy or of unclear preponderent etiology. Alcohol drinking was inversely related to risk of CAD-HF (eg, at 1 to 2 drinks/day, relative risk 0.6, 95% confidence interval 0.5 to 0.7), with consistency across subgroups of age, gender, ethnicity, education, smoking status, interval to diagnosis, and presence or absence of baseline heart disease or systemic hypertension. Moderate drinking was inversely related to non-CAD-HF only in subjects who had diabetes mellitus (n = 252). In conclusion, heavy, but not light, alcohol drinking is associated with increased risk of non-CAD-HF and that apparent protection by alcohol drinking against CAD-HF risk provides confirmation of a protective effect of alcohol against CAD.


BACKGROUND Lifestyle modification can forestall diabetes in high-risk people, but the long-term cost-effectiveness is uncertain.

OBJECTIVE To estimate the effects of the lifestyle modification program used in the Diabetes Prevention Program (DPP) on health and economic outcomes.

DESIGN Cost-effectiveness analysis using the Archimedes model.

DATA SOURCES Published basic and epidemiologic studies, clinical trials, and Kaiser Permanente administrative data.

TARGETPOPULATION Adults at high risk for diabetes (body mass index >24 kg/m², fasting plasma glucose level of 5.2725 to 6.9375 mmol/L [95 to 125 mg/dL], two-hour glucose tolerance test result of 7.77 to 11.0445 mmol/L [140 to 199 mg/dL]).

TIMEHORIZON 5 to 30 years.

PERSPECTIVE Patient, health plan, and societal.

INTERVENTIONS No prevention, DPP’s lifestyle modification program, lifestyle modification begun after a person develops diabetes, and metformin.

MEASUREMENTS Diagnosis and complications of diabetes.

RESULTS OF BASE-CASE ANALYSIS: Compared with no prevention program, the DPP lifestyle program would reduce a high-risk person’s 30-year chances of getting diabetes from about 72% to 61%, the chances of a serious complication from about 38% to 30%, and the chances of dying of a complication of diabetes from about 13.5% to 11.2%. Metformin would deliver about one third of the long-term health benefits achievable by immediate lifestyle modification. Compared with not implementing any prevention program, the expected 30-year cost/quality-adjusted life-year (QALY) of the DPP lifestyle intervention from the health plan’s perspective would be about 143,000 dollars. From a societal perspective, the cost/QALY of the lifestyle intervention compared with doing nothing would be about 62,600 dollars. Either using metformin or delaying
the lifestyle intervention until after a person develops diabetes would be more cost-effective, costing about $35,400 or $24,500 per QALY gained, respectively, compared with no program. Compared with delaying the lifestyle program until after diabetes is diagnosed, the marginal cost-effectiveness of beginning the DPP lifestyle program immediately would be about $201,800.

**RESULTS OF SENSITIVITY ANALYSIS:** Variability and uncertainty deriving from the structure of the model were tested by comparing the model's results with the results of real clinical trials of diabetes and its complications. The most critical element of uncertainty is the effectiveness of the lifestyle program, as expressed by the 95% CI of the DPP study. The most important potentially controllable factor is the cost of the lifestyle program. Compared with no program, lifestyle modification for high-risk people can be made cost-saving over 30 years if the annual cost of the intervention can be reduced to about $100.

**LIMITATIONS** Results depend on the accuracy of the model.

**CONCLUSIONS** Lifestyle modification is likely to have important effects on the morbidity and mortality of diabetes and should be recommended to all high-risk people. The program used in the DPP study may be too expensive for health plans or a national program to implement. Less expensive methods are needed to achieve the degree of weight loss seen in the DPP.

**CLINICAL IMPLICATION:** Lifestyle modification with weight loss and exercise is important ways to reduce the risk of developing diabetes and its complications in high-risk people. They should be strongly encouraged. The particular lifestyle modification program implemented in the Diabetes Prevention Program was very expensive and is unlikely to be cost-effective in most settings. Less expensive ways to help people lose weight need to be found and implemented. –DE

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**From The Northwest**

**Higher medical care costs accompany impaired fasting glucose.**


**OBJECTIVE** The purpose of this study was to estimate medical costs associated with elevated fasting plasma glucose (FPG) and to determine whether costs differed for patients who met the 2003 (≥ 109 mg/dL) versus the 1997 (≥ 110 mg/dL) American Diabetes Association (ADA) cut point for impaired fasting glucose.

**RESEARCH DESIGN AND METHODS** We identified 28,335 patients with two or more FPG test results of at least 100 mg/dL between 1 January 1994 and 31 December 2003. Those with evidence of diabetes before the second test were excluded. We categorized patients into two stages of abnormal glucose (100-109 mg/dL and 110-125 mg/dL) and matched each of these subjects to a patient with a normal FPG test (<100 mg/dL) on age, sex, and year of FPG test. All subjects were followed until an FPG test qualified them for a higher stage, dispensing of an anti-hyperglycemic drug, health plan termination, or 31 December 2003.

**RESULTS** Adjusted annual costs were $4357 among patients with normal FPG, $4580 among stage 1 patients, and $4960 among stage 2 patients (p < 0.001, all comparisons). After removing patients with normal FPG tests whose condition progressed to a higher stage or diabetes, costs in the normal FPG stage were $3799. Patients in both stages 1 and 2 had more cardiovascular comorbidities than patients with normal FPG.

**CONCLUSIONS** Our results demonstrate that abnormal glucose metabolism is associated with higher medical care costs. Much of the excess cost was attributable to concurrent cardiovascular disease. The 2003 ADA cut point identifies a group of patients with greater costs and comorbidity than normoglycemic patients but with lower costs and less comorbidity than patients with FPG above the 1997 cut point.

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**From Colorado**

**Comparison of syndromic surveillance and a sentinel provider system in detecting an influenza outbreak—Denver, Colorado, 2003.**


**INTRODUCTION** Syndromic surveillance systems can be useful in detecting naturally occurring illness.

**OBJECTIVES** Syndromic surveillance performance was assessed to identify an early and severe influenza A outbreak in Denver in 2003.

**METHODS** During October 1, 2003-January 31, 2004, syndromic surveillance signals generated for detecting clusters of influenza-like illness (ILI) were compared with ILI activity identified through a sentinel provider system and with reports of laboratory-confirmed influenza. The syndromic surveillance and sentinel provider systems identified ILI activity based on ambulatory-care visits to Kaiser Permanente Colorado. The syndromic surveillance system counted a visit as ILI if the provider recorded any in a list of 30 respiratory diagnoses plus fever. The sentinel provider system required the provider to select “influenza” or “ILI.”

**RESULTS** Laboratory-confirmed influenza cases, syndromic surveillance ILI episodes,
and sentinel provider reports of patient visits for ILI all increased substantially during the week ending November 8, 2003. A greater absolute increase in syndromic surveillance episodes was observed than in sentinel provider reports, suggesting that sentinel clinicians failed to code certain cases of influenza. During the week ending December 6, when reports of laboratory-confirmed cases peaked, the number of sentinel provider reports exceeded the number of syndromic surveillance episodes, possibly because clinicians diagnosed influenza without documenting fever.

**CONCLUSION** Syndromic surveillance performed as well as the sentinel provider system, particularly when clinicians were advised to be alert to influenza, suggesting that syndromic surveillance can be useful for detecting clusters of respiratory illness in various settings.

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**From Northern California**

**Comparison of glyburide and insulin for the management of gestational diabetes in a large managed care organization.**


**OBJECTIVE** This study was undertaken to compare the use of glyburide with insulin for the treatment of gestational diabetes mellitus (GDM) unresponsive to diet therapy.

**STUDY DESIGN** A retrospective study was performed among women with singleton pregnancies who had GDM diagnosed, with fasting plasma glucose 140 mg/dL or less on glucose tolerance testing, between 12 and 34 weeks who failed diet therapy from 1999 to 2002. We identified 584 women and compared those treated with insulin between 1999 and 2000 with women treated with glyburide between 2001 and 2002. Maternal and neonatal outcomes and complications were assessed. Statistical methods included univariate analyses and multivariable logistic regression.

**RESULTS** In 1999 through 2000, 268 women had GDM diagnosed and were treated with insulin; in 2001 through 2002, 316 women had GDM diagnosed of which 236 (75%) received glyburide. The two groups were similar with regard to age, nulliparity, and historical GDM risk factors; however, women in the insulin group had a higher mean body mass index (31.9 vs 30.6 kg/m², p = .04), a greater proportion identified themselves as white (43%, 28%, p < .001) and fewer as Asian (24%, 37%, p = .001), and they had a significantly higher mean fasting on glucose tolerance test (105.4 vs 102.4 mg/dL, p = .005) compared with the glyburide group. There were no significant differences in birth weight (3599 ± 650 g vs 3661 ± 629 g, p = .3), macrosomia (24%, 25%, p = .7), or cesarean delivery (35%, 39%, p = .4). Women in the glyburide group had a higher incidence of preeclampsia (12%, 6%, p = .02), and neonates in the glyburide group were more likely to receive phototherapy (9%, 5%, p < .05), and less likely to be admitted to the neonatal intensive care unit (NICU) (15%, 24%, p = .008) though they had a longer NICU length of stay (4.3 ± 9.6 vs 8.0 ± 10.1, p = .002). Posttreatment glycemic control data were available for 122 women treated with insulin and 137 women treated with glyburide. More women in the glyburide group achieved mean fasting and postprandial goals (86%, 63%, p < .001). These findings remained significant in logistic regression analysis.

**CONCLUSION** In a large managed care organization, glyburide was at least as effective as insulin in achieving glycemic control and similar birth weights in women with GDM who failed diet therapy. The increased risk of preeclampsia and phototherapy in the glyburide group warrant further study.


**CLINICAL IMPLICATION:** Our study showed that glyburide is a reasonable alternative to insulin for the treatment of gestational diabetics who fail diet therapy. We successfully demonstrated this in a large clinical setting.

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**From Colorado**

**Radiation exposure to the hands from mini C-arm fluoroscopy.**


**PURPOSE** To quantify the level of radiation exposure to the hands of hand surgeons using intraoperative mini C-arm fluoroscopy and to compare the actual level of exposure with predicted levels and acceptable limits.

**METHODS** Five hand surgeons were given ring dosimeters to measure radiation exposure to their hands during surgery of the finger, hand, and wrist. A total of 81 rings were analyzed. After the clinical study a phantom was used to measure scatter at close range from the mini C-arm.

**RESULTS** Surgeons’ hands were exposed to an average ±SD of 20 ± 12.3 mrem/case. For comparison a chest x-ray results in approximately 20 mrem exposure to the patient. Radiation exposure for the group of hand surgeons ranged from 5 to 80 mrem. Surgeons used an average of 51 ± 36.9 seconds of fluoroscopy time per case. Exposure time for the group ranged from 6 to 170 seconds. The radiation scatter rate decreases precipitously outside the beam and as a result their hands potentially are exposed to a nontrivial amount of radiation. We recommend that surgeons who use the mini C-arm use precautions to minimize radiation exposure, particularly to their hands.

CLINICAL IMPLICATION: The mini C-arm fluoroscope is being used increasingly in trauma clinics, emergency rooms and operating rooms. This study provides both clinical data and experimental scatter data to quantify exposure for the health care worker operating the machine. Results show that although exposure is low relative to allowable levels, they are higher than might be expected. Scatter to the operator’s torso appears to be small, but radiation from direct exposure to the operator’s hand is higher than expected. In addition to other measures to minimize radiation exposure, one should specifically avoid putting ones’ hand directly in the beam when operating the fluoroscope. –GS

From Southern California
Obesity and perioperative morbidity in total hip and total knee arthroplasty patients.

The incidence of obesity in 1071 total hip arthroplasty (THA) patients and 1813 total knee arthroplasty (TKA) patients and its effect on perioperative morbidity were evaluated prospectively. Fifty-two percent of TKA and 36% of THA patients were obese (body mass index ≥30). The obese patients were significantly younger, with a higher proportion of obese TKA patients being women. Higher rates of diabetes and hypertension were found in obese patients. Higher postoperative infection rates were observed in patients with body mass index 35 or higher. The odds ratio was 6.7 times higher risk for infection in obese TKA patients and 4.2 times higher for obese THA patients. The increased risk of infection in obese patients undergoing total joint arthroplasty must be realized by both the patient and surgeon. ❖

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What Matters
It’s not what you look at that matters.
It’s what you see.
—Henry David Thoreau, 1817-62, naturalist and poet
With this issue we include abstracts from the 2005 11th Annual HMO Research Network Conference, held in Santa Fe, New Mexico, that focused on “Translating Research into Practice.”

April 4-6, 2005 Santa Fe, NM “Translating Research Into Practice—Scaling New Heights”

From Group Health Center for Health Studies, Seattle, WA; University of Washington, Seattle, WA

Effect of Mindfulness-Based Stress Reduction on persons with chronic back pain.
Cherkin D, Sherman K, Erro J, Deyo R.

BACKGROUND Numerous therapies exist for treating chronic low back pain (CLBP) but few, if any, have been found to be cost-effective. There remains a need to identify treatments whose benefits outweigh their costs. This pilot study evaluated the effect on CLBP of an inexpensive and potentially life-changing training program, Mindfulness-Based Stress Reduction (MBSR).

METHODS Members of a large health plan with uncomplicated low back pain persisting over three months were invited to participate in a trial comparing MBSR (eight weekly 2.5 hour sessions) with a book on self-management techniques. Forty-six volunteers were randomized to MBSR (n = 22) or the book (n = 24). Outcomes measured before randomization and after 12 and 26 weeks included function (Roland) symptom bothersomeness (0 to 10 scale) and general health status (SF-36). MBSR training participants were also asked about their effect on their thoughts, feelings, reactions, or activities.

RESULTS Eighty-two percent of participants randomized to MBSR attended at least one class (median seven classes). Adjusting for baseline values, the MBSR group fared better than the book group by 1.9 points on the Roland scale at 12 weeks (p > 0.05), but by only 0.3 points at 26 weeks (p > 0.05). Differences in SF-36 and symptom bothersomeness were small. However, at 26 weeks, all 16 respondents in the MBSR group claimed to be practicing MBSR for an average of four days per week and 20 minutes per day and to have experienced lasting benefits, most commonly decreased stress, increased ability to relax, increased mindfulness, and ability to cope.

CONCLUSIONS Although this pilot study found only limited and temporary benefits of MBSR on conventional CLBP outcomes (function, symptoms), informal qualitative feedback suggests MBSR may have other important benefits (eg, coping, attitude) for persons with CLBP and possibly for other conditions caused or exacerbated by life stress.

From HealthPartners Research Foundation

The boomers are coming: A total cost of care model of the impact of population aging on the cost of chronic conditions in the US.
Garrett N, Martini EM.

BACKGROUND This study estimates the impact of population aging on medical costs over the next five decades in the US. The focus is on chronic and/or expensive conditions often included in disease management programs: coronary artery disease, congestive heart failure, diabetes, asthma, obstetrics, psychiatry, and chemical dependency. We go beyond previous macro-economic studies by modeling the effects of aging on medical costs at a clinically meaningful level of detail.

METHODS Our model applies estimated age-, gender-, and condition-specific annualized costs to US population projections in each age and gender group through 2050. This provides an estimate of future health care costs, assuming the age, gender, and disease cost profiles remain the same and holding other factors that could affect costs constant.

RESULTS We project that from 2000-2050 the aging of the population would result in an 18% increase in overall medical costs over the next five decades, with most of the change taking place from 2000-2030. However, there is a great deal of variation of the impact of population aging on specific chronic diseases. Diseases where the ratio of costs for older vs younger ages is greater, such as CAD, CHF, and diabetes will be affected most by population aging.

CONCLUSIONS These disease-specific projections can inform health policy and planning as providers of health care, health plans, and disease management vendors anticipate meeting future US health care needs.

From KPNW

Effectiveness and acceptability of complementary and alternative medicine for temporomandibular joint disorder among HMO members.
Vuckovic NH, Gallion CM.

BACKGROUND We report on a study testing the feasibility, acceptability and effects of CAM vs Usual Care as treatment for temporomandibular joint disorder (TMD), a chronic, frequently intractable pain condition. Although previous studies have indicated the extensive use of CAM by the general public and by HMO members (including KPNW), as well as the...
effectiveness of CAM for treating chronic pain, questions remained regarding the willingness of HMO members to be randomized to CAM as opposed to usual dental care for TMD, and about the effectiveness of the modalities and protocols used in this study.

METHODS Participants were screened via self-report of pain and by a clinical TMD exam. Eligible volunteers were randomized to either acupuncture, acupuncture plus herbs, chiropractic, massage, or usual care. Participants in the CAM arms received ten treatments following protocols developed by CAM practitioners. Usual care participants received standard care that included treatment in TMD clinic and possible referral to classes, physical therapy and/or medications. Usual care was provided in KPNW TMD clinic; CAM treatments occurred in practitioners’ offices. Study outcomes of change from baseline in usual and worst pain was measured by self-report questionnaire. Acceptability of treatment was measured by adherence to treatment, self-report, and qualitative interviews.

RESULTS Of the 216 participants randomized, 17 refused initial treatment. Of the remaining 199 participants, 165 completed the intervention. We used an intent-to-treat analysis using mixed model analysis of variance with restricted maximum likelihood estimation to analyze the effects of treatment. Analysis indicates that CAM treatments reduced usual and worst pain as well as or better than usual care. Most patients indicated they would go back to their study provider or to another CAM provider for TMD treatment in the future.

CONCLUSIONS The apparent positive effects of CAM for chronic pain and its acceptability and desirability among members suggest that managed care organizations should consider CAM as a viable service option.

From Henry Ford Health Systems Patient-physician colorectal cancer discussions in primary care.
Lafata JE, Moon C, Divine G, Williams LK

BACKGROUND Routine screening is known to reduce colorectal cancer (CRC) morbidity and mortality. Yet, many people (including those receiving routine primary care) fail to receive recommended screening. How physicians and patients discuss CRC screening and how these discussions impact screening use is not known.

METHODS We mailed surveys to 4966 HMO enrollees aged 50–80 years with a recent visit to a PCP. The survey collected information on the content of CRC screening discussions (including the “5 As”: Assess, Advise, Agree, Assist, and Arrange) as well as patient preferences for shared decision making. Survey responses were linked with five-year claims data on prior CRC screening use. We estimate the proportions of primary care patients receiving recommended CRC screening, discussing CRC screening with their physician and, among those discussing CRC with their physician, reporting different elements of discussion content.

RESULTS Among the 2513 survey respondents (50.6% response rate), 58.7% were female, 68.1% were married, and 34.4% were African American. Fifty-four percent received recommended CRC screening and 79.6% reported discussing CRC screening with their physician. The most frequently discussed screening modality was colonoscopy (70.7%), followed by sigmoidoscopy (41.4%) and fecal occult blood testing (40.6%). Approximately two thirds indicated discussing their interest in screening (“assess”), 36.1% reported being offered a choice among different screening modalities (“advise”) and 31.1% were asked about their preferences for different types of tests (“agree”). Over half (55.5%) reported receiving help making an appointment (“assist”) and 60.9% indicated receiving information on how to get test results (“arrange”). Three quarters of respondents indicated they were involved in the CRC screening decision-making process as much as they wanted and 13.9% indicated there was information they wanted but not discussed with their physicians.

CONCLUSIONS The majority of primary care patients report discussing CRC screening with their physicians. Yet, the content of these discussions varies and almost half have not received recommended CRC screening. Given the limited time PCPs and patients have to discuss CRC screening, it is important that discussions be as productive as possible. Whether the use of a shared decision-making process and the “5 As” lead to improved CRC screening adherence remains an important question.

From HealthPartners Research Foundation Relationship of psychosocial and health factors and continuity of care to ED use among seniors.
Whitebird RR, Gumnsson TM, Flottemesch TJ, Asche SE, Martinson BC, Degelau JF

BACKGROUND This study examines the relationship between Emergency Department (ED) use and health status, psychological, social factors, and continuity of primary care in a senior population of HMO members.

METHODS An observational study using survey data and two-year prospective administrative data in a sample of 11,338 seniors enrolled in an HMO from 1995 through 1997. The study used multinomial logistic regression analysis to model relationships between biopsychosocial factors, continuity of care and ED utilization. Health status and social support measures were collected by survey. Depression was measured with administrative data using ICD9 codes. Continuity of primary care was calculated based on the number of visits with a single primary care provider for patients with two or more primary care visits.

RESULTS The mean age of the study population was 73 years of age, 42% were male, 27% reported living alone, 13% had a Charlson score of two or greater, 29% of the population had ED use during the two-year study period. Results showed that advanced age, male gender, Charlson score, poor perceived health, higher medication use, falls within the prior six months, need for assistance with activities of daily living, and use of assistive devices were significantly related to one ED visit. Age > 75, multiple medications, depression, low social contact, living alone, bereavement in the prior six months, and low continuity of primary care were related to multiple ED visits.

CONCLUSION ED use among seniors is correlated with a complex of physical, health status and psychosocial factors. Psychosocial factors and low continuity of primary care were strongly related to multiple ED visits. Interventions directed to ED use among seniors should include components that address these psychosocial issues and improve continuity in the provision of primary care, in addition to the management of chronic conditions and declining health status. •
**Stereotactic Radiosurgery: Indications and Results — Part 2**

*By Joseph C T Chen, MD, PhD*  
*Michael R Girvigian, MD*

**Abstract**  
Stereotactic radiosurgery and fractionated stereotactic radiotherapy represent an increasingly important option in the treatment of central nervous system disease. In this article, we discuss indications for stereotactic radiosurgery and review results reported in the medical literature.

**Introduction**  
Stereotactic radiosurgery differs from open surgery insofar as stereotactic radiosurgery has no immediate cytoreductive role. Instead, the goal of radiosurgery is to change the biology of tumor cells so as to inhibit their proliferative potential. A successful outcome of radiosurgical treatment is therefore arrest of tumor growth, not disappearance of the tumor. Radiosurgery is therefore inappropriate for patients who are symptomatic from mass effect of tumors. Regardless of mass effect, however, another limiting aspect of radiosurgery is tumor size: Because external beam techniques can achieve only a limited degree of conformity, radiosurgical treatment of larger tumors may expose normal tissue to an unacceptably high level of radiation. Large tumors may require surgical debulking (ie, to reduce tumor volume) so that single-fraction radiosurgical treatment can be used. Fractionated treatments are another alternative for patients with large tumors.

**Radiosurgery as Treatment for Benign Tumors**  
Radiosurgery has been used extensively for treating benign tumors of the central nervous system. The most extensively developed data for radiosurgical treatments have pertained to treatment of acoustic neuroma (vestibular schwannoma) and meningioma of the skull base. The clear margins and discrete imaging characteristics of these tumors make them ideal candidates for radiosurgical treatment.

Radiosurgical treatment eliminates risks of blood loss, infection, anesthesia complications, and other perioperative risks. In addition, radiosurgery is administered on an outpatient basis, thereby eliminating the need for hospitalization, specialized care in the intensive care unit (ICU), and rehabilitation. For these reasons, radiosurgery is a compelling treatment alternative for many patients. For patients who are medically fragile or who cannot accept the potential complications of surgery (eg, risks inherent in blood transfusion), radiosurgery may be the only feasible treatment alternative.

**Radiosurgical Treatment of Acoustic Neuroma**  
Acoustic neuroma has been treated with radiosurgery since the 1960s. However, initial results of this technique were poor because the only imaging modality was computed tomography (CT). CT is inferior to magnetic resonance imaging (MRI) in the diagnosis and follow-up of radiographically occult tumors. MRI allows the radiologist to observe the relationship of the tumor to the brainstem, cerebellum, and facial nerve. Consequently, the location of the acoustic neuroma can be correlated with certain symptoms, such as facial numbness or weakness. MRI also allows the radiologist to assess the degree of compressive mass effect and the extent and rate of tumor growth. The advent of fast imaging sequences has led to the ability to capture dynamic studies that show the vascular supply of the acoustic neuroma.

**Figure 1.** Photograph shows Novalis LINAC device (BrainLAB, Heimstetten, Germany) used at the Southern California Kaiser Permanente Regional Radiation Oncology Center.

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The Permanente Journal / Spring 2006 / Volume 10 No. 1

clinical contributions

Stereotactic Radiosurgery: Indications and Results — Part 2

Early treatment methods included angiography or contrast cisternography followed by use of two-dimensional dose-planning techniques. Such two-dimensional techniques yielded relatively nonconformal treatments that risked not only underdosing of tumor tissue but also overdosing of normal tissue. In addition, excessively high doses were used—as high as 35 Gy in a single fraction. Compared with modern methods, this treatment resulted in relatively poor tumor control and high incidence of cranial nerve injury. Nonetheless, treatment results were acceptable for some high-risk patients.

The advent of MRI imaging, three-dimensional computer-assisted dose planning, and modern dosing schedules have dramatically improved rates of morbidity from radiosurgery as well as overall tumor control (Figure 1). Numerous studies from various centers around the world have repeatedly shown the safety and efficacy of classical radiosurgery for treating acoustic neuroma. Five-year follow-up has shown that current techniques provide overall clinical tumor control in 97% to 98% of lesions treated.1 The facial nerve is preserved in approximately 99% of patients receiving this treatment, and hearing is preserved in more than 70% of treated patients. Mortality and morbidity from the procedure is extraordinarily low in comparison with contemporary series describing surgical extirpation of these tumors.

From the standpoint of hearing preservation, introduction of fractionated stereotactic radiotherapy may improve upon the already superior results of radiosurgery and may allow use of radiosurgery for larger tumors not previously treatable with classical radiosurgery.5 Radiosurgery using present techniques results in outstanding cranial nerve preservation and tumor-control rates similar to those reported in the surgical literature while eliminating the risk of immediate periprocedural complications. We and others believe that radiosurgery should be first-line treatment for all acoustic tumors measuring <2.5 cm in diameter.6 Patients with larger tumors should be given the choice of receiving either fractionated stereotactic radiotherapy or surgical extirpation. The results of radiosurgical intervention for acoustic neuroma can also be applied to other types of cranial nerve schwannoma, such as trigeminal schwannoma.

Meningioma

Meningioma is a tumor that arises from arachnoidal cap cells commonly associated with arachnoid granulations at the dural venous sinuses, cranial nerve foramina, cribriform plate, and medial middle fossa. The tumor is most commonly benign but may exhibit atypical or even malignant features and behavior. The lesion may arise anywhere along the dura, including the convexity and base of the skull. Modern imaging techniques have enabled highly reliable diagnosis of this type of tumor.

Numerous studies from various centers around the world have repeatedly shown the safety and efficacy of classical radiosurgery for treating acoustic neuroma.

Convexity and falcine meningiomas are easily treated using conventional open surgical techniques. Modern anesthesia combined with meticulous surgical techniques may result in high rates of gross total surgical resection with minimal morbidity and mortality (Figure 2). For these lesions, open surgical treatment remains the preferred treatment for patients with low medical risk.

Various lesions of the skull base present substantially higher overall operative risk. Most tumors located in this region are intimately associated with critical nervous and vascular structures; therefore, attempts at total resection carry substantial risk of morbidity to these nerves. Published surgical series7,8 have shown relatively high rates of cranial nerve palsy as well as leakage of cerebrospinal fluid and high risk of tumor recurrence.

Because of these risks, radiosurgery has become an increasingly attractive alternative to microsurgical resection for lesions located at the skull base. Published series7,8 have described radiosurgical management of these lesions and have shown excellent overall tumor control.
control and extremely low rates of morbidity. In fact, in patients with meningioma, tumor control with radiosurgery has been shown equivalent to that of gross total resection and produced only minimal morbidity.10

For certain types of meningioma of the skull base, such as meningioma affecting the cavernous sinus,11-15 orbital apex, clivus, and petrous bones,16-18 radiosurgery has been clearly shown to be the most preferable treatment. In addition to the data developed by numerous groups showing superior tumor control and extraordinarily low risk of cranial nerve deficits, radiosurgery and fractionated stereotactic radiotherapy clearly have improved cranial nerve function in a high percentage of patients who had functional impairment caused by tumor progression.

Pituitary Adenoma

Pituitary adenoma is a benign tumor of the anterior pituitary gland. Most of these tumors are nonfunctional from the standpoint of their endocrine activity, although others can be the proximal cause of Cushing’s disease, hyperprolactinemia, acromegaly, and hyperthyroidism. Generally, the preferred means of managing these lesions is transsphenoidal excision, an approach which has been proved safe and effective. Benefits of this approach are relatively low morbidity and rapid correction of endocrinopathy. Nonetheless, subtotal resection and failure of inducing endocrine remission remain problems. The endocrine remission rate for functional adenoma remains approximately 70% among all patients who receive treatment for this tumor.19

Salvage treatments given after failed transsphenoidal exploration include reoperation and conventional fractionated external-beam radiotherapy. Conventional radiotherapy has been a time-tested option but has the disadvantage of long latency of effect before endocrine remission is established.20,21

In instances of endocrine failure or presence of gross residual disease, stereotactic radiosurgery has become an important means of salvage treatment. Of patients who had no disease remission after having surgery for Cushing’s disease, 60% to 85% may have disease remission after receiving salvage stereotactic radiosurgery.22-24 Similar outcomes have resulted from using stereotactic radiosurgery to treat prolactinoma and growth hormone-secreting adenoma.25,26

Chordoma

Chordoma is a highly aggressive tumor which can arise from the skull base or from the spine. The tumor is malignant and has a high rate of recurrence after resection. Modern management of these tumors uses a multimodality approach which includes aggressive surgical resection followed by stereotactic radiosurgery, stereotactic radiotherapy, or particle-beam irradiation.27-29 Multimodality treatment results in an overall five-year survival rate of approximately 80%. Conventional external-beam techniques are difficult to use because they require use of very high radiation doses to achieve tumor control.

Craniopharyngioma

Craniopharyngioma arises from remnants of the craniopharyngeal pouch. This type of tumor is histologically benign but tends to recur locally after surgical removal. Nonetheless, aggressive surgical removal of this tumor can be hazardous because it can be locally invasive of brain tissue. Common complications associated with these tumors include pituitary insufficiency (including diabetes insipidus), hypothalamic injury, and loss of vision. Surgical excision of these tumors can produce high rates of local control, but this treatment carries a substantial risk of recurrence. In cases where subtotal resection is achieved, stereotactic radiosurgery and fractionated stereotactic radiation treatment can be of great utility (Figures 3, 4), yielding high overall rates of tumor control and survival as well as low rates of morbidity.30-32

Glioma

Patients with high-grade malignant glioma continue to have a dismal prognosis despite decades of intensive clinical and laboratory investigation. Current practice for management of these lesions commonly includes surgery, conventional external-beam radiotherapy, and chemotherapy.

Radiosurgery as an additional treatment modality for these tumors has been suggested to be useful in some
limited circumstances. However, a recent Radiation Therapy Oncology Group phase III trial, RTOG 93-05, was unable to show any advantage of using radiosurgery for high-grade glioma. Thus, effective long-term control of malignant gliomas cannot be achieved by local treatment, such as radiosurgery. Effective management of this devastating disease awaits a method of treating the central nervous system as a whole.

Similarly, data regarding use of radiosurgery to treat low-grade and anaplastic-grade infiltrative glioma are weak. Use of radiosurgery to treat such lesions, therefore, cannot be considered as routine adjuvant therapy.

Pilocytic astrocytoma is a type of low-grade glioma that is typically well circumscribed and often amenable to surgical resection that results in long-term survival. Nonetheless, these tumors may develop in locations unfavorable for surgical management. As standalone treatment or in conjunction with conservative debulking surgery, radiosurgery for these lesions may offer important advantages over open surgery alone, although data conclusively proving this point are still unavailable.

Metastatic Disease

In contrast to glioma, where progression of disease is marked by infiltrative changes, metastases to the brain typically have discrete margins. Before radiosurgery was first introduced, metastases to the brain were best treated by surgical excision (whenever feasible) in conjunction with whole-brain radiotherapy.38

The advent of radiosurgery has heralded a revolution in management of metastatic lesions. Although external-beam radiotherapy remains an important treatment component, radiosurgery can in many instances replace surgical resection.39-41 This treatment approach results in high rates of lesion control and overall postoperative survival rates comparable to those produced by surgery with whole-brain radiotherapy. In this field, current controversy surrounds the role of radiosurgery in relation to whole-brain radiotherapy.

General selection criteria for treating metastases include Karnofsky score >70, four or fewer lesions, and lesion volume <9 mL.

Trigeminal Neuralgia

Trigeminal neuralgia is characterized by paroxysms of severe, lancinating facial pain which is sometimes caused by an arterial vessel loop compressing the trigeminal nerve in the root-entry zone. Trigeminal neuralgia typically responds well to anticonvulsant medication such as carbamazepine; in many patients, however, the condition becomes refractory to medical management. Surgical intervention may be indicated in such instances. Surgical intervention falls into two general categories: destructive techniques and microvascular decompression.
Destructive techniques include percutaneous radiofrequency rhizolysis, balloon microcompression, and glycerol injection. These procedures have the advantage of low procedural risk and have the disadvantage of precipitating facial numbness. These procedures can also be very uncomfortable for the patient.

Microvascular decompression involves craniotomy and microdissection with the goal of separating a compressing vascular loop away from the trigeminal root entry zone. Microvascular decompression offers the highest rates of long-term remission from facial pain as well as low risk of causing facial numbness. Microvascular decompression is highly invasive, however, and carries with it the risk associated with craniotomy.

Trigeminal radiosurgery is a destructive technique the target of which is the segment of the trigeminal nerve within the prepontine cistern (Figure 5). This procedure could therefore be described as a retrogasserian radiosurgical rhizolysis. Overall, it results in initially good and excellent outcomes for approximately 80% of patients who receive the procedure. Complications such as facial numbness are uncommon, and the risks of an invasive procedure are entirely eliminated. However, the risk of recurrent pain is substantial, and retreatment may become necessary.

**Arteriovenous Malformation**

Surgical treatment of arteriovenous malformation has long represented the pinnacle of vascular neurosurgery practice. The complex anatomy of these lesions and the challenges of their surgical management have given many generations of neurosurgeons great respect for these lesions. Surgery has been a time-tested treatment that can result in complete resection of these lesions; however, rates of morbidity and mortality associated with this surgical treatment can be substantial, and great effort has been made to develop alternative methods for treating these difficult lesions. Over the past 15 years, therefore, a balanced multimodality approach has emerged that includes endovascular embolization, surgery, and stereotactic radiosurgery.

Radiosurgical treatment of these lesions has been used since the 1970s. This approach is controversial in some circles; for properly selected patients, however, we believe that radiosurgery can yield outstanding results when used alone or in a multimodality management strategy (eg, with endovascular treatment).

When used as treatment for arteriovenous malformations, radiosurgery acts by causing hyalinization within the blood vessels of an arteriovenous malformation, thereby resulting in gradual occlusion of flow through these lesions. Complete obliteration of the arteriovenous malformation is generally achieved two to three years after treatment. The likelihood of angiographic obliteration of the arteriovenous malformation is a function of its size, the marginal dose delivered, and the length of time since completion of the radiosurgical procedure. Radiosurgery has been shown to effectively obliterate approximately 80% of lesions with mean diameter <3 cm.

**Radiosurgery and Fractionated Stereotactic Radiotherapy**

On a typical treatment day, patients undergoing radiosurgery are admitted to the radiation clinic, where neurosurgical members of the radiosurgery team apply the stereotactic frame with the patient placed under local anesthesia (Figures 6, 7). In some cases, an
clinical contributions

Stereotactic Radiosurgery: Indications and Results — Part 2

For many indications, radiosurgery has proved safe and highly effective.

anxiolytic agent is orally administered. A high-resolution CT scan is then obtained. Images from a fiducialized CT and from a previously obtained fine-cut MRI scan are then combined in a process called image fusion. This process is critical for eliminating the spatial distortion seen when MRI images are used alone in planning treatment. A protocol of dose planning and quality control is then undertaken before treatment is begun. The treatment is then delivered, typically for approximately 20 minutes to 40 minutes. When treatment is completed, the stereotactic frame is immediately removed. Most treated patients are then discharged home; in unusual instances (such as if general anesthesia is required), patients may be admitted to the hospital for overnight observation.

Patients undergoing fractionated stereotactic radiotherapy procedures do not undergo placement of a stereotactic frame but instead are fitted with a rigid thermoplastic mask that enables precise repositioning (Figure 8). Depending on the type of pathology being treated, fractionation regimens can range from two fractions to more than 30 fractions.

Follow-up protocols for benign tumors and vascular conditions include serial MRI imaging done once every six months for the first two years after treatment, then annual scanning thereafter for three years. Malignant conditions warrant more frequent imaging and clinical follow-up.

Conclusions

Stereotactic radiosurgery and fractionated stereotactic radiotherapy have emerged as important additions to the neurosurgical treatment armamentarium and as such have wide application. For many indications, radiosurgery has proved safe and highly effective. For some indications, radiosurgery is emerging as the preferred treatment.

References

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Predictive Value of the Rapid Whole Blood Agglutination D-Dimer Assay (AGEN SimpliRED) in Community Outpatients with Suspected Deep Venous Thrombosis

By Julieta E Hayag, MD
Prem P Manchanda, MD

Abstract
Context: D-dimer assay has been used to screen patients with deep venous thrombosis (DVT). Because both the predictive value and sensitivity/specificity of the test vary according to the type of assay, prevalence, and pretest probability of DVT, clinicians must know the local performance of the d-dimer assay.

Objective: To evaluate the predictive value of the rapid whole blood agglutination d-dimer Assay (AGEN SimpliRED) in community outpatients with suspected DVT in the Kaiser Permanente (KP) Mid-Atlantic Region.

Methodology: A total of 5104 patients with suspected venous thromboembolism underwent d-dimer testing using AGEN SimpliRED from April 2001 to December 2002. A total of 551 electronic medical records were reviewed, and results of d-dimer assay and compression ultrasonography were tabulated. Records were analyzed to determine later diagnosis of DVT or unexplained death occurring as late as six months after initial testing.

Results: Electronic records showed a 5.3% disease prevalence. Ten patients were excluded from data analysis. A total of 129 (23.8%) patients had positive d-dimer; the positive predictive value was 20.2% (CI, 13.2% to 27%). A total of 412 (76.1%) patients had negative test results; three of these patients had DVT shown by compression ultrasonography; negative predictive value was 99.3% (CI, 98.4% to 100%). Calculated sensitivity was 89.7%; specificity was 79.9%.

Conclusion: In the outpatient setting, the rapid whole blood agglutination d-dimer assay (AGEN SimpliRED) used in combination with both clinical judgment and compression ultrasonography exhibited a high negative predictive value comparable with previously reported values.

Introduction
In the evaluation and management of suspected deep venous thrombosis (DVT), clinical evaluation alone is not sufficient to confirm or exclude presence of the disease.5,6 The reference standard for diagnosing DVT is by venography, which is invasive. Because of its noninvasive nature, compression ultrasonography (CUS) has replaced venography; however, although CUS is highly sensitive and specific for symptomatic proximal DVT, this technique is not as sensitive as venography for detecting thrombus in the distal vein of the calf.5,6 Because approximately 13% to 30% of affected patients have distal DVT that may propagate proximally,5,6 a second examination is recommended five to seven days later to detect unvisualized calf thrombi that may have propagated proximally.5,6 This additional examination can be costly, inconvenient, and could still miss acute DVT. In past years, d-dimer assays have been studied as a tool to aid diagnosis of thromboembolic disease. D-dimers are products of fibrin degradation when fibrin in the thrombus is lysed by plasmin. D-dimer assays cannot differentiate between clots associated with spontaneous venous thromboembolism and other causes of thrombus (eg, sepsis, trauma, surgery, malignancy, postoperative states, posttraumatic states, infection, autoimmune disease, inflammatory disease).13 The combination of clinical decision rules or guidelines, d-dimer assay, and CUS also has...
been studied for diagnosis of DVT. These reports show that when used and interpreted in the proper clinical setting, the d-dimer assay provides a safe, cost-effective, clinician/patient-friendly means of ruling out DVT.2,7-10

Several assays are used to measure d-dimer: ELISA, which is the most accurate but which is lengthy and costly;11,12 the latex agglutination test, which has high false-negative rates;13 and the red blood cell agglutination test, which has wide ranges of specificity and sensitivity.14 These tests have different characteristics; and because each test uses different reagents, the reported sensitivity/specificity of the d-dimer test vary according to the type of assay and pretest probability of DVT.2,15 Clinicians must understand the indications for and limitations of d-dimer measurement in the diagnosis of DVT and must inquire whether the assay’s performance has been investigated locally.

The AGEN SimpliRED d-dimer test kit currently used in our laboratory is an autologous red cell agglutination assay which uses a chemical conjugate of a monoclonal antibody specific to d-dimer. D-dimer levels in excess of 0.12 mg/L result in visible agglutination of whole blood.

Table 1. Referral guideline for suspected deep venous thrombosis (DVT) a

<table>
<thead>
<tr>
<th>Clinical indications for referral</th>
<th>Patients tested with d-dimer n = 551</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk for DVT may be defined as:</td>
<td>Patients tested with d-dimer n = 551</td>
</tr>
<tr>
<td>Major criteria for DVT:</td>
<td>No further work-up n = 26</td>
</tr>
<tr>
<td>• three or more MAJOR criteria and no alternate diagnosis OR • two or more MAJOR criteria and two or more MINOR criteria and an alternate diagnosis</td>
<td></td>
</tr>
<tr>
<td>Minor criteria for DVT:</td>
<td>Excluded n = 10</td>
</tr>
<tr>
<td>• Trauma &lt; 60 days</td>
<td>(+) d-dimer n = 129</td>
</tr>
<tr>
<td>• Pitting edema of the leg</td>
<td>(-) d-dimer n = 412</td>
</tr>
<tr>
<td>• Erythema</td>
<td>CUS</td>
</tr>
<tr>
<td>• Dilated veins</td>
<td>(-) DVT n = 103</td>
</tr>
<tr>
<td>• Hospitalization &lt; 6 months</td>
<td>(+) DVT n = 26</td>
</tr>
</tbody>
</table>

a Since 2003, guideline recommends CUS for pregnant patients.


Figure 1. Summary of results of SimpliRED and Compression Ultrasonography (CUS) in patients with suspected deep venous thrombosis (DVT).
Table 2. D-dimer assay diagnostic performance in 541 patients with clinical signs of deep venous thrombosis (DVT)

<table>
<thead>
<tr>
<th>Results of d-dimer assay</th>
<th>DVT present</th>
<th>DVT absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive (n = 129)</td>
<td>26</td>
<td>103</td>
<td>129</td>
</tr>
<tr>
<td>Negative (n = 412)</td>
<td>3</td>
<td>409</td>
<td>412</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>512</td>
<td>541</td>
</tr>
</tbody>
</table>

Reported sensitivity ranges from 77% to 100%, and reported specificity ranges from 64% to 75%.22,23

Use of the AGEN SimpliRED d-dimer assay began in the KP Mid-Atlantic States Region in April 2001. We analyzed the predictive value of the rapid whole blood agglutination d-dimer assay in community outpatients seen for suspected DVT.

Methods

Over the 20-month period extending from April 2001 to December 2002, 5104 d-dimer tests using AGEN SimpliRED were conducted on outpatients in whom a clinician suspected venous thromboembolism. The tests were performed at ten different laboratory sites.

We conducted a retrospective, randomized review of the electronic medical records of 551 patients who had d-dimer testing for suspected DVT (Figure 1). Results of d-dimer testing were categorized according to test result. Current guidelines recommend CUS for all patients with positive d-dimer test results. Results of CUS were tabulated. Each medical record of patients with negative d-dimer results was reviewed to identify patients who subsequently had recorded results of CUS. The decision to refer patients with negative d-dimer for CUS was made independently by each clinician on the basis of physical findings as well as clinical judgment. Although we currently have a Referral Guideline for Evaluation of Suspected DVT24 (Table 1) that categorizes patients into risk levels by using several major/minor criteria, this guideline is meant to be informational and does not replace reasonable, independent clinical judgment.

All records showing a negative d-dimer and no CUS as well as records that showed positive d-dimer but negative CUS results were further reviewed to determine later diagnosis of DVT or unexplained death occurring as long as six months after initial testing.

Data analysis was performed using the standard Bayesian statistical formula and calculations.

Results

Of the 551 patients whose electronic medical records were reviewed, ten patients were excluded for the following reasons: no electronic records documenting examination (seven patients); negative d-dimer with previous diagnosis of DVT several weeks before the test and preexisting receipt of anticoagulation therapy (one patient); negative d-dimer but patient unavailable for follow-up (one patient); positive d-dimer but additional testing refused (one patient).

Of the 541 records (Table 2), 29 showed DVT diagnosed by CUS, indicating a 5.3% prevalence (95% CI, 3.5% to 7.3%). For 129 (23.8%) patients, records showed positive d-dimer; and 412 (76.1%) patients tested negative. Of the 129 patients who tested positive, 103 patients had negative results of CUS, and CUS was used to diagnose 26 patients with DVT; these results indicated 89.7% sensitivity (95% CI, 78.6% to 100%) and 20.2% positive predictive value (95% CI, 13.2% to 27%).

Of the 412 patients who tested negative, 54 patients (13.1%) were referred for CUS on the basis of a clinician’s evaluation and judgment. CUS was used to diagnose DVT in 3 of the 54 patients, indicating 79.9% specificity (95% CI, 76.4% to 83.4%); the negative predictive value was 99.3% (95% CI, 98.4% to 100%), and the false-negative rate was 0.7%.

Of the 541 patients, 183 (34%) had CUS. This group represented all patients with positive d-dimer and those with negative d-dimer referred for CUS by the clinician. None of the patients with positive d-dimer who had negative CUS or negative d-dimer results who did not have CUS had later diagnosis of DVT or unexplained death within six months after initial d-dimer testing.

We also reviewed the electronic medical records of the three patients who had false negative results of d-dimer testing. One of these patients was a 44-year-old man with a history of alcoholism who was seen for right lower leg pain and swelling, had negative results of d-dimer testing, and right peroneal clot shown subsequently by CUS. The second patient with false negative test results was a 25-year-old man with a history of DVT (in 1992) following fibular stress fracture and both grandparents with history of blood clots. He was initially seen for left lower leg pain and erythema and was treated with cephalixin; two days later, he returned with swelling of the left leg and received d-dimer testing that yielded negative results. Because of the patient’s medical history, CUS was done; this technique showed extensive superficial venous thrombotic disease as well as a partial narrowing in the popliteal vein. The third patient with false-negative test results was a 35-year-old woman with a history of advanced cervical cancer treated with radiation who was initially seen for a two-week history of bilateral swelling of the lower extremi-
ties. D-dimer test results for this patient were negative. CUS showed left-sided DVT.

Discussion

Our study showed sensitivity of 89.7%, specificity of 79.9%, negative predictive value of 99.3%, and a positive predictive value of 20.2%. These results are comparable with several published studies, which showed high negative predictive value in patients who are at low to moderate risk for DVT.4,5 Several reports show that sensitivity decreased with higher disease prevalence.6,7 Our three patients with false negative d-dimer test results were at high risk for DVT. The question arises as to whether d-dimer testing should have been omitted in these patients and the patients instead referred directly for CUS. Review of electronic medical records for each of the 54 patients with negative d-dimer results who had CUS showed that the risk for DVT among these patients ranged from low to moderate to high on the basis of our current guideline (categorizing patients into risk levels by using major and minor criteria).

The decision to refer patients with negative d-dimer test results for CUS was made by each clinician independently on the basis of physical signs and clinical judgment. Several factors may influence a clinician’s choice to refer a patient for CUS. Some clinical instances (for example, pregnancy) might not have been captured in the guideline: Our guideline, which was revised in April 2003, recommends CUS for pregnant patients because this population has a high rate of false-negative test results.8,9 This population might not have been captured in our guideline. Although venography is the reference standard used to rule out DVT, we must note that CUS, the rapid whole blood agglutination d-dimer assay (AGEN SimpliRED) had 99.3% negative predictive value and a 20.2% positive predictive value in the outpatient setting—results comparable with previous reports.

Study Limitations

Among the study population, clinical probability for DVT ranged from low to moderate to high—a finding that may lower the sensitivity/specificity of the test because this probability may vary according to the prevalence and pretest probability of DVT. That is, the lower the prevalence of the disease, the higher the negative predictive value.2,3 Although venography is the reference standard used to rule out DVT, we must note that CUS, the rapid whole blood agglutination d-dimer assay (AGEN SimpliRED) had 99.3% negative predictive value and a 20.2% positive predictive value in the outpatient setting—results comparable with previous reports.

Acknowledgments

The authors would like to acknowledge the following members of the KP Mid-Atlantic States Region and the Mid-Atlantic States Permanente Medical Group (MAPMG) for assistance in collection and interpretation of the data: Earle D Henry, MPH, formerly Health Services Research Fellow, Washington, DC, MAPMG; Jane W Price, MT, AMT, MBA, Laboratory Operations Manager, Springfield, Virginia; Sherry J Weinstein-Mayer, MD, Internal Medicine, Lutherville, Maryland, MAPMG; and Margaret A Brown, MD, Pathology, Falls Church, Virginia, MAPMG.

References


**Prediction**

Prediction is extremely difficult. Especially about the future.  
—Niels Bohr, 1885–1962, Danish physicist
Snoring Versus Obstructive Sleep Apnea: A Case Report

Report of a Case
A 67-year-old man with a long-standing history of snoring noted that, in recent years, the snoring had worsened so much that his wife banned him from their bedroom. Since his retirement, he gained 20 pounds, and knee problems reduced his physical activity. His nasal allergies also had worsened. He noted increased fatigue, daytime sleepiness, and some trouble concentrating. He reported following a medication regimen as treatment for hypertension, but he otherwise denied having any medical problems. He had a tonsillectomy and adenoidectomy as a child and had no history of thyroid disease.

Physical examination showed nasal congestion with moderately swollen, pale turbinates and no purulent discharge. The septum was midline. Oropharyngeal examination showed no tonsils and a low soft palate with elongated uvula that tended to collapse against the posterior aspect of the pharynx and abutted the base of tongue. Fiberoptic laryngeal examination showed a normal larynx with moderate collapse of the lateral pharyngeal walls in “blocked” inspiration (a reverse Müller’s maneuver whereby the patient holds his nose, closes his mouth, and attempts to breathe inward). He had a short, thick neck and was overweight.

The working diagnosis was obstructive sleep apnea.

Diagnosis of Obstructive Sleep Apnea
The reference standard for diagnosis of sleep disorders is to perform polysomnography (a sleep study), during which the sleeping patient is observed for oxygen saturation level, amount of oral and nasal airflow, degree of respiratory effort, electrocardiographic measurements, body position, and overall body movement. This examination can be done both “inhouse” in a sleep laboratory and with home sleep studies for which the patient is connected to monitors and observed in the patient’s natural sleep environment.

On the basis of the apnea-hypopnea index, the severity of sleep apnea is categorized as mild, moderate, or severe. Mild sleep apnea is defined by an apnea-hypopnea index score anywhere from 5 to 14, oxygen saturation level of at least 86%, and minimal daytime disability. Moderate sleep apnea is defined by an index score anywhere from 15 to 30 or an oxygen saturation level of 80% to 85% and clinically significant dysfunction at work or socially because of daytime somnolence and loss of concentration. Severe sleep apnea is defined by an index score >30 or an oxygen saturation level of ≤79% and incapacitation caused by the sleep disorder.

Common causes of obstructive sleep apnea include obesity or excessive weight gain (fatty tissue in the throat tissue narrows and blocks the airway when the muscles relax), age (loss of muscle mass and tone in the upper airway), gender (men tend to have narrower airways than women), irregular sleep hours, anatomic abnormality (nasal obstruction, enlarged tongue, elongated soft palate, large tonsils and adenoids), use of alcohol and sedatives (relaxes the musculature), smoking (causes inflammation and swelling of the upper airway), and severe reflux (gastroesophageal reflux disease). Snoring is a common symptom of sleep apnea and results from obstruction, usually by the soft palate and uvula (Figure 1). However, snoring itself does not involve cessation of breathing, and many “snorers” have normal results of sleep studies.

Treatment of Obstructive Sleep Apnea
Where “sleep classes” are available, most patients are referred to these classes, group appointments at which patients receive educational material on snoring and sleep apnea. This material advises patients to eliminate...
their use of alcohol, tobacco, and sedatives, to sleep on their side instead of their back, and to regularize their sleep hours. Overweight patients receive a plan for weight reduction and appropriate exercise to maintain mobility. Physicians prescribe intranasal steroid medication and nonsedating antihistamine drugs for nasal allergies.

Patients with moderate to severe sleep apnea are treated with continuous positive airway pressure (CPAP). This therapy requires the patient to wear a mask over their nose during sleep, when the pressure is adjusted to keep the airway open at night. Although CPAP therapy is the most effective treatment for obstructive sleep apnea, this therapy is often unsuccessful because of patient noncompliance: Some studies have reported compliance rates lower than 70%. The patient described in the present case report was treated with CPAP and noted substantial reduction in both fatigue and daytime somnolence.

Obstructive sleep apnea has been treated with many surgical procedures: uvulopalatopharyngoplasty (UPPP), a procedure which removes soft tissue at the back of the throat—uvula, tonsils (if present), and part of the redundant soft palate—but does not address problems originating at the base of tongue or hypopharynx; tonsillectomy and adenoidectomy (effective in some children); mandibular and hyoid advancement procedures (operations which are difficult, risky, and inconsistently successful); and radiofrequency ablation procedures (effective treatment for snoring but inconsistently successful for treating sleep apnea). All of these treatments have substantial risks and are only moderately successful. Tracheostomy is the most effective treatment because it bypasses the upper airway completely; however, this procedure is also the least popular and is technically challenging in the morbidly obese patient. For most patients, the postoperative care necessitated by tracheostomy makes this option untenable as an elective procedure.

**Conclusion**

Snoring is part of the spectrum of sleep-disordered breathing that may be a symptom of obstructive sleep apnea, but not all patients who snore have clinically significant sleep apnea. Snoring may be present in 30% to 50% of the general adult population, whereas 2% of women and 4% of men have clinically significant (moderate to severe) obstructive sleep apnea.

Complications of untreated obstructive sleep apnea can include cardiovascular changes such as hypertension, ventricular dysfunction, or pulmonary hypertension. To determine the proper intervention required to reduce these complications, patients should receive a polysomnogram, either on an outpatient (“home” study) basis or in a sleep laboratory with a technician in attendance. Severity of sleep apnea does not always correlate with anatomic findings or with medical history; therefore, patients who snore should receive at least a nocturnal screening test measuring oxygen saturation and airflow, and patients with daytime somnolence or symptoms suggestive of sleep apnea should receive a full sleep study.

Patients with sleep apnea have an increased risk of airway problems after general anesthesia and should be observed carefully during the perioperative period. In addition, use of opioid and sedative drugs should be minimized for these patients to prevent airway compromise and desaturation.

To splint and keep the upper airway patent during sleep, the most effective treatment for sleep apnea is CPAP given at a level determined by results of a titration study; variations of this treatment include bi-level positive air pressure (BIPAP, a procedure in which expiratory pressure is lower than prescribed inspiratory pressure if high pressure is required) or auto titration (self-adjusting pressure).

Treatment for snoring may include weight loss, avoidance of supine sleeping position, sleeping with head elevated, avoidance of alcohol or sedatives at night, and treatment of nasal symptoms.

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Figure 1. Diagram shows anatomic structures involved in snoring. Adapted and reproduced by permission from: Abeloff D. Medical art: graphics for use. Baltimore: Williams & Wilkins; 1982.
who snore may opt to use a dental appliance at night or may consider various procedures for treating snoring—eg, radiofrequency ablation of the palate (somnoplasty), a procedure designed to stiffen the soft palate or to increase airway patency. These procedures are considered cosmetic and thus are not covered either by the Kaiser Foundation Health Plan or by other insurance providers, but many Head and Neck Surgery Departments will soon offer snoring treatment procedures on a fee-for-service basis.

References

Recommended Reading

Rising from Bed
The sound of the belch’d words of my voice loos’d to the eddies of the wind,
A few light kisses, a few embraces, a reaching around of arms,
The play of shine and shade on the trees as the supple boughs wag,
The delight alone or in the rush of the streets, or along the fields and hill-sides,
The feeling of health, the full-noon trill,
The song of me rising from bed and meeting the sun.

—Walt Whitman, 1819-1892, American poet, from Song of Myself
“Green Sea Turtle”
photograph
By Joseph MacKenzie, PA

Mr MacKenzie is in the Department of Gastroenterology on the Interstate campus in Portland, OR. More of his art can be seen on the cover.
As a child, did you like reading science fiction or watching Star Trek? If so, this issue is really a treat for you!

Robots the size of small VW bugs in the operating room assisting urologists in removing a prostate. Wireless endoscopy capsules, the size of large vitamin pills, touring through the small intestine, filming a scene straight out of Fantastic Voyage. Preimplantation genetic testing on one cell from an embryo. Molecular-targeted therapies for cancer.

This issue of The Permanente Journal will explore these and other exciting new technologies, devices, tests, and drugs, but it will only scratch the surface of the plethora of new technologies being developed in the 21st century. Many challenges for Kaiser Permanente (KP) arise from this exploding pace of development. Which new technologies should we deploy? Where and in how many medical centers? How do we retrain our physicians in these new procedures? Who are the appropriate patients to receive these new procedures? How do we monitor results?

The answers to these questions and the technology management process in KP will also be reviewed in this issue. This issue focuses on NEW technology, but we cannot lose sight of the fact that a recent study revealed that Americans in general receive medical procedures supported by evidence-based medicine only about half the time. The evidence-based technology management process has also been utilized in KP to address inadequate utilization of older technologies.

Finally, we also hope to help answer a burning question for clinicians—how do I keep up with such rapidly changing medical advancements? Resources to answer this question are in this issue.

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Discoveries

The most important discoveries will provide answers to questions that we do not yet know how to ask and will concern objects we have not yet imagined.

—John N Bahcall, 1934-2005, American astrophysicist

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Reference

Advances in Imaging—The Changing Environment for the Imaging Specialist

By John Rego, MD
KM Tan, MD

Over the last two to three decades, the demand for imaging services has blossomed at an unprecedented rate. New modalities have either been introduced as in magnetic resonance imaging (MRI) and positron emission tomography (PET) or significantly improved as in computed tomography (CT) and ultrasound (US).

The increasing sophistication of cross-sectional imaging with very rapid development and integration of interventional radiology into the clinical arena has had a dramatic impact on patient care. The imaging specialist now faces a remarkable transition in his/her work environment.

Bryan refers to two separate but related phenomena. The marked increase in information available from modality advances, and now available in three dimensions, accompanied by technology allowing extensive digital manipulation of such data presages a new era in medical imaging.

Digital data and technology have revolutionized the imaging field. The electronic acquisition, interpretation, transmission and storage of image data has not only increased access for patients but also benefits their referring physicians. Imaging interpretations are available earlier and more readily, and there is almost instantaneous access to these examinations on their office computers. This, of course, mandates an integrated information enterprise that all Kaiser Permanente (KP) Regions have now or will have soon. Picture archiving and communications systems (PACS), radiology information systems (RIS), and hospital information systems (HIS) all contribute to seamless acquisition of image data through PACS, which, together with information from the RIS and the HIS, result in rapid interpretation available to clinicians together with the original images pulled from archival storage. Thus, images and reports are at the right place at the right time.

This technology has inevitably resulted in increasing efficiencies, particularly during off hours, allowing one radiologist to offer interpretation coverage for 17 hospitals in Northern California. A similar situation prevails in Southern California (see page 47). It allows immediate access during the working day to subspecialty imaging expertise of multiple experts located throughout the Region and also allows the ability to provide interpretation services to some of the personnel-strapped Regions both within and outside of California.

Perhaps nowhere else in medicine has there been such rapid advance in technology than in CT scanning. With the advent of multidetector CT (MDCT) five years ago and, more recently volume CT (VCT), a relatively quiet revolution has taken place. CT scanners are now capable of obtaining 128 slices in less than one second. The entire chest, abdomen and pelvis can now be examined with submillimeter imaging in less than 15 seconds. This has led for the first time to true CT volume imaging where image reconstruction can take place in any plane with equal resolution.

We are just beginning to feel the impact of this very valuable tool in such areas as vascular imaging and virtual colonoscopy. The VCT has replaced peripheral...
diagnostic angiography in many centers and is poised to do the same for diagnostic coronary angiography. In the study of the colon, VCT has been shown to be superior to barium enema, approaching the sensitivity of colonoscopy in the detection of polyps larger than 9 mm.²

Advances in software have allowed almost instantaneous display of the images in shaded 3-D representations. This is proving invaluable in preoperative planning. The addition of CT fluoroscopy has allowed rapid, accurate real-time placement of biopsy needles, drainage catheters, and therapy devices.

As the technology advances, several vendors plan to introduce scanners that will acquire up to 512 images per half second with coverage of 12 cm. This will allow for perfusion imaging where viability of tissue can be evaluated. Coronary arterial and myocardial viability will be able to be evaluated simultaneously. Beyond 512 imaging, scanners are being tested that will use large-area detectors that will allow examination of the entire abdomen in just one pass of the x-ray tube.

Advances in MRI are equally as remarkable. As the 1.5T technology matures, there is new technology in the form of 3T-fieldstrength magnets that allow for faster, more detailed, and thinner imaging sections than its 1.5T counterpart. MRI is showing that it can compete with CT in noninvasive imaging of the heart. Multiplanar real-time images of the beating heart can now be obtained that allow for full, functional assessment of the heart. With contrast, perfusion studies can also be obtained.

MRI remains the imaging examination of choice for musculoskeletal and neurologic applications and will continue to compete with CT in evaluation of the vascular tree. And many new applications of MRI will spur further growth. For example, in the breast, with the use of gadolinium contrast agents, MRI is proving to be very sensitive for detection of small breast cancers. Its role in this regard is still being evaluated. When coupled with focused high-energy ultrasound, MRI can be used to guide noninvasive tumor therapies. It has shown its usefulness in treating such tumors and uterine fibroids and in limited applications of other visceral tumors.

Spurred on by miniaturization and by advances in computing power, the applications of ultrasound continue to grow. It is now possible to do high-quality ultrasound on devices the size of a laptop computer. Some devices in development are no larger than a PDA; these may indeed be the stethoscopes of the future. Three- and 4-D ultrasound have been further refined and are now being used in fetal imaging and ultrasound contrast imaging. Voice recognition and real-time image optimization (tuning of the image to the patient’s own acoustic properties) have improved patient workflow.

With the pending approval of ultrasound contrast agents, ultrasound will compete with CT and MRI in the evaluation of the liver.

Interventional radiology continues to grow as procedures migrate from the OR to the IR suite. Stents and stent grafts have dramatically changed the practice of vascular surgery. Vascular surgeons and interventional radiologists have joined forces in many labs with a merging of their two specialties. Percutaneous tumor ablation, stabilization of vertebral body fractures, tumor embolization, venous ablation and recanalization are all procedures now common to the interventional labs.

New flat panel detectors have improved image quality and decreased radiation dose. New rotation angiographic techniques have allowed 3-D vascular image displays. With tube rotation it is now possible through post processing to obtain multislice CT images from the IR equipment.

Digital image acquisition has replaced film throughout the Radiology Department. Digital detectors are now used instead of film to allow immediate image review. This advance has lead to an increase in image quality and a 50% decrease in imaging time. Dual-energy subtraction has allowed improved evaluation of the lungs by subtraction of the bony structures. Additional application of computer-aided diagnosis (CAD) has led to a 10% increase in tumor detection in 64 slice CT scanner now used for cardiac work.
the chest and breast. This same application is being trialed in CT colonoscopy as well.

Thus several trends are becoming clearer. The earlier and more frequent use of imaging will continue with a shortening of the initial clinical evaluation. As indicated above, the 64-slice CT scanner will allow immediate evaluation of a patient’s chest pain, allowing differentiation between a benign situation and the possibility of a heart attack, an aneurysm, or a pulmonary embolism.

Technology will continue to drive care from the hospital. Decreasing cost and size of equipment will allow CT and MRI to devolve outside the hospital Radiology Department into freestanding situations.

The readily available image distribution process ironically will decrease reliance on the radiologist and there will be an enhanced shift to proactive, prophylactic screening in imaging. Computer-assisted detection and diagnosis in the areas of breast, lung, and colon disease are but a harbinger of such use in all clinical areas. Last but not least, functional and metabolic imaging is becoming a reality, and the promise of genetic and molecular marker imaging is not far behind.

One issue merits ongoing discussion and research. Advances in technology serve as one of the most important drivers of health care spending growth. Currently in the United States, medical care consumes more than 14% of the gross domestic product and is likely to reach 17.7% by 2012.³

Increases in the supply of specific technologies such as CT and MRI are associated with higher numbers of procedures per population and with consequent higher health care spending. Experience has shown that co-existence of CT and MRI is not complementary but supplementary. Thus, MRI availability does not offset CT use.⁴

While there may be a legitimate argument for bypassing the current progression of imaging tests from the least expensive to more costly examinations in favor of expensive high-tech imaging as a first-time test that provides more information, the effect is a distinct overall increase in health care spending. With the number of uninsured Americans approaching 50 million and with more of us unable to afford soaring health care costs, it is appropriate to question to what extent we can and should continue to spend dollars in pursuit of increasing diagnostic capabilities that in turn increase the probability of detecting multiple benign abnormalities and the consequent need to resolve them. Can we afford an “arms race” among manufacturers as they continue to outdo one another in the increasing detail and sophistication of their imaging devices? Is it appropriate to tolerate surging health care costs, especially in view of the lack of well-planned cost effectiveness and outcomes studies to support the increasing use of such modalities?

References

Inventions
Our inventions mirror our secret wishes.
—Mountolive, Lawrence Durrell, 1912-1990, Anglo-Irish novelist and playwright
Genetic Services in the KP Southern California Region: Delivering the Promises of Tomorrow Today

Abstract
The impact of advances in molecular biology over the past 25 years—especially the completion of the Human Genome Project—touches every branch of medicine and will continue to have profound influence on medical practice. Advances in genetic technology are changing the traditional patient/doctor paradigm. For some medical conditions, current genetic technology and predictive testing enable us to offer medical management before a patient is diagnosed with a disorder. However, advances in genetic technology impose on all clinicians the added requirement of identifying patients who may benefit from having access to this technology. Kaiser Permanente (KP) provides a unique, integrated approach to this challenge by serving as a model for delivery of genetic services. This article outlines the history and current status of genetic services provided in the KP Southern California Region and summarizes current and future developments in medical genetics technology.

Dawn of a New Era
The integral role of genetics in everyday medical practice is the result of more than five decades of revolutionary clinical and molecular research. The impact of advances in molecular biology over the past 25 years—especially the completion of the Human Genome Project—.touches every branch of medicine and will continue to profoundly influence medical practice. Application of genomics to the study of responses to pharmaceuticals is opening new opportunities in drug development and in pharmacogenetic tools for lowering risks of drug therapy and for increasing its benefits. While genetic technology continues to evolve, however, clinicians face the daunting task of integrating emerging technologies into daily medical practice to improve the health and welfare of patients. As medical genetics gained unparalleled prominence in the 1990s, Kaiser Permanente (KP) has enhanced its unique system of integrated health care services by becoming a national leader in delivering cutting-edge genetic services to KP members. This article outlines the history and current status of genetic services available in the KP Southern California Region (KPSC) and summarizes current and future developments in medical genetics technology.

From Humble Beginnings to State-of-the-Art Practice
Clinical geneticist Nancy Shinno, MD—who is now KPSC Chief of Regional Genetic Services—started her KP career in 1978 as one of only four KPSC clinical geneticists. In those early years, KP geneticists divided their time between medical genetics practice and pediatrics. Moreover, the practice of genetics primarily consisted of evaluating children with dysmorphic features and developmental delay and counseling women about the risks of advanced maternal age. Other than cytogenetic analysis performed to determine chromosome abnormality, few options existed for prenatal diagnosis of genetic disorders.

Now Dr Shinno leads the KPSC Regional Genetics Department, which includes 8 full-time medical geneticists, 22 genetic counselors, a regional genetic screening program, and a regional metabolic genetics program. The KPSC Genetics Department provides genetic ser-

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services to KP members at every KPSC medical center. The “menu” of available genetic tests has expanded exponentially, and the practice of genetics has grown beyond the realm of prenatal and pediatric genetics to include cancer genetics and neurogenetics, among other areas (see Tables 1 and 2). KPSC geneticists and genetic counselors also participate in programs where genetic disorders are managed by other specialists, such as those practicing in the craniofacial service, the sickle-cell disease center, and clinics that evaluate patients for neuromuscular or neurodegenerative disorders.

The impact of genetic technology on diagnosis and management of genetic disorders over time is clearly illustrated by treatment of Fabry disease, an X-linked recessive storage disorder first described in 1898. The disorder causes painful, disabling crises in boys as young as ten years of age; progressive damage to the kidneys, heart, and central nervous system, among other organs; and generally results in renal failure that can lead to early death in men in their thirties and forties. Fabry disease is caused by mutation in the alpha galactosidase A (GAL) gene. This genetic mutation causes deficient activity of the alpha galactosidase enzyme. This deficiency results in progressive accumulation of glycosphingolipids, especially in vascular endothelium, leading to ischemia and infarction of small vessels and resultant renal, cardiac, and cerebrovascular dysfunctions.

In 1978, when Dr Shinno counseled a young woman whose brother and a maternal uncle had Fabry disease, doctors could offer such women little other than the information that they had a 50% chance of being a carrier of the condition. At that time, Fabry disease could be diagnosed in the woman’s brother by using enzyme analysis of leukocytes to identify alpha galactosidase deficiency, but this diagnostic test could not reliably diagnose the carrier state. Prenatal diagnosis using enzyme analysis could be used to detect an affected male fetus, but no treatment (other than kidney transplantation) was available for any affected sons the woman might bear.

By the early 1990s, scientists had mapped the gene for Fabry disease, and DNA analysis was available to inform women whether or not they were carriers of the disease. If results of DNA analysis were negative, the woman had no need to worry about bearing sons destined to have the disorder; if results of the test were positive, the woman could have prenatal diagnosis using sequence analysis, which could detect nearly 100% of mutations in the GAL gene.

By 2003, medical geneticists could inform a carrier patient that enzyme replacement therapy (a drug spinoff from identifying the gene) was available for her affected sons to help prevent renal failure, cardiac and cerebrovascular sequela, and pain.

Table 1. Scope of KPSC Regional Genetic services

| Prenatal/Reproductive Genetics testing |
| Genetic Screening |
| Neonatal/Pediatric Genetics |
| Adult Genetics (including Cancer and Neurogenetics) |
| Metabolic Genetics |
| Craniofacial Service |
| Genetic Testing Laboratory |

Table 2. KPSC Regional Genetics mission statement

The primary aim of the KPSC Regional Genetics Program is to help individuals and families faced with genetic disorders to live and reproduce as normally as possible. Our goal is to ensure that high-quality services are available and accessible to all patients who require care. We strive to reduce morbidity and mortality, to alleviate the suffering associated with genetic and congenital disorders, to improve health and pregnancy outcomes, and to optimize life options for people affected by a genetic disorder.
formation (ie, about risk of disease recurrence) to accurate diagnosis and carrier testing and, finally, to use of enzyme replacement to treat and prevent complications.

**Genetic Testing, Screening, and Counseling**

Genetic testing analyzes human DNA, RNA, genes, chromosomes, or a combination of these structures to detect heritable or acquired genotypes, mutations, phenotypes, or karyotypes that can cause a specific disease or condition. Genetic testing also analyzes human proteins and certain metabolites, which are predominantly used to detect heritable or acquired genotypes, mutations, or phenotypes. Many different types of genetic tests are currently available (see Table 3).

Most genetic testing in KPSC is conducted at our state-of-the-art Regional Genetic Testing Laboratory. During the past year, the laboratory conducted more than 12,000 cytogenetic tests, 14,000 molecular tests, and more than 20,000 biochemical tests. In addition, each year the laboratory conducts revenue-generating tests, including approximately 56,000 maternal serum alpha-fetoprotein (AFP) tests reimbursed by the California Expanded AFP Screening Program. The biochemical genetics section of the laboratory also provides services (eg, analysis of amino acids, organic acids, tandem mass spectrometry) to other KP Regions, including Northern California and Hawaii. Since 1991, the number of cancer cytogenetic tests performed at the KPSC Regional Genetic Testing Laboratory has increased by more than 500%, the number of fluorescent in situ hybridization (FISH) procedures has increased by nearly 200%, and the number of cytogenetic studies of prenatal specimens has remained fairly consistent. Moreover, during the past five years, the Regional Genetic Testing Laboratory has seen a dramatic decrease in the number of molecular tests sent to outside laboratories while the number of inhouse DNA tests has increased even more dramatically (Figures 1 and 2).

Genetic tests are often more complex than other types of medical tests. Testing for genetic susceptibility to disease (eg, examination of breast cancer susceptibility genes BRCA1 and BRCA2) is inherently complex because of its probabilistic and familial nature. Tests of this type identify empirical risks on the basis of genetic linkage studies of populations, not studies of risk in individual persons. This type of population testing has social and ethical consequences that extend beyond medical management and reveals information that affects not only the patient but also the patient’s blood relatives. For this reason, genetic counseling is always an integral part of genetic testing. At KPSC, an outstanding team of 22 genetic counselors works alongside SCPMG medical geneticists to provide pedigree collection and risk assessment; education about genetic diseases and genetic testing options; discussion of options for disease manage-

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**Table 3. Types of genetic tests**

<table>
<thead>
<tr>
<th>Diagnostic Tests: Used to confirm or exclude suspected genetic conditions (eg, Duchenne muscular dystrophy) in symptomatic persons of any age.</th>
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</thead>
<tbody>
<tr>
<td>Predictive Tests: Offered to asymptomatic persons concerned about possible susceptibility to a genetic disorder. Two types:</td>
</tr>
<tr>
<td>Presymptomatic, where eventual development of symptoms is certain, eg, Huntington disease.</td>
</tr>
<tr>
<td>Predispositional, where eventual development of symptoms is likely but not certain, eg, inherited susceptibility to breast and ovarian cancer.</td>
</tr>
<tr>
<td>Carrier Tests: Used to identify healthy persons who have a genetic mutation coding for an autosomal or X-linked recessive disorder which puts their children at risk for having the disorder. Carrier tests may be conducted in persons with a family history of the condition or in ethnic groups known to have a higher carrier rate for the condition (eg, cystic fibrosis).</td>
</tr>
<tr>
<td>Prenatal Tests: Used to diagnose genetic conditions in the fetus. Offered to pregnant women who, because of any conditions (maternal age, personal or family history, ethnicity, suggestive results of either multiple-marker screening or fetal ultrasound), are at increased risk for having a child with a genetic condition or congenital defect.</td>
</tr>
<tr>
<td>Newborn Screening Tests: Used in newborns to determine whether they are at increased risk for specific genetic conditions that usually need immediate treatment.</td>
</tr>
<tr>
<td>Pharmacogenetic Tests: Used to determine how a person’s genetic makeup may affect that person’s reactions to specific drugs. These tests may help clinicians to prescribe drugs that are most effective and cause the least side effects.</td>
</tr>
<tr>
<td>Preimplantation Genetic Diagnosis (PGD): Used to test embryos for genetic disorders before transfer of the embryo to the uterus. PGD has limited application and is considered on a case-by-case basis.</td>
</tr>
</tbody>
</table>

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**Table 4. Most common cancer susceptibility syndromes**

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Gene</th>
<th>Cancer Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBOC</td>
<td>BRCA1, BRCA2</td>
<td>breast, ovarian, prostate, others</td>
</tr>
<tr>
<td>Li-Fraumeni</td>
<td>p53</td>
<td>breast, brain, adrenocortical, sarcoma, leukemia, others</td>
</tr>
<tr>
<td>FAP</td>
<td>APC</td>
<td>colorectal, duodenal, thyroid, others</td>
</tr>
<tr>
<td>HNPCC</td>
<td>MLH1, MSH2, MSH6</td>
<td>colorectal, endometrial, stomach, ovary, others</td>
</tr>
<tr>
<td>Cowden</td>
<td>PTEN</td>
<td>hamartoma of skin, breast, thyroid, oral mucosa, and intestine</td>
</tr>
</tbody>
</table>
The KPSC Genetic Screening Program administers the California Expanded AFP Screening Program as well as the Regional Cystic Fibrosis (CF) Program and the Newborn Screening Program. In California, all pregnant women are offered prenatal “multiple marker screening” through the California Expanded AFP Program. The current panel reports a detection rate of 70% for Down syndrome and detection rates ranging from 85% to 97% for neural tube defects (depending on the type of neural tube defect). “Quad” screening, which adds another analyte to the assay, is under development and is expected to substantially improve prenatal detection rates for Down syndrome over the current “triple screen.” Prenatal CF carrier screening is offered to women on the basis of their ethnicity or on request. KP members who receive positive test results are immediately referred for genetic counseling to help them understand their risks, evaluate their options for additional testing, and make informed medical and personal decisions about having additional genetic tests.

KPSC also participates in the California Newborn Screening Program, which has for many years been screening newborns for phenylketonuria (PKU), sickle-cell anemia, congenital hypothyroidism, and galactosemia. Since its inception, the program has screened virtually all babies born to KPSC members. The program was expanded in 2005 to screen for more than 40 additional disorders through use of tandem mass spectrometry. Among the disorders detected by this method are medium-chain-acyl CoA dehydrogenase (MCAD) deficiency and glutaric acidemia type I (GA1).

Cancer Genetics

For decades, physicians have been able to identify families that have clearly hereditary patterns of cancer; however, physicians had little to offer these families other than recommending vigilance toward all family members without knowing who was (or was not) at risk. That situation changed in the past decade, thanks to the discovery and mapping of several genes associated with susceptibility to cancer. Commercial testing for familial adenomatous polyposis (FAP, the most thoroughly characterized hereditary form of colorectal cancer) was first made available in 1995 and was closely followed by testing for BRCA1 and BRCA2 (breast cancer susceptibility genes 1 and 2)—testing which first became available in 1996—and testing for hereditary nonpolyposis colorectal cancer (HNPCC). Opportunities for commercial and research testing for other cancer syndromes continue to evolve (see Table 4). KP has always
been a leader in the area of cancer genetics and was one of the first healthcare organizations in the nation to address the issues related to BRCA1/BRCA2 testing. In 1997, the National KP Guidelines for BRCA Counseling and Testing were among the first such guidelines developed in the United States. Geneticists and genetic counselors from KPSC were key contributors to development of that guideline, and today these professionals continue to provide comprehensive risk assessment, genetic testing and interpretation, and management information to patients who are at risk for hereditary cancer susceptibility, as well as to their families.

Diagnosis and management of FAP are excellent examples of how genetic technology has substantially changed the way that hereditary cancer susceptibility is diagnosed and treated today. FAP is an autosomal dominant condition which affects approximately 1 in 5000 persons and is characterized by development of numerous (often more than 1000) colon adenomas; virtually all affected patients are at risk for having colorectal cancer by age 40 years. Before 1995, diagnosis of FAP was based on family history of either polyposis, early colon cancer, or both, and sometimes based on presence of extracolonic characteristics (eg, congenital hyperpigmentation of retinal epithelium). Because of the early manifestations of the disorder, all children of affected parents were scheduled for annual endoscopic examination beginning around ten years of age. Because each child had a 50% chance of being affected, half of the children receiving endoscopy had the procedure unnecessarily. After genetic testing became available and the family mutation could be identified, children at risk could be tested; and only those carrying the family mutation would need to be screened for colon cancer. This genetic technology thus spares unaffected children from being tested and allows families and the healthcare systems to focus their resources where they are most needed. Thanks to recent developments in molecular diagnostics, the rate of detecting the mutations in FAP families has increased from about 80% (in the 1990s) to 90% today.

### Table 5. Enzyme Replacement Therapy commercially available or pending FDA review

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>imiglucerase (Cerezyme)</td>
<td>Type I Gaucher disease</td>
</tr>
<tr>
<td>laronidase (Aldurazyme)</td>
<td>mucopolysaccharidosis I (MPS I)</td>
</tr>
<tr>
<td>agalsidase beta (Fabrazyme)</td>
<td>Fabry disease</td>
</tr>
<tr>
<td>galsulfase (Naglazyme)</td>
<td>MPS VI (Maroteaux-Lamy syndrome)</td>
</tr>
<tr>
<td>alpha-glucosidase</td>
<td>Pompe disease</td>
</tr>
<tr>
<td>iduronate-2-sulfatase</td>
<td>MPS II (Hunter syndrome)</td>
</tr>
</tbody>
</table>

*Commercially available in the United States as of late 2005.*

### Table 6. Minimum requirements for obtaining family medical history

<table>
<thead>
<tr>
<th>Obtain family history information on at least three generations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask about all individuals in both sides of the patient’s family and record pregnancy history, including losses/stillbirths/neonatal deaths, age at diagnosis of significant disease, current age (or age at— and cause of—death).</td>
</tr>
<tr>
<td>Ask about history of mental retardation or developmental delay, birth defects, known genetic disorders.</td>
</tr>
<tr>
<td>Record ethnicity and race.</td>
</tr>
<tr>
<td>Record consanguinity.</td>
</tr>
</tbody>
</table>

The Vision of Pharmacogenetics and Pharmacogenomics: The Right Drug for the Right Patient

Pharmacogenetics is the study of variations in DNA sequence related to drug action and disposition and includes study of the enzymes involved in drug metabolism as well as the transporters involved in the absorption, distribution, and excretion of drugs. Pharmacogenomics is the study of all genes that affect the body’s response to drugs; pharmacogenomics is thus the intersection of pharmacology and genomics. Although the terms pharmacogenomics and pharmacogenetics are often used interchangeably, pharmacogenomics is a broader term because it applies to all genes.

Pharmacotherapy for Heritable Disorders

Recombinant versions of enzymes have been developed for treating several heritable disorders of lysosomal storage. Enzyme replacement therapy is available for patients with Gaucher disease, Fabry disease, and some forms of mucopolysaccharidosis (MPS). Other forms of enzyme replacement therapy may soon be approved for treating Pompe disease and another type of MPS (see Table 5).

Throughout California, semiannual collaborative videoconferences have been held by KP geneticists and other specialists (eg, cardiologists, neurologists, nephrologists, ophthalmologists, and gastroenterologists) who treat these patients.
Videoconference participants review the newer enzyme replacement products as well as issues surrounding therapy. This interactive approach provides an optimum perspective on complex diseases, enables sharing of information, and helps clinicians who are making treatment decisions regarding enzyme replacement therapy.

The Promise of Personalized Medicine

News articles have heralded the approach of personalized medicine, a vision of the future wherein type and dose of medication will be chosen on the basis of each patient’s own genetic profile as determined by pharmacogenetic pretesting. This envisioned future will probably occur in small steps, because testing is not yet widely available for most genetic variants and because outcome data must first be collected to guide prescription adjustments based on pretesting. This futuristic model of personalized medicine must also account for multiple factors that can affect gene expression.

Pharmacogenetic information has already been added to the FDA-approved labeling of some medications. Many others will follow, adding new facets to treatment decisions in individual cases. In addition, pharmacogenomic analysis conducted during the drug development process will result in more accurately targeted drugs with more limited toxicity. This achievement may bring new therapies to the consumer market, because improved efficacy and lessened toxicity could justify FDA approval of drugs which could not have been approved for less-well-defined target populations.

During the past five decades, research has led to considerable increase in knowledge concerning the metabolizing enzymes affected by polymorphisms of single genes. Examples of these enzymes include:
- N-acetyltransferase (NAT2), related to alterations in pharmacokinetics of isoniazid, hydralazine, procainamide, and sulfonamides
- cytochrome-P450 isoenzymes, such as CYP2D6, CYP2C19, and CYP2C9, which affect metabolism of many drugs
- UDP-glucuronosyl transferases (UDP-GT), which has an isofrom (UGT1A1) that converts the active metabolite of irinotecan to an inactive glucuronide.

Patients with one of these polymorphisms may be at increased risk for adverse reactions or for inefficacy of the substrate drugs when these drugs are used at usual doses.

With new pharmacogenetic applications and expanded information about associations between drug therapy and genetic variations, the challenge presented to KP includes the need for careful, evidence-based evaluation regarding use of pharmacogenetic testing in drug therapy. This evaluation will require the coordinated efforts of physicians, clinical laboratory staff, and pharmacy staff. In most instances, we will find value in development of evidence-based guidelines, educational tools, and internal KP review by the Biotechnology and Emerging Pharmaceutical Technology Assessment Committee (BEPTAC), physician committees, and the Pharmacy and Therapeutics Committee.

Genetic Testing and Drug Therapy

At least two types of genetic testing will be used in pharmacogenetic applications that affect choice of drug therapy.
- One such type of testing measures genetic variation in a disease, such as mutations in tumor tissue. One of the best-known examples of gene testing related to drug therapy is testing of tumor tissue in metastatic breast cancer patients as a determinant of whether trastuzumab (Herceptin, Genentech, South San Francisco, CA) might be effective. Overexpression of the HER2 protein has been found in some human primary tumors and has been identified in 25% to 30% of patients with breast cancer. Available methods of testing include an immunohistochemical (IHC) assay to test for overexpression of HER2 protein and a FISH test using a DNA probe to determine HER2 gene amplification. Testing has become both a standard feature of treatment plans and requisite for use of trastuzumab in a specified subset of patients diagnosed with metastatic breast cancer.
- The other type of genetic testing is testing for genetic variations in an individual person. An example of such variation is the gene variant for UGT1A1 enzyme, which converts the active metabolite of irinotecan (Camptosar; Pharmacia, Peapak, NJ), indicated for metastatic colorectal carcinoma to an inactive metabolite. This polymorphism (UGT1A1*28) leads to decrease in UGT1A1 enzyme activity, which in turn leads to increased irinotecan toxicity (eg, severe neutropenia). About 10% of North Americans are homozygous for the polymorphism and are at increased risk for this toxicity. Another 40% of the North American population are heterozygotes and may also have some increased risk for toxicity. The FDA has recently added this information to the irinotecan product label. Oncologists, pharmacists, laboratory personnel, and geneticists are interacting to determine how to use this pharmacogenetic information most effectively.
The Family Medical History: A Timeless Tool

Although genetic technology continues to evolve at an unprecedented pace, the family medical history remains a valuable clinical tool in delivery of genetic services to our patients. Indeed, one forecast has stated that “Personal and family [medical] history will continue to be the key indicator for clinical use of genetic tests.”

Collection and interpretation of information on family medical history is essential for several purposes: to identify persons at risk for genetic conditions, to determine genetic testing options, to interpret results of genetic tests, and to choose appropriate options for clinical case management. The FAP example presented above is a perfect illustration of how knowing a patient’s family medical history affects diagnosis and management of a genetic condition.

Physicians in all specialties will face increasing demands “to explore family [medical] history, explain genetic testing options, and separate genetic hype from reality for their patients—roles for which physicians currently receive little or no training.”

Recently, several professional organizations have focused on increasing genetic competency among primary care practitioners. The National Coalition for Health Professional Education in Genetics (NCHPEG) has defined core competencies in genetics for all health professionals and has developed education tools to promote integration of genetics into healthcare practice. The American Academy of Family Physicians chose genomics as their Annual Clinical Focus (ACF) for 2005 and invited Francis Collins, MD, Director of the Human Genome Project, to kick off the program; and the CDC declared Thanksgiving 2004 as “Family History Day” to launch its Family History Initiative.

The family medical history should include information on at least three generations from both sides of the family (see Table 6). Physicians must recognize that family history is dynamic. As relatives age, they may be diagnosed with new disorders that were not part of the original history collected for the patient. For data on family medical history to be accurate, it must be updated regularly. Collecting and updating information on family medical history should not be the sole responsibility of primary care practitioners, however. Because some KP members rarely see a primary care practitioner, all clinicians should seize the opportunity to collect and update information about their patients’ family medical history.

KP HealthConnect will provide an opportunity for collecting and tracking some data on family medical history. Moreover, a KP interregional committee of genetics specialists is currently exploring options for developing expanded databases of family medical history and pedigree.

We hope that these initiatives will allow family history interpretation software to become widely available to assist primary care practitioners in identifying patients at risk for genetic conditions and to improve clinical care of these patients. Until those tools are universally available, clinicians should familiarize themselves with some of the more common “clues” that suggest the need for a referral to the genetics service (Table 7).

Present and Future Evaluation of Genetic Technology at KPSC

The KPSC Regional Genetics Department works closely with many other departments and processes to ensure that the following occur:

- Decisions regarding introduction of new genetics technology are evidence-based
- All aspects of service quality and cost are considered during the planning and implementation process
- An ongoing management structure for existing technologies is provided. Groups who interact with the KPSC Regional

Table 7. Genetic “red flags” in the family medical history

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children with birth defects, developmental delay, unexplained short stature, clinically significant hearing loss, unusual dermatologic conditions, ambiguous genitalia, or tumors with possible hereditary component (eg, retinoblastoma, Wilms’ tumor)</td>
</tr>
<tr>
<td>Family history of mental retardation, birth defects, or known genetic disorders (eg, muscular dystrophy, hemophilia, neurofibromatosis)</td>
</tr>
<tr>
<td>Family history of multiple pregnancy losses, stillbirths, or unexplained neonatal death</td>
</tr>
<tr>
<td>Consanguinity</td>
</tr>
<tr>
<td>Evidence of autosomal dominant (vertical) transmission</td>
</tr>
<tr>
<td>Evidence of autosomal recessive (horizontal) transmission</td>
</tr>
<tr>
<td>Three or more relatives (on same side of family) with same disorder (eg, colon cancer)</td>
</tr>
<tr>
<td>Early age at diagnosis of common cancer (eg, breast or colon cancer at age &lt;50 years)</td>
</tr>
<tr>
<td>Multiple primary cancers in same individual</td>
</tr>
<tr>
<td>Constellation of tumors consistent with specific cancer syndrome (eg, breast and ovary, or colon and endometrium, in the same side of the family)</td>
</tr>
</tbody>
</table>
Genetics Department include National KP and KPSC Medical Technology Assessment and Deployment Committees, the Biotechnology and Emerging Pharmaceutical Technology Assessment Committee, the Regional Laboratory, and the Research and Evaluation Department.

Advances in genetic technology are changing the traditional patient-doctor paradigm. Because of current genetic technology and predictive testing, medical management is now available for some conditions before they are diagnosed in a patient, and diagnosis is possible for many conditions for which no effective treatment currently exists. In both situations, genetic counseling of patients is imperative for helping them and their families to understand this complex information. In the future, evolving genetic technology will allow physicians to manage their cases on the basis of each patient's individual genetic makeup, the disorders to which these patients are predisposed, and how these patients respond to treatment.

The impressive power of genetic technology brings with it an equally impressive three-part responsibility: equitable access, clinically responsible care, and timely use of genetic technology for patients who may benefit from it. Collecting, documenting, and acting on information about each patient's family medical history are key factors in this equation. The physicians and counselors at the KPSC Regional Genetics Department are already delivering on the promises of genetic technology and will continue to combine powerful, state-of-the-art medicine with a personal touch and with the same excellence that exemplifies genetic services in each KP region.

Glossary

- Genetics is the study of single genes and their effects.
- Genetic Medicine includes the diagnosis and treatment of conditions caused by mutations in a single gene (eg, Huntington disease) or chromosomal abnormality (eg, Down syndrome). Genetic counseling, genetic testing, and genetic-disease management are services that have been associated with genetic medicine practice.
- Clinical geneticists are Board-certified or Board-eligible physicians who have completed a fellowship approved by the American Board of Medical Genetics. The American Board of Medical Genetics, recognized by the American Board of Medical Specialties in 1991, certifies physicians in clinical genetics along with physicians and PhDs in clinical biochemical genetics, clinical cytogenetics, and clinical molecular genetics. In the past, clinical geneticists were interested primarily in dysmorphology and evaluation of children with birth defects, mental retardation, or both. Although this interest continues to be a part of their practice, clinical geneticists now engage in a wide range of clinical endeavors involving patients of all ages.
- Genetic Counselors are medical professionals trained in all areas of medical genetics who have completed a master's degree program accredited by the American Board of Genetic Counseling and who are Board-certified or Board-eligible. In addition to collecting and interpreting information of a patient's family history, genetic counselors educate and counsel patients about genetic disorders, inheritance patterns, genetic testing options, interpretation of test results, and the medical and social implications of genetic disorders. Genetic counselors work under the supervision of, and in collaboration with, clinical geneticists. Genetic counselors provide preconception and prenatal genetic counseling to determine family history of birth defects or inherited conditions, possible teratogenic exposure, consanguinity, suspected personal or family history of cancer susceptibility, and other conditions.
- Genomics is the study of the whole genome—how individual genes interact with each other and how they may interact with the environment to spur development of disease. When genomics is fully developed as a field, genetics will be a subset of genomics, and genetic medicine will be part of the prevention, diagnosis, and treatment of all disease, not just genetic disorders. 

References


4. American Board of Medical Genetics.
Wonder

Wonder was the motive that led people to philosophy. Philosophy is to the cure of the soul what medicine is to the cure of the body. Wonder is a kind of desire in knowing. It is the cause of delight because it carries with it the hope of discovery.

—Thomas Aquinas, circa 1225-1274, Italian Catholic philosopher and theologian
Kaiser Permanente Southern California Regional Technology Management Process: Evidence-Based Medicine Operationalized

By Joanne Schottinger, MD
Richard M Odell


Introduction
Kaiser Permanente (KP) has a robust process for evaluating, deploying, and monitoring new types of medical technology, including devices, equipment, diagnostics, and procedures. This process provides guidance and management of new and existing medical technology to ensure that physicians of the Southern California Permanente Medical Group (SCPMG) can provide state-of-the-art care. The success of the process depends on participation of a variety of internal professional and physician experts as well as other internal groups, such as the Interregional New Technologies Committee, Laboratory Committees, and Pharmacy Committees.

The process of managing medical technology uses three teams of physicians and support staff: the Medical Technology Assessment Team (MTAT), the Medical Technology Deployment Strategy Team (MTDST), and the Regional Product Council (RPC). The medical technology management process seeks to evaluate medical technology in a timely manner, using principles of evidence-based medicine and focusing on efficacy, safety, and expected improvement in health outcomes. The evaluation process also provides analytical and tactical support to SCPMG physicians by assisting them with systematic, well-thought-out deployment of medical technology. The final component of the process considers benchmark standards to coordinate purchase of the technology while ensuring that KP leverages its collective purchasing power, and provides appropriate vendor support.

Over the past two decades, the process of managing new technology in the KP Southern California Region has evolved continuously. Initially, in 1983, a Medical Technology Committee was formed to evaluate requests of local medical centers for regional approval to purchase capital medical equipment. At that time, much focus was directed on new types of imaging technology, such as computed tomography (CT) or magnetic resonance imaging (MRI).

In 1995, the Technology Assessment and Guidelines (TAG) Unit was developed to support the committee by providing evidence-based evaluation of new technology. In 1998, the California legislature enacted the Friedman-Knowles Act, which set the stage for independent medical review of coverage decisions for individual health plan enrollees. The Medical Technology Inquiry Line was created in the KP Southern California Region as a one-stop location for giving clinicians prompt access to objective, evidence-based medical information on new technology. With the support of the Permanente Federation, this service was expanded to include support for KP regions outside California.

In 2000, a process called the Medical Technology Management Process was implemented to connect the discipline of evidence-based evaluation of medical technology with a strategy for planned equipment purchase and deployment. Figure 1 shows the groups currently participating in this process, the components of which include assessing and deploying medical technology as well as responding to inquiries about it.

Technology Assessment
The Medical Technology Assessment Team (MTAT) performs critical analysis of published, peer-reviewed medical literature to evaluate the evidence supporting use (or avoidance) of specific types of technology for medical diagnosis or treatment. Assessment of new tech-
New Technology

health systems

New Technology

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technology includes describing the specific health problem, the population of concern, the new technology, any alternative interventions, and the desired health outcomes. The medical problem of interest is described precisely and systematically with input from clinicians practicing in specialties relevant to the specified condition.

One of the analytical staff uses PubMed (an online bibliographic resource) to search the medical literature. The published medical literature is searched also to identify any previous assessments that may have been conducted by other organizations that use evidence-based methodology (for example, the Emergency Care Research Institute, Blue Cross/Blue Shield, or Hayes, Inc, an independent assessor of health technology). Information is sought also from government agencies, such as the US Food and Drug Administration (FDA), National Institutes of Health (NIH), National Cancer Institute (NCI), Centers for Disease Control and Prevention (CDC), and from medical specialty societies.

The MTAT carefully evaluates the quality of available evidence by thoughtfully considering such factors as number of studies and subjects, quality of investigation (Figure 2), consistency of study results, certainty and magnitude of possible benefits and harms, and number of potential candidates for a specified intervention. Stating the rationale for its conclusion, the MTAT develops and forwards to interested specialty groups a recommendation based on the sufficiency of the evidence.

Technology Deployment

Technology whose use is supported by available evidence is also recommended by MTAT to the Medical Technology Deployment Strategy Team (MTDST), which considers the logistics of deployment, including forecasting the need and uses for the technology, developing a business case for its use, determining requirements for training and credentialing staff who will use the technology, and defining processes for monitoring the quality of the technology’s outcomes. The Regional Product Council (RPC) is responsible for acquiring, standardizing, and budgeting for medical equipment. The RPC communicates with KP’s geographic service areas in Southern California.

This process of evaluating, recommending, planning, acquiring, and monitoring use of new medical technology is tied together and is administratively coordinated by the Joint Chairs Committee (a group which includes the Chair and Co-chairs of the MTAT, MTDST, and RPC). The Joint Chairs Committee ultimately makes regionwide recommendations about new technology.
health systems

Kaiser Permanente Southern California Regional Technology Management Process: Evidence-Based Medicine Operationalized

Special Feature

Systematic reviews and meta-analyses

Figure 2. Diagram shows pyramidal hierarchy of evidence used by clinicians, researchers, and administrative decisionmakers to evaluate medical technology for possible use in the KP Southern California Region.

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after carefully consulting with KP internal experts, chiefs groups, regional clinical committees, and clinical technology committees. At their meetings, the medical directors and medical group administrators receive regular updates on new technology, including capital requirements as well as implications for future space planning.

Responding to Inquiries about Technology

Physicians or Member Services Representatives with a specific patient case question or leaders with questions about new technologies can easily access informational resources on new technology by contacting the KP Southern California Region Technology Inquiry Line at 626-405-5138 or by sending an electronic inquiry to Med-Technology-AGU, Scal (KP e-mail) or scal.med-technology-agu@kp.org (Internet access). Questions can range widely—from the newest technology for targeted cancer therapy or drugs still in clinical trials to the oldest technologies—and ask, for example, “What is the role of leeches in medical therapy?” and “How can we acquire leeches appropriate for medical use?”

In response to the inquiry, the technology assessment group sends an electronic file containing several components:

- a summary and analysis of published information
- a reference list with published abstracts obtained from MEDLINE
- assessments obtained from other evidence-based organizations, if available; and
- information on FDA/Medicare coverage.

The inquiry line receives about 700 inquiries per year, about a third of which originate from outside California. Maintaining assessments and responses in a database enables most inquiries to be answered within 24 hours.

The KP Interregional New Technologies Committee

Technology that may have programwide application is also assessed by an interregional KP group, the Interregional New Technologies Committee. This group, chaired by the Permanente Federation Associate Executive Director for Quality and Program Improvement, includes physician-representatives from each KP region, Program Offices, the Care Management Institute (CMI), and from Kaiser Foundation Hospitals benefits and regulatory services, legal counsel, public affairs departments, and ethics advisors. The INTC tracks emerging technology as it is developed for entry into the marketplace.

On the basis of the published literature reviewed, the INTC can issue any of three types of recommendation:

- Sufficient evidence shows that use of the technology is medically appropriate for select patients
- Insufficient evidence exists for the committee to determine whether use of the technology is medically appropriate for any patient; or
- Sufficient evidence shows that use of the technology is generally not medically appropriate for any patient.

Recommendations and discussion of the rationale for new technology discussed by the INTC are available on the clinical library Intranet site, http://cl.kp.org/. These materials are filed under Clinical Practice Guidelines as the last item (New Clinical Technologies) and can be searched either chronologically or alphabetically. Table 1 lists some recent examples of technology reviewed by the INTC along with its recommendations.

Evaluation of New Drugs

Assisted by monographs prepared by KP National Drug Information Services, the KP Pharmacy and Therapeutic Committees use an evidence-based approach to assess the safety and efficacy of new medications. Individual clinicians can obtain literature searches and information about new medications from the Drug Info line (available by phone in the KP Southern California Region), electronically at Drug-Info-Inquiry (available through KP e-mail), or Drug-Info-Inquiry@kp.org (accessed over the Internet).

The KP Biotechnology and Emerging Pharmaceuticals Technology Advisory Committee (BEPTAC) was formed in response to the exploding growth of new types of medication, including human proteins, mono-
clonal antibodies, growth factors, immunomodulatory drugs, and chemotherapeutic agents. Although expensive, these drugs often represent major advances in treating the diseases for which the new medications are approved. Monitoring these medications is challenging also because they may have more widespread potential applications that have not yet been well studied; and that neither the safety of these medications, often approved after review of very limited clinical trials, nor the adverse reactions they cause, may not yet be completely understood. This concern is illustrated by the recent withdrawal of natalizumab from the market after progressive multifocal leukoencephalopathy developed in some patients who had received the drug as treatment for multiple sclerosis or Crohn’s disease.2-4

**Challenges to Use of New Medical Technology**

Tension in evidence-based technology management is presented mostly by the statement that “there is insufficient evidence showing that this intervention is medically appropriate for patients.” Because the process tries to “stay ahead of the curve,” many assessments of medical technology initially include this statement, often reflecting existence of lag time between data collection, its presentation at specialty society meetings, and publication of the evidence in peer-reviewed medical journals. In some cases, the technology that appears in a publication is already outdated and has been replaced by newer methods. Frequently, assessments must be updated and the medical literature monitored until the technology “matures” or until high-quality investigational trials are completed.

A good current example of this sequence of events is presented by virtual colonoscopy as used for detecting polyps and colorectal cancer. The medical community eagerly awaits the results of ongoing large randomized controlled trials to determine the utility of this technology compared with standard visual colonoscopy.5

Another reason for concluding that a recommendation is supported by insufficient evidence may be that different studies present conflicting evidence. In addition, other reasons may be found for recommending against use of medical technology: existing published studies may be methodologically weak or include too small a study cohort; the magnitude of the benefit may be small; or no comparison has been made with existing technologies and therefore no evidence has been presented showing that the newer technology improves upon the older technology. In these instances, one possible solution is to deploy the new technology at KP as part of a research protocol or as a quality pilot project designed to collect data for responding to unanswered questions about whether the technology deployed within KP has improved treatment outcomes. If the technology is thus deployed as part of a research protocol, we can contribute to the health of our communities also by contributing to the peer-reviewed medical literature or by publishing our own results. With our organization’s size, the interests of our clinicians, the strength of our research departments, and especially the power of an electronic medical record, the future holds much promise for us to lead in the most effective use of new medical technology.

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**Table 1. Recent recommendations of the KP Interregional New Technologies Committee regarding several new types of technology**

<table>
<thead>
<tr>
<th>Evidence sufficient to recommend use of these technologies in selected patients</th>
</tr>
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<tbody>
<tr>
<td>- Vagal nerve stimulation for patients with intractable epilepsy</td>
</tr>
<tr>
<td>- Wireless capsule endoscopy for evaluation of Crohn’s disease</td>
</tr>
<tr>
<td>- Artificial lumbar disc replacement for single-level vertebral disease</td>
</tr>
<tr>
<td>- Bone morphogenetic proteins for spinal fusion surgery</td>
</tr>
<tr>
<td>- Laparoscopic hysterectomy for benign uterine conditions</td>
</tr>
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<th>Evidence insufficient to recommend use of these technologies</th>
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<tr>
<td>- Vagal nerve stimulation for treating depression</td>
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<td>- Electrical stimulation and electromagnetic therapy for healing of chronic wounds</td>
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<td>- Islet cell transplantation for patients with type 1 diabetes</td>
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<td>- Robot-assisted prostatectomy</td>
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**References**

Update on Interventional Neuroradiology

By Amon Y Liu, MD

Introduction

Interventional neuroradiology—a relatively new medical subspecialty known also as endovascular neurosurgery—treats cerebrovascular, head and neck, and spinal disease by using minimally invasive techniques. Interventional neuroradiology was originally developed in the 1980s by neuroradiologists and neurosurgeons. Since that time, dramatic advances in interventional neuroradiology have been made possible by similarly rapid advances in medical technology, such as neuroimaging (particularly digital subtraction cerebral angiography and angiographic road-mapping), and development of revolutionary medical devices. Many medical conditions which could not be treated effectively 15 years ago can now be treated curatively using current endovascular techniques. Indeed, even within the field of interventional neuroradiology, new technology and devices introduced within the past five years have allowed interventional neuroradiologists to increase the number of life-threatening cerebrovascular diseases which can be treated effectively.

This article provides a brief overview of the historical basis for interventional neuroradiology, current treatment options for different types of cerebrovascular disease, and anticipated future developments in the field. This article also discusses current status and future plans for the Interventional Neuroradiology program at Kaiser Permanente (KP) Medical Center in Redwood City, California.

Historical Basis of Interventional Neuroradiology

Diagnostic Neuroradiology

Diagnostic neuroradiology is a subspecialty of radiology. The first report of cerebral angiography (visualization of the cerebral vascular anatomy) in a living human subject, in 1927, described a small surgical incision made in the neck to puncture the common carotid artery, after which radiopaque contrast material was injected as a bolus for serial filming of the cerebral arteries and veins. In the ensuing decades, cerebral angiography advanced considerably in accuracy, efficacy, and safety. Direct surgical incision was replaced by percutaneous direct carotid puncture, a procedure which has subsequently been supplanted by percutaneous transfemoral catheterization (ie, insertion of a catheter through the common femoral artery after percutaneous needle puncture) and use of safer radiopaque contrast materials for cerebral angiography. In addition, modern mechanical devices for injecting contrast material, advent of digital subtraction angiography, new techniques for obtaining high-speed serial films, and manufacture of modern high-performance catheters also have contributed to the evolution of cerebral angiography as an imaging modality which is safe and effective when used by experienced operators.

Concurrent with these developments, noninvasive advanced technology such as ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) have sometimes allowed interventional neuroradiologists to make more accurate diagnoses and to plan endovascular interventions without making a skin incision to see inside the body. Further improvements in noninvasive imaging equipment and powerful computer processors have led to new techniques for visualizing the cerebral vasculature using CT or MRI. These techniques—computed tomographic angiography (CTA) and magnetic resonance angiography (MRA)—are now often used to screen patients for suspected cerebrovascular disease. These techniques reduce (but do not eliminate) the need for diagnostic cerebral angiography, which currently has greatest sensitivity for detecting subtle abnormalities or diseases of the small and distal cerebral vessels.

Interventional Neuroradiology

Interventional neuroradiology is a radiologic subspecialty which was introduced in the 1980s to help neuroradiologists and neurosurgeons to find effective techniques for treating patients for whom tradi-
tional treatments (ie, open brain surgery) were neither possible nor feasible. Conditions precluding traditional treatment included giant cerebral aneurysm, surgically inaccessible aneurysm, large arteriovenous malformation, clinically significant medical comorbidity, or a combination of these conditions. Introduction of cerebral angiography provided an avenue for achieving more effective treatment for patients with these conditions.

Through the 1980s, neurointerventional techniques were considered largely experimental and were done only for patients who had no other treatment options. In the late 1980s and early 1990s, two key developments in angiographic equipment—digital subtraction angiography and roadmap fluoroscopic imaging—permitted dramatic growth of interventional neuroradiology. Digital subtraction angiography initially had resolution inferior to that of cut-film angiography but allowed more rapid decision making during angiographic procedures by eliminating the need for using time-consuming, conventional film processing after each angiographic injection of contrast material. Roadmap fluoroscopic imaging has allowed interventional neuroradiologists to obtain angiographic images of a blood vessel, lesion (eg, cerebral aneurysm), or both by injecting only a small amount of contrast medium and to maintain this angiographic image on the fluoroscopic monitor while superimposing live fluoroscopic (x-ray) images on the angiographic image. In essence, by giving interventional neuroradiologists a “roadmap” of the blood vessel and lesion, this imaging technique has enabled these specialists to treat the lesion. For example, a “roadmap” can be used to guide a catheter to the proper location within a blood vessel so that materials can be deployed to treat a cerebral aneurysm. The “roadmap” also enables interventional neuroradiologists to then inflate and deploy a balloon within the aneurysm to occlude it. Indeed, interventional neuroradiology would be impossible without the advent of roadmaping.

Equally important for advancement of interventional neuroradiology were the rapid technological improvements in each successive generation of medical devices and materials. In general, therapeutic procedures in interventional neuroradiology are done through a microcatheter measuring between .013 and .021 inches in diameter. The microcatheter is inserted coaxially through a larger catheter (the “guide” catheter, measuring approximately 2 mm in diameter) placed in the groin. Under fluoroscopic (x-ray) guidance, the microcatheter is threaded through the blood vessels leading into the brain. Depending on the disease process being treated, any of several devices or materials may be deployed or injected through the microcatheter.

Despite its strong roots in the field of radiology, interventional neuroradiology has evolved into a distinct medical discipline that combines elements of radiology and neurosurgery. Emergence of interventional neuroradiology has marked a transition from the radiologist’s traditional role as a consultant: Interventional neuroradiologists serve not only as consultants but as clinicians who assume an active role and responsibility in treatment. As interventional neuroradiology continues to evolve, radiologists as well as a growing number of neurosurgeons have entered the field. The American Society of Interventional and Therapeutic Neuroradiology was formed in 1992 as the governing body for this multidisciplinary field.

**Current Treatment Options in Interventional Neuroradiology**

The minimally invasive procedures used by interventional neuroradiologists accomplish a wide variety of treatments (some of which are described in this article) designed to provide pain relief as well as to correct life-threatening conditions. Such conditions include aneurysm (treated by inserting platinum coils into the aneurysm bulge to promote clotting and to prevent rupture), abnormal, enlarged cerebral arteries (treated by injecting embolic material into a arteriovenous malformation to prevent life-threatening hemorrhage), and stroke (treated either by delivering “clot-busting” drugs directly to the site of blockage or by using microdevices specifically designed to retrieve clots). As alternatives to invasive surgery, these forms of therapy are often advantageous because they can lower the risk to patients, shorten hospital stays, and hasten recovery. Endovascular techniques also allow treatment of many lesions which could not be treated with open surgery.

Similarly, interventional neuroradiologists use endovascular and other percutaneous techniques to treat some types of head and neck disease (for example, embolic or sclerosing agents are injected to treat carotid
blowout syndrome, epistaxis, and facial hemangioma) and some types of spinal disease (for example, a “glue” is injected to treat spinal arteriovenous malformation, or cement is injected into a fractured vertebra to treat pain caused by fracture).

**Treatment of Cerebral Aneurysms**

Initially, only aneurysms described as giant (> 2.5 cm) or otherwise inoperable were treated using endovascular techniques. These aneurysms were treated by inflating and detaching small silicone or latex balloons within the aneurysm in the hope that filling the aneurysm would prevent its rupture. Other aneurysms were treated, wherever possible, by using balloons to deliberately occlude the blood vessel both proximal and distal to the aneurysm.

The early 1990s brought a revolutionary advance to interventional neuroradiology: the Guglielmi Detachable Coil, GDC (Boston Scientific, Natick, MA). This device is an electrolytically detachable platinum coil which can be delivered into a cerebral aneurysm to promote clotting within the aneurysm. If satisfactory positioning of the coil cannot be achieved, it can be withdrawn through the microcatheter. Currently, interventional neuroradiologists planning treatment of aneurysms can choose from among several types of FDA-approved coils: bare platinum coils, 2- and 3-dimensional coils, aneurysm-conforming coils, bioactive coils, and hydrogel-coated coils. These coils differ from one another in performance characteristics, advantages, and disadvantages. When used in the appropriate setting, these newer-generation coils are expected to improve the stability of aneurysm coiling and thereby reduce the need for repeat embolization.

The International Subarachnoid Aneurysm Trial (ISAT) was designed to compare the efficacy of aneurysm coiling versus open surgery in patients with ruptured aneurysms. In 2002, investigators showed that patients who were treated with coil embolization had improved outcomes compared with patients who received open surgery.

The next revolutionary advance in endovascular treatment of cerebral aneurysms came in 2003 with the introduction of the first stent approved by the FDA for intracranial use. The Neuroform stent (Boston Scientific, Natick, MA) facilitates treatment of wide-necked cerebral aneurysms by bridging the neck of the aneurysm with a very thin meshwork which prevents coil loops from prolapsing into the parent vessel and thereby reduces the risk of a treatment-related stroke.

**Treatment of Cerebral Vasospasm**

Interventional neuroradiologists are also frequently called upon to treat cerebral vasospasm, one of the devastating sequelae of aneurysmal subarachnoid hemorrhage. Endovascular treatment of vasospasm may include use of a microcatheter for intraarterial injection of vasodilating agents, or balloon angioplasty of the intracranial vessels.

**Treatment of Cerebral Arteriovenous Malformations and Dural Arteriovenous Fistulae**

These types of vascular malformations can often cause debilitating symptoms such as headaches or pulsatile tinnitus (“ringing or buzzing in the ears”) and can cause life-threatening intracranial hemorrhage. Depending on the type of arteriovenous vascular malformation involved, interventional neuroradiologists can very effectively treat these lesions by injecting embolic agents such as polyvinyl alcohol (PVA) and n-butyl cyanoacrylate (colloquially known as “glue” and approved by the FDA in 2003) into arteries supplying the lesions. In August 2005, the FDA approved Onyx (Micro Therapeutics, Irvine, CA), a nonadhesive liquid embolic system composed of ethylvinyl alcohol dissolved in dimethyl sulfoxide, for preoperative and radiosurgical embolization of arteriovenous malformations. Other types of vascular malformation can be treated using platinum coils placed through a transvenous approach.

**Treatment of Intracranial and Extracranial Atherosclerosis**

Increasingly, interventional neuroradiologists are also treating these conditions by using endovascular techniques, such as balloon angioplasty, stenting, or both techniques. In patients who have symptomatic intracranial atherosclerosis and who have suboptimal results of medical management using antiplatelet agents or anticoagulants, stroke is highly likely to develop shortly after this medical treatment; in such cases, use of intracranial angioplasty, stenting, or a combination of these techniques can make the disease less debilitating by improving cerebral perfusion, by reducing the risk of thrombotic/embolic events, or by both actions. The FDA has recently approved the first intracranial stent, the Wingspan (Boston Scientific, Natick, MA), for use in atherosclerotic disease, further raising the prospects for improved outcomes in affected patients. Stenting of the extracranial carotid and vertebral arteries has also advanced greatly. Carotid endarterectomy done by an experienced surgeon remains a highly effective procedure.
method of treating symptomatic carotid stenosis, and most interventional neuroradiologists reserve stenting for patients who are poor candidates for carotid endarterectomy. (In these patients, the procedure is precluded by recurrent postendarterectomy stenosis, radiation-induced stenosis contralateral carotid occlusion, high-cervical stenosis, or clinically significant medical comorbidity). However, multicenter randomized clinical trials, such as the Carotid Revascularization Endarterectomy vs Stenting Trial (CREST), are well underway to determine whether carotid stenting done by experienced operators is superior, equivalent, or inferior to endarterectomy for treating carotid stenosis. Early results of this study have been encouraging for stenting.

Vertebroplasty
In many cases, painful spinal compression fracture (osteooporotic or traumatic), isolated vertebral bone metastasis, and vertebral hemangioma can be treated effectively with vertebroplasty when the pain is not relieved by analgesic medications. In such cases, a large spinal needle is guided percutaneously into the fractured bone under x-ray guidance, and a bone cement mixture is then carefully injected into the bone to treat the fracture. In approximately 90% of appropriately selected patients, the pain is either partially or completely relieved after completion of this procedure. Many patients who receive the procedure can safely eliminate or substantially reduce their use of pain medication.

Future Developments in Interventional Neuroradiology

The rapid pace of technological innovation in interventional neuroradiology makes this a very exciting field. Although we cannot precisely predict what new devices may become available in the next five years, we can certainly expect continued improvement in successive generations of the coils and stents used for treating aneurysms. The Onyx liquid embolic system (Micro Therapeutics, Irvine, CA) has also been used successfully in clinical trials to treat selected cerebral aneurysms, and the manufacturer is expected to seek FDA approval for this indication within the next two to three years. This embolic material may ultimately be used in conjunction with coils or may in some cases replace use of coils for aneurysm treatment.

In August 2004, endovascular treatment of acute ischemic stroke was advanced substantially by FDA approval of the Merci Retriever device (Concentric Medical, Mountain View, CA). The device is designed to restore flow to the brain by retrieving embolic material (or blood clot) within an occluded cerebral vessel. Nonetheless, the device is only approximately 50% effective in appropriately selected patients. Further improvement in this and other similar devices is anticipated.

Continuing improvement in imaging technology is also expected to enhance the capabilities of interventional neuroradiologists. Angiographic equipment improvements in image resolution, 3-D imaging, and imaging of soft tissue all will help interventional neuroradiologists to make more effective treatment decisions.

The Interventional Neuroradiology Program at the KP Redwood City Medical Center

The Interventional Neuroradiology program at the KP Redwood City Medical Center is led by Amon Y Liu, MD; Gwinette Cowan, RN (Manager, Interventional Services); and Beverly Land, RN (Interventional Neuroradiology Nurse Coordinator) and includes a team of six angiography technologists and five staff nurses. In September 2005, the team was joined by a second neurointerventionalist, Sean P Cullen, MD.

The goals of the Interventional Neuroradiology program at the KP Redwood City Medical Center are

• to extend the range of cerebrovascular and head and neck diseases that can be effectively treated;
• to improve rates of morbidity and mortality associated with treating cerebrovascular and head and neck disease; and
• to improve continuity of care and to reduce treatment delays in the KP Northern California Region.

As the regional service center for the neurosciences, the KP Redwood City Medical Center has been able to form this cohesive team, which uses a multidisciplinary approach to treating patients diagnosed with neurological disease. With regard to patients with cerebrovascular disease in particular, specialists in interventional neuroradiology, neurosurgery, and neurology-critical care work closely with each patient to determine the best course of treatment and management. At present, the Interventional Neuroradiology service can provide all FDA-approved treatments that do not require participation in clinical trials (except treatments for acute ischemic stroke, which are treated on a case-by-case basis). Participation in selected clinical trials is considered if a potential benefit to a patient can be established. The service expects to offer complete coverage for acute ischemic stroke upon certification by the American Stroke Association as a comprehensive stroke center. ♦
References


Suggested Reading


The Mysterious

The most beautiful thing we can experience is the mysterious. It is the source of all true art and science.

—Albert Einstein, 1879-1955, physicist, 1921 Nobel Laureate in Physics
Implementation of a Teleradiology System to Improve After-Hours Radiology Services in Kaiser Permanente Southern California

Abstract
Kaiser Permanente Southern California (KPSC) has implemented a teleradiology service to provide after-hours radiology services to its 11 medical centers from 7:00 pm to 7:00 am each day of the week. Features of the service include a Web application that is used to manage the workflow associated with teleradiology exams and to provide reports of the teleradiologists’ findings to referring clinicians. Currently, two teleradiologists who can be located at any KPSC facility (varies from day to day) are used to provide preliminary interpretations of CT, MRI and ultrasound exams. However, the service is scalable and could be easily reconfigured to accommodate additional teleradiologists if needed. The service also includes a quality monitoring system that tracks significant discrepancies between the teleradiologist’s findings and the subsequent final report of a medical center’s staff radiologist. Clinicians who utilize the teleradiology service have been highly satisfied with the responsiveness of the service—median time between performance of an exam and availability of a wet read is 19 minutes.

For several years, the Southern California Chiefs of Radiology explored various technology options to improve the efficiency of after-hours services. Until 2002, on-call radiologists at each of the 11 medical centers provided after-hours radiology services for their local Emergency Departments (ED) in Kaiser Permanente Southern California (KPSC). This process had been in place for many years and reflected the medical group’s political structure (essentially 11 separate groups of radiologists). The time lag between when a radiologist received a page and when s/he arrived at the medical center produced inevitable delays in providing radiology consultations to EDs. In most cases, the radiologist was needed only to provide image interpretation, not to perform the exam.

The Chiefs discussed a variety of options, including providing each on-call radiologist with the ability to view exams and transmit interpretations from home. This and other potential solutions did not prove to be feasible for various reasons, including: concern over the quality of images viewed on home computers, the challenge of remotely supporting a variety of home systems and the Southern California Permanente Medical Group compensation structure. After much discussion, the Chiefs, with the support of administration, elected to implement a teleradiology system that would station a radiologist in a central location to provide image interpretation for CT, MRI and ultrasound exams from 7:00 pm to 7:00 am seven days a week for all KP Southern California medical centers. “Wet read” reports would be communicated via fax to the referring ED.

However, when working out the final details of the implementation, two important changes were made. First, the single central location plan was abandoned. The radiologists strongly preferred an alternative option that provided the ability to access the teleradiology studies from any of KPSC’s 11 medical centers. This alternative permitted each teleradiologist to work from his/her home medical center, or another if more convenient. This change was made due to concerns about the willingness of radiologists interested in working a teleradiology shift to...
travel to a central location (for example, radiologists who normally worked in San Diego to travel more than 125 miles to Pasadena). Doing so offered the advantage of having the teleradiologist work in a familiar setting, using familiar equipment and traveling no more than for a typical workday. Second, the plan to communicate the teleradiologist’s findings via fax was replaced by a Web application that would provide the ability to track a request for teleradiology services throughout the entire process, as well as communicate the findings to the referring site.

**Workflow**

Two different components of teleradiology needed to be managed as part of the workflow (Figure 1): information and images. Information workflow begins with the ED initiating a request for an exam. Required information during this first step includes the patient’s name, medical record number, date of birth, clinical reason for the exam, radiology exam requested, and name and contact information of the clinician who needs the results. Next, a radiologic technologist performs the requested exam. At the completion of the exam, the technologist can add comments to the information record that could be useful to a radiologist interpreting the exam (e.g., technologist’s impressions during an ultrasound exam are particularly helpful to radiologists remotely reading the resulting images). The technologist documents that the exam has been performed and the images sent to the teleradiologist. Step three is the teleradiologist reading the exam and documenting his/her preliminary findings (“wet read”). The Web application makes these available to the referring site where the clinician or staff, who originally requested the exam, views the findings as the fourth step. Any user can view the up-to-date status for each exam (requested, performed, read). In addition, the Web application alerts teleradiology support staff when the referring site has not accessed the interpretation after 30 minutes so that they can follow-up with the site.

Images are the second component of the teleradiology workflow. Images produced during an exam need to be delivered to the teleradiologist for interpretation. Because the location of the teleradiologist varies from day to day, there was concern that images could be frequently misrouted to the wrong location if technologists had to check schedules and send the completed exam’s images directly to the teleradiologist. This design would also have required that each possible teleradiologist location (at least 11 sites) be configured on each of the 50+ possible imaging systems used for the exams. For these reasons, a central image router serving all of Southern California was installed. Exam images are communicated via Digital Imaging and Communications in Medicine (DICOM) from the originating imaging system (e.g., CT scanner) to the router. DICOM is a non-proprietary industry standard for communicating images in digital form between medical devices. The router then automatically sends the images directly to the workstation at the location of the teleradiologist for that day. Changes in teleradiologist location are easily accommodated by changing the destination configuration of the router.

**Initial Launch, Expansion and Scalability**

EDs in 5 of the 11 medical centers in Southern California were included in a pilot of the teleradiology service in August 2002 so that the process could be refined before expanding the service to the entire Region. As the remaining six medical centers were brought online, the workload grew to the point that a single teleradiologist was no longer sufficient. Furthermore, although originally designed to support the EDs, workload increased substantially due to addition of urgent after-hours inpatient and some outpatient studies. The design flexibility of both the image router and the Web application accommodated this increase in workload with the addition of a teleradiologist.
In this expanded model, the Region was divided into two groups, with a teleradiologist assigned to each group. Medical centers were assigned to a group on the basis of their historical workload so that the total workload for each group would be roughly equal. This method of balancing the workload among teleradiologists also insured that multiple exams performed on the same patient during a shift would be read by the same teleradiologist. The image router sends the exam to the workstation of the appropriate teleradiologist on the basis of knowledge of the medical center from which the exam was submitted. Consequently, each teleradiologist only sees a worklist of the exams requested by the medical centers in his/her group. The ability to have multiple groupings for workload division and to route images on the basis of their source allows the teleradiology service to expand as workload grows in the future and more teleradiologists are needed. The design will also support variable shift schedules should these be developed.

Monitoring Quality

One of the concerns that surfaced during the development of the teleradiology service was how to monitor the quality of the teleradiologists’ findings when the teleradiologist was, in most cases, providing preliminary reads of exams originating from medical centers other than his/her own. To address this issue, the Web application used to support the exam workflow was enhanced to include a post-exam quality monitoring process. Since the teleradiology findings are only “wet reads,” all teleradiology exams are subsequently interpreted by a staff radiologist at the originating medical center. The local staff radiologist’s interpretation is the official diagnostic report for the exam. This practice is identical to that used for any preliminary interpretation.

The first step in the quality monitoring process is comparison by the local radiologist of the teleradiologist’s preliminary findings with his/her official diagnosis for the same exam. The staff radiologist uses the Web application to enter whether there was a significant difference in findings and to add any pertinent comments.

The designated QA radiologist for each medical center performs the second step in the process. This radiologist reviews each exam noted to have a significant difference in interpretation between the teleradiologist and staff radiologist. The QA radiologist also uses the Web application to enter whether s/he agrees that a significant difference in findings exists and to record pertinent comments.

The third process step is performed by four radiologists who meet quarterly to collectively review those teleradiology exams for which both the interpreting staff radiologist and the medical center’s QA radiologist agreed there was a significant difference from the teleradiologist findings. The conclusions of this group of four are recorded in the Web application and the teleradiologist is notified of any exam for which the group agreed there was a significant difference between the group’s findings after reviewing the actual images and the original teleradiology findings.

Quality statistics for each teleradiologist are maintained in this fashion for all exams.

Staff Support

During each teleradiology shift, regional staff is on duty and immediately available via telephone to support the teleradiology workflow. Typically, requested support consists of determining the cause of any delays that may occur in performing or interpreting requested exams and following-up on exams with completed findings that have not been viewed by the requesting department within a reasonable amount of time. The goal is to assure that clinicians are aware of the teleradiologist’s findings. This staff is also responsible for implement-

Sidebar: Teleradiology statistics

Statistics for the six months of teleradiology activity from March 1 to August 31, 2005:
- Average number of exams per 12-hour shift: 125
- Annualized number of exams per year: 46,000
- Number of teleradiologists per shift: 2

Proportion of exams by imaging modality:
- CT: 80%
- Ultrasound: 19%
- MRI: 1%

Proportion of teleradiology requests by referring department:
- ED: 85%
- Outpatient: 9%
- Inpatient: 6%

Median delay from exam performed to teleradiologist wet read: 0:19 (hrs:min)
Median delay from exam requested to teleradiologist wet read: 1:17 (hrs:min)
Busiest teleradiology hours (based on time read): 8:00 PM to midnight (50% of exams)
ing a manual method of communicating teleradiology results if the Web application fails. In the event of technical problems with the Web application or with the image router, staff can contact on-call imaging technical support staff.

Regional staff support the quality monitoring process and collect the images for the exams that need to be reviewed for the third process step, compile the group’s findings and provide communications of the findings to teleradiologists.

**Future Directions**

As the teleradiology workload increases, methods to incrementally increase capacity in an efficient manner continue to be investigated. Rather than simply adding another teleradiologist for an entire 12-hour shift, it may be advantageous to add teleradiologist capacity only during the peak hours of activity (see sidebar: Teleradiology Statistics).

For example, three teleradiologists could be scheduled for the first half of the shift and two for the remainder of the shift.

Another process improvement under investigation is provision of the complete official diagnostic findings by the teleradiologist, rather than only reporting preliminary findings as is currently the case. Several operational and technical challenges will need to be adequately addressed in order to implement this change in teleradiology practice: a) teleradiologist staffing will need to be adjusted to allow for the longer interpretation times required for final reports as compared to preliminary findings; b) conversion of the imaging modalities to a filmless environment will need to be complete across the Region in order to support efficient retrieval of prior exams required to support final reports; and c) the dictation/transcription process for radiology reports will need to be modified to accommodate any radiologist providing a report for any medical center from any location.

**Conclusion**

The KPSC teleradiology service has improved Radiology’s support of EDs by significantly decreasing delays in providing after-hours interpretation of CT, MRI, and ultrasound exams. The Chiefs of Emergency Medicine have been enthusiastic about the prompt service that minimizes the time required for clinical management decisions in EDs, enhances throughput and helps improve ED capacity. The service has also made it possible to more effectively manage the Region’s collective radiologist resources and to provide a process to assure the ongoing quality of those services—developments that have produced a high level of confidence in the results among emergency physicians. In addition, radiologists have experienced an improved quality of life due to the significant reduction of “callbacks” when on call for their medical centers.

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**To Win**

Pick battles big enough to matter, small enough to win.

—Jonathan Kozol, b 1936, non-fiction writer, educator, and activist
Between November 2004 and January 2005, the Institute for Culturally Competent Care (ICCC) conducted a needs assessment survey to identify perceived needs for education and training in the area of culturally competent care, as well as preferred methods to receive that education and training. Among targeted recipients were physicians, physician assistants, osteopaths, nurse practitioners, nurses, pharmacists, and dieticians. The Colorado Region opted out of the assessment survey because it was preparing to conduct its own survey in the near future. The Southern California and Northwest Regions participated through representatives because each Region had recently conducted similar surveys.

Respondents were almost exclusively physicians (MDs). The possible reasons for this include: 1) key regional diversity contacts had primarily MD e-mail lists and/or are accustomed to surveying physicians; 2) the lack of appropriate contacts with access to RN e-mail lists; 3) historically, RNs are less likely to respond to these types of survey requests; and 4) RN Union concerns.

Survey Questions
To address the stated twofold purpose of the survey, the following questions were asked:
1. Would you be interested in attending (additional) culturally competent care training if conveniently offered in your Region?
2. If YES to No. 1, what topics would you like to see addressed? (Five options were provided in addition to an “Other” category, which included a narrative box.)
3. How do you prefer to receive training or information on culturally competent care? (Eight options were provided in addition to a “Combination of the above” or “Other” category, which included a narrative box. Choices included: Printed material, Web-based training, video vignettes, e-mail, videoconference, grand rounds, workshops, CDs/DVDs, combination of above, and other.)
4. Would you be interested in receiving CME/CEU credit for attending training in culturally competent care?
5. Specifically, are you interested in receiving CME/CEU credit for training on the basis of the information in the Provider Handbook series on culturally competent care?
6. If YES to question No. 5 on CME/CEU credit for training on the basis of information in the handbooks, how would you like the training delivered? (Please select no more than three choices: Read the handbook and answer multiple-choice questions, grand rounds, CD/DVD, workshop, Web-based training, and other.)
7. Identify your job or position. (Seven options were provided in addition to an “Other” category, which included a narrative box.)
8. Please identify your Region.

Perceived Needs
Nationally, 73% (n = 879) of respondents indicated that they would be interested in attending additional culturally competent care training if conveniently offered. The lowest interest rate was in Ohio (70.5%), with the Northwest and Southern California at 100%. The area of greatest interest was “crosscultural communication skills with culturally diverse populations” (74%). The other two areas of greatest interest were “understanding health beliefs and practices” (68%) and “how to best use interpreter services” (49%).

Respondents indicated particular interest in learning about two broad population areas: Latinos (also identified as Hispanics, Mexicans, Central Americans, Latin Americans, and Spanish language) and Asian and Pacific Islanders (also identified as Chinese, Vietnamese,
Training Preferences

When responding regarding the preferred method of training, respondents were requested to select up to but not more than three choices from a list. The most often chosen responses were grand rounds, workshops, and printed materials (see Table 1). Significant numbers (>300 responses each) also responded affirmatively to the use of new technologies (videoconferences and Web-based training). Of the 50 who wrote in to describe a combination or alternative option, the main message was the importance of offering CME credit. This was also reflected in the responses to the question of interest in receiving CME/CEU credit for training in culturally competent care.

Provider Handbook Series

ICCC produces a Provider Handbook Series, which speaks to the requested areas of interest for training/learning needs and population groups. Culturally Competent Care Training may be modeled from information in the Handbook Series in order to meet providers’ needs, including the provision of CME credit. The survey, however, indicated a general lack of familiarity with this series, indicating the need to promote the Handbook Series to increase awareness nationally.

Summary

ICCC has much to glean from the six questions posed in this survey. Together with regional diversity educators, ICCC has multiple opportunities to impact the quality of culturally competent care delivered by all its clinicians. Results will help inform the Institute for Culturally Competent Care’s ongoing priorities and strategic initiatives. ❖

Table 1. How do you prefer to receive training?

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A Better World

You cannot hope to build a better world without improving the individuals.
To that end each of us must work for his own improvement,
and at the same time share a general responsibility for all humanity,
our particular duty being to aid those to whom we think we can be most useful.

—Marie Curie, 1867–1934, Polish chemist and early pioneer in the field of Radiology,
  1903 Nobel Prize Laureate in Physics, 1911 Nobel Laureate in Chemistry
A Successful Partnership to Help Reduce Health Disparities at Kaiser Permanente: The Institute for Culturally Competent Care and the Kaiser Permanente School of Anesthesia

Abstract
An innovative partnership with the Kaiser Permanente (KP) Institute for Culturally Competent Care (ICCC) has enabled the KP School of Anesthesia (KPSA) to become one of the first nurse anesthetist programs in the western United States to incorporate a formal cultural competence curriculum into its educational program. Housed administratively in the California State University system since 1981, KPSA is a fully accredited, 24-month program that educates registered nurses to become certified registered nurse anesthetists (CRNAs). The collaboration between the ICCC and KPSA represents a unique opportunity to enhance the care student nurse anesthetists provide in ten Southern California KP hospitals. In addition to serving KP patient populations, students travel to 12 affiliated hospitals in urban and rural areas. The partnership also benefits KP: Upon graduation, 80% to 90% of the student nurse anesthetists in each graduating class join the diverse KP workforce. This article describes the genesis, evolution, and potential impact of this ongoing collaboration to reduce health disparities.

The Need for Cultural Competency Curricula at the Kaiser Permanente School of Anesthesia

The patient population in the Kaiser Permanente (KP) Southern California Region comprises approximately 100 distinct cultural groups. The major ethnic communities in the area include African American, Armenian American, Central American, Chinese American, East Indian American, Filipino American, Mexican American, Jewish American, Japanese American, Korean American, and Vietnamese American. Aware of the diversity in the patient population in Southern California, the faculty at the KP School of Anesthesia (KPSA) concluded that principles of culturally competent care should be incorporated into the didactic curriculum to enhance students’ opportunities to deliver high-quality care and establish effective cross-cultural communication with patients.

To reach this educational goal, KPSA enlisted the participation and support of KP’s Institute for Culturally Competent Care (ICCC). ICCC provides consultation and develops tools, training, and educational resources for clinicians to develop and enhance their cultural competency in order to increase their patients’ compliance with treatment and positively impact the health outcomes of patients during the clinical encounter.

The KPSA faculty envisioned cultural competency training as enhancing student nurse anesthetists’ ability to provide holistic, high-quality anesthesia care and to exhibit awareness, knowledge, understanding, and respect regarding cultural differences and similarities during the perioperative period. The faculty decided that the scope of the training would frame “culture” as

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Culturally competent care update

Three cornerstones guided the collaborative planning process undertaken by ICCC and KPSA. First, the changing demographic profile of the United States requires health care staff to have a basic understanding of conceptual issues regarding cross-cultural communication and basic knowledge of health beliefs and practices of culturally diverse populations. Second, cultural competence can enhance clinicians’ opportunities to deliver high-quality care to patients from diverse cultural backgrounds. Finally, the collaboration represented a strategic opportunity to help decrease racial and ethnic health disparities.

Developing and Implementing Culturally Competent Curricula at KPSA

Theoretical and practical aspects of patient care are incorporated into every accredited nursing educational program in the US. From human anatomy and physiology to pharmacology and pathophysiology, a major goal of nurse anesthesia education is to provide students with a solid theoretical foundation. Of critical importance is integration of theoretical concepts into clinical practice, which has been the focus of nursing education. Distinct educational opportunities for cultural competency knowledge and skills acquisition have not traditionally been formally integrated into nursing education curricula.

The KPSA cultural competency curriculum consists of four modules and was developed from the 16-hour cultural competence training curriculum created for KP health care clinicians by ICCC. Through collaboration with the KP Distance Learning Program, the KPSA curriculum was customized for integration into the existing KPSA nurse anesthesia program. Because application to clinical practice is a key component in developing cultural skills, the four modules are interwoven throughout the nurse anesthesia curriculum. This methodology allows students ample time to apply and practice the module concepts during clinical rotations. At the conclusion of the four-module training sessions, student nurse anesthetists become formally certified in culturally competent care.

During the first semester of each academic year, the Institute staff deliver Module 1: Introduction to Diversity and Culturally Competent Care and Module 2: Cultural Awareness. Through facilitated class discussions and learning exercises, students learn how to recognize and deal with the biases and preconceptions they have formed throughout their childhood and adulthood experiences.

Building upon the first two modules, KP content experts present Module 3: Cultural Knowledge to the students in the second semester. This module focuses on cultural beliefs, health practices, and nuances of specific social and cultural groups and includes information on African Americans, Latinos, Asian and Pacific Islander populations, LGBT (lesbian, gay, bisexual, and transgender) populations, and persons with disabilities. ICCC’s Provider Handbook Series on Culturally Competent Care serves as a major resource for the students: Each handbook is devoted to a specific sociocultural group. Students who complete Module 3 are assigned to select a patient whose culture differs from their own and to record clinical encounters that occur during the clinical rotations; this serves as preparation for the case presentation each student is expected to conduct at the conclusion of the nurse anesthesia program.

During the last semester, students participate in Module 4: Cultural Skills, a highly interactive module that focuses on cross-cultural communication. A major component of this module is the individual student case presentation and discussion with peers.

Successes and Challenges

An obvious challenge encountered when implementing the cultural competency curriculum has been students' uneasiness with discussing cultural values different from their own. Some resistance to change has been encountered in the form of some students questioning the need for cultural competency when their jobs involved “minimal interaction with patients” and “putting people to sleep for a living.” On the successful side, many students value the utility of the cultural knowledge and skills gained as well as appreciate the insight gained from identifying their own biases and preconceptions around diversity issues.

The KPSA cultural competence program continues to evolve. Since 2004, for example, students have received didactic training sessions on culture and expressions of fear and pain, leading students to understand that these cultural differences exist not only among patients but also among health care providers.

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leadership in delivering health care that is both evidence-based and built on understanding the health beliefs and practices of our culturally diverse membership. Training programs such as the four-module training curriculum in culturally competent care can facilitate development of cultural awareness, knowledge, and skills for the lifelong journey toward cultural competence. Most importantly, the KPSA-ICCC partnership reaffirms KP’s commitment to help reduce health disparities. ❖

Acknowledgment
The Medical Editing Service of The Permanente Medical Group Physician Education and Development Department provided editorial assistance.

References

Mutuality
All men are caught in an inescapable network of mutuality.
—Martin Luther King, Jr, 1929-1968, Baptist minister, civil rights activist, 1964 Nobel Laureate for peace
"The Monks"

oil on canvas

18x20

By Ming Jing (Mike) Wang, MD

Dr Wang is an anesthesiologist at the KP Santa Clara Medical Center. He is a self-taught artist working with oil, acrylic, and water media. Dr Wang focuses his artistic work on human faces and figures, portraying people's emotions in a realistic manner. This painting is part of a group of paintings inspired by the lives of Tibetans Dr Wang encountered in his recent travel to Tibet. More of Dr Wang's work can be seen on his Web site: www.mwangmd.com.
Writing and Telling Our Clinical Stories to Improve the Art of Medicine

Why do doctors and nurses write stories? And why tell them to a group of unfamiliar colleagues? People write to learn from their experiences, to express the meaning of their life’s work. Although we remember our stories, we may not understand them until we write them on paper, move them out into the world.

**Origin of Spirit Section**

In this issue we publish a large collection of original stories, poems, and essays by Kaiser Permanente doctors and nurses, written either during the five Narrative Medicine conferences and workshops *The Permanente Journal (TPJ)* sponsored in 2004-5, or the TPJ Portland and Oakland quarterly writing groups in 2005. Barry Lopez, an Oregon naturalist, wrote in his Native American tale, *Crow and Weasel*, “The stories people tell have a way of taking care of them. If stories come to you, care for them. And learn to give them away where they are needed. Sometimes a person needs a story more than food to stay alive.”

**Physician Authors on Writing**

Kate Scannell, MD, internist with The Permanente Medical Group and author of “The Death of the Good Doctor,” keynotes our writing workshops. She wrote in *Annals of Internal Medicine*, “Writing and speaking about doctoring can save your life. By this I do not mean that they can prolong life, but, rather, that they can prove deeply enlivening. Giving language to what we witness lifts into personal and, sometimes, public consciousness the otherwise unarticulated existential dimensions of experience that permeate our work—whether we name them or not. Consciously narrating these accounts illuminates more of our collective lives as patients and physicians, expanding our felt understanding of human frailty, compassion, strength, love, fear, hatred, and ill will.”

Abraham Verghese, MD, MFA, a New York Times best-selling author and practicing internist, gave the keynote address at our first writing conference. He wrote in *Annals of Internal Medicine*, “A sense for the stories unfolding before us will perhaps allow us to be more conscious of bringing people to the epiphanies that their stories require … [W]e will remember the voice of the patient, even though it is the voice of medicine that we record in the chart. … We should be not just ‘doctors for adults’ but also ministers of healing, storytellers, storymakers, and players in the greatest drama of all: the story of our patients’ lives as well as our own.”

**Spirit: The Permanente Literary & Arts Journal**

*TPJ* has produced three supplements thus far: Weight Management, HealthConnect, and Evidence-Based Medicine. From this issue we will produce a fourth, somewhat different one. We will collect the stories, poems, essays, published in this section, with a spiritual symposium, commentary,
other new stories, and art into an annual periodical, called “Spirit: The Permanente Literary & Arts Journal.” When published in Summer, 2006, it will be our second book. The first book, published in 2005, was Soul of the Healer: The Art & Stories of The Permanente Journal: The First Seven Years. Motivated by our readers’ comments, we created this book to bring together our art and stories they say are so beautiful and uplifting. The editors hope you enjoy reading your colleagues’ never-before-told stories and poems, and that they bring you health. Write and tell us one of your stories, and please attend one of our writing groups, or tell us of your interest in starting your own.

Restoring Our Humanity: Our Intention to Heal

Being a doctor can be such a lonely place to inhabit. Our task-oriented approaches to patient care can all too often reduce us to feeling more like two-dimensional characters in someone else’s story than three- and four-dimensional people in our own meaningful lives. Never has there been a time in the history of medicine when physicians have had a greater need to find meaning in what they do. When we translate clinical experience into written narratives, we bring to life the physician-patient relationships in which we live. The act of writing helps us to restore our own humanity, and the act of seeing ourselves with our patients on the written page reminds us of what led most of us into medicine in the first place. These stories both humanize the physician-patient encounter and make physicians feel more like the human beings they are than the “human-doings” they sometimes become. And it is only through being more fully human ourselves that we may convey convincingly to patients our intention to heal.

Fred Griffin, MD

Fred Griffin, MD, is a psychiatrist and a professor at the University of Alabama School of Medicine. Dr Griffin has written extensively on literature in medicine, the use of writing in psychoanalysis, and the physician-patient relationship. He presented to and attended the TPJ writing workshop in Atlanta, Georgia in October 2005.

References
Does Anyone Have a Case?  
The Balint Group Experience

So begins another Balint group for clinicians. Using a case presentation model in a facilitated discussion format, clinicians are invited to explore the clinician-patient dynamic. The deceptively simple process can enable clinicians not only to learn more about the perspectives of the patient but also to foster greater satisfaction in the practice of medicine. This is one possible method of practice-based learning that we are exploring to reinvigorate our vocation.

Since the 1950s, Balint groups have been used in medical schools, residency programs, and among practicing clinicians worldwide. Recent articles document the value of these groups in preparing clinicians for practice as well as provoking insight, personal growth and satisfaction among those clinicians who have been practicing medicine for some time.1-3 According to the American Balint Society Mission Statement, the goal of the Balint Group experience is "for the participants to transform uncertainty, confusion and difficulty in the doctor-patient relationship into understanding and meaning that nurtures a more therapeutic alliance between clinician and patient."4

For over two years now, the Department of Medicine at Kaiser Permanente (KP) Oakland has sponsored a hybrid Balint/Practice Inquiry group for physicians, which combines evidence-based medicine with the traditional Balint approach. Every two weeks, a drop-in discussion is held, with lunches and meeting space provided by the department. Recently, Eric Lipsitt, MD, and Laura Morgan, MD, from the KP Oakland Medicine Department, with Cecilia Runkle, PhD, from Regional Physician Education and Development and Lucia Sommers, DrPH, author of the Practice Inquiry method, attended a Balint Leaders Intensive course in Portland, Oregon.

The Intensive

Over a four-day period, we participated in seven Balint groups, with opportunities to co-lead. Each session was followed by a one-hour debriefing of the group’s interaction: what was observed in the leaders’ and group’s behavior? Did facilitators provide a safe environment for presentation and discussion? What could leaders have done to improve the way in which the group addressed both the clinician’s and patient’s perspectives? What occurred unexpectedly and how was it handled? One session was videotaped. Later in the day, the group observed and commented on facilitators’ interventions.

The Value

The practice of medicine is often referred to as the “art of medicine.” Our experiences in participating in and co-facilitating Balint groups reflect this adage. After a case is presented and clarifying questions answered, the presenter listens while the group verbally shines a light on the case from many perspectives. Gradually, the picture becomes three-dimensional, with many shades and possible meanings. The presenter is then invited back into the group discussion, free to view the picture of their case from new directions. Sometimes, a presenter will put further touches on the picture; sometimes one will paint it over completely; sometimes one will simply contemplate a new picture they’d not been aware of before. In all cases, for all participants, there is a change in perception that leads to finer practice of the art of medicine.

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Finding Meaning in Medicine

By Laura Morgan, MD

Since January of 2004, an extraordinary series of physician gatherings has been taking place at our homes each month. Most participants are from the Kaiser Permanente (KP) Oakland Medicine Department, but the group has grown to include physicians from the Oakland community and other KP facilities as well.

After a reasonably priced, catered dinner and homemade dessert (there's stiff competition for best baked goods between two of us), we settle down to discuss the night's "theme." We follow a format created by Rachel Remen, MD, author of Kitchen Table Wisdom.

We contribute writings, drawings, songs, photos, objects or a group exercise that expresses our "take" on a specific topic as it relates to our practice of medicine. This week, the theme is "silence." Last month it was "listening." In prior months, the themes have ranged from "celebration" to "loss."

Through these gatherings, original writings have emerged, such as Roger Baxter's haikus, which appeared in The Permanente Journal in the Summer 2004 issue. Stories of our experiences with patients easily fit a "narrative medicine" description. If shy or unprepared, group members may simply contribute their attention to their peers.

Distinct from the case-based colleague groups discussed above, "Meaning in Medicine" dinners are purely for clinician renewal. Most of us practice in busy isolation, take care of everyone but ourselves, and have little time for reflection. These gatherings have created community, self-awareness, and a base of support for needed change in our professional and personal lives (not to mention hilarity and occasional rowdiness!).

Initiation and logistics are not difficult but require either one consistent host(ess) or an agreement to rotate homes. A simple e-mail to your facility or department can identify interested colleagues.

For further information, you may contact me or better yet, see "Meaning in Medicine.org," or Rachel Remen's Web site: www.rachelremen.com.

References

Things Happen in the Park

By Steve Long, MD

A boy yelled, “Stop crying!”
As I turned toward him, he pushed his sister. She landed, hard, bouncing on the cement.
Then she stood, head bowed, facing him.
“Why are you f…ing crying?” he shouted. He was thirteen or fourteen, big, sitting on a park bench, a cast on his leg, crutches at his side. His face was red, his hair short.
The girl, maybe five, had flat blond curls, and pale skin.
“Why can’t you be happy like all the other kids here? Look around. They’re all happy. Everyone here is happy but you. Stop your f…ing crying.” He screamed in her face.
I couldn’t hear her response. An old gentleman and his wife were sitting on the bench facing the boy. They had a black terrier.
The boy yelled, “Well then go swing on the swings. Have fun.” The girl stood still, unmoving, with her head down.
In the twenty seconds this all took place, I had managed to convince myself that my angry stare was somehow going to make a difference.
The old man stood up. His wife stared off into space. The man and his dog walked away.
“Stop your crying,” yelled the boy.
I stared.
A young woman walked up from behind the bench. “Where’s your parent?” she asked, calmly. She was plain, thin, with glasses and mousy hair.
“My dad’s at work.” The boy replied.
“Where’s your mom?” The woman asked.
“My mom abandoned me.” The boy said.
At this point my daughter asked me to pick her up. The woman kneeled beside the boy. I couldn’t hear anything else said. I carried my daughter to another part of the park. She played while I watched.
After awhile, the boy stopped staring straight ahead and looked at the young woman.
The woman took the sister to the slides. The woman again knelt next to the boy, then disappeared from my view, then came back to sit, at a slight distance, with her own group of friends.
The boy continued to sit on the bench, staring straight ahead. His sister was gone.
As my daughter played, I kept looking back. I wanted to go up to the woman, to thank her. To tell her she is brave and smart and wise.
“Time to go find mom,” I said.
I carried my own daughter to our car, carefully strapped her into her car seat, and we drove away.

Steve Long, MD, is an otolaryngologist at Northwest Permanente. He has a wife, Wendy, and two children, Zaidie and Eli. He enjoys film as well as writing.
For Carl

We were in my exam room, where I most always see my patients. This was probably the fourth or fifth time I’d seen Carl. He was always intense, yet despite his intensity, there was a softness to his eyes. I could imagine him having thoughtful discussions with his middle-school students. His voice was soft, but direct and clear and firm.

We finished talking about the latest tack his treatment would take, and for once he didn’t seem to have an endless stream of questions.

Instead, he sat and thanked me for always taking the time to answer his questions, and said he really appreciated it, it made him feel well cared for.

I thanked him. If he only knew what a struggle it sometimes was for me talking to him. He had a bad disease, a malignant brain tumor, and I certainly wanted to take good care of him. I had struggled to make it appear that I had all the time in the world to talk to him.

He subsequently died. The image of his tweed coat, his mustache, his clear gaze, and his words of thanks remain.

Barbara Gardner, MD, (right) has worked as a neurologist with PMG in Sacramento for 20 years, and is also doing work in palliative care. She is married with three children and has many outside interests, which she juggles with variable success.

Shawna L Swetech, RN, (not pictured) is a medical/surgical nurse at the KP Santa Rosa Medical Center. She has been studying and writing poetry for five years. Ms Swetech finds the magnificence of the human spirit a constant source of inspiration.

Life Lesson

7:15 am. I am sitting at the nurse’s station, getting report on my group of patients for the shift. Oh, no—this one is going to be a challenge: 55-year-old male, admitted with Stage IV decubitus ulcer and septicemia. History: paraplegic x23 years from a gunshot wound to the spine, with subsequent bilateral AKA, multiple surgeries, and colon cancer two years ago with colostomy placement. He has a suprapubic catheter, triple lumen central line catheter, extensive Q shift dressing changes, and is on bed rest in supine position only. God, how awful. I can’t imagine any quality of life worth waking up to, day in and day out, after all of that. Life is hard enough as it is.

Now, the poor soul has weeks of around-the-clock antibiotics and more surgery to deal with.

8:15 am. I’m at the door to his room now, initial assessment time. Knock, knock, I say as I peek around the curtain, clipboard clutched against my chest. There, floating atop the fluid air mattress, is the upper half of a body: the entire lower portion of the bed is empty. I expect to see a man with a sad, broken spirit—or at least someone with a chronic, sour disposition, rightfully earned from all those years of misery. But no. An infectious smile quickly spreads across his face when he sees me. In fact, he exudes a palpable joy that radiates into the room like a warm light. I am stunned.

This man is not just my patient; today, he is my teacher.
Mountain

By Laura L Wozniak, LCSW

Everyone who sits on my couch sees a black and white print of the valley I lived in as a teenager viewed from our mountain. It hangs out of my line of sight, behind me and over my head. I forget it is there most of the time, but it was a gift to my Dad toward the end of his life from one of his art students. They were as eager for his praise as I was—and less frustrated. Above the print hung a ceremonial eagle feather given to me by a Native American elder. I thought it looked great flying above the aerial view. More importantly, it reminded me of hope and higher powers.

Frank sat there today, looking past me as he dredged up words from his own valley of physical pain and depression. There was a mountain of trouble for this man. He was a tribal policeman laid low; a revered youth hockey coach stopped cold; a mountain of strength to his family, now dependent. Maybe he was a cooling volcano looking for just one reason to glow again.

I remember the mountain I saw rising from the shore of the Connecticut River across the road from my house as a teenager. Mount Sugarloaf looked huge because it was so steep and loomed in striped sunset colors above the flatness of shade tobacco fields and wide water. Pocumtuck tribal history said it was the body of a menacing giant beaver killed by a god, but when I was a teenager you could drive up and park on top with your boyfriend. From my window I could see the lookout tower and all the places where the fence leaned out dangerously.

Looks deceived. The mountain was made of arkose—coarse sandstone. A handhold turned into handful of miniature rocks of pink, red and gray and ochre yellow. Each bit beautiful and nothing that you wanted to keep in the end. Mount Sugarloaf got smaller every year. It was earth science in fast forward, but it still so dominated human scale that I knew my grandchildren would gasp to see it just as I had when we moved there.

I saw Mount Sugarloaf every morning and every day. It stands over my mother’s old garden bordered with chives and marigolds to repel pests. It stands over the tiny Christmas tree farm my Dad planted in front of our house—now tall and shadowing the long driveway. It was my point of reference—always there when I needed to take the long view.

I looked up after my Dad died at home and Mount Sugarloaf was still there when his ashes came back in a cardboard box. The ashes looked like tiny pale rocks—nothing that could hold together in the shape of a tall, tall man with a giant presence.

I got up at the end of the hour with Frank. He moved slowly, so I had time to look around. I was searching for one more thing to say or do to ease his life. My hand flew up and I spoke without hesitation.

“Please take this eagle feather. It is meant for an elder.” I think of him now every time I see the pinhole in the wall above my Sugarloaf view.

Laura L Wozniak, LCSW, is a therapist in the Mental Health Department at Beaverton Clinic as well as the Team Supervisor for the Westside Clinics. She is delighted to be married to Ken and has two wonderful sons, aged 19 and 21. She takes care of herself with ballet classes, gardening and great friends. She thanks her first clinical supervisor, Julia Kling, MSW, who taught her compassion and courage nearly 30 years ago.
One of Our Stories
Might, Beauty, and Machine Take Flight for “Right” and “Only”:
Is This Story Too Big to Hear?

By Tom Janisse, MD

High over heads at the World Health Congress, beauty dazzles and drugs, as does sleek black tech.
Washington, DC

Please do not vandalize this phone booth. I have no place else to change clothes.” —Superman
Volcano, California, population 100

One hour before the green flag Tony’s orange, 20, Home Depot Chevy is second pole. A brilliant racer, True Speed author, he wins at Indy, wins the year, and signs my Stewart hat.
Michigan International Speedway

“The Sphere,” a bronze sculpture in the plaza’s fountain buried at the World Trade Center, rises altered, a peace monument awaiting return.
Battery Park, NYC
I got the call at sundown on Friday five minutes before walking out the door for my first free weekend in three weeks. The ER doctor on the phone said he had a patient with acute radicular low back pain, and hoped I could help. The patient, he said, was Dr Peter Devereaux, one of our internists, who, on exam and imaging, was free of spine abnormalities. He said he knew that I, as an anesthesiologist, was an expert, and did I think an epidural steroid injection would work?

I gulped, more anxious than I would have guessed to perform a spinal procedure, which I had done a thousand times, on a colleague. Afraid for a moment I could hurt another doctor, I wondered what if he was the one-in-a-thousand patient? What if, while he lay helpless on a white sheet in the fetal position I advanced the 14 gauge metal behemoth through the skin and toward the spinal cord in search of the tiny, potential epidural space, and the needle slipped and I lacerated a lumbar spinal nerve, irreparably.

“Sure,” I said, “I’d be glad to take care of him.”

When Peter hobbled in, I was at once anxious and confident, concerned and certain, of my skill. He smiled, and said he was so grateful I would help, and happy that I was the doctor on-call who would perform the spinal procedure he dreaded.

“Well, how was that Peter?” I said, withdrawing the needle. I had performed a flawless epidural puncture and injected dexamethasone and lidocaine bathing the spinal roots to shrink and numb them.

He sat up on the gurney, turned his head side to side, looking into the empty corners of the Recovery Unit and out the windows, now black pictures of night lights, and said, “You know, I think I’m starting to feel less pain already. Yes, the pain is definitely better.”

“Great,” I said, my heart rate plummeting. “Peter, I have a request.” I had just received a letter at home from our Physician Health Committee encouraging each of our medical group to find a personal physician (like patient, like doctor): “Would you be my personal physician?” I said. “Turns out, I don’t have a doctor. I was one of the 25% of our Health Plan member population who was unassigned and unbonded.”

“I’d consider it an honor,” Peter said.
Evanescence

By Mason Turner-Tree, MD

The cold, damp institutional concrete leapt at me like a prisoner attacking with a fork, ready to extract my radial artery and bite it in half. Fear permeated the minimal throng of people who were just moments before ensconced in laughter, joviality, and irresponsibility. The vague camphor smell went unnoticed until a polyester protector reminded us that the room was last occupied in the early 1960s. Suddenly, as she inhaled deeply, we all followed suit, as if our individuality had been stamped into an 8x8 cell with a regulation coiled, uncomfortable bed and an assaulting jumpsuit. Suddenly, the camphor flowed over me, not in my lungs, but on my skin, across my eyes and through my hair. The collective shudder was more frightening than the camphor. A shared soul is less easy to tolerate than a distant smell leaching from walls that contained such misery. I peered to my companion, hesitant to break the collection of souls marching alongside the polyester protector. It was night. Bleak, cold, wet, and exhausting night. As I broke the camphoria and touched my companion, the bare bulb blew. An echoed scream blinded us, until we realized that it was blackness, not loudness that had burned the retina of our collective. I pulled to the window, and looked at the marshmallow skyline, enveloped by black, moonlit tar. Suddenly, it was 1960-something, and I was trapped. Imprisoned not by concrete walls, but by loneliness and isolation. The smell of chocolate now filled my lungs, but never made it to my brain, stopped on its marginal path by the bleakness of my soul. Snuffed by the camphoria. Blinded by the pale green that I could feel pressing against me. Relief was usurped when a bowl of light fell upon that very same pale green. The polyester protector squashed the collective with her bowl of chocolate-scented fragrance. I stood alone, so close to the moonlit tar that fear permeated my olfactory senses and dragged me, quicksand-like, into the roiling pot of tar, studded with the white, fluffy figures that seemed like heaven. They too, were imprisoned by the sticky filth around us. Suddenly, a solvent hand touched my shoulder, and the collective was gone. The pale green marshmallows were sucked into the moat, and a radiant dragon appeared to damselize me. In the distance, I heard, “That was the room, where Robert “The Birdman” Stroud died …”

Mason Turner-Tree, MD, earned his AB degree in psychology from Dartmouth College and completed his medical degree at the University of Texas Southwestern Medical Center/ Parkland Hospital in Dallas, TX. He joined The Permanente Medical Group as an associate physician in the Department of Psychiatry at San Francisco Medical Center and in Addiction Medicine at the Chemical Dependency Recovery Program in July 2003. He is currently working on his first novel. In his spare time, he also enjoys playing classical piano and attending opera.
Miracle

By Vicky Van Dyke, CNM

“Do you have privileges at the hospital yet?” I looked up from my computer charting to see my colleague, Julie, standing in the doorway. “Yeah, I was on call last weekend, why?” “Well, I’m supposed to be on call tonight and I just found out that the medical staff office didn’t finish processing mine. Now it’s past five o’clock and it can’t get done today.” The impact of what she was saying hit me—we had to have someone available for the laboring women who would surely be arriving at the hospital all night. Our obstetric group had just moved from a hospital that closed to a new facility. All of the members of our group were experienced, competent practitioners but all hospitals have a checklist of information that has to be completed before they allow a practitioner to care for patients. Only a few members of our 11-person group had gotten through the process.

I thought through the reasons I might not be able to do it. Tired from a long day at the office didn’t count in this situation. No previous engagements for the evening. No young children at home requiring care. I hadn’t been on call the night before. I didn’t even have the excuse that too many patients would have to be moved from my next day’s schedule—I was scheduled to do some work for our marketing department and therefore did not have any patients to be rescheduled. I sighed inwardly. “Sure, I can do it. I’ll just finish up here and head on over.” She looked relieved. “Thanks, I’m not scheduled again for a while, so I should be able to get it straightened out.”

As I walked through the door of the hospital, I noticed a large group of people gathered outside the door of one of the rooms, some crying, some looking angry. Further down the hall, a small group of nurses was talking with great animation.

Arriving at the call room, I changed quickly into scrubs and went looking for the people who had been on call that day so they could “sign out”—tell me which patients were ours to care for and what their condition was.

I found my friend and colleague, Kristy, standing with the group of nurses. “You’re probably going to be sorry you volunteered for this. You’re walking into a powder keg.” That could mean anything when you’re talking about caring for laboring women. Kristy and I walked down the hall to find a private place to discuss the patients.

“We’re not terribly busy,” she said, “Only one person in labor, but she’s a doozy. She and the family are pretty upset at all of us.”

“Why?” I asked.

“Lots of reasons. Have you heard about Camie Bentley?” The name did sound familiar. Then I remembered—the patient screaming at my colleague with the office next to mine a few months ago. Dan had been upset enough about the interaction that he’d talked about it for days after. Apparently he had been discussing a 20-week ultrasound report that showed that Camie’s baby had a serious birth defect called anencephaly. This means that most of the brain is absent. Babies with this disorder rarely survive more than a few days after birth and most die within minutes. Carrying a baby destined to die is a burden few women want to shoulder. Dan had started to arrange a termination of the pregnancy, assuming that this was what the patient would want. She had become hysterical. A devout, “born again” Christian, she did not believe in abortion for any reason. The last words I heard her say were, “You don’t know everything. Tests can be wrong. They told my cousin her baby would be deformed and he was all right!” With these words she had stormed out of the clinic. Dan and his nurse had contacted her numerous times since, but she refused to come in for any more prenatal care, not wanting to discuss the issue any further. And now she was in labor. I sensed things weren’t going well here, either.

Kristy continued. “She came in contracting on her own and has been insisting on having continuous monitoring. We don’t want to do that, because we don’t want to have to do a crash c-section if we see distress.” “That seems sensible—this situation is difficult enough without subjecting the mother to the pain and potential danger of a c-section,” I answered. I, too, was mak-

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ing the assumption that the mother’s safety should be the primary concern when survival for the baby was impossible. However, when Kristy explained the full nature of the conflict between the woman and her husband and the medical team, it was obvious that what seemed sensible to us was only making the family angry and alienated. Complicating things further, in addition to her family, the patient had her minister and a ten-person prayer support group in the room. None of them were talking to the daytime medical team any more, stating that they did not trust them and they had been waiting for our “change of shift” to have a new person to deal with. Kristy finished up with “That patient’s husband is in Holly’s office and he wants to talk to you.”

I took a deep breath. I consider myself a spiritual person, rather than a religious person, having difficulty finding any church that “felt right.” But I had been raised in a fundamentalist Christian family and know a lot about the common beliefs. I encounter patients whose belief structure impacted their decision making all the time and generally have no difficulty finding a treatment plan that was respectful of their faith and safe for the fetus. This isn’t all that common, unfortunately. Many highly trained, scientific medical practitioners find their rationale impossible to understand and try to direct them more. The night promised to be a challenge, but less for me than others in my group. I decided it was good that I was going to be the one here.

I went first to meet with the father of the baby, David. I’m a small woman, and David was only slightly taller than me, slender and muscular, wearing cowboy boots and a big buckle. His dark eyes were flashing and his face flushed.

“Hi, I’m Vicky. I’m the midwife on call tonight. I hear you’ve been having some troubles. Why don’t you tell me what’s been going on?”

The story poured out of him. They did not believe that the fetus would be born with the predicted severe life-threatening defect. “We’re expecting a miracle. We’re expecting God to heal our little girl tonight. That’s what we are all praying for and we believe that God answers prayers. So we want her to get the best possible care. We want her to be treated like the healthy, valuable child of God she is and for everything possible to be done to save her. Is that so unreasonable?” He looked exhausted and on the verge of tears as he pleaded with me. I thought about it. As he explained the situation from his perspective, I could see why they were demanding care for their child. We all, instinctively, want to do everything for our children. A mother myself, I could understand that. I told him so.

“Well, you know, David, I agree with you that there will be a miracle here tonight. I’m not sure I believe it will be the same one you are expecting but I do believe that we will experience a miracle. And I want to give you the same care I would any other family in labor. But I do have to let you know, I’m not a fan of continuous monitoring in any situation. Over the years it’s been shown to increase the c-section rate without really improving outcomes for babies. I think the labor would go faster and therefore be easier on both your wife and daughter if she was up walking and we listened to the baby’s heart rate intermittently. Intermittent monitoring is an accepted obstetric practice.”

“What about resuscitating her after she is born?” he asked.

I answered, “That’s not as clear cut to me but I’m willing to respect whatever decision you and Camie make. I just want you to have all the facts. Have you ever seen a full neonatal resuscitation before?” He hadn’t. “They can be pretty brutal. The baby is whisked away from the parents, a tube is placed down the throat and another into the stomach. An IV is started in the umbilical vein and medicines are given. It is almost always necessary to breathe for the baby with a bag and most need chest compression. I know you believe she will be healed and not need this but what if it turns out God intends a different miracle tonight? Is this how you want to spend the precious few moments you will share of her life?” I could tell he hadn’t thought of this. “Would you explain all of this to my wife?” Of course I would. I sensed the tension that I had first felt from him draining away and he seemed calmer and more ready to face the rest of the labor, whatever it brought us.

I entered Camie’s room. It was darkened; there was soft music playing and clusters of people with their heads down and their hands clasped were murmuring prayers. A man who was introduced as the minister was standing at the head of the bed, one hand on a Bible and the other on Camie. She was working with the contractions and appeared to be coping well with them. “Camie, I think you should listen to what the midwife has to say,” David started.
“Hi, I’m Vicky and I’m coming on to take care of you tonight. David’s been telling me about your difficulties today and I’m wondering if you’d like to hear my opinion of what we should do.” She looked at David and he nodded. I repeated my belief that continuous monitoring was not necessary to protect the baby. Again, I said I believed there would be a miracle, but I wasn’t sure what it would be. There is a miracle at every birth and I wanted her to have the most healing birth possible. She agreed with me and we took the monitors off. She went to sit with her prayer partner, and they began to pray in earnest, with Camie stopping from time to time to breathe through a contraction. I went out to tell her nurse that we would be using the intermittent protocol and that the family was deciding about the level of resuscitation they would want.

I went back into the room, partially for labor support and partially to get a sense of who was there and what their roles would be. The minister and her prayer partner seemed focused on Camie and genuinely involved in supporting her. Her husband seemed loving, and they seemed connected as a couple and trusting of each other. The reactions of the church members varied—some seemed there for moral support, some to watch the show, others mainly seemed there to share every horrible birth story they had ever heard. I see that often with laboring women and I wonder at the cruelty of it.

The night wore on, and Camie made steady labor progress. She refused all pain medication, fearing it would compromise the baby. We talked a lot in those hours about her faith and the experience of the pregnancy. Finally, I broached the subject of resuscitation after the birth. “If she is anencephalic and your moments with her are going to be limited, how do you want us to spend them?” I could see her mother’s heart struggle, then answer, “I want her life to be gentle. I want her to feel our loving arms and hear our words. Don’t resuscitate any more than drying and suctioning her.” I nodded. That felt right to me, too.

The birth of a full term anencephalic presents other complications that we hadn’t talked about but were at the back of my mind. Without a full scalp, it is often difficult to distend the mother’s tissue enough to have the head come through the birth canal. Women push to exhaustion. The risk of having the shoulders get stuck is higher. I’d never done this before and was a little nervous. My backup MD, at home, hadn’t either.

Throughout the evening, there had been a video camera filming parts of the birth. Many of my colleagues don’t allow cameras to film deliveries but I usually do. For some people this is an important way to be able to make peace with their birth experience. I was pretty sure that was going to be necessary here.

About midnight, it was time to push. We gathered, me to coach her, the minister to bless her and the congregation to pray for the miracle. She pushed with a strength and determination that I had to think was otherworldly. It took hours. Finally, the head was low enough that I could feel it. It was anencephalic—should I tell them? I decided to. “The head I am feeling is shaped in a way that leads me to believe that your baby will be anencephalic.” The praying intensified. Camie’s eyes met mine and I could tell she was ready for whatever the next few moments gave her. We sat in a halo of light from the exam light, the rest of the room darkened. The soft sound of hymns around us, I reached in, hooked my fingers around the little arms and pulled the baby forward into the world. Other than the lack of fullness at the back of her head, she was a beautiful little girl. I laid her on her mother’s abdomen and she cradled her gently. “Welcome to the world, Hope” she said. I felt the umbilical pulse—life-giving blood continued to flow from her mother but the baby made no effort to breathe. Her eyes were open and she appeared to look at her mother and father. “Camie, if I cut the cord, it will stop the flow of oxygen from you to her and that is what is keeping her alive. It will stop on its own soon, but I want you to have her as long as possible.” She nodded and continued to explore her baby. The cord continued to pulse for what seemed to me a very long time, then got weaker and weaker. Hope closed her eyes. Her mother kissed her and I cut the cord.

I looked up at the quiet crowd. They were silent, not knowing what to say or do. Who does? Words came to me. “There was a miracle in this room tonight. The miracle I saw was the amazing power of Love. Thank you for letting me be a part of it.” The church members slowly drifted away, leaving Camie, David, Hope, and the minister. I left, too, to give them some privacy. Walking out of the light into the hall, it seemed like I was walking into a different world. ❖
Verl was born in 1970. He thinks there is something about 1970 that has made him different from his brothers. Not: Oh, isn’t it unfortunate that in 1970 my neurons got scrambled while incubating in my mother’s womb?

But rather, What is it about 1970 that made me so different from my brothers? I wish I wasn’t born in 1970.

He has said that many times. But who knows whether his neurons were fried in utero or whether my mother simply did not get the Rhogam shot when she should have. My parents were young and scared and this was rural North Dakota. I think all we knew was that there was a new arrival in our house that kept having seizures. Those images are some of my earliest memories. Verl, having one of his seizures next to the TV. Maybe even under the TV with his legs sticking out like the Wicked Witch of the West except that Verl was not crushed because the TV was on four legs.

Two months after Verl moved in with me, and my wife, Kris, I woke up one morning at 3 or 4 am to very bizarre sounding noises coming from Verl’s room down the hall. Kris was in Chicago visiting her family so it was just Verl and me. It was April 2000. I went into his bedroom and my first thought was Is Verl possessed by the devil? His breathing sounded very noisy and labored and he sounded as if he were making grunting animal-like noises. One of his arms was stiff and it was extended into the air. He could not respond to me. He seemed asleep but not asleep. I called 911 because I was scared and because I wasn’t sure what else to do other than sit next to him on the bed.

When the crew arrived Verl was coming out of it but was still pretty confused and couldn’t walk on his own. We stood him up and half-walked/half-carried him into the hallway where he pissed in his underwear. They took him to Kaiser Sunnyside Medical Center because that’s the location where I worked at the time and because I had enrolled Verl as a KP member when he moved here. I thought it would be better for Verl to be enrolled in the Health Plan where I worked. A nervous control thing on my part. Pulling out of the driveway to follow the ambulance, I couldn’t control my tears crying most of the way there. Twelve miles. Sobbing is probably more accurate. But it’s only a seizure. Seizures don’t seem to kill many people. The threat to life seems to be somewhere between sneezing and a heart attack. But his seizure scared me. I think I was crying because he seemed so helpless and vulnerable and so much like a child—he was starting to seem like my child.

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“I asked to see you over an hour ago!” she complained as I entered her room and introduced myself. Judy looked slightly older than her 44 years with thick gray hair that had been styled short in preparation for the surgery. A volatility that had plagued her most of her life, manifested itself in the furrows on her brow. Annoyed that she was missing work because of her surgery—to remove a tumor that had engulfed an ovary—and aggravated by the pain she was experiencing, she tyrannized the nursing staff activating the call light continuously as if the mere act of pushing on the device would palliate her impatience.

“I came as soon as I could,” I replied, trying not to become defensive. “Anyway, I’m here now.”

“I can’t reach anyone on this phone! What’s more, the doctor says I’m ready to leave the hospital tomorrow. I am not ready to leave yet.” The tone of her voice betrayed a hint of something besides frustration … anxiety, perhaps. I pulled up a chair next to her bedside table and sat down.

She recited a litany of unmet expectations: family and coworkers not visiting more often, hospital staff seemingly unable to figure out what was wrong. “What kind of God allows a person to get cancer?” she demanded to know. Judy thought: “It’s as if the mere act of pushing on the device would palliate her impatience.”

After the divorce was finalized, Judy became sullen and irascible. At work, the least frustration provoked her and she lashed out at whomever was closest, which created resentment and anxiety among her colleagues. At some point, she began to have a sense that something was amiss, something was happening with or to her, but it was all so vague. She had been feeling under the weather: a cold, a fever, a slight discomfort—or rather a sense of fullness in her abdomen—none of which were going away. She was frustrated with the inability to concentrate on her work, and she decided to get to the bottom of it all and see the doctor. The appointment was inconclusive; the doctor wanted her to return for a test. She became suspicious.

At a follow-up appointment she was told the diagnosis: a tumor was growing on one of her ovaries, and it was uncertain if, or how far it had spread. “Tumor? You mean cancer?” I asked. Judy exclaimed. “It’s as if the mere act of pushing on the device would palliate her impatience.”

A recent divorce had left her feeling embittered. Furious about the settlement, she blamed the judge for being biased and not understanding the rationale of her side of the suit. One of Judy’s colleagues argued the case and was quite persuasive Judy thought. The whole contentious process created a deep resentment in her that grew as time passed, as if it were something alive inside of her.

Rattled, she left quickly without making any decisions about the next step.

A few days afterward, Judy vaguely recalled the doctor having mentioned SURGERY saying that the need was URGENT. She was unsuccessful in attempting to compartmentalize these troublesome words. They would not remain in her mental file cabinet that she could open and close at will. Finally, in order to settle the matter, she decided to call the doctor. Presenting the evidence, the doctor convinced Judy of the need for surgery, and she reluctantly scheduled time off from work. She thought, “Why does it feel as if I’m admitting that I’m wrong?”

As I sat beside her, listening to her recollections, I noticed that the tone in her voice was changing. I sensed in it something like regret. When I asked her how the surgery went, she replied thoughtfully, “Fine, I guess, but it seems the cancer has spread. She looked down and then looked directly at me. “I have a question for you. Do you think …” she began, “… that anger can cause cancer?”

Momentarily taken aback by her question, I wondered: Is she really seeking a medical answer to this question, or is there something on a deep level that is working its way into her consciousness?

“Are you wondering if perhaps your anger might have caused your cancer?” I asked.

She fought back tears as she began recounting instances in her life when her angry outbursts had alienated others—family, coworkers, friends. Her illness was forcing her to confront the limits of her control, and when she allowed herself to think about it all, she could begin to see the destructiveness of her anger.

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Silence

By Laura Morgan, MD

Maggie taught me about silence. Three years ago, with a nasty case of laryngitis, I went to clinic as usual and let patients know that I would be essentially silent during their visit. Most appointments went smoothly, in fact, more smoothly and quickly than usual, which should have been a hint. But Maggie’s visit, to this day, stands out in my memory most powerfully.

I knew her as a type 1 diabetic, accident-prone, morbidly obese, self-deprecating woman who lived in a trailer with her chronically ill, demented mother and her troubled sister and niece. Every previous visit with her had brought reports of conflict, injury, frustration, poverty, and sometimes theft. On the day of laryngitis, I resigned myself to listen passively instead of actively trying to make a difference for the better in this unfortunate woman’s life.

I indicated to her that I wouldn’t be able to speak during our visit and, with that, she was off and running. For the first time since our first visit, ten years ago, Maggie told me the story of her abusive father, her “silent” mother, her deliberate decision to gain weight in order to repulse her father’s advances after she heard him express an aversion toward fat women. She told me about protecting her younger sister, with whom she was now living, by offering herself as bait to her father until her sister was old enough to defend herself. She imitated the words and voice he used to initiate physical contact and how, to this day, despite his death, she can still hear his voice.

I think it took her all of ten minutes to explain her life to me. She expected nothing in return but my attention. She left the office in what seemed a remarkably lightened mood and told me it was the best visit she had ever had with me.

Since that day, Maggie is still my patient, now taking two hours to travel by bus one way to my new office. She never complains about the distance and she’s never late.

Since that day, Maggie exercises and diets on her own and has lost over 100 pounds. She is highly compliant with her medication regimen and her chronic disease is in optimal control. She has not fallen down or injured herself accidentally again. Maggie placed her mother into skilled nursing care, helped her sister raise her daughter, set and enforced behavioral guidelines in their home, and became a fine seamstress. I treasure the pillow she made for me; I try to imagine placing it firmly over my mouth whenever I feel the urge to tell someone how to live without first understanding something of his or her life.

Laura Morgan, MD, is a family physician working in primary care in the Northern California Region for the past 13 years. She has authored Surviving and Thriving at Kaiser Permanente, a manual for physicians, and continues to seek ways to improve the quality of professional life for her peers.
Harpooning the Vein

By Shawna L Swetech, RN

Are they prominent and soft, or fine
like dark thread? Are they hidden
beneath spongy layers of adipose?
And the skin, is it thick like tanned leather,
or thin like a white veil separating
the inner and outer worlds?
Should I use a tourniquet?
Will the vein distend and harden,
roll from the needle's probe?
Or will binding pressure burst
the thin blue line, ecchymosis
purpleing the tissues.

Take a deep breath, I say,
imagine your vein is a caterpillar,
fat and juicy. I swipe antiseptic
across the target, twirl the steel
stylette in the cannula.
Please, God.
Please let me get in, first stick.
I can't think of this as real now,
can't think of causing pain, injury.
The angiocath becomes a harpoon,
the arm a lifeless fish.

I pierce the flesh —
Don't move now! and wait
for crimson flashback in the needle's hub.
Score, there it is. I hook up tubing,
chevron the paper tape over and under,
place a see-through dressing.
Blue lights flash, the IV pump
beeps to life.

Yes. I have been granted the power again.

Shawna L Swetech, RN, is a medical/surgical nurse at the KP Santa Rosa Medical Center. She has been studying and writing poetry for five years. Ms Swetech finds the magnificence of the human spirit a constant source of inspiration.
The Wheezing Cherub, 
Her Earth Grandmama, 
and OUR LOSSES

By Ed Ruden, MD

Natalie is my sonorous Wheezer—The Orchestra in her chest is rarely in Tune—Alveolar Anxiety
She will come in with Raucous Cacophony and appear to have just finished a 50-yard dash unsuccessfully
I Treasure her serendipitous visits
Rosey Cheeks, the Thickest Light Brown Ponytail,
Those Gifted Round Eyes
The Heavenly Angel Reads to US while being NEBBED with OUR Misty Solutions to relieve the Frothy Rigid PULmonary MILKSHAKE …
BOOKS Of Joy, OF HOPE, of HUGS and Kisses, of Teddy Bears and Soft, Fluffy Creatures ONE would like to crawl into bed with when our Bones are damp and aching
Grandmama is Her most capable Caretaker since the young one’s earliest years
Such a Tragedy—MOM’s death from a Lymphomatous Lecher in her prime
The mid-50s SAVIOR is a bundle of nurturing energy, a 60s lady grown wise, mellow, with Rainbow vestments and Iridescent fingernails
I unveil the recent Demise of my own Father
We weep together and Breath out Long Serene, Unobstructed Exhalations to Placate our Grief …
The Young Father’s Imperfect Gift of Life

By Ed Ruden, MD

He gave part of his liver to his Infant Son …
I was there at the Start of this Ugly Biliary Disease
Unfortunate “Draw of the Straw” plagued by Biliary Atresia
Paternal “Foie Gras” Sucked out … but nurturing the young babe and
recapturing this childhood vigor and joy
Yet, the Sequellae of the Donor Impairs DAD’s life Abysmally
Robbing the prime of Paternal 20s
HOLES/CAVITIES/Abdominal Fenestrations years after “The Taking”
Haunt him
Swiss Cheese of the Peritoneum and Rectus Abdominus
This Vaporizes his Vitality—Suspends his LIFE
Nonetheless, I know you Treasure the Gift you Gave and I honor you
In your Ultimate HOLY Sacrifice …

Hypochondriacal Atopic Derm Adolescent

By Ed Ruden, MD

His body is like crocodile skin – every Angstrom of it
A scaley mass of crustaceous keratin
A warty six-foot toad of a teen
Intense use of fluoridated steroid ointments,
Petrolatum baths, antihistamines q4h, and
Newer Immunmodulator agents have little effect on his intense pruritis
The true cause of his eczema lies not in the superficial layers of his body;
but deep in his somaticizing mind
The “boy” tortures himself from within
Perseverating in his brain about this malady or that
“If only there were another blood test,” “A Radiographique”
“A serum porcelain level to pinpoint my illness!”
He stammers/agitates
I present this theory – “The mind-skin” gap!
If you “soothe” your mind, you will surely “soothe”
your alligator dermis
In theory, he takes it in but never really engulfs the reality of his tortured cerebrum
Fitfully, the young lad wallows in his “crustiness” and painstakingly
relentlessly scratching as he exits my exam room!
Poetic Moments

By Cecilia Runkle, PhD

Yellow green leaf drops
Thin stalks, white bark, like slow rain
Still, no whisper

Light glances red maple leaves
Green intertwined with red
Not Christmas, just nature

Red maple on burnt coals
Dead yet still beautiful
A life after death?

Disbelief

By Kurt Smidt-Jernstrom, MDiv, MA

Doubting the diagnosis
she listened apprehensively
for the sounds
of marrow exploding
deep in her bones,
portending the disintegration
of her life.

Hearing nothing
and buoyed
by an infusion of packed cells
she insisted
that it was
a mistake.

Cecilia Runkle, PhD, is a former Senior Training and Development Consultant with TPMG’s Physician Education and Development Department, Northern California Region. She joined Kaiser Permanente in 1981 and in her spare time enjoys writing haikus, reading mysteries, and race walking. Kurt Smidt-Jernstrom, MDiv, MA, is currently a chaplain at Kaiser Sunnyside Medical Center in Clackamas, Oregon. He has previously worked as a pastoral counselor with KP Northwest Hospice.
Pay-for-Performance: At Last or Alas?

What a lovely phrase ... pay-for-performance. For those who toil harder, work smarter, go the extra mile, satisfy customers, follow the rules, comply with regulations—the surest incentive of all—more money on payday.

The underlying principle of pay-for-performance compensation, now the rage in health care, is the creation of financial incentives that reward quality-improving, cost-saving, and more efficient behavior by medical professionals.

For many in health care, the question is not why now, but rather what took so long with this pay-for-performance? Isn’t it about time that someone recognized the quality work of physicians and hospitals? After all, for years everyone has known that a fee schedule that rewards volume will result in ... more volume. Therefore, isn’t it a no-brainer that a payment mechanism that compensates clinical excellence will lead to better quality? What’s not to like?

Barely five years old, a myriad of different pay-for-performance strategies have already spread from New England to California, and the notion has been embraced by hospitals, physicians, health plans, and employers, particularly large corporations. Medical journals, management literature, the lay press, government leaders, and CEOs all tout the concept as a solution to the ills of health care.

But does pay for performance, long the mantra of corporate America, offer a realistic means for improving quality and efficiency in health care? Or is this another ill-conceived strategy that falls flat on the way from bench to bedside? Will pay for performance be the answer to national concerns regarding rising health care costs and uneven quality in medicine? Or will this payment mechanism founder in a sea of complexity, imperfect data and provider pessimism?

Pay-for-performance made it to Main Street commerce in the 1990s when it emerged as the model for executive compensation, especially in publicly traded, for-profit companies. The idea was logical enough: senior management would have their pay (in the form of salary, equities, or bonuses) tied to quantitative outcomes such as earnings or stock price—presumably a win-win strategy for shareholders and company officials.

Though mentioned in health care management circles as early as 1985, the pay-for-performance movement did not really get going until the creation of the Leapfrog Group in 2000. Prompted by the 1999 Institute of Medicine report about the parlous state of quality in American medicine, companies such as General Electric, IBM, General Motors, and Boeing launched Leapfrog with an original mission of disseminating information about quality and fashioning a payment mechanism that rewarded value and efficiency.

Leapfrog quickly settled on three standards for judging hospitals: computerized physician order entry, full-time intensivist staffing of ICUs, and referral to hospitals with high-volume surgical practices. Hospital compliance with these voluntary standards is published annually in the group’s Hospital Quality and Safety Survey.

While tangible benefits for complying with these guidelines have been limited, some hospitals in New York have been given bonuses for meeting the standards, and in Seattle employees have had copayments waived at cooperating institutions.

A second major project began in 2003 when Premier, Inc, a medical center purchasing alliance, partnered with Medicare in a pilot project to improve quality in more than 300 member hospitals. The trial involves following patients with myocardial infarction, knee and hip replacement, congestive heart failure, community acquired pneumonia, and coronary artery bypass surgery.

As an example, in orthopedic surgery patients, outcomes such as antibiotic usage in the perioperative period, post-operative bleeding, and readmissions within 30 days will be measured. In coronary artery bypass patients, rates of internal mammary grafts and inpatient mortality will be assessed.

For the first time, there was an explicit financial incentive for participation. Hospitals in the top 10% will receive an additional 2.0% in payments, the second 10% will earn an extra 1.0%, while the lowest 10% can be docked as much as 2.0%.

Bridges to Excellence, originated by General Electric in 2003, goes one step further than Leapfrog by creating a financial bonus system for physicians, at least as pertains to caring for patients with diabetes and heart disease. By adhering to National Committee for Quality Assurance guidelines, a physician can earn $80 for diabetic and $160 for heart patients per year. The guidelines are straightforward—for example, monitoring lipids, blood pressure and renal functions in patients with diabetes; smoking cessation; and antithrombotic use in cardiac patients.

From its origins in New England, Bridges has now spread across the country as the product has been licensed nationally to insurers including BlueCross BlueShield, Cigna, and United Healthcare.

While all these initiatives provided a boost for the pay-for-performance movement, the whole landscape for physicians was jolted.

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recently when the 2000-pound gorilla, namely Medicare, got into the game. On February 1, 2005, Mark McClellan, MD, an economist/internist and the Director of the Center for Medicare and Medicaid Services (CMS), announced that ten physician groups would be enrolled in a pay-for-performance trial, dubbed the Medicare Physician Group Practice Demonstration.²

These practices included the Geisinger Health System in Pennsylvania, Dartmouth-Hitchcock in New Hampshire, Deaconess Billings in Montana, Forsyth in Winston-Salem, the University of Michigan Faculty Group Practice, and others. Unlike the Premier experiment, which involved only technical or hospital fees, this new venture would put physician revenue at risk.

Each group will have a different area of concentration. For instance, Geisinger will emphasize the use of its electronic medical record to improve access to health care information among Medicare beneficiaries in rural Pennsylvania. Other participants will optimize treatment of patients with diabetes, congestive heart failure, hypertension and COPD utilizing means such as home care, preventive health, and disease management programs.

Other programs have arisen that share a similar philosophy. In California, the Integrated Healthcare Association, formed in 1994 by six health plans encompassing over seven million members, is unique in its incorporation of patient satisfaction into the bonus formula for its pay-for-performance initiative. In 2004, more than $50 million was distributed on the basis of clinical quality (50%), patient satisfaction (40%) and computer investments (10%). (Kaiser Permanente initially played an advisory role only, because the medical group incentive payments did not fit with its integrated health plan-medical group structure. However, the two California Permanente Medical Groups began reporting data on clinical and satisfaction measures to the IHA initiative in 2005 and 2006.)

Hospital Compare, a cooperative effort of CMS, the Department of Health and Human Services, and the Hospital Quality Alliance, was introduced in April 2005 to provide the public with quality metrics from every American hospital on their outcomes in patients with myocardial infarction, congestive heart failure, and pneumonia.

So as all these projects show, the pay-for-performance movement is not only alive and well, it’s growing. Nonetheless, legitimate concerns have arisen, generally centered on the programs’ effectiveness, durability and fairness. Such issues include:

**Stifling Innovation**

In nonmedical industries, with their vastly larger experience, one of the major worries about pay-for-performance programs has been about overvaluing the status quo and underinvesting in new initiatives.³ A company might find it easy to measure and reward established, easily quantifiable outputs such as sales, but what about strategic planning or new product development? A medical practice can easily tabulate the RVUs for routine CTs of the abdomen, but who pays for the time and effort to develop virtual colonoscopy? Are the short-term gains of increased activity in these conventional areas coming at the expense of a company or medical practice’s future?

**Undervaluing Teamwork**

The new Medicare Physician Group Practice Demonstration proposes paying physicians more for better results in treating patients with congestive heart failure, asthma, diabetes, depression, and other conditions. And in the descriptions of the individual project goals, much emphasis is placed on collaborative care. Yet no mention is made about compensating other members of the health care team—not nurses, technologists, therapists, pharmacists—no one but physicians. In a profession where virtually no task is performed alone, how will this be justified? What will be the impact on the morale and professionalism of valued colleagues?

**Exploiting the System**

In the Hospital Compare database, facilities are compared on the basis of the time between the diagnosis of pneumonia and the initiation of antibiotic therapy. Who makes the call on the diagnosis of pneumonia? The paramedic? Senior resident? Attending? Does someone in the emergency room trigger a stop watch? What about patients with other infections? Will hospitals shortchange other patients with urinary tract infections, meningitis, or bronchitis in their race to beat the clock?

Although this may seem like a frivolous scenario, teasing out a subgroup of patients for analysis does raise questions about extrapolation of the data to an entire hospital population.

**Selection Bias**

Benchmarking, which is at the core of pay-for-performance, is not without its limitations. As discussed recently by Denrell,⁴ in the absence of a carefully monitored setting such as a controlled experiment, corporate data is frequently not collected in a rigorous manner. Quite the contrary. In commerce, successful businesses are happy to answer surveys about their triumphs, but the unsuccessful companies—those whose ideas failed—are out of business and no longer around to respond. So, like Lake Wobegon, only above-average results are tabulated.

In medicine, this phenomenon corresponds with the well-accepted fact that investigators frequently do not publish negative results.

**Fragmentation**

Most community physicians practice at more than one hospital, and nearly all participate in multiple insurance plans. As noted by Epstein, et al,⁵ if only 1% of an internist’s patients were in the Bridges to Excellence program, the annual bonus would be $1265, hardly worth the paperwork necessary to enroll. If each pay-for-performance program necessitates an incompatible information system, this could pose an insurmountable burden, particularly to small practices.

**Winners and Losers**

Behind the headlines about pay-for-performance, some morning-after realities are not so pleasant, specifically zero-sum accounting, better known as winners and losers.⁶ While everyone’s first take may be more money for better results, with budget neutrality that also
means less money for those on the wrong side of the bell curve.

For example, in the Premier trial, hospital reimbursements could vary from plus 2.0% to minus 2.0%. If Medicare patients were a third of hospital admissions, as is frequently the case, being on the wrong side of that swing could be disastrous, especially in an industry where 4% margins are the stuff of dreams.

Further, will the very hospitals struggling to keep up with information system investments and human resource needs be the ones receiving less compensation? Very likely—thereby raising a multitude of questions about equity and access over the long term.

**Provider Acceptance**

The Leapfrog Group was the first out of the blocks in the pay-for-performance movement, so their standards would seem likely to be the most accepted. Perhaps, but a query into hospitals within 100 miles of downtown Washington, DC reveals only two institutions, Johns Hopkins in Baltimore and Christiana in Delaware, that had fully responded to their surveys.

Why so limited? In a recent analysis, Galvin, et al, identified a number of factors including the voluntary nature of hospital surveys and the unrealistically high expectations by Leapfrog’s founders. Further, computerized physician order entry and intensivist staffing are expensive and, without tangible returns, hospital executives were reluctant to invest in these programs. And is it realistic to expect that low-volume surgical hospitals are going to rush to answer a survey that recommends diverting their patients to a higher-volume facility?

**Impact on the Disadvantaged**

Socioeconomic status has been shown to have a strong correlation with HEDIS scores. That is, the poor are much more likely to have lower baseline scores on measures such as breast, cervical, and colorectal cancer screening, hypertension control, and immunization rates. From so far back in the pack, how likely is it that these populations will meet the lofty targets of most pay-for-performance programs? No doubt, very improbable. And where is the fairness in financially punishing the physicians and hospitals who care for these patients?

The arguments for pay-for-performance are persuasive, and few believe that trials of the methodology are out of order. But many outputs of the health care industry are difficult to define, much less measure. The everyday bazaar of a hospital represents a delicate equilibrium between business and benevolence, empiricism and instinct, complexity and simplicity. The current metrics of pay-for-performance are, by any standard, rudimentary—so elementary as to raise doubts about their real impact or the long-term buy-in by physicians and hospitals.

**The Formula for Success**

I cannot give you the formula for success, but I can give you the formula for failure, which is: Try to please everybody.

—Herbert Bayard Swope, 1882-1958, American editor and journalist; first recipient of Pulitzer Prize for reporting, 1917

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2. Wessel D. Rx for health care may include carrots. Wall Street Journal 2005 Feb 3; Sect A2.


soul of the healer

“Zan”
acrylic on canvas
By Sevada Younesian, RN

Mr Younesian works in the Emergency Department at the Baldwin Park Medical Center. Mr Younesian draws upon his Middle Eastern background to create paintings that celebrate women. He says he hopes to bring color and life to these women whose voices have been unheard for a long time.
announcements

15th Annual Kaiser Permanente Internal & Family Medicine Symposium
July 16-21, 2006
Kauai Marriott, Hawaii
For registration and program information call 510-527-9500 or 800-700-2636.

Kaiser Permanente Northern California Ethics Department’s
15th Annual Ethics Symposium
Contemporary Ethical Dilemmas in Health Care
Saturday, March 4, 2006
San Ramon Valley Conference Center, San Ramon, CA
For information and registration please go to: www.SignUp4.net/Public/as.aspx?EID=NORC11E

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KP Aging Network Physician Named to National Alzheimer's Association Board

Richard D Della Penna, MD, CMI's National Elder Care Clinical Lead and Director of the Kaiser Permanente (KP) Aging Network, has been appointed to the National Board of the Alzheimer's Association. Dr Della Penna states that his selection to be on the Board was in recognition of KP's long-term efforts to improve the quality and outcomes of care for members with Alzheimer's disease and related dementias and their families. KP's efforts with regard to and approaches to dementia care have been heralded by the Association as a “Model for the Nation's Health Care System.” Fellow directors include: Princess Aga Khan, Nancy Reagan, David Hyde Pierce, clinicians working to improve the quality of care of people with dementia, and scientists dedicated to unraveling the causes and eventual prevention and treatment of Alzheimer's disease and family members of people who have had the disease. The Association’s mission is to eliminate Alzheimer's disease through the advancement of research to provide care and support for those affected; and to reduce the risk of dementia through brain health.

KP Clinicians Named as Delegates to White House Conference on Aging

A number of KP clinicians were named and participated as At-Large delegates to the 2005 White House Conference on Aging (WHCoA). The conference makes recommendations to the President and Congress to help guide national aging policies for the next ten years and beyond.

KP Executives on 100 Most Powerful List

Modern Healthcare magazine recently released its fourth annual ranking of the 100 Most Powerful People in Healthcare, naming George Halvorson, Chairman and CEO, Kaiser Foundation Health Plan and Hospitals (KFHP/H), number 68, and Benjamin Chu, MD, President, KFHP/H Southern California Region, number 73.

Southern California Permanente Medical Group (SCPMG)

Goldsmith Scholarship Awarded to Future Physicians for Advancing Equal Care

SCPMG awarded seven Southern California medical students the second annual KP Oliver Goldsmith, MD, Scholarship for the Promotion and Advancement of Culturally Responsive Care. The Goldsmith Scholarship celebrates students’ efforts to improve the health care of underserved communities while raising awareness to the unique medical issues that affect ethnic minorities. Awardees receive a $5000 scholarship, mentoring from a KP clinician, and a clinical rotation at a KP facility. The seven recipients are: Jose Avalos, Shabnam Besimanto, Candace Jones, Kristen Ochoa, Kameelah Philips, Eric Sandoval, and Candace Taylor.

Physician Receives Award for Educating Divers

Matthew Berry, MD, was awarded the Charlie Brown Memorial Award by the National Association of Underwater Instructors (NAUI). Dr Berry is a KP Resource Physician for Underwater and Hyperbaric Medicine and practices Emergency Medicine at the West Los Angeles Medical Center. Last awarded in 1997, the Charlie Brown Memorial award is given for volunteer service to the diving community. Dr Berry received the award in recognition of his community service in educating divers and physicians on diving safety and field treatment of diving injuries. Founded in 1959, NAUI is the oldest dive training and certifying organization in the world, and has trained millions of divers worldwide.

KP Southern California Earns Top Ranking in California Health Plan Report Card

KP's Southern California Region (KPSC) earned the top rating in the 2005 HMO Quality Report Card from the California Office of the Patient Advocate (OPA). KPSC was the only health plan to earn two excellent or three-star ratings. KPSC also led the way in clinical quality, with 11 top scores in the 29 clinical measures cited in

By Barbara Caruso

Barbara Caruso is a Senior Communications Consultant for The Permanente Federation. E-mail: barbara.caruso@kp.org.
The Permanente Medical Group (TPMG)

Californai HealthCare Foundation Announces Fellows for Health Care Leadership Program

Three KP clinicians were selected by the California HealthCare Foundation (CHCF) to participate as Health Care Leadership Program fellows. The three KP clinicians are Rajan Bhandari, MD, Santa Teresa Medical Center, Moses D Elam, MD, Central Valley, and Diane Hildebrandt, BSN, Napa Medical Offices. The program helps talented professionals acquire the skills needed to positively influence health care policy and delivery in California.

Physicians Receive TPMG Research and Teaching Awards

Four TPMG physicians received research and teaching awards for their exemplary efforts in these areas: Nazir Habib, MD, Vallejo, was recognized for his instrumental role in bringing Fundamentals of Critical Care Support (FCCS) Certification to HBS physicians. John Husokowski, MD, Oakland, was recognized for his contributions to the Oakland KP Ob/Gyn Residency Program. Randy Berger, MD, Walnut Creek, was recognized for the research he conducted that established the safety of cold-adapted trivalent intranasal influenza virus vaccine (CAIV) in children over three years of age and adolescents. Donald Dyson, MD, Santa Clara, was recognized for his prolific and highly regarded research contributions over the past 20 years, particularly in the field of maternal-fetal medicine.

The Southeast Permanente Medical Group (TSPMG)

Red Cross Philos Award Presented to KP of Georgia

KP of Georgia received the prestigious Philos Award from the Volunteer Council Committee of the American Red Cross’ Metropolitan Atlanta Chapter. KP was honored for its significant financial contributions and for its sponsorship of CPR Saturday.

Colorado Permanente Medical Group (CPMG)

5280 Magazine Names 18 KP “Top Doctors”

Congratulations to the 18 KP physicians who were named to the annual list of Denver’s top doctors in 5280 Magazine. The top 250 honorees were selected by their peers, via a random survey of 4000 metro area doctors. The 18 CPMG physicians were: Jandel Allen-Davis, MD; William Bentley, MD; Tim Collins, MD; Royal Gerow, MD; Richard Hathaway, MD; James Jacobs, MD; Elizabeth Kincannon, MD; Richard Koken, MD; Janet Kuhns, MD; Chris Lang, MD; Jean Milofsky, MD; Nora Morgenstern, MD; David Mulica, MD; Mark Rhine, MD; Elizabeth Sofian, MD; Sophia Symko, MD; Edward Vaughn; and John Williams, MD.

Mid-Atlantic Permanente Medical Group (MAPMG)

MASKFHP President Honored as Influential Women Executive

Marilyn Kawamura, President of KFHP, Inc Mid-Atlantic States Region, was chosen as one of Washington’s Women Who Mean Business 2005. This list honors the Region’s most influential and powerful women executives as selected by the Washington Business Journal.

MAS Named Top Quality Health Plan in Maryland

For the third year in a row, KP Mid-Atlantic States received more Star Performer and Above Average scores than any other participating HMO and POS plan in the State of Maryland, according to Measuring the Quality of HMO and POS Plans: Consumer Guide, released by the Maryland Health Care commission. KP was named a Star Performer in 10 categories, 6 more Star Performer measures than the next best health plan, and Above Average in 15 categories, 7 more than the next highest scoring health plan.
Medicine Meets Religion

Visit TPJ on the Web for answers to this puzzle: www.kp.org/permanentejournal

Created by Kenneth J Berniker, MD

Across
1. Therapeutic salt named after an English town
6. Home of the Mets
10. Injured by a .44 Magnum
14. Singer and songwriter Nyro
15. Legendary Swiss archer William
16. Surface a driveway, perhaps
17. Cunning people
18. Side of a doorway
19. Away from the wind, as in sailing
20. Standard unit of the pressure arising in a liquid from its solutes
22. Fluids said to flow in the veins of gods; or, discharges from certain wounds
24. Structure lying between the auricle and the tympanic membrane (abbr)
27. Exclamation of triumph or surprise
28. ___-out (entering a basketball hoop but not going through, hyph.)
29. Mistakenly enter a restricted area by wandering (2 wds)
31. Epinephrine prefix
32. French summer

35. Forceps and scalpels, for example
36. Prevent the opponents from fulfilling a bridge contract
38. Satan
40. When a symptom began
41. When repeated, a rock music guitar sound
42. Covered with vines, as Dartmouth's buildings might be
43. Out of fashion; stale
44. Raw rock containing a valuable mineral
45. Mother-of-pearl
46. Serious connective tissue disease, often affecting multiple organs (abbr)
47. Blood test for syphilis (abbr)
49. Those who irritate or make fun of
51. One who believes in a divinity that created the world
53. Building extension
54. Rested one's legs
55. Type of street often found in a large city (hyph)

57. Mennonites of Pennsylvania or Ohio
59. Actress Dunaway of “Chinatown”
60. Fish often seen in Japanese pools
62. Very small amounts, or 9th Greek letters
66. Person with a drug habit
67. Bits of rock-like precipitation
68. What the foreskin covers
69. Answer rudely
70. Gradually go away, as a pain might
71. Some brightly colored salamanders

Down
1. Small, mischievous creature
2. Kung ___ spicy chicken dish
3. Short-acting paralytic drug, familiarly
4. Top-selling cookie, introduced in 1912
5. WIDESPREAD CONFUSION (2 wds)
6. MEDICINAL HERBS OF THE GENUS HYPERICUM (hyph)
7. Recover from surgery
8. Stately tree
9. Lacking almost all color, as a plant or animal
10. Braves' Hall of Fame pitcher Warren
11. GIZMOS THAT STABILIZE NECK FRACTURES (2 wds)
12. Done
13. Golf accessories
21. ___ Tai
23. A PHYSICAL FINDING OF PRIME IMPORTANCE (2 wds)
24. Prevents in legalese
25. In music, having no key
26. INTERNAL STRABISMUS (2 wds)
28. WHERE A PERSON MIGHT FEEL A HEADACHE (3 wds)
30. They may be pale or amber
33. ___ del Fuego
34. The first-born of siblings
37. Common site to pierce
39. Gabor and Pernot
48. One's mental structure, to an analyst
50. Giants' quarterback Manning
52. Water pitchers
55. “He's one ___” (2 wds)
56. Agcy for Apollo and Gemini (abbr)
57. Fleischer and Onassis
58. Gopher's legacy
61. Excellent bond rating
63. Fancy marble used as a shooter
64. Hard working insect
65. US draft board (abbr)

Kenneth J Bernicker, MD, is a Board-certified Emergency Physician at the KP Vallejo Medical Center. Dr. Bernicker has long enjoyed solving crossword and cryptic puzzles and now creates his own. The challenges in creating the puzzles include: completing the grid with usable answers and perhaps a theme, generating interesting clues of suitable difficulty, being error-free in framing questions and answers, and injecting humor. Have fun, and please send him your comments. E-mail: kenneth.berniker@kp.org.
Suddenly, instead of cars making their usual “vrump,” they sound like crumpling paper; words turn into mumbled “mmmm mmm bmm verumf,” and then nothing. After a battery of MRIs and hearing tests, you find you have irreversible hearing loss. You’re deaf. You’ve heard about cochlear implants, was it that old TV show, *The Six Million Dollar Man?* Wasn’t that what Rush Limbaugh had done? Your hopes soar as you think of a bionic ear that will restore your hearing and bring you back into the “normal” world.

*Rebuilt*, a memoir by Michael Chorost, takes us into his world of no sound. If “Going deaf is a kind of death …” Mr Chorost takes us through his stages of rebirth. From the two-hour outpatient procedure to the programming of the implant, the reader is taken on a fascinating journey. In the author’s words, he becomes a cyborg. He is careful to point out the difference between an android like the Terminator (a robot that looks like a human being) and a cyborg, a human with a bionic part. But unlike an artificial limb, a cochlear implant alters his perception of the world. The simple sounds of a bird, a car, or a horn are now different. Autumn leaves tinkle rather than crunch. Leaf blowers and toilets sound like artillery fire. Sounds are so altered, he needs to relearn the sound and cadence of the world around him.

How does this new computer stimulation trigger his eighth cranial nerve? He describes it like a rock skipping over the surface of water. The 140,000 transistors of his implant cannot completely replicate the 12,500 outer hairs cells and 3500 inner hairs cells of his cochlea. The sixteen electrodes implanted through his round window into his cochlea send a digital series of ones and zeroes that Chorost’s brain learns to interpret. The metal disc attached magnetically behind his ear to his implant is liberating for him, because people don’t know “… what the heck it is …” Unlike a hearing aid, people don’t assume the wearer is “… slow … [has] to be shouted at … old.” *Imagine.* The implant not only gives him the ability to understand the sounds around him, it gives him the freedom to shape how people perceive him.

In this moving account, the reader experiences what it’s like to live in the author’s world, from the first cell phone he’s able to plug into his implant to the first time he fumbles to remove the wires in the throes of passion. “…there’s nothing more isolating than deafness,” Mr Chorost states, and his cochlear implant—his built-in computer chip—makes him feel more connected to the world than before. With his internal “World Wide Web” he learns to construct the environment around him and create a fulfilling new reality.

As we enter a new age of bionics and cyborgs, *Rebuilt* teaches us that although we can now make the deaf hear, in the author’s words, “they cannot make me listen.” To paraphrase Mr Chorost, it’s only when we listen that we become better human beings.

Reference
Last Chance in Texas: The Redemption of Criminal Youth
by John Hubner

Last Chance in Texas is about a way some teenagers who have committed serious crimes can be rehabilitated and re-enter society with a very low risk of recidivism. It holds interest for health providers for several reasons.

John Hubner’s factual account underscores the fact that virtually all delinquent youths were abused children. It can be assumed that all of them had contact with health providers in their early months and years. It is likely that had their problems been recognized, opportunities for preventive interventions were present. Our ongoing failure to recognize risk and to provide the proven family supports that reduce abuse and later delinquency could be considered as a failure of the primary health care system because no other system has both access to almost all families with young children and the ability to engage them. Home visiting programs have been shown to reduce child abuse and later delinquency.

Further, this population of young people is at high risk to prematurely re-enter the health system. Even if they may have learned to avoid future criminal acts, the long-term effects of adverse childhood experiences on health will probably catch up with them in the forms of untreated obesity, smoking, drug and alcohol use, heart disease, and certain cancers.

Reading Mr Hubner’s book causes both pain and joy as he mixes history and facts from the juvenile justice system with the personal stories of the young people caught in that system. He shows how remarkable (and how hard) it is for them to take responsibility and to learn empathy. An especially moving chapter describes how parents of murdered children with extraordinary courage join with the professional staff to confront youthful murderers or attempted murderers with the ongoing pain they have caused.

The methods employed by the staff at the Giddings State School and supported by the Texas Youth Commission are also of great interest to mental health professionals and are worthy of study by the many correctional programs for youth in other states. The “Last Chance” in the title is apt; the youths who fail to meet the tough criteria for parole from Giddings will be sent to adult prisons to serve out long sentences.

The specter of prison did not deter these youths and prison is not enough to turn them around in four or five years. The Texas program, complex and multifaceted, appears to offer some success. Some of the main components appear to be firmly rooted in well-accepted principles of cognitive-behavioral therapy; other techniques are considered unproven by mainstream psychologists. It has been difficult to isolate its many components in a way that would allow rigorous therapeutic research. It’s also pretty clear that putting on a program like this in any state is a tough political task, and that superimposing an expensive research program that might show why it works is unlikely.

The Texas program appears less expensive than the ineffective programs provided in California and many other states. These more typical programs return many youths to the street “angrier and dumber” than when they were confined. The Texas program is very inexpensive in comparison with prolonged confinement.

Mr Hubner’s book is not a comfortable read, but it is clearly and simply written with a clear message. It’s a good book for all professionals and especially health professionals.
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Section A.

Article 1. Predictive Value of the Rapid Whole Blood Agglutination D-Dimer Assay (AGEN SimpliRED) in Community Outpatients with Suspected Deep Venous Thrombosis

Which of the following statements is not correct?

a. the AGEN SimpliRED d-dimer assay has a negative predictive value of 20.2% in this study
b. the lower the prevalence of the deep venous thrombosis, the higher the negative predictive value of the assay
c. all patients with high pretest probability of deep venous thrombosis should have compression ultrasonography (CUS)
d. the sensitivity and specificity varies upon the type of d-dimer assay

e. all of the above

Which of the following statements is correct?

a. this study has negative predictive value of 99.3% by AGEN SimpliRED method
b. the sensitivity and specificity of d-dimer assay can be applied interchangeably
c. the CUS is as sensitive as venography for detecting thrombus in the distal veins of the calf
d. if d-dimer is positive, there is no need for CUS

Article 2. Genetic Services in the KP Southern California Region: Delivering the Promises of Tomorrow Today

Minimum requirements for taking a genetic family history include:

a. obtain information on at least three generations of the family
b. ask about both sides of the family
c. record ethnicity and race
d. record consanguinity
e. all of the above

Which of the following is incorrect?

Fabry disease is an inherited metabolic disorder first described in 1898. Characteristics of the disorder include:

a. caused by mutations in the GAL (alpha galactosidase A gene)
b. X-linked recessive inheritance
c. causes disabling pain crises in boys as young as ten years of age
d. enzyme replacement treatment is not currently available to treat affected individuals
e. DNA testing is available to determine if a woman with a family history of Fabry is a carrier of the disease

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Article 3. Update on Interventional Neuroradiology

Which statement is incorrect?
Carotid stenting is contraindicated in patients with:
- contralateral carotid occlusion
- clinically significant medical comorbidity
- low cervical stenosis
- recurrent postendarterectomy stenosis

Which statement would you most disagree with?
Interventional radiology progression has been enhanced by:
- the availability of digital subtraction angiography
- the replacement of invasive neurosurgeons by interventional radiologists in all treatments
- the development of roadmap fluoroscopic imaging
- rapid improvements in successive generations of medical devices and materials

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Article 4. Pay for Performance: At Last or Alas?

Pay-for-performance initiatives were first advocated in health care by:
- US House of Representatives
- RAND Corporation
- Leapfrog Group
- US Food and Drug Administration
- United States Chamber of Commerce

Clinical conditions or outcomes that have been frequently targeted in pay-for-performance strategies include all the following, except:
- management of congestive heart failure
- results of hip replacement surgery
- bariatric surgery
- breast cancer screening rates
- postoperative antibiotic usage

Objectives
1) to inculcate the use of evidence-based medicine as part of the science of medicine. 2) to stress the art of medicine via enhanced patient physician communication, improved care experience for patients, and more satisfying care giving experience for physicians and staff through better teamwork. 3) to review appropriate updates on the diagnosis and treatment of clinical conditions. 4) to describe infrastructure and systems improvements that lead to improvements in outcomes and patient care experiences.

Section B.

Referring to the CME articles and to the stated objectives, please check the box next to each statement as appropriate.

<table>
<thead>
<tr>
<th>Article 1</th>
<th>Article 2</th>
<th>Article 3</th>
<th>Article 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Strongly Disagree</td>
<td>Strongly Agree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

The article covered the stated objectives.

I learned something new that was important.

I plan to use this information as appropriate.

I plan to seek more information on this topic.

I understood what the author was trying to say.

Section C.

What change(s), if any, do you plan to make in your practice as a result of reading these articles?

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

Section D. (Please print)

Name: _________________________________________

E-mail: _________________________________________

Address: _________________________________________

______________________________________________

Signature: _________________________________________

Date: _________________________________________

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Mr. MacKenzie is in the Department of Gastroenterology. He participates in other local and international meetings. He is a photographer recognizing the beauty and richness to the colors. He is a member of the Brotherhood of Light and participates in other cultural activities.

Mr. MacKenzie is in the Department of Gastroenterology on the Interstate campus in Portland, OR. More of his art can be seen on page 24.