



The **Permanente Journal**
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Mission: *The Permanente Journal* is written and published by the clinicians of the Permanente Medical Groups and KFHP to promote the delivery of superior health care through the principles and benefits of Permanente Medicine.



On the cover: "Sky Tower" by Cal Weisberger, MD, was taken in Auckland, New Zealand. Dr Weisberger has been doing photography since grade school. This photo reflects the use of perspective to increase the effect on the eye and to 'connect' with the viewer. Dr Weisberger last used film in 1999. The digital photographic medium has opened new vistas of opportunity. Dr Weisberger hopes to

combine his photography and his interest in writing as he moves into new phases of life. He is presently Coordinating Chief of Cardiology for SCPMG and also Chairman of the Southern California Regional Product Council. Dr Weisberger's writing has been published in *The Permanente Journal* and in other venues.

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SPECIAL FEATURE

A Focus on KP HealthConnect

Guest Editors: Andrew M Wiesenthal, MD and Jon Stewart

As the KP HealthConnect system is rolled out across the regions, the editors of *The Permanente Journal* gathered some of the significant participants in the development of the electronic medical record (EMR) to share their thoughts, processes, insights, and learnings. This Special Feature delves into the history of the EMR at KP, the process for implementation throughout the regions, some valuable lessons on using the computer in the exam room and as a clinical tool, on the interface with the Clinical Library, and the potential to transform the medical encounter.

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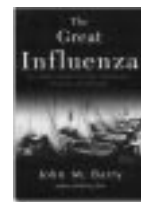
Two Permanente physicians share their experiences in Iraq, Uzbekistan and Afghanistan and discuss how these experiences have changed their lives.



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Submitting Manuscripts: Manuscripts submitted to *TPJ* are reviewed by members of the editorial staff and selected for peer review. For more information regarding manuscript submissions, read "Instructions for Authors" on our Web site at www.kp.org/permanentejournal or contact our editorial office.

Submitting Artwork: Send us a high-quality color photograph of your art no smaller than 4"x5" and no larger than 8"x10". Please include a cover letter explaining Kaiser Permanente association, art background, medium and a brief statement about the artwork (description, inspiration, etc). Electronic and e-mail submissions are accepted; 600 dpi resolution is required.

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Kaiser Permanente HealthConnect

Crossing the Quality Chasm



Louise Liang, MD,
Senior Vice President,
Quality and Clinical
Systems Support
Kaiser Foundation
Health Plan and
Hospitals Co-Executive
Sponsor, KP
HealthConnect

Dr Liang was the
Founding CEO and
President of Group
Health Permanente

Sadly, most of us have become used to practicing medicine with incomplete information. Thanks to the significant effort and investments that The Permanente Medical Groups have expended over the years, we have far better information than most physicians have available to them. However, it still falls short of a fully integrated information system that parallels our integrated structure. Our integrated structure is the core of who we are and is our strongest competitive advantage. KP HealthConnect will significantly increase our ability to manage care across all settings, including the patient's home. It will strengthen our partnership with our patients and help them take ownership of their health.

The Care Management Institute has spent years understanding what is truly evidence-based medicine. This knowledge will now be available literally at our fingertips when we are making decisions in the exam room with our patients. Health information, patient instructions, and self-care tools to support patients will be easily available. Busy patients will have a more efficient option than an office visit or phone call via secure messaging. Our experience at Kaiser Permanente Northwest (KPNW) and Group Health Permanente has taught us that patients are very judicious in their use of this option and will stay with us because of it. Phone call visits will be more effective with immediate access to all clinical information. Clinicians and staff will be able to personalize care for patients based on their recorded preferences. Testing and diagnostic results will always be available, eliminating repeat studies and delays in care. Myriad adverse drug events because of unreadable or unavailable information will be eliminated.

The experience of KPNW and Colorado Permanente Medical Group with electronic medical records has taught us that we have the potential to improve our already nationally recognized clinical performance to world-class levels. No other health care organization in the world is better positioned to cross the quality chasm so well described in the Institute of Medicine's recent reports.¹ Our comprehensive longitudinal database will enable us to make significant contributions to medical knowledge to help other health care organizations "cross the quality chasm." Each of us chose medicine knowing that we were embarking on a lifelong journey in search of the best care we could provide our patients. Implementing KP HealthConnect will help us reach that goal.

At the same time, as we are poised to attain clinical excellence, we are beleaguered by demands for lower-cost health plan coverage. Hardly a week passes without a newspaper story describing the burden that health care costs place on individuals, employers, and government programs. Even employers and purchasers who believe that integrated, comprehensive care is the best model have been demanding information that demonstrates the value we add. KP HealthConnect will give us both the data to document our added value and the administrative processes to administer deductibles and other cost-sharing products the market demands. This will ensure that we can continue to make care available to millions of patients.

But KP HealthConnect is not primarily about technology. It is about leveraging our integrated structure and changing how we work with each other and with our patients. Like most very important work, it will be challenging and difficult. Each of us will learn new skills and processes. I recognize the personal stamina it takes to change such a fundamental part of how we practice. In addition, your clinical team will look to each of you for leadership in this change. You can help provide the important clinical and competitive context for the \$3.2 billion investment that we are making over the next ten years. We hope that this issue of *The Permanente Journal* will give you a view of the many ways that we expect KP HealthConnect to affect your work life, your team, and your patients.

The KP HealthConnect national team works very closely with your regional team, Medical Group, and Health Plan leadership to support the regional goals you have established. Together we are committed to ensuring a smooth an implementation as possible. Nonetheless, we are undertaking a very complex transition and there will be setbacks, frustrations, and long days for everyone involved. Despite this, I have not met a single physician who wants to stay with our current fragmented systems. In the end, our shared commitment to the excellence we can achieve together will vault us over the quality chasm. ❖

Reference

1. Institute of Medicine, Committee on Health Care in America. Crossing the quality chasm: a new health system for the 21st Century. Washington (DC): National Academy Press; 2001. Available from: <http://www.nap.edu/books/0309072808/html/> (accessed September 28, 2004).

From Our Readers ...

Mr Stewart,

I recently read with great interest your article on narrative medicine and advocacy journalism (Perm J 2004 Spring;8(2):80-1). My own experience in practice bears out the validity of your article. About 20 years ago, I read an interesting fictional book about midwives written by a certified nurse midwife. In it she described using a positional method for conducting the labor of a patient with a direct OP presentation. This kind of labor is not only very painful but increases the risk of operative or assisted delivery. Her method was very simple—place the patient in knee-chest position. This adds a centimeter to the pelvic outlet, decreases the pain, and affords the fetal head a better chance of rotating to an anterior presentation, thus increasing the chances of a less painful and spontaneous delivery.

Several days after reading this information, I was assisting with the labor of a patient who had this problem. After consulting with her physician, we tried the maneuver with great success—two pushes and an easy, spontaneous delivery. Since then, I have used this information many times with the same success, including with my own daughter. She was able to progress to 5 cm at home, had a spontaneous ROM as soon as she reached the hospital, and with the assistance of a well-timed epidural was fully dilated just two hours later. After two more hours of pushing (not bad for a primip), she had a wonderful NSVD of a beautiful baby girl.

Such evidence-based narratives are of great use to us in the health care professions if we only look at them for their basis in scientific fact and then try them! Thanks for a great article.

Mary Lou Shookhoff,
TLC Case Manager, Mid-Atlantic

—Reply

Thanks for your wonderful letter. Your own story is a great example of narrative medicine.

Jon Stewart
Communications Editor
Communications Practice Leader,
Government Relations and Health Policy
Oakland, CA

Dear *Journal* Staff;

I read with interest your article by Dr Hayek and Ms Beatty in the Winter 2004 *Journal* (Human Embryonic Stem Cells and Type 1 Diabetes: How Far to the Clinic? Perm J 2004 Winter;8(1):11-4). However, although the article was titled "Human Embryonic Stem Cells ...," I am still puzzled that there is not a single nod of recognition of the successful use of adult and umbilical cord blood stem cells (this latter being an intermediate category of stem cells between adult and embryonic) in several areas of medicine. This seems to be the trend in everything I read in the mainstream media concerning stem cells. But this trend would indicate to me either 1) sloppiness/laziness in rigor for literature research, or 2) an ideological taint or slanting of the articles chosen for publication, neither of which is appropriate for scholarly publications.

Keith L Griffin, MSN, PhD
Brea, CA

—Reply

The article was an update on human embryonic stem cells and not a discussion of adult stem cells. There has been one article in the scientific literature showing, in mice, that bone-marrow-derived stem cells generate a few cells in the pancreas that produce insulin with the tags that indicate origin in the donor cell. Two more recent articles have been unable to reproduce those results. Concerning umbilical stem cells, we have not seen any paper showing that such conversion is possible either in mice or humans. Most reports of differentiation of adult stem cells into other organs appear to be due to cellular fusion. For a wonderful review of this subject, please see: Wagers AJ and Weissman I, *Cell* 116:639, 2004.

Alberto Hayek, MD, and Gillian Beattie, BSc
La Jolla, CA

To the Editors:

In the article on Bariatric Surgery (2004 Sum;8(3):10-13) you state, "The standard measurement to define obesity is the body mass index (BMI), calculated as the weight in kilograms divided by the height in square meters." Height is a one-dimensional attribute. The sentence should read "The standard measurement to define obesity is the body mass index (BMI), calculated as the weight in kilograms divided by the height in METERS SQUARED.

Paul Dieter, MD
Pasadena, CA



Dear Dr Felitti,

I recently read your article in *The Permanente Journal* entitled "Hemochromatosis Update" (2004 Winter;8(1):39-44). I found this article very informative and interesting.

I am an Internal Medicine nurse at the KP center at City Plaza in Baltimore, Maryland. We are treating one patient with hemochromatosis who will be coming to the office tomorrow for therapeutic phlebotomy.

I would like to inquire as to the possibility of acquiring a copy of the video that you provide for patients and any other patient-education materials that are available.

Margaret Cannoles, RN
Baltimore, MD

—Reply

I'm glad you found the article helpful. Yes, I'll send you a copy of that video. Here in San Diego, having screened several hundred thousand adults for iron overload, we have many hundreds of patients in the phlebotomy program. The cost of once-in-a-lifetime screening, if properly set up, is more than offset by the value of the derived blood. The last time I checked, about 40% of all blood transfused at KFH San Diego came from our phlebotomy program.

You may feel free to copy the video for further distribution. Bulk reproduction costs should be <\$4 a copy. DVD would be even less. Sending patients a copy of the video before they come in for consultation radically changes the nature of that meeting from a feeble attempt at complex information transfer with a frightened patient to a meaningful discussion of the implications of the diagnosis with a knowledgeable person.

Vincent J Felitti, MD, Book Review Editor
Kaiser Permanente Medical Care Program
San Diego, CA

To the Editorial Staff of *The Permanente Journal*:

I received my copy of the Summer 2004 issue and was simply shocked to see the photograph that was chosen for the cover.

The picture depicts pampas grass in full bloom.

For the uninformed: this is one of the most invasive, introduced, nonnative plants that is ravaging the western coast of the US. It is a plant, native to Argentina, that was introduced as an ornamental plant in the US many years ago, before it escaped and its seriously invasive nature was recognized. It is not only very invasive but is also very hard to eradicate.

As a 25-year resident of the gorgeous coast of Northern California, I have witnessed the gradual replacement of our native coastal flora by the amazing uncontrolled growth of pampas grass. As you drive from San Francisco to Carmel, the cliffs along Highway 1 are now literally covered by this pest plant.

There is very little state funding to deal with this serious ecological problem. Local efforts exist in many coastal communities, but they are unable to make a significant dent.

I consider that using that image was a serious mistake for an organization like TPMG. Perhaps the remedy could involve in-depth coverage of this problem and getting TPMG and HP employees involved in the local eradication of this pest.

And with the next issue, please don't include a photo of a cigarette butt.

Maurice Franco, MD
Hayward Medical Center,
Hayward, CA

—Reply
Dr Franco,

The Staff of The Permanente Journal (which is produced and published by The Permanente Federation of all Permanente Medical Groups, not by TPMG) can claim some expertise in distinguishing an exceptional photograph from the run-of-the-mill, but we acknowledge our lack of expertise in terms of the flora and fauna of California—or any other state, most of which have some invasive plant. In short, most of us can't tell a weed from a wildflower, an invasive from a native, or an exotic from a neurotic. A little research in the book "Invasive Plants of California's Wildlands" (UC Press, 2000) bears out the writer's exhortations about Argentine Pampas Grass, which seems to be every bit as nasty, aggressive, and voracious as claimed. We urge anyone concerned about such threats to biodiversity to join any of a number of worthy organizations fighting to reverse the invasions, such as the California Native Plant Society in that state. As for us, we offer our apologies—not for printing a beautiful photograph, but for our inability to tell one blade of grass from another.

Jon Stewart
Communications Editor
Communications Practice Leader,
Government Relations and Health Policy, Oakland, CA

Dear Dr Felitti,

I was sitting on a bench while my son was playing a jazz tune for his trombone audition, and it gave me the chance to catch up on some reading. It provided the perfect background for your *TPJ* article on hemochromatosis. Your article is one of the best things I have ever read about the complex interplay of genes, environment, what it means, and how to think about it. Thank you. I love the example of the two sisters. And you are exactly right—it provides an excellent model for thinking about other conditions.

When I was a med student (in the UCB-UCSF) program, I was an assistant on MC King's research on familial breast cancer (ultimately her group identified the BrCA gene, I believe), and I visited cohorts of Mormon families (collecting blood samples) and later did a project in health policy that had to do with screening for sickle cell. I was impressed by how challenging it is to think about these issues, talk about them, develop policy, and communicate with families and patients.

Your article is a tour de force!

Brigid McCaw, MD, MS, MPH
Clinical Lead, Family Violence Prevention Services
Oakland, CA

Dear Dr Felitti,

I am preparing to submit an application for a workshop for the International Critical Incident Stress Foundation's Eighth World Congress on the subject of Helping Children Touched By Trauma. I read an article in *The Permanente Journal* entitled, *The Relation Between Adverse Childhood Experiences and Adult Health: Turning Gold into Lead* (Perm J 2002 Winter;6(1):44-7). I would like your permission to reprint the article as a handout for the workshop.

Nancy E Crump, MS
Director of Family Care Services
Kansas City, MO

—Reply

I'm sure that will be fine, as long as you credit the Journal. I'll send you text of an article I published in Germany that relates addiction to adverse childhood experiences. Lastly, the ACE Study Web site at www.acestudy.org might be of interest to your audience; it contains a full bibliography of the 30 Study-derived publications.

Vincent J Felitti, MD, Book Review Editor
Kaiser Permanente Medical Care Program
San Diego, CA

Hello,

I read your article entitled *Thrive* in *TPJ* (Perm J 2004 Summer;8(3):2) about KP's new "Thrive" Campaign. I think the campaign is a step in the right direction for KP, and I wish the company the best success with it. I have seen the billboards throughout my home area (San Francisco Bay Area), and I think the billboards/posters are really cool.

Good luck to Kaiser Permanente with the new campaign.

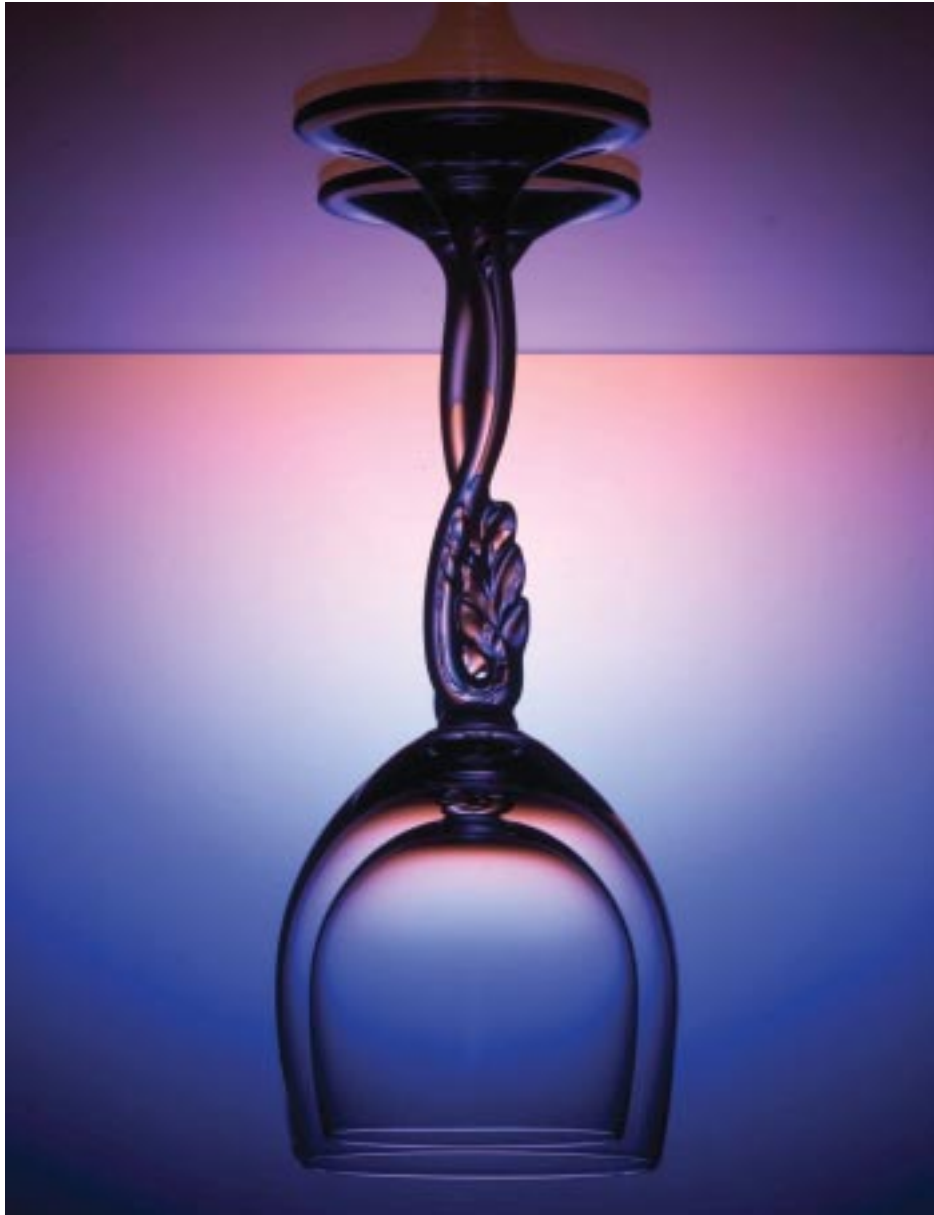
T Williams
San Francisco, CA

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We encourage you to write, either to respond to an article published in the *Journal* or to address a clinical issue of importance to you. You may submit letters by mail, fax, or e-mail.

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Be sure to include your full address, phone and fax numbers, and e-mail address. Submission of a letter constitutes permission for *The Permanente Journal* to publish it in various editions and forms. Letters may be edited for style and length.



"Sunrise"

photograph

By Anna Marie Aguiar, PTA

Anna Marie Aguiar is a Physical Therapist Assistant at the Santa Clara Medical Center in Northern California. More of Ms Aguiar's art can be found on page 74.

Abstracts of Articles Authored or Coauthored by Permanente Physicians

Selected by Daphne Plaut, MLS, Librarian, Center for Health Research

From Georgia

The relationship of cardiovascular risk factors to microalbuminuria in older adults with or without diabetes mellitus or hypertension: the cardiovascular health study.

Barzilay JI, Peterson D, Cushman M, et al. *Am J Kidney Dis* 2004 Jul;44(1):25-34.

BACKGROUND: Microalbuminuria is a risk factor for coronary heart disease (CHD). It occurs most commonly in the settings of diabetes and hypertension. The mechanisms by which it increases CHD risk are uncertain.

METHODS: We examined the cross-sectional association of microalbuminuria with a broad range of CHD risk factors in three groups of adults aged 65 years or older with and without microalbuminuria: those with 1) no diabetes or hypertension (n = 1098), 2) hypertension only (n = 1450), and 3) diabetes with or without hypertension (n = 465).

RESULTS: Three factors were related to microalbuminuria in all three groups: age, elevated systolic blood pressure, and markers of systemic inflammation. In patients with neither diabetes nor hypertension, increasing C-reactive protein levels were associated with microalbuminuria (odds ratio per 1-mg/L increase, 1.46; 95% confidence interval [CI], 1.15 to 1.84). Among those with diabetes, an increase in white blood cell (WBC) count was associated with microalbuminuria (odds ratio per 1000-cell/mL increase, 2.57; 95% CI, 1.12 to 5.89). Among those with hypertension, an increase in WBC count (odds ratio per 1000-cell/mL increase, 1.83; 95% CI, 1.04 to 3.23) and fibrinogen level (odds ratio per 10-mg/dL increase, 1.02; 95% CI, 1.00 to 1.05) were significantly associated with microalbuminuria. In all three groups, prevalent CHD was related to an elevated WBC count. In none of the three groups

was brachial artery reactivity to ischemia, an in vivo marker of endothelial function, related to microalbuminuria.

CONCLUSION: Microalbuminuria is associated with age, systolic blood pressure, and markers of inflammation. These associations reflect potential mechanisms by which microalbuminuria is related to CHD risk.

Reprinted from the American Journal of Kidney Diseases, 44(1), Barzilay JI, Peterson D, Cushman M, Heckbert SR, Cao JJ, Blaum C, Tracy RP, Klein R, Herrington DM. The relationship of cardiovascular risk factors to microalbuminuria in older adults with or without diabetes mellitus or hypertension: the cardiovascular health study, 25-34. Copyright 2004, with permission from the National Kidney Foundation.

CLINICAL IMPLICATION: In this study, we show that coronary heart disease (CHD) and microalbuminuria share three common factors—elevated systolic blood pressure, advanced age, and the presence of increased levels of inflammatory markers. These associations—whether in the presence or absence of diabetes or hypertension—provide a mechanism to explain why the exudation of a small amount of protein in the urine is associated with an increased risk of CHD. —JB

From Southern California

The relationship of asthma medication use to perinatal outcomes.

Schatz M, Dombrowski MP, Wise R, et al. *J Allergy Clin Immunol* 2004 Jun;113(6):1040-5.

BACKGROUND: Maternal asthma has been reported to increase the risk of preeclampsia, preterm deliveries, and lower-birth-weight infants, but the mechanisms of this effect are not defined.

OBJECTIVE: We sought to evaluate the relationship between the use of contemporary asthma medications and adverse perinatal outcomes.

METHODS: Asthmatic patients were recruited from the 16 centers of the National Institute of Child Health and Human Development Maternal Fetal Medicine Units Network from December 1994 through February 2000. Gestational medication use was determined on the basis of patient history at enrollment and at monthly visits during pregnancy. Perinatal data were obtained at postpartum chart reviews. Perinatal outcome variables included gestational hypertension, preterm births, low-birth-weight infants, small-for-gestational-age infants, and major malformations.

RESULTS: The final cohort included 2123 asthmatic participants. No significant relationships were found between the use of inhaled beta-agonists (n = 1828), inhaled corticosteroids (n = 722), or theophylline (n = 273) and adverse perinatal outcomes. After adjusting for demographic and asthma severity covariates, oral corticosteroid use was significantly associated with both preterm birth at less than 37 weeks' gestation (odds ratio, 1.54; 95% CI, 1.02-2.33) and low birth weight of less than 2500 g (odds ratio, 1.80; 95% CI, 1.13-2.88).

CONCLUSIONS: Use of inhaled beta-agonists, inhaled steroids, and theophylline do not appear to increase perinatal risks in pregnant asthmatic women. The mechanism of the association between maternal oral corticosteroid use and prematurity remains to be determined.

Reprinted from the Journal of Allergy and Clinical Immunology, 113(6), Schatz M, Dombrowski MP, Wise R, Momirova V, Landon M, Mabie W, Newman RB, Hauth JC, Lindheimer M, Caritis SN, Leveno KJ, Meis P, Miodovnik M, Wapner RJ, Paul RH, Varner MW, O'Sullivan MJ, Thurnau GR, Conway DL; Maternal-Fetal Medicine Units Network, The National Institute of Child Health and Development; The National Heart, Lung and Blood Institute, 1040-5, Copyright 2004, with permission from the American Academy of Allergy, Asthma and Immunology.

From Georgia

The association of fasting glucose levels with congestive heart failure in diabetic adults > or =65 years: the Cardiovascular Health Study.

Barzilay JJ, Kronmal RA, Gottdiener JS, et al. J Am Coll Cardiol 2004 Jun 16;43(12):2236-41.

OBJECTIVES: The purpose of this study was to determine if fasting glucose levels are an independent risk factor for congestive heart failure (CHF) in elderly individuals with diabetes mellitus (DM) with or without coronary heart disease (CHD).

BACKGROUND: Diabetes mellitus and CHF frequently coexist in the elderly. It is not clear whether fasting glucose levels in the setting of DM are a risk factor for incident CHF in the elderly.

METHODS: A cohort of 829 diabetic participants, age > or = 65 years, without prevalent CHF, was followed for five to eight years. The Cox proportional hazards modeling was used to determine the risk of CHF by fasting glucose levels. The cohort was categorized by the presence or absence of prevalent CHD.

RESULTS: For a one standard deviation (60.6 mg/dl) increase in fasting glucose, the adjusted hazard ratios for incident CHF among participants without CHD at baseline, with or without an incident myocardial infarction (MI) or CHD event on follow-up, was 1.41 (95% confidence interval 1.24 to 1.61; $p < 0.0001$). Among those with prevalent CHD at baseline, with or without another incident MI or CHD event on follow-up, the corresponding adjusted hazard ratio was 1.27 (95% confidence interval 1.02 to 1.58; $p < 0.05$).

CONCLUSIONS: Among older adults with DM, elevated fasting glucose levels are a risk factor for incident CHF. The relationship of fasting glucose to CHF differs somewhat by the presence or absence of prevalent CHD.

Reprinted from the Journal of the American College of Cardiology, 43, Barzilay JJ, Kronmal RA, Gottdiener JS, Smith NL, Burke GL, Tracy R, Savage PJ, Carlson M. The association of fasting glucose levels with congestive heart failure in diabetic adults > or =65 years: the Cardiovascular Health Study: 2236-41: Copyright 2004, with permission from the American College of Cardiology Foundation.

CLINICAL IMPLICATION: Diabetic patients have more than twice the burden of heart failure (HF) as compared to nondiabetic individuals. In this article we demonstrate that CHF risk in people with diabetes has a strong association with glucose control. This is especially so in the absence of coronary heart disease (ie, "diabetic cardiomyopathy"). These findings offer one more reason that the clinician should attempt tight glucose control in diabetic patients. -JB

From Southern California

Irritable bowel syndrome and surgery: a multivariable analysis.

Longstreth GF, Yao JF. Gastroenterology 2004 Jun;126(7):1665-73.

BACKGROUND AND AIMS: Patients with irritable bowel syndrome (IBS) have high surgical rates. We investigated the demographic and medical factors independently associated with surgical histories of health examinees.

METHODS: We applied multiple stepwise logistic regression analysis to self-completed questionnaire data from 89,008 examinees, assessing six surgeries as outcomes. We assessed questionnaire/physician record agreement of physician-diagnosed IBS and surgical history on 201 randomly selected examinees with ≥ 3 years of records.

RESULTS: Questionnaire/record agreement for IBS and surgery was 83.6% (kappa = 0.68) and 95.5%-100.0% (kappa = 0.82-1), respectively. IBS was reported by 4587 examinees (5.2%) (1382 men [3.0%] and 3205 women [7.5%]). Subjects with and without IBS, respectively, reported the following surgical procedures: cholecystectomy, 569 (12.4%) versus 3428 (4.1%), $p < 0.0001$; appendectomy, 967 (21.1%) versus 9906 (11.7%), $p < 0.0001$; hysterectomy, 1063 (33.2%) versus 6751 (17.0%), $p < 0.0001$; back surgery, 201 (4.4%) versus 2436 (2.9%), $p < 0.0001$; coronary artery surgery, 127 (2.8%) versus 2033 (2.4%), $p > 0.05$; peptic ulcer surgery, 22 (0.5%) versus 277 (0.3%), $p > 0.05$. Among independent surgery associations, IBS was associated with cholecystectomy (adjusted odds ratio [OR], 2.09; 95% confidence inter-

val [CI], 1.89-2.31; $p < 0.0001$), appendectomy (OR, 1.45; 95% CI, 1.33-1.56; $p < 0.0001$), hysterectomy (OR, 1.70; 95% CI, 1.55-1.87; $p < 0.0001$), and back surgery (OR, 1.22; 95% CI, 1.05-1.43; $p = 0.0084$).

CONCLUSIONS: Health examinees with physician-diagnosed IBS report rates of cholecystectomy three-fold higher, appendectomy and hysterectomy two-fold higher, and back surgery 50% higher than examinees without IBS; IBS is independently associated with these surgical procedures.

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CLINICAL IMPLICATION: To minimize unnecessary abdominal surgery in IBS patients, physicians should diagnose IBS unequivocally, explain to patients that it can cause severe pain, and avoid unnecessary tests. For example, gallstones are common (especially in women), but biliary pain can usually be distinguished from bloating, fatty food intolerance and other types of dyspepsia that are common in IBS patients but not of biliary origin. By limiting gallbladder sonography to patients with biliary-type pain, asymptomatic gallstones will remain undiscovered and untreated by mistaken surgery. "Chronic pelvic pain" is often due to IBS, whether or not gynecological pathology is present, and collaboration of gynecologists with other physicians can reduce unnecessary hysterectomy. - GL

From The Northwest

An evaluation of one-on-one advanced proficiency training in clinicians' use of computer information systems.

Kirshner M, Salomon H, Chin H. Int J Med Inform 2004 May;73(4):341-8.

OBJECTIVE: We examined the effectiveness of a one-on-one training strategy for advanced proficiency in computer information systems (CIS) by clinicians in a large health maintenance organization (HMO). Specifically, this

study assessed the level of self-reported improvement in CIS efficiency following one-on-one training, and assessed the perceived value of one-on-one training compared to other teaching methods.

DESIGN: We performed a cross-sectional study using a paper-based survey of 129 clinicians practicing in the HMO.

MEASUREMENTS: We used a multi-item satisfaction index to measure clinician satisfaction with the one-on-one training. We measured whether clinicians thought they were more efficient using the system after training.

RESULTS: The one-on-one method was significantly preferred over other teaching methods. Compared to other CIS components, use of the electronic medical record (EMR) improved most following one-on-one training. Sixty-one percent of the clinicians reported major improvements (ie, >3 on a 5-point Likert scale; 5 being the highest score) in using the EMR.

CONCLUSION: Perceived effectiveness of one-on-one training and overall satisfaction were ranked high by clinicians. The findings support the assumption that clinicians value one-on-one training and value this training method above other methods.

Reprinted from International Journal of Medical Informatics, 73(4), Kirshner M, Salomon H, Chin H, An evaluation of one-on-one advanced proficiency training in clinicians' use of computer information systems, 341-38, Copyright 2004, with permission from Elsevier.

CLINICAL IMPLICATION: Becoming proficient in use of clinical information systems (CIS), such as Hyperspace, requires training and practice. When compared to small groups, classrooms, and e-learning, one-on-one per-

sonalized training is favored by most primary care providers studied. Clinicians reported improved satisfaction, effectiveness, and efficiency with CIS following one-on-one training. Offering multiple venues, however, may be necessary to provide appropriate opportunities for individual learning styles and the apparent benefits must be weighed against associated time and financial costs. Despite these limitations, one-on-one CIS training is viewed as providing high value to Permanente clinicians. —MK

From Northern California
Smoking, coffee, and pancreatitis.

Morton C, Klatsky AL, Udaltsova N. Am J Gastroenterol 2004 Apr;99(4):731-8.

OBJECTIVES: We studied relationships of cigarette smoking and coffee drinking to risk of pancreatitis.

METHODS: This was a cohort study among 129,000 prepaid health plan members who supplied data about demographics and habits in 1978-85. Among 439 persons subsequently hospitalized for pancreatitis, probable etiologic associations were cholelithiasis (168/439 = 38%), alcohol (125/439 = 29%), idiopathic (110/430 = 25%), and miscellaneous (36/439 = 8%). Cox proportional hazards models with seven covariates (including alcohol intake) yielded relative risk estimates for smoking and coffee use.

RESULTS: Increasing smoking was strongly related to increased risk of alcohol-associated pancreatitis, less related to idiopathic pancreatitis, and unrelated to gallstone-associated pancreatitis. Relative risks (95% confidence

intervals, CI) of one pack per day (vs never) smokers for pancreatitis groups were: alcohol = 4.9 (2.2-11.2, p < 0.001), idiopathic = 3.1 (1.4-7.2, p < 0.01), and gallstone = 1.3 (0.6-3.1). The relationship of smoking to alcohol-associated pancreatitis was consistent in sex and race subsets. Drinking coffee, but not tea, was weakly inversely related to risk only of alcohol-associated pancreatitis, with relative risk (95% CI) per cup per day = 0.85 (0.77-0.95; p = 0.003). Male sex, black ethnicity, and lower-educational attainment were other predictors of alcohol-associated pancreatitis.

CONCLUSIONS: Cigarette smoking is an independent risk factor for alcohol-associated and idiopathic pancreatitis. Coffee drinking is associated with reduced risk of alcohol-associated pancreatitis. The data are compatible with the hypotheses that smoking may be toxic to the pancreas or may potentiate other pancreatic toxins while some ingredient in coffee may have a modulating effect.

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CLINICAL IMPLICATION: Since these data strongly suggest that cigarette smoking promotes or causes pancreatitis, they mandate that especially strong advice to stop smoking be given to persons at risk of pancreatitis or recurrence of the condition. On the other hand, there is no reason to prohibit or discourage coffee drinking among such persons, in view of the apparent protective role of coffee drinking. —CM ❖

The Possibility

To become aware of the possibility of the search is to be onto something.

— Walker Percy, 1916-1990, American author

10th Annual HMO Research Network Conference

Abstracts from the HMO Research Network

This important abstract is the first to emerge from the Garfield Memorial Fund (GMF) study on Best Communication Practices. The study amassed videotape, audiotape, and pre/post physician and patient questionnaire data from live physician-patient primary care visits in two regions. It is one of a collection of five inaugural studies of the GMF Communication Initiative.

This abstract is also part of a collection of abstracts from the 10th Annual HMO Research Network annual meeting in May 2004, which will be published this year in The

Permanente Journal (TPJ). Several of these abstracts related to women will appear in the special Women's Health Winter issue in February 2005. All of these represent a new feature in TPJ called "Abstracts from the HMO Research Network." Tom Vogt, MD, FAHA, in his article (page 10), describes this network. I believe publishing these abstracts creates an opportunity for Permanente physicians and clinicians to learn from the research findings in like integrated groups and systems in other parts of the country.

— Tom Janisse, MD, Editor-In-Chief

May 3-5, 2004 Dearborn, MI
Evaluating Care Delivery

Ambulatory Care Visits: Squeezing 22 Minutes into a 19-Minute Visit?

Sue Hee Sung, MPH; John Hsu, MD, MBA, et al.

BACKGROUND: Balancing patient and provider demands for time during an ambulatory visit represents a significant clinical and economic challenge. The study examines actual visit times, patient satisfaction with time spent with the physician, and time perceptions of patients and physicians.

METHODS: We collected video and post visit questionnaire data from a convenience sample of patients and primary care physicians. We examined the time perceptions of how long physicians were in the exam room, stratified by whether patients felt they had adequate time with the physician. Using a mixed linear model, we evaluated differences in time estimates between the patient, physician, and a researcher watching the video.

RESULTS: Of the 192 patient-subjects, the majority was female (61%) and nonwhite (59%), with a mean age of 63 years. Most of

the 61 physician-subjects were male (59%) and had 10+ years experience in the health system. Overall, 84% of patients strongly felt that their physician spent enough time with them during their visit. On average, these patients estimated that physicians spent 22 minutes in the exam room, whereas physicians estimated 19 minutes and the actual mean time was 19 minutes. In visits where patients were less satisfied, on average the patients estimated that physicians spent 19 minutes in the exam room, whereas physicians estimated 20 minutes and the actual mean time was 18 minutes. After adjusting for age, gender, and clustering by physician, highly satisfied patients reported significantly more time spent with the physician on average compared with physicians' estimates or with actual measured time (difference = 2.6 minutes and 2.4 minutes, $p < 0.01$). There were no statistically signifi-

cant differences in actual visit times by patient satisfaction or between physician estimates and actual times.

CONCLUSIONS: Patients who are highly satisfied perceive spending significantly more time with the physician than actually occurred. In contrast, less-satisfied patients' time estimates did not differ from actual times; nor did physician time estimates differ. Similarly, there were no detectable differences in actual time between visits with various levels of patient satisfaction. These

preliminary results suggest that there may be methods to help patients feel that they have spent an adequate amount of time with their physician within the current visit-time constraints. ❖

Patients who are highly satisfied perceive spending significantly more time with the physician than actually occurred.

The Role of Research in Integrated Health Care Systems: The HMO Research Network

By Thomas M Vogt, MD, MPH, FAHA
Jennifer Elston Lafata, PhD
Dennis D Tolsma, MPH
Sarah M Greene, MPH

A similar version of this article was published in: The American Journal of Managed Care 2004 Sep;10(9):643-8.

Abstract

Integrated care systems have unique advantages for conducting research. The HMO Research Network (HMORN) includes research centers associated with 13 large integrated care systems whose research focuses on improving health and health care delivery using the extraordinary platform provided by these health systems. We conducted literature reviews and surveys and interviews with directors of HMORN research centers, research investigators, and selected support staff in order to identify the characteristics of the research in HMORN centers and to present examples of how this research has affected health and health policy. The 13 HMORN member health systems deliver health care to 13 million people. HMORN research centers have access to large, defined populations, comprehensive medical information, extensive computerized data systems and to medical care delivery systems that offer extraordinary research opportunities. HMORN centers publish about 1200 scientific articles each year and received about \$180 million in external research funding in 2002, most of it from NIH, CDC, and other federal sources. More than 2000 research studies are currently underway at these centers, which employ approximately 1500 persons in the research activities. HMORN research centers have had a profound impact on health policy and care. New technologies are steadily expanding the research capacities of these research groups. Increased collaboration between academic and HMO researchers would enhance the work of both.

Introduction

The failure to efficiently translate research findings into care delivery has become a national crisis.¹ The Institute of Medicine (IOM) has emphasized the critical need to develop information systems that are designed to address the needs of clinical research.² This article discusses the work of the HMO Research Network (HMORN). The HMORN includes 13 research centers affiliated with integrated care delivery systems. These centers have the information systems that the IOM says are needed, and these systems are growing increasingly more complex and sophisticated.

Research in Integrated Care Settings—The HMO Research Network

Integrated care health maintenance organizations (HMOs) provide the optimal mix of population base, electronic medical and financial databases, and longitudinal observation for much health research. They are especially well situated for research addressing issues such as the costs and effectiveness of prevention and treatment practices, the organization of care, secular trends in diseases, and relative priorities on how to apportion scarce resources. The member organizations of the HMO Research Network are carrying out research that is crucial to improving the quality, availability, and effectiveness of health care. The 13 HMORN institutions carry out 90% of all research conducted by HMOs with formal research centers.³ This article describes the importance and extent of this research.

In 1961, Kaiser Permanente (KP) Northern California formed the Division of Research (DOR), the first of the integrated care research centers. The KP Northwest Center for Health Research in Portland, OR, followed three years later. Both centers are professionally au-



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onomous health research centers in the public domain that use the integrated care system as a laboratory for research that improves care. These two research centers grew steadily over the years, competing successfully with universities for federal research grants and developing lines of research that influenced care at the national level. By the early 1970s, their research had already led to changes in federal regulations relating to Medicaid coverage.⁴ Today, six KP research centers employ more than 100 scientists and 1000 staff and publish about 600 articles per year in peer-reviewed medical literature.

Over the ensuing decades, other integrated care systems across the nation began to recognize the value of affiliated research centers that provide expert investigators the autonomy to develop and fund their own lines of research. In 1994, research centers in these geographically dispersed systems established a professional organization, the HMO Research Network (HMORN) in order to encourage high-quality, public domain research within HMOs. The 13 HMORN centers represent integrated care systems with approximately 13 million members. Collectively, they publish about 1200 scientific publications per year. These members include several that are exclusively prepaid group practices, several that are mixed models, and one that is an IPA-model HMO. These research centers vary in structure and organization, as do their parent health plans. However, they all have in common access to a

defined population of members and access to data, much of it electronically available, that permits longitudinal evaluation of care practices. Their placement within large health systems makes feasible rigorous evaluation of alternative approaches to care.

HMORN research centers study a broad range of health and health care issues. Research conducted by member organizations is in the public domain, and the principle products of their studies are peer-reviewed publications. Table 1 lists the members of the HMORN and selected characteristics of their research centers. These centers are funded primarily through competitive grants and contracts from federal, foundation, and proprietary funding organizations and not by dues from health plan members. The annual HMORN scientific meeting combines presentations of scientific papers with seminars on how to develop collaborative research studies that permit the member organizations to collectively address research questions that cannot be carried out within single centers. HMORN members either already have fully automated electronic medical records (EMR) systems or are in the process of installing them. As they come online, these EMR systems will provide unprecedented opportunities to evaluate alternative approaches to treatment, long-term outcomes of care, cost effectiveness and cost benefits, rare disease epidemiology and treatment, and many other critical health care issues.

Research from the HMORN centers has profoundly affected the organization, delivery, and quality of care,

HMOs ... are especially well situated for research addressing issues such as the costs and effectiveness of prevention and treatment practices, the organization of care, secular trends in diseases, and relative priorities on how to apportion scarce resources.

Table 1. HMO research members and their characteristics

Member	Research center began	2002 HMO members	2002 Research budget (millions)	2002 publications
Kaiser Permanente (KP) Division of Research, Oakland, CA	1961	3,500,000	28.1	188
KP Center for Health Research, Portland, OR	1964	452,000	26.2	102
KP Southern California, Pasadena, CA	1978	3,000,000	9.7	127
Henry Ford Health System, Detroit, MI	1979	571,000	62.0	~300 ^{a,b}
Group Health Cooperative, Seattle, WA	1983	588,000	19.8	143
HealthPartners Research Foundation, Minneapolis, MN	1989	657,000	7.3	80
Lovelace Clinic Foundation, Albuquerque, NM	1990	240,000	2.3	6
KP Colorado, Denver, CO	1990	370,000	5.7	17 ^a
Harvard Pilgrim, Boston, MA	1992	770,000	15.0	80
Meyers Primary Care Institute (Fallon Healthcare), Worcester, MA	1996	207,000	2.2	66
United Healthcare, Minnetonka, MN	1997	3,000,000 ^c	NA	11 ^a
KP Georgia, Atlanta, GA	1998	281,000	1.1	7
KP Hawaii, Honolulu, HI	1999	227,000	2.5	16

^a 2001 publications

^b Henry Ford Health System has a large clinical science research program; 10-15% of publications are in health services, epidemiology, and related fields similar to those of other HMORN members.

^c Number of members accessible for research purposes

NOTE: Some publication counts include those by clinicians and non-peer-reviewed publications (eg, book chapters); others do not.

federal and state health policies and regulations, plan benefits, and many other aspects of health and health care delivery. The 19 studies summarized in Table 2⁵⁻²⁹ are examples of HMORN projects that have influenced health care, health law, and health policy. At any given

point in time, the members of the Research Network are conducting more than a thousand research studies. HMORN research centers have also been key participants in some of the nation's most important multisite National Institutes of Health studies including the Mul-

Table 2. A few managed care research projects with significant impact on policy and practice

Project	Description	Impact	Selected references
Poverty project ^a	Enrolled Medicaid recipients in integrated care and examined utilization	Changed federal law to permit capitated enrollment of Medicaid recipients	5, 6
Medicare Plus project ^a	Enrolled Medicare recipients in integrated care and examined utilization	Changed federal law to permit capitated enrollment of Medicare recipients	7
Influenza Vaccine studies ^{a,b}	Evaluated cost-effectiveness of influenza and <i>H influenza</i> immunizations	Immunization is effective, cost-saving; established national standards.	8, 9, 10
Colorectal (CR) cancer screening ^b	Evaluated effect of colorectal cancer screening on outcomes	Showed benefits of CR screening on survival; showed long-term benefit of colonoscopy	11
Office-based tobacco intervention ^a	Evaluated impact of nurse-directed tobacco intervention with smokers	Adopted in multiple health systems; contributed to AHCPH standards	12, 13
Dietary approaches to stop hypertension ^a	Tested efficacy of a diet integrating two decades of research findings in reducing blood pressure	Diet reduces BP; best-selling book; good for other conditions; acceptable to consumers	14, 15
Multiphasic Physical Exam (MPE) studies ^b	Evaluated data from years of HMO multiphasic exams and subsequent morbidities	Broad new epidemiologic insights and many new risk factors for illness identified; lack of efficacy of MPE in reducing illness	16
Adverse drug events in elderly ^c	Cohort study of elderly; identify factors associated with adverse drug events	Identified factors related to serious adverse drug events; recommend preventive strategies	17
Childhood allergy study ^d	HMO cohort examining environmental risk for allergy/asthma	Pets in household <i>protective</i> against allergy; changed advice on allergy and pets	18
Vaginal birth after C-section ^e	Observational study of 57,553 HMO births	Showed safety, and frequency of vaginal birth after cesarean; changed standard practice	19
Childhood Asthma Management Program (CAMP) ^e	Effects of inhaled corticosteroids in children, randomized trial	Basis for national guidelines on asthma management in children	20
Handguns, homicide and suicide ^f	Case control study comparing homicide, suicide rates among handgun owners and nonowners	Those with handguns are twice as likely to suffer homicide or suicide; important data for gun control debate	21
Chronic disease management model	Model, strategies for changing chronic disease management	Many health systems and WHO adopted model	22
Bicycle safety helmets ^f	Large HMO case control study on bicycle injuries and safety helmets	Helmets reduce head/brain injury by 70%; led to national helmet campaigns	23
Chlamydia screening & Pelvic Inflammatory Disease ^f	Does chlamydia screening reduce later pelvic inflammatory disease?	Led to national standards and programs	24
Prevention priorities ^g	Relative costs of preventive services to save a quality-adjusted year of life	Established priorities for preventive care; used to measure system quality	25, 26
Minority health ^{d,h,i,j}	HMO Demonstration; collected and used minority health data to reduce disparities	Disparities identified; remedial programs started. Widely referenced; used by government/organizations	27
Prenatal visits and perinatal outcomes ⁱ	Randomized trial of effect of prenatal visits among low-risk women on perinatal outcomes	Altered perinatal outcome schedule widely implemented in several HMOs	28
Group visits for chronically ill ⁱ	Randomized trial of group visits on care of older chronically ill persons	Group visit model adopted in KPCO and elsewhere	29

^a KP Northwest, Portland, OR
^b KP Northern California, Oakland, CA
^c Meyers Primary Care Institute, Worcester, MA
^d Henry Ford Health System, Detroit, MI
^e KP Southern California, Pasadena, CA
^f Group Health Cooperative, Seattle, WA
^g HealthPartners of Minneapolis
^h KP Hawaii, Honolulu, HI
ⁱ KP Colorado, Denver, CO
^j Lovelace Clinic Foundation, Albuquerque, NM

multiple Risk Factor Intervention Trial (MRFIT),³⁰ the Systolic Hypertension in the Elderly Program (SHEP),³¹ the Study of Osteoporotic Fractures (SOF),³² the Trials of Hypertension Prevention (TOHP),³³ the Beta-Blocker Heart Attack Trial (BHAT),³⁴ the Women's Health Initiative (WHI),³⁵ the Dietary Approaches to Stop Hypertension (DASH) trial,¹⁴ and many others.

HMORN Collaborative Programs

In 1998, the HMORN received its first multi-institutional program award from the National Cancer Institute. The Cancer Research Network (CRN) includes 11 of the HMORN members. The CRN established an infrastructure to foster and facilitate development of new cancer research initiatives within integrated care systems. In addition, they conducted three large, multi-institutional research studies, each addressing questions that cannot be addressed within a single health system. These projects evaluated the impact of tobacco policies and training on smoking rates and patient satisfaction in health plans,^{36,37} outcomes and the reasons for occurrence of late-stage breast and invasive cervical cancer among female plan members with full access to preventive screening services,³⁸ and effectiveness of earlier mammography and prophylactic mastectomy in reducing breast cancer mortality. The CRN has been renewed through 2007 with three new projects. In addition, 15 cancer research projects have been funded through the CRN network as separate grant applications, and several others are pending. Funded CRN-affiliated projects address a broad array of cancer research issues, including expanding enrollment in cancer clinical trials, cancer epidemiology, end-of-life care, effects of therapy on survival, and HRT use patterns.

The HMORN currently participates in five national, multisite research networks (Table 3): the CRN, the Center for Education and Research in Therapeutics

(CERT), the Integrated Delivery System Research Network (IDSRN), the Cancer Care Outcomes Research and Surveillance (CanCORS) group, and the Vaccine Safety Datalink program. The first two are supported by the Agency for Healthcare Research and Quality (AHRQ), the third by the National Cancer Institute (NCI), and the last by the Centers for Disease Control and Prevention. The HMORN also has formal partnerships with the American Association of Health Plans and the Alliance of Community Health Plans for the conduct of public health research.

Research Advantages in Integrated Care Systems

Defined population base—An entire population of plan members permits long-term observation of both numerator (the sick) and denominator (the population). This observation permits the estimation of rates that is essential to understanding changes over time, cause-and-effect relationships, and factors associated with disease incidence and treatment outcome.

Stable population base—Long-term cohort studies are critical elements of hypothesis formation and cause/effect determination (eg, Framingham Study, Study of Osteoporotic Fractures). These studies, though, are very expensive. However, in integrated care systems, many cohorts exist naturally, and data on those cohorts are already present in electronic form. This permits long-term cohort studies to be conducted retrospectively and at reasonable cost. The experiences of health plan members can serve to identify readily observable secular trends and outcomes of system interventions and can also serve as dependent variables when identifying risk factors and their interactions. Five of the 11 CRN sites examined the stability of enrollment of colorectal cancer cases to assure that study results were not skewed due to disenrollment

An entire population of plan members permits long-term observation of both numerator (the sick) and denominator (the population).

Table 3. HMORN studies

Network study	No. sites	Description	Funding agency
Cancer Research Network (CRN)	11	Multisystem cancer research studies addressing prevention, control, cost, outcomes	NIH - NCI
Center for Education and Research in Therapeutics (CERT)	11	Safety, effectiveness, appropriateness of drugs, biologics, devices	AHRQ
Cancer Outcomes Research and Surveillance (CanCORS) [five HMORN sites act as one study site]	5	Multisite study; relates care, outcomes for lung and colorectal cancer to demographics and other factors	NIH - NCI
Integrated Delivery System Research Network (IDSRN)	13	Task order responses to multiple health services research issues	AHRQ
Vaccine Safety Datalink (VSD)	5	Evaluates vaccine effectiveness and outcomes	CDC

of persons with cancer. Between 91% and 95% of survivors of cases were still enrolled two years after diagnosis, and 81-90% were still enrolled after five years.³⁹

High volunteer rates—Health plan members are more likely to respond to appeals for research volunteers when that appeal is from their own health plan. Recruitment and retention rates from integrated care system research cohorts are substantially higher than those from community recruitment.

Representativeness—Large, often nonprofit, integrated care systems are usually, though not always, demographically representative of their geographic populations. Medicaid and Medicare recipients can, and do, enroll as members assuring representation across age and income groups.

Diverse ethnicity—The members of the HMO Research Network are highly diverse ethnically, culturally, and geographically. One member (KP Hawaii) draws 75% of its membership from minority groups. KP Northern and Southern California each include very large numbers of Hispanic, Asian, and African-American groups. Henry Ford Health System (Detroit) and KP Georgia both have large African-American populations. Lovelace in New Mexico has a high concentration of Hispanic members. Working together, these groups can use existing databases to examine issues on ethnic diversity and its relation to care and care outcomes.

Comprehensive medical records—In private practice medicine, one person may see several physicians, each of whom maintains a separate medical record. All diagnoses, medications, lifestyle habits, and other pertinent information are not included in any single record. Many integrated care systems maintain comprehensive medical records that may include information across inpatient and outpatient settings. As they move toward electronic records (see below), this practice will become universal.

Electronic data lead to easy "preliminary" studies; rare disease studies—Successful research requires preliminary data, often collected at considerable expense, time, and energy. Comprehensive data information systems in integrated care can serve much of this need. Many research ideas can be successfully developed without pilot funds beyond those required for retrieving and analyzing data from existing databases. The evolution and various components of these data systems has been described elsewhere.⁴⁰

Electronic data also permit identification of uncommon diseases and treatments. Five of the 11 CRN sites identified 132,580 cancer cases for one study, including 2680 pancreatic cancer cases, 2788 ovarian cancers, 2986

bladder cancers, and 5147 non-Hodgkins lymphomas.³⁹

Automated medical records—Perhaps the greatest innovation in medical care in the 21st century will grow out of the shift to EMRs. EMR systems have the capacity to facilitate use of consensus guidelines, to minimize drug interactions and reactions, to design prevention and care plans that are individually tailored, and to provide explicit, detailed information on where care is being delivered according to optimal or suboptimal standards. In addition, these systems will provide extraordinary epidemiologic opportunities to observe disease trends, disease outcomes, and disease/risk-factor associations. They will provide health economists the opportunity to study the relative costs and effectiveness of different approaches to care and will assist in designing and evaluating alternative structures for delivering care.

Ability to test efficacy of care alternatives—Large, integrated delivery systems often experiment with innovations in delivery. These innovations can be rigorously evaluated when trained researchers are involved. Many health systems pride themselves on their innovations, but sound evaluation requires rigorous methodology. KP supports the Garfield Memorial Fund for the purpose of providing support to its research centers for development, implementation, and evaluation of system innovations.

Location inside of health care systems—The presence of the HMORN centers within health care systems encourages interactions and critical partnerships among researchers, clinicians, and managers early in the research process. This interaction facilitates implementation and testing in real-world settings. The perspectives of managers, clinicians, and staff often lead researchers to modify naïve assumptions about what will work or will not work within their systems and to support development of functional innovations that can be successfully translated into practice. Dissemination of scientific findings into health care is a serious national problem.¹ The presence of research in health settings also helps managers, clinicians, technicians, and staff to respect research activities as legitimate and to view support of the research enterprise as legitimate and integral to providing care. Facilitating research serves the clinicians, the patients, and, ultimately, the entire system. These partnerships create an environment that facilitates the translation of research findings into practice.

Research budgeting expertise—All large health systems engage to some degree in proprietary research (eg, research funded by drug companies). Recent

audits at two of the HMORN institutions showed that for every dollar they took in for proprietary research, they spent between two and three dollars. HMORN research centers can provide expertise to their parent systems for assuring that research budgets cover actual costs and do not drain funds from health care premiums.

Why Should Integrated Care Systems Participate in Research?

Outcomes management requires an infrastructure in which population-based outcomes can be readily assessed.⁴¹ There are no comparable environments for addressing many of these issues in the United States. We believe that these advantages are so powerful that large integrated care systems actually have a social obligation to participate in research as a part of the healthcare process. The reasons for academic researchers to form effective partnerships and collaborations with HMO-based research centers are also compelling.¹⁸

Members benefit—Research provides members an opportunity to make a contribution. An unpublished survey done by the senior author of more than 300 volunteers in a randomized trial of hypertension medications showed that most volunteered primarily to help others and not because they expected personal benefit. Research makes some therapies available to patients earlier than would otherwise be the case. This strategy is particularly valuable when standard therapy offers little benefit.

Physicians and staff benefit—Research participation helps clinicians to stay abreast of new developments; it provides new activities that make their work more interesting and relevant; and it enhances job satisfaction and retention. Research also makes physicians advocates for change when research findings support that change. Research brings additional skills and perspectives into the health care setting.

Interdisciplinary research—The HMO research environment fosters multidisciplinary research.⁴ This integration of disciplines is essential to understanding the complex interrelationships of health services and their outcomes.

Discussion

“The US health care system becomes a more embarrassing disaster each year ...”⁴³ and it is “failing in front of our eyes”⁴⁴—particularly with respect to our ability to synthesize the mountains of information required to optimize care. The reasons for the morbid state of US health care are rooted in our medical history and our

economic structure. They arise from complex, confusing, and constantly changing reimbursement processes; from perverse incentives that encourage excessive services; from our love affair with expensive technologies; from our inability to stop doing what doesn't work; from a legal system that encourages fault finding and paranoia instead of remedial action; and from the lack of a systematic means for learning from our mistakes and for translating those learnings back into practice. Research that takes advantage of integrated care system opportunities cannot address all of these problems, but it is a critical step in the needed information synthesis. Research within integrated care systems can develop new concepts and methods that define basic goals; design practical tools that document the nature and magnitude of problems and outcomes; evaluate strategies and interventions for improving care; and evaluate new models, programs, and systems.⁴⁵ A balanced research portfolio requires investigator-initiated development of theory, methods and measures, organizational and systems research, effectiveness and cost-effectiveness studies, management and implementation research, results that can be understood and integrated into practice, and development of researchers skilled in these areas.⁴⁵ Research priorities should be based on clinical realities and economic epidemiology and also should be guided by recognizing deficiencies in conventional wisdom.⁴⁶

In integrated care systems, these key factors intersect. Economics pushes those systems to avoid unnecessary services, quality assurance processes such as the Healthplan Employer Data Information Set (HEDIS) push them toward quality improvement, and the clinical setting requires them to take into account the real-world realities of delivering care. Their settings are ideal for testing and evaluating various preventive and treatment services and for evaluating different organizational structures.

The proliferation of EMR systems will dramatically enhance the quantity and quality of performance assessments both within and across health care systems.⁴⁷ These systems will also greatly improve the capacity to perform inexpensive retrospective evaluations. They can assess quality of care at the patient, provider, clinic, and system levels and can prompt clinicians on current guidelines, potential drug interactions, and overdue services. They permit prospective cohort studies to be performed retrospectively, allow identification of

Research priorities should be based on clinical realities and economic epidemiology and also should be guided by recognizing deficiencies in conventional wisdom.

rare diseases for recruitment into studies, and facilitate cost-effectiveness analyses of various approaches to treatment. All of these advantages afforded by EMRs depend on the presence of diverse, defined populations such as those found in integrated care systems.

The HMORN recognizes that access to these extraordinary resources is a public trust. The HMORN vision is to “transform US health care through research on the diverse populations served by integrated health systems.” Its aim is “to become the premier resource for population-based research by drawing on the unique member and geographic diversity of the network and its organization, human capital, and data resources.” HMORN accomplishes these aims through public domain research that serves the public interest. Integrated care research has moved into the mainstream of health care research in the US. In the future, it will become increasingly important in the formation of policy and practice.

In summary, integrated care systems are such an ideal setting to conduct many types of applied medical research that the larger integrated care delivery systems have a social obligation to actively support and participate in such research. High-quality medical care requires high-quality research and evaluation. Clinicians, managers, and the public must come to view research as an integral and essential part of what health systems do. The design of data systems in large health care organizations needs to include considerations relating to research and evaluation. University researchers should develop closer partnerships with their health system research colleagues to improve the quality and quantity of research in these settings.¹²

... the larger integrated care delivery systems have a social obligation to actively support and participate in such research.

Science is the Basis of Medicine

Good science leads to better decisions and systems that are effective in supporting those decisions. Where would you prefer to send a loved one for the best possible care? Most people think immediately of research institutions—the Mayo Clinic, Sloan Kettering, MD Anderson, Cleveland Clinic, etc. Although less widely recognized, the members of the HMO Research Network are quietly joining this elite group. ❖

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"Parisian Street"

oil on canvas

By Jeffrey Brown, MD

Dr Brown works in the internal medicine department at TPMG in Redwood City, CA.
More of Dr Brown's art can be found on page 66.

Initial Kaiser Permanente Southern California Experience Embracing the New Technology of Transcatheter Closure of Atrial Septal Defects

By Ronald M Rosengart, MD
Morris M Salem, MD
Timothy L Degner, MD
Samuel O Sapin, MD

Abstract

As a result of individual physicians' initiative, transcatheter closure of secundum atrial septal defects—a new procedure—was made available to patients in the Kaiser Permanente (KP) Southern California Region soon after the US Food and Drug Administration (FDA) approved use of the AMPLATZER Septal Occluder. This ingenious device and the procedure for its implantation are described along with results of implantation in our initial 51 pediatric and adult patients. These results are compared with other published results. The clinical implications of using this new procedure are major: Many pediatric and adult patients with atrial septal defects can now benefit from nonoperative closure of these defects. On the basis of these observations, we attest to the commitment of Permanente physicians to incorporate technical advances into medical practice and to assess KP's experience using the new technology.

Introduction

Atrial septal defects are among the most common congenital cardiac anomalies in children and adults. The most common type of atrial septal defect is the ostium secundum defect, which affects the fossa ovalis in the midportion of the atrial septum. Fenestrated defects and multiple defects sometimes occur. Although results of surgical closure have been excellent for many years, interventional cardiologists have attempted to close the defect without open heart surgery. The AMPLATZER Septal Occluder device

(AGA Medical Corporation, Golden Valley, Minnesota) was first used in Europe in 1995 to close ostium secundum defects; and in 1997, Masura et al¹ reported a series of 30 patients (age range 2.9 years to 62.4 years), 97% of whom had complete closure of a secundum defect and none of whom had complications. The device was approved by the FDA for use in the United States in December 2001.

The Kaiser Permanente (KP) Southern California Region established its own diagnostic cardiac catheterization laboratory for pedi-

atric and adult patients in 1960. Today, many therapeutic interventional procedures are being done in the laboratory, often replacing or complementing those done by surgery. In 1999, anticipating FDA approval of the AMPLATZER device, one of the authors (RMR) went to France on an extended educational leave, where he was able to learn how to implant the device. His experience was very helpful to our laboratory. Beginning in May 2002, five months after the FDA approved use of the AMPLATZER device, we started our implantation program. During the next 14 months, 51 patients (including children and adults) were identified as candidates for transcatheter closure of secundum atrial defects using the AMPLATZER device. We present this initial experience using transcatheter closure of atrial septal defects in these 51 patients.

Methods

Patient Selection

Patients were evaluated by KP cardiologists, who established the diagnosis of secundum atrial septal defect. These cardiologists also de-

Although results of surgical closure have been excellent for many years, interventional cardiologists have attempted to close the defect without open heart surgery.

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Samuel O Sapin, MD, (bottom, left), is retired. He was the first pediatric cardiologist in the Southern California Region. He has held many administrative positions including former Chief of Pediatrics, Panorama City Medical Center, former Associate Medical Director of Clinical Services. E-mail: samuel.o.sapin@kp.org.



terminated that closure of the defect was desirable and that the AMPLATZER device was suitable for defect closure on the basis of published criteria. Except for some older adults, all patients were asymptomatic; and all patients were given their choice of surgery or transcatheter closure. Implantation was performed by pediatric cardiologists.

Description of Device Used

We used the AMPLATZER Septal Occluder, a one-piece device with three components: A cylinder (or waist) fits inside the atrial defect like a stent and is connected on each end to a saucer-shaped disk in each atrium, thus completely occluding the defect. The entire device is made from a fine nitinol (nickel-titanium alloy) wire mesh with a preformed shape. The device can be compressed to fit into a catheter and then self-expand when released inside the atria. A thin, polyester thrombogenic patch inside each of the three components prevents blood flow through the defect after the device is implanted.

Figure 1 illustrates the device and its implantation. The waist self-centers the device in the defect and stabilizes it. The left-sided disk is slightly larger than the right, and both disks grip the septal rim after implantation. The diameter of the waist determines the size of the device chosen for each patient. The device is available in sizes ranging from 4 mm to 38 mm and can be used to close a defect with stretched diameter as large as 38 mm. The center of the right atrial disk is attached to the end of a long cable by a screw-in mechanism for device delivery and is released after satisfactory positioning. Animal studies indicate that most of the devices are completely covered by endothelium in three months.

Description of Implantation Procedure

Most patients receiving the AMPLATZER device had general anesthesia, tracheal intubation, and transthoracic confirmation of defect size, location, and anatomy. Most recently, intracardiac echocardiography guidance has been used in nonintubated, fully awake patients. The entire procedure was done percutaneously through the femoral vein. Angiography conducted from the right-upper-lobe pulmonary vein excluded presence of an anomalous right pulmonary vein and showed the defect. A sizing balloon catheter was advanced through the atrial defect over a wire, and the balloon was expanded with a dilute solution of contrast medium to completely occlude the defect. The diameter of the stretched defect was measured to determine appropriate device size.

A long delivery sheath was advanced over the wire into the upper left pulmonary vein. The device was then loaded into the delivery sheath and advanced into the left atrium. The sheath was withdrawn, allowing the left atrial disk to self-expand in the left atrium, the waist to expand within the defect, and the right atrial disk to expand in the right atrium. Echocardiography was used to confirm the position of the device and to assess residual shunting across the defect. (At this point in the procedure, the device can be recaptured and repositioned if necessary.) Once occlusion was assured, the cable was unscrewed from the right disk and withdrawn with the sheath.

Patients were discharged that evening or were kept in the hospital overnight. A chest x-ray film and transthoracic echocardiogram were obtained before patients were discharged, and daily aspirin and endocarditis pro-

phylaxis for six months were prescribed. Patients were seen for chest x-ray examination about two weeks postoperatively and again at six weeks postoperatively. At six months postoperatively, patients were seen for transthoracic echocardiography. Further follow-up was conducted by the referring cardiologist.

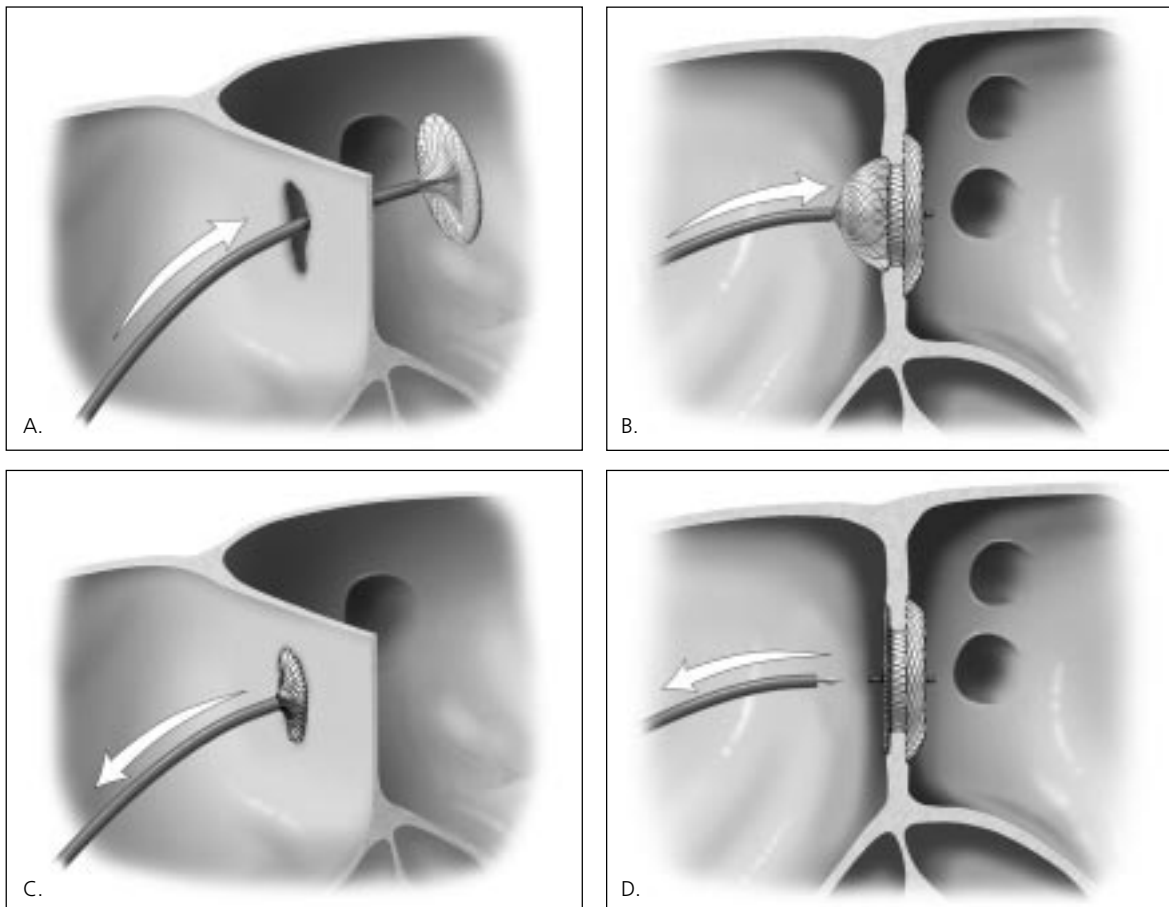
Results

Forty female and 11 male patients (age range 2 years to 69 years) were admitted to the hospital for implantation of the AMPLATZER device. Six patients were younger than five years of age, and 24 patients were younger than 21 years of age. Mean procedure time for the entire group was 68 minutes (range 24 to 138 minutes). Mean fluoroscopy time was 18.6 minutes (range 3 to 52 minutes). Thirty-nine devices were implanted in 38 patients. Device sizes ranged from 4 mm to 38 mm; 30 devices had a diameter between 10 mm and 30 mm. One complication was observed: A 53-year-old woman had hemopericardial effusion after successful deployment of the AMPLATZER device.

Thirteen of the 51 patients had no implantation of the device. In eight of these 13 patients, complex lesions or excessively large defects precluded deployment of the device; in the other five patients, the device was withdrawn after attempted deployment, either because the defect was too large or because the device could not be safely positioned. Complete closure of the defect was defined as absence of any shunt across the defect, as determined by echocardiography done at the end of the procedure or before the patient was discharged from the hospital.

In 2002, 19 patients were brought to the KP Southern California Regional Cardiac Catheterization

The entire procedure was done percutaneously through the femoral vein.

Figure 1. Schematic diagrams show implantation of the AMPLATZER Septal Occluder device

A: Left-side disk is delivered, via sheath, through atrial septal defect into left atrium. Disk is shown expanded. B: Right-side disk is withdrawn into right atrium. Disk is shown expanded, with waist stenting the defect. C: Securing disks are positioned against rim of defect. D: Delivery cable is released from right-side disk, with disks completely occluding defect. (Illustrations are reproduced by permission of AGA Medical Corporation and remain their sole property.)

Laboratory for closure of an atrial septal defect using the AMPLATZER device. Deployment of the device was not attempted in five (26%) of these 19 patients and was attempted in 14 (74%) of the 19 patients. Among these 14 patients, deployment was successful in 10 (71%) and resulted in complete closure. Complete closure using the AMPLATZER device was thus accomplished in 10 (53%) of our first 19 patients for whom deployment of the device was intended.

In 2003, 32 patients with atrial sep-

tal defects were brought to the Regional Cardiac Catheterization Laboratory for deployment of the AMPLATZER device. Deployment was not attempted in two (6%) of these 32 patients and thus was attempted in 30 (94%) of the 32 patients. Among these 30 patients, deployment was successful in 28 (93%) and resulted in complete closure. Complete closure using the AMPLATZER device was thus accomplished in 28 (88%) of the 32 patients for whom deployment of the device was intended.

Discussion

The advantages of the AMPLATZER Septal Occluder device include durable construction; a simple placement technique; use of small introducing sheaths; a self-centering mechanism that maximizes closure of the defect and minimizes the likelihood of device movement and embolization; usefulness for closing larger defects; and ability to be withdrawn or repositioned before its release. In our Southern California Region, introduction of new technology has of-

ten been a result of individual physician initiative, an example of which is the initiative shown for timely, successful introduction of transcatheter closure of secundum atrial septal defects. Collaboration between cardiologists in our adult and pediatric departments also was required, as was the support given by our cardiac surgeons and anesthesiologists.

To evaluate our performance, we reviewed published outcomes, starting with "intent-to-treat" data. The latter are influenced by selection criteria and by the experience of those conducting the intervention. The percentage of previously described patients for whom AMPLATZER device implantation was intended but, for various reasons, was not deployed ranged from 3.0% to 43.5%.²⁻⁵ Our rate for this measure in 2002 was 26% and decreased to 6% in 2003. We believe that this result represents substantial improvement achieved with increased experience and was a good outcome.

The definition of "successful closure" in the device literature varies from absence of a shunt (ie, complete closure; this is the definition we used) to presence of a residual, trivial, or small shunt. Citing results of 17 reports, Harper et al⁶ concluded that "in the order of 98%" of defects in patients are closed completely by 12 months after successful deployment of the AMPLATZER device. A large, preclosure FDA study² reported technical failure in only 4.3% of attempted deployments; by our calculation, their closure rate in patients who had successful deployment (including patients with small residual shunts) was 98.8% at 12 months and was 90.8% among patients for whom deployment was initially intended. Our technical results thus show substantial improvement in results for

this deployment and are comparable to those published in the FDA study.

The FDA study² reported 7 major complications and 27 minor complications among the 442 patients treated with AMPLATZER device implantation. No deaths have been observed. Only one complication was observed in our series of patients. Concerns about future endocarditis, nickel-related toxicity, and harm from excessive fluoroscopy have been mentioned, but these possible complications are believed to be remote. However, long-term follow-up is not yet available. In the FDA study,² mean fluoroscopy time was 20.7 minutes (range 3.3 minutes to 75.5 minutes); mean fluoroscopy time in our study was 18.6 minutes. The FDA mean procedure time was 105.7 minutes,² whereas mean procedure time in our study was 68 minutes.

Clinical Implications

The diagnosis of secundum atrial septal defects is often not made until older childhood or adulthood; and life expectancy in untreated adults with these defects begins to decline substantially between ages 40 and 50 years. Surgery has greatly improved this poor prognosis and has been shown superior to medical treatment, even in highly symptomatic older adults. The high success rate and low complication rate in patients treated with the AMPLATZER Septal Occluder device have important clinical implications for management of pediatric and adult patients with secundum atrial septal defects. According to the AMPLATZER manufacturer, approximately 30,000 of these devices have already been implanted worldwide.⁷ The percentage of unselected patients of all ages with secundum defects who are candidates for de-

vice closure has been estimated variously as 37%,³ 50%,⁵ or 83%.⁸

In the FDA study,² defect closure using the AMPLATZER device was compared with surgical closure of secundum atrial septal defects in children and adults; and the report concluded that the device is a safe, effective alternative to surgery. Advantages of the device included a much lower complication rate than surgery, avoidance of thoracotomy and cardiopulmonary bypass (which may cause cognitive impairment in adults and possibly in children), and many other obvious advantages of a nonoperative procedure, both to patients and to their families.

A clear implication drawn from our results is that for most pediatric and adult patients with secundum defects and major left-to-right atrial shunts who meet inclusion and exclusion criteria, transcatheter closure with the AMPLATZER device is preferable to surgery. Occasionally, closure of the defect is required in an infant or young child with a large left-to-right shunt or growth failure. Vogel et al⁹ concluded that for patients younger than two years, the success rate with the AMPLATZER device is lower and the procedure time longer than in older patients; this observation suggests that surgery may be preferable for this younger age group. Secundum defects diagnosed in patients younger than two years and which have a diameter less than 6 mm frequently close spontaneously.¹⁰⁻¹¹ Therefore, we would agree with Harper et al⁶ that if the child is asymptomatic and is growing normally, treatment should be postponed until the child is older; and that if the shunt is then clinically significant and all implantation criteria are met, closure should be attempted using the AMPLATZER device.

The diagnosis of secundum atrial septal defects is often not made until older childhood or adulthood ...

Conclusion

Transcatheter closure of secundum atrial septal defects for pediatric and adult patients with this very common congenital cardiac anomaly is a major therapeutic advance and is now readily available to patients in the KP Southern California Region. Use of this technology in our Region is one example of how acquisition of new technology has been facilitated by the initiative of Permanente physicians and by their commitment to evaluate critically the clinical outcomes of using new procedures. ❖

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Use of this technology in our Region is one example of how acquisition of new technology has been facilitated by the initiative of Permanente physicians ...

The Heart and Mind

To understand the heart and mind of a person, look not at what he has already achieved, but at what he aspires to.

— Kahlil Gibran, 1883-1931, mystic, poet, and artist

■ clinical contributions

How Should We Screen Patients for Major Depression?

By David Price, MD, FAAFP

A 66-year-old obese woman with type II diabetes and a history of myocardial infarction is seen in the clinic for medical follow-up. Her current medication regimen includes metformin, lisinopril, hydrochlorothiazide, aspirin, and lovastatin. Her most recent glycosylated hemoglobin measurement was 10.2%. She admits to variable adherence to her medication regimen, does not regularly monitor her blood glucose levels, maintains a sedentary lifestyle, and does not follow a specific diet. Her blood pressure is 150/94 mm Hg. In the past, both you and your care manager have discussed with the patient the importance of self-

care and adherence to treatment regimens. Could depression be contributing to the patient's lack of success?

Depression is one of the most common conditions seen in primary care practice. At any given time, an estimated 4.8% to 8.6% of patients seen by primary care physicians have depression,¹ and as many as 12% of men and 25% of women experience an episode of major depressive disorder in their lifetime.² In the United States, depression accounts for at least \$83 billion per year in health care costs and lost work each year.³

Worldwide, depression is the fourth leading cause of disability; and by the year 2020, only one disease—cardiovascular disease—will lead depression in frequency of occurrence.⁴ Depression is more prevalent in the elderly, in patients with previous episodes of depression, and in many people with comorbid medical conditions (including most of the conditions targeted by the Kaiser Permanente Care Management Institute). When accompanied by other medical conditions, depression is associated with poorer patient compliance and outcomes^{5,6} and increased health care costs.⁷ Most primary care patients with mild to moderate major depression can be successfully treated with psychotherapy or antidepressant medication. In cases of severe major depression, treatment with both antidepressants and psychotherapy may be warranted.

Nonetheless, major depression is commonly underdiagnosed. Primary care physicians are believed to miss the diagnosis of depression in 50% of their affected primary care patients.¹ Most studies on which this conclusion is based are short-term, cross-sectional studies; over longer periods of time, primary care physicians may recognize depression in as many as 86% of the persistently depressed patients seen in clinical

practice.⁸ However, the initial manifestations of depression can be subtle and might not be recognized during routine, often brief, primary care visits focused on physical complaints or conditions (as illustrated in the case presented here). Many office visits may occur before the physician explores the possibility of depression. Untreated depression may lead patients to attempt suicide (and perhaps to succeed at the attempt). Earlier identification of patients with depression can shorten the course of the illness and improve the quality of life for patients and families who must cope with this illness.

In 2002, the United States Preventive Services Task Force (USPSTF) recommended that all adults receive screening for major depression on a routine basis, provided that adequate systems are available to ensure adequate treatment and follow-up (grade B recommendation).⁹ The USPSTF estimated that this systematic screening would add one improved depression outcome at six months for every 110 to 160 patients screened.⁹ Current evidence is insufficient either to determine the optimal frequency of screening or to formulate a recommendation for or against routine screening of asymptomatic children and adolescents.

The likelihood of accurately identifying a disease by screening de-

Primary care physicians are believed to miss the diagnosis of depression in 50% of their affected primary care patients.



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depends on the sensitivity and specificity of the screening test (ie, rates of false-negative and false-positive test results) and on the prevalence of disease in the population being screened. The higher the pretest probability (actual prevalence) of disease in the target population, the higher the positive predictive value (ie, the more likely a patient with a positive test is to have the disease). Therefore, a sensible approach would be to focus initial screening efforts on populations who have a higher prevalence of depression than in the general population. For example, the estimated prevalence of major depression in diabetic patients ranges from 11% to 32%.¹⁰ From a practical standpoint, given the multiple concurrent clinical problems seen in primary care and multiple existing disease treatment programs, leveraging our efforts makes sense by initially focusing depression screening on patients who have comorbid medical conditions addressed currently by other disease management initiatives.

A two-question screen (Table 1) has been shown highly sensitive for identifying depressed patients.^{11,12} Patients who respond “no” to both questions are unlikely to have major depression (the false-negative rate in this situation is 3%-4%). Therefore, unless clinical suspicion for depression is high, patients like the one in our illustrative case usually do not require additional screening after the two-question screen yields a negative result. A “yes” response to one or both questions in the screen indicates possible major depression but has a high (33%-43%) rate of false-positive screen results. Therefore, if patients like the one in our illustrative case screen positive using the two-question screen, confirmatory testing (measured against diagnostic criteria)

Table 1. Two-question screen for major depressive disorder¹¹

- | |
|--|
| <ul style="list-style-type: none"> • During the past month, have you often been bothered by feeling “down,” depressed, or hopeless? |
| <ul style="list-style-type: none"> • During the past month, have you often been bothered by having little interest or pleasure in doing things? |

should be conducted using a validated depression screening instrument or a clinical interview. Instruments developed for depression screening include the Beck Depression Inventory,¹³ Center for Epidemiologic Studies Depression Scale (CES-D),¹⁴ PHQ-9,¹⁵ Prime MD,¹⁶ Zung Depression scale,¹⁷ and others. These tools generally have similar sensitivity (80%-90%) and specificity (70%-80%) in primary care populations.^{11,18,19} Considerations relevant for choosing a depression screening instrument include literacy level of the patient; ability of the patient to complete the test; time involved and ease of scoring the test; validation of test results against a criterion standard for depression diagnosis; availability and validation of the test in languages other than English; amount of time necessary for completing the test; ability of the test to accurately track both treatment response and severity of illness over time; and cost of administering and scoring the test.

For patients who have screened positive for depression, clinicians should consider possible organic and iatrogenic (medication-related) causes of major depression. A full discussion of the differential diagnosis of major depression and its treatment options is beyond the scope of this article; instead, the reader is referred to clinical tools formulated by the Kaiser Permanente Care Management Institute and available at <http://cl.kp.org>.

Targeted use of brief screening tools in patients at increased risk for depression can help primary care

clinicians to identify more patients with major depression.⁹ Involving care managers and other members of the care team may facilitate more systematic identification of depressed patients. This team-based, population-based approach can be easily integrated with other care management programs and can lessen depression-related suffering in our patients and in their families. ❖

Acknowledgment

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... clinicians should consider possible organic and iatrogenic (medication-related) causes of major depression.

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Every Man

No man is an island, entire of itself, every man is a piece of the Continent, a part of the main; if a clod be washed away by the sea, Europe is the less, as well as if a promontory were, as well as if a manor of thy friends or of thine own were; any man's death diminishes me, because I am involved in Mankind ...

— John Donne, 1573-1631, poet

This is Getting Serious

At a recent meeting, my boss, Jay Crosson, MD, was heard to say, "This is getting serious."

Indeed it is. Some time during 2004, every region will have launched a part of the KP HealthConnect suite of systems. Issues and problems that were theoretical in 2003 now have real operational significance. Everyone in the organization will need to learn new software, learn new ways of performing their work, and begin to think about how to build the future of Kaiser Permanente (KP) using this new set of tools.

The implementation of complex software like KP HealthConnect can usefully be divided into three phases: adaptation, sophistication, and transformation. Adaptation is the process by which people get comfortable with the basics—performing the essential tasks of patient care and other parts of our operations through a limited, "get-through-the-day" approach to learning the software. "I've got to document my work, write orders, and manage results, and I probably won't learn anything else until I learn how to do those things." Once a user has adapted to the software, they can move on to sophistication. This advance involves a richer exploration of all the features and functions of the software, making it possible to perform those basic tasks and produce better results—of higher quality, safer, or more efficient. Transformation occurs when a user or group of users figures out how to do something completely new, something perhaps that couldn't have been done before, by using the new tool.

All of us who have worked to implement electronic health record software in KP during the past two decades have expended a great deal of energy making sure that all users adapt. Adaptation is essential. If people cannot use the system to do their basic work, the implementation will fail. We also know that most users remain at that stage, because additional investments in training are required to help them progress to a more sophisticated level of use. Sophistication is desirable because the system will not benefit members or staff in any substantial way if all that is achieved is limited automation of current processes. We want users to take the fullest advantage possible of the capabilities of the software.

The real goal is transformation. What we really want is to do new and better things as we work with members, abetted by the software. Here, it is more a question of creating an environment that fosters the creative use of the tool, observing the impacts of that creativity, and widely propagating the successful ideas while pruning out the unsuccessful ideas or the old processes that the new approaches have supplanted. When transformation becomes our routine, the implementation of KP HealthConnect can truly be characterized as successful.

We have asked some noteworthy experts to help describe approaches to moving our KP HealthConnect users through adaptation to sophistication and beyond to transformation. George Halvorson shares his vision for the

By Andrew M Wiesenthal, MD
Associate Executive Director, Clinical Information Support
The Permanente Federation



The dynamic duo of KP HealthConnect, Drs Andy Wiesenthal and Louise Liang have served as point persons for the top leadership of the medical groups and the health plan in ensuring a successful implementation of KP HealthConnect in all of KP's regions.

future and how KP HealthConnect plays a key role. Peter DeVault, from Epic Systems, gives us the benefit of our vendor's broad experience in implementing their system, and Homer Chin, MD, who helped lead implementation of Epic in the Northwest, shares some valuable lessons learned from their experience. Paul Wallace, MD, Executive Director of KP's Care Management Institute, describes how KP HealthConnect combines with our capacity to understand medical evidence to enable our clinicians to do the right thing. There are also some historical tidbits,

commentaries from various champions of KP's implementation initiatives, and more. We thought you would enjoy having the benefits of all these experiences, and we welcome hearing from you about your own.

Thinking about my role in the development and implementation of electronic health records at KP brings to mind a Jerry Garcia quote—"What a long strange trip it's been." I have been on it for a long time, and, as I contemplate the rich possibilities described in the articles that follow, I am excited about the next leg of the journey. ♦

Reengineering Care with KP HealthConnect

By George C Halvorson

Excerpted from Epilogue: Prepaid Group Practice and Computerized Caregiver Support Tools; Toward a 21st Century Health System: The Contributions and Promise of Prepaid Group Practice by Alain Enthoven and Laura Tollen, editors. (April 2004; \$30.00; Cloth) by permission of Jossey-Bass/A Wiley Imprint

Many of America's health care costs, financial and otherwise, result from its current paper-based approach to maintaining patient records. This nonsystem often leads to inconsistencies in patient care (poor quality) and dysfunctional information transmission systems (inefficiencies). It is an outmoded, ineffective support system for caregivers. A fully computerized system, including patient-specific medical records, reminders, and treatment protocols, is needed to provide complete information about each patient to the caregiver in the exam room. That electronic tool is the missing link between current inconsistent care and best care. After years of experimentation and development, these tools are now ready for practical use by caregivers, and multispecialty group practices (including prepaid group practices) are the logical environment for the initial large-scale use of these approaches.

Poor Quality and Inconsistencies

Evidence compiled by researchers from several high-profile organizations—including the Institute of Medicine, the National Committee for Quality Assurance, RAND, and the Dartmouth Atlas Project—points toward the fact that the actual delivery of health care in this country too often varies from science-based best practice.^{1,6} Study after study of health care performance shows wide variations in both treatment approaches and care outcomes—with levels of performance inconsistency that would be unacceptable in any other area of the American economy.

Some specific examples of variation from best practice include the following:

- Heart disease is America's number one killer (approximately one person dies each minute from a coronary event),⁶ yet nearly half of America's heart attack patients do not receive the most effective follow-up care.¹
- More than 6% of the American population has diabetes,⁶ but fewer than half of America's diabetics receive the levels of care necessary to reduce or prevent complications.⁵
- High blood pressure (hypertension) is the most treatable cardiovascular disease; however, roughly 40% of America's hypertension patients do not receive the most current and appropriate levels of care, resulting in 68,000 premature deaths each year.⁵

Another sad fact for the current practice of medicine is that with rare exceptions, no one external to the caregiver or patient has an ongoing quantitative sense of whether or not the approaches used are effective or add optimal value for a given patient or for populations of similar patients. Unless care is so out of line as to constitute malpractice—an extremely rare event—there is almost no process in most settings for determining what is or is not working in any comparative sense for individuals or groups of patients or for any aggregation of caregivers.

In fact, using today's nonsystematic methods of communicating new medical science, it can take many years for a valuable new best practice to become the routine standard of care. As noted, the normal compliance level with best practice typically falls short for many important care approaches. No other industry or portion of the economy takes anywhere near this long to disseminate new approaches. Most industries retool yearly, if needed. Reengineering is a constant fact of life. Health care has been a glaring exception to that rule.

Dysfunctional Information Transmission

Quality deficiencies and inconsistencies are exacerbated by the fact that the noncomputerized care improvement processes used by most providers and health plans rely on the distribution of paper-based patient status reports and information about best care. Attempting to distribute pieces of paper about these topics to each caregiver is at best inconsistent and at worst expensive, time-consuming, and frustrating. Care sites are typically unconnected, and passing on best-practice information at a one-on-one, doctor-to-doctor, teacher-to-caregiver level can be a logistical nightmare even in a group practice setting.

Health care is an information-dependent profession that is operationally handicapped by a remarkably dysfunctional information transmission nonsystem. In an era when practically every other major segment of the economy relies on computers for data flow, decision support, and production improvement, health care still stores all-important patient-based data on inaccessible, incomplete,

Reengineering is a constant fact of life. Health care has been a glaring exception to that rule.



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sometimes inaccurate, and frequently illegible paper files. Filing systems are almost always set up and segregated by individual care providers or treatment sites, not by individual patients. In this country, a patient who receives care from three separate doctors generally ends up with three separate paper folders, with different contents, located in three separate metal file boxes.

Dysfunctional information transmission means that neither physicians nor patients nor researchers can benefit from the full spectrum of useful or timely data. Keeping up to date on current best practices is difficult. Doctors who want to keep up on medical research in their specialty are confronted by information overload; an estimated 1500 medical articles are published each day, and there are about 4000 health-related journals to choose from.⁷ It is simply beyond the ability of any single physician to keep up with all this information, let alone remember it when confronted with a patient for whom that information would be relevant.

As a result, when the typical solo-practice doctor enters an exam room to see a patient, s/he often has no systematic tools at hand to remind him/her of the patient's specific needs or the full scope of care most appropriate to the patient's particular diagnosis, condition, and treatment plan. The physician typically relies on memory for large portions of each patient's current and future treatment regimen—including dosages of drugs and duration of therapies. The physician seldom, if ever, receives any systematic follow-up information about the patient or the patient's compliance with care. The patients themselves often leave the exam room trying hard to remember the four or five key points that the doctor told them about their follow-up care.

The Solution: Computerized Caregiver Support Tools

Anyone who looks closely at the inconsistency of health care practice must conclude that computerized caregiver support tools—

including “electronic,” “automated,” or “computerized” medical or patient record systems and treatment protocols—are the best way of achieving optimal care for large numbers of patients. These tools can make best care easier and more likely to occur.

Giving physicians, other health care practitioners, and researchers appropriate access to this information is the key to moving care delivery and quality to the next level of performance. Each physician should be able to quickly track the care given to each patient against the very best and most current protocols. This system should enable them to remember what tests need to be done, what drugs need to be prescribed, what follow-up care needs to be accomplished, and even when referral to specialty care is advised.

The data system also needs to be accessible to medical researchers so that they can tell, on an ongoing basis, which drugs are working, which procedures are creating value for the patient, and which technologies are leading to the very best improvements in patient outcomes.

Another critical function of a clinical information system is to generate complete and easy-to-use information for patients about their condition and their care. The information for each patient can be programmed to be culturally competent and multilingual, reducing the misunderstandings and miscommunications that now occur far too often in an increasingly diverse society. In the best situation, the system should also provide patients with direct, confidential access to their own medical history and information—along with patient-focused medical protocols and best practice information.

Benefits of Computerized Caregiver Support Tools: The Evidence

New and more reliable computerized caregiver support tools (or clinical information systems) have the potential to achieve

many of the ideal system qualities described in the Institute of Medicine's Crossing the Quality Chasm report.¹ In a comprehensive analysis of the peer-reviewed literature, Raymond and Dold found strong evidence to support the notion that such systems do in fact improve safety, efficiency, timeliness, and quality.⁸⁻¹² They also found that these systems have potential for improving service and patient satisfaction through enhanced communication and information sharing.

In their review of nearly 100 published studies spanning 30 years of research, Raymond and Dold document improvements in preventive health services, disease management, drug prescribing and administration, documentation of data, access to clinical information, and avoidance of medical errors—all resulting from the use of clinical information systems.⁸

Clinical information systems also show promise for increasing administrative efficiency through improved work flow and time savings, streamlined information storage and access, and enhanced billing efficiency.⁸ Use of electronic medical records saves resources, including physician and clerical staff time,¹³ storage space,¹⁴ and ultimately money.¹⁵

The successes have all resulted from at least a partial computerization of care: in each case, the computer was used to enhance a particular aspect of care delivery. But the impact of a complete care support tool has yet to be fully tested. There is every reason to believe that the more complete systems will achieve even more success than the partial systems tested to date.

Pioneers of Clinical Information Systems

Although most health care practitioners and institutions in the United States are not yet ready to implement clinical information systems, a few have positioned themselves as pioneers in their use of such systems.⁹ Multibillion-dollar technology investments are being made by Kaiser Permanente (KP), the Mayo Clinic, Intermountain Health Care, the Henry Ford Health System, and Geisinger Clinic, among others.³ Group Health Cooperative has demonstrated through research the value of automated records in improving chronic care management; in particular, diabetes care.

Health care is an information-dependent profession that is operationally handicapped by a remarkably dysfunctional information transmission nonsystem.

Special Feature

THE PROMISE

KP's own work with clinical information systems dates back over 40 years to 1961 when Morris Collen, MD, a founding partner of The Permanente Medical Group and the first director of the organization's research arm, piloted a computerized medical records system in San Francisco (see page 34). This effort ultimately provided researchers with a vast database of member health conditions, which is still used by researchers today to study care delivery.¹⁶⁻¹⁷

Although withdrawal of federal funding prevented the regionwide deployment of Dr Collen's automated record system, KP has continued to innovate in the use of information technology to improve care.¹⁷ Within the organization, computer-based technologies have included an automated appointment booking and registration system (PARRS) piloted in 1977; a computerized hospital information system (ADT), in place by 1985; an outpatient pharmacy dispensing and tracking system (PIMS) implemented in 1988; and the Clinical Information Presentation System (CIPS), which began delivering real-time, patient-specific, clinical information to physicians' desktops in 1993.

Fulfilling Dr Collen's vision of a truly automated medical record, KP is currently investing nearly \$3 billion over the next several years to build an integrated clinical information system for its more than eight million members nationwide. This system moves beyond electronic medical records and includes electronic documentation of patient visits, order entry for medications and procedures, and linking of inpatient and outpatient care. Kaiser Permanente estimates that when fully implemented, the new system will result in annual savings of approximately \$500 million, due to cost avoidance, cost savings, and improved and more accurate reimbursement.^b

Although only a small portion of the industry is currently on track to implement systemwide clinical information technology, a critical mass of multispecialty group practice users are choosing the same software vendor,

including KP, Cleveland Clinic, Sutter Health, University of California at Davis, and Palo Alto Medical Foundation.^c These developments may lead to increased opportunities for interoperability among care systems. Under the auspices of the Council on Accountable Physician Practices, some of these group practices are beginning to meet with each other to standardize data flow and share learning.^d

Conclusion

Just about every informed observer of the health care system now recognizes and deplores what the Institute of Medicine identified as a vast and dangerous inconsistency of care.¹ We can reduce some of that inconsistency by making improvements in the context of our current medical processes and paper-based patient information systems. But we can't have highly reliable, up-to-date care and optimal value for the health care dollar until we have a complete electronic medical record

for each patient and until we make usable, efficient clinical tools and information about each patient available to the physician at the exact point and time of care. Without such clinical information technology, the current cost burden will continue to grow, and vast numbers of patients will continue to receive inconsistent, often inadequate, and sometimes dangerous care.

Once best care has been demonstrated—through the use of computerized caregiver support tools by America's leading multispecialty and prepaid group practices—

market competition will force the rest of American caregivers to follow (particularly if employers and government create appropriate market conditions). This will not happen until best care is thoroughly demonstrated, however. Because of their inherent advantages, prepaid group practices are natural laboratories for learning about the benefits and uses of these systems.

Reengineering of care support is an evolu-

tion, as opposed to a revolution. Once the benefits of clinical information systems become obvious to policymakers, purchasers, and the public, it is logical to expect that major segments of the health care delivery nonsystem will figure out how to work with payers or each other to create functional equivalents of the integrated approach. This should ultimately result in the building, in multiple settings, of virtually integrated groups and plans. Delivery systems with the size, scale, and incentives to overcome the barriers to technology adoption will likely emerge from mergers, acquisitions, and affiliations. Technology diffusion will accelerate as the clinical information system business case is repeatedly validated with measurable and significant return on investment and as successful strategies are replicated and found to be transferable across organizations.

Narrowing the performance gap between integrated and fragmented care will clearly require greater information connectivity, which does not come easily or cheaply. The ultimate beneficiaries, however, will be patients. ♦

^a See also: Coddington DC, Fischer EA, Moore KD. Strategies for the new health care marketplace: managing the convergence of consumerism and technology. San Francisco: Jossey-Bass, 2001.

^b The total estimated annual savings is expressed in current dollars. The programwide estimate is based on an extrapolation from two board-reviewed business cases developed by Kaiser Foundation Health Plan, Inc: National Clinical Systems Planning Consulting, "Southern California Outpatient AMR Business Case" (February 2002) and "Regionalized HIS Business Case" (August 2003).

^c The software vendor chosen by many of these organizations is Epic.

^d For information about the Council on Accountable Physician Practices, go to: www.amga.org/CAPP.

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Notable Winners

History has demonstrated that the most notable winners usually encountered heartbreaking obstacles before they triumphed. They won because they refused to become discouraged by their defeats.

BC Forbes, 1880-1954, financial journalist, founder Forbes

KP HealthConnect: Fulfilling the Vision of KP's Founding Physician

By Tom Debley

When the centenary of the birth of founding Kaiser Permanente (KP) physician Sidney R Garfield is marked in 2006,³ full implementation of KP HealthConnect the same year will be a fitting tribute. The reason: It was Dr Garfield who first urged KP to embrace computer technology in May 1960 “to acquire and store medical information.”¹

Dr Garfield's call came at KP's first interregional management conference in Monterey, CA, which focused on forecasting and planning for the decade of the 1960s. Dr Garfield argued—in the words of John G Smillie, MD—that KP “should not be a sick plan but a health plan in the full sense of the term: an ongoing commitment to the maintenance of health in the membership.”¹

To accomplish this, he envisioned information technology as part of a three-pronged approach described by Dr Smillie:

“New methods of providing health care as opposed to sick care must be tested.

“New technology must be used to acquire and store medical information.

“Non-physician medical personnel must be brought further into the health care process, under physician supervision, so as to extend the scope and efficiency of physician treatment.”¹

Over the decade, Dr Garfield's technology challenge triggered a proliferation of early research and implementation—first in Northern California, led by Morris F Collen, MD, but quickly expanding into Northwest Permanente (NWP) and the Southern California Permanente Medical Group (SCPMG) and, in the ensuing decades, across KP.

The first step was to dispatch Dr Collen to a national congress on medical electronics in New York. He returned “to confirm that Dr Garfield was correct: medical electronics was beginning a period of great innovation

and diffusion, and ... we should begin to take advantage of the potential of electronic digital computers.”²

Early on, the vision developed of an electronic medical record that could serve patients across the nation—far ahead of any capability of early computer systems. In 1965, Cecil C Cutting, MD, then Executive Director of The Permanente Medical Group (TPMG), predicted it in a speech to scientists at a meeting of the American Association for the Advancement of Science at the University of California Berkeley.

“Each member,” he said, “would automatically and periodically be called in for service. All histories and findings would be recorded by computers and made available to the physician wherever members go for needed definitive medical care.”³

As interesting as the story is of the research and implementation of projects that evolved—including development of both new hardware and software for the job—equally fascinating is the vision of Dr Garfield in historic retrospect. He saw the potential for tracking medical information that could help patients achieve “optimal health”—a vision being taken

into the 21st century with KP HealthConnect.

“... The great promise of computers for medicine lies in making an entirely new medical care system possible,” Garfield wrote in 1974.⁴ “Such a new system is just now beginning to take form and emerge from the old.

“... *Health care* [emphasis in original] is a new division of medicine that does not exist in this country or any country. Its purpose is to improve health and keep people well.

“The system holds great promise for the provision of truly preventive care. We need no longer generalize, but instead we can instruct each individual about what he should do for optimal health on the basis of his

Dr Garfield ... saw the potential for tracking medical information that could help patients achieve “optimal health”—a vision being taken into the 21st century with KP HealthConnect.



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own updated profile. Such personalized instruction should lead to maximum motivation and cooperation on the part of patients.

“This change from episodic crisis sick care to programmed total health care forces a new look at the recording and processing of medical information ...

“Continuing total health care requires a continuing life record for each individual The content of that life record, now made possible by computer information technology, will chart the course to be taken by each individual for optimal health.”

In another article, Dr Garfield concluded, “Matching the superb technology of present-day medicine with an effective delivery system can raise US medical care to a level unparalleled in the world.”⁵

It was quite a prediction more than a quarter of a century ago—one confirmed in the view of some today. As Richard Feachem, Executive Director of the Global Fund to Fight AIDS, Tuberculosis and Malaria, recently told *The Economist*: “There is no perfect system in the world; every one has serious flaws and makes serious mistakes which people suffer from, but Kaiser *comes closer* to an ideal than any system I know.”⁶ ❖

^a Sidney R Garfield, MD, was born April 17, 1906, in Elizabeth, NJ.

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Smokescreen

The Wright brothers flew right through
the smokescreen of impossibility.

— Charles Franklin Kettering, 1876-1958, engineer-inventor

The Driving Vision: Pioneers of the EMR

The Permanente Journal asked some of the pioneers of KP's commitment to the electronic medical record to talk about the visions that drove them to dedicate much of their careers to translating the promises of the EMR into reality.

The Pioneering Physician Morris Collen, MD

Our original vision (of clinical information systems) started with Sidney Garfield, MD, as always, and my objective was simply to carry out Dr Garfield's vision. He'd come up with all these wonderful ideas. He always said, "We can never be perfect, and so we must continually try to improve our program."

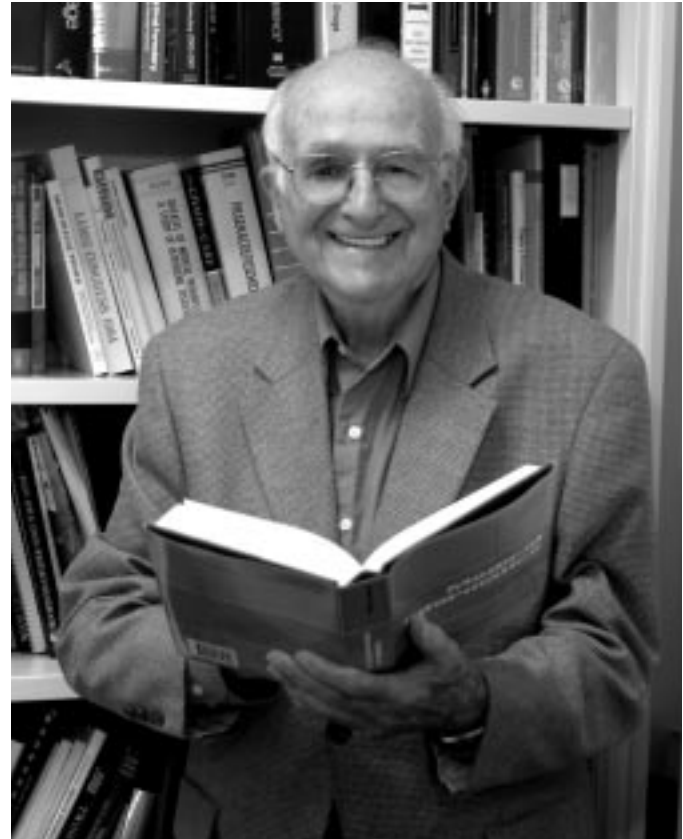
Dr Garfield knew that I had a degree in electrical engineering in addition to medicine. So he asked me to attend the first congress on medical informatics in New York and to come back and advise him. I remember getting all fired up at that congress about what was happening and the great potential for computers in medicine. So he and Cecil Cutting, MD (then Medical Director of The Permanente Medical Group) set up a new department so that I could devise and test computer applications, and that was the Medical Methods Research Department, which later became the Department of Research.

At that time, about 1960, we were already doing multiphasic health screenings for the Longshoremen's Union, but we were doing it manually, and that seemed like the ideal way to test computers on essentially healthy people. Everything about the multiphasic screening program was routine. People would go through the tests, and I would sit at the end of the line and check them off and arrange whatever follow-

up they needed. After a year of that, I got tired of it, so I asked our resident physicians to do it, and after a few months they got tired of it and asked the interns to do it, and they got bored with it because it was such a routine chore. It was exactly the kind of process that computers were suited for. And so automated multiphasic health testing became our first application of computers in medicine for patient care.

The government was impressed enough that they gave us some money to build a separate building for it. The computer alone was so big it took up a whole room with its own air conditioning, and it had less power than we now have on our desktop computers. We used punch cards, and as the patient went from station to station the information was punched in a card and at the end of the line we printed it all out and gave it to the physicians. My objective was to use these tools to provide better quality technically and to save physicians' time by not having them need to ask 200 questions when only 10% of them would be answered yes. So the physician would get a report on each patient with just those questions to which the patient had answered yes, and he wouldn't have to ask all the others.

Later on in the 1960s, we got another grant for the Medical Care Delivery System program, which included computerizing the inpatient and outpatient service at our San Francisco Hospital. We were going



For more than 40 years, Dr Morris Collen, a founding physician of The Permanente Medical Group, has been a driving force in bringing the electronic medical record from dream to reality in Kaiser Permanente, and throughout American health care.

to have the computer do essentially the beginnings of what is happening now, including physician order entry and results reporting. We didn't have it all, but we were looking forward to the time when we could. It was our goal to provide a comprehensive medical information system for all of our facilities, with patient records available no matter where the patient presented. For our San Francisco patients, we had every outpatient visit, every drug dispensed, every lab test—it was in the computer to be called up in the middle of the night or

anytime. It was a giant step, and we visualized essentially doing what the new EpicCare system will do for us today.

Then, in 1970, the country had an economic recession and our grants were eliminated and that terminated our program. The Emergency Room physicians in San Francisco almost wept because they lost this great service. Donald Lindberg, MD, who was the director of the National Library of Medicine, said that at the time, we had the leading system in the whole world.

And so that's how it got started.

Clinical Information Technology

Allan T Khoury, MD, PhD

We started planning for our clinical Information Technology (IT) implementation in 1988. Our Medical Director at the time was Ron Potts, MD, and he realized that computers were going to play a big role in medicine. He asked me to explore the field.

I've always viewed clinical IT as a great way to improve the quality of care we deliver to our members. I thought this could happen in two ways: first, by providing a synopsis of crucial, relevant information from each patient visit, so the doctor wouldn't be treating the patient blindly. Second, it had become clear by the mid-1980s that computers could enhance quality by generating reminders to physicians at the moment of care—so-called decision support—about things that needed to be done but were simply being overlooked. We set out to build our own system that would do these two things. The initial goal was not to replace the paper record but to use the computer as a quality improvement tool.

We started with the printed chart summaries in 1990; and in 1993, we printed reminders at the point of care. We were on a shoestring budget, just \$83,000 the first year. That is

We should be able to reduce admissions from errors in outpatient drug ordering by as much as two thirds. That's pretty compelling.

probably one of the reasons we were successful; since the number was small, we were allowed to experiment. Our early success led to deployment of a more complete electronic medical record, starting in 1994 and 1995, when we realized that by using scanning we could capture progress notes and probably eliminate the need for the paper chart entirely.

When I took this on, I did it on the condition that I retain control of disease management and prevention activities, because it was clear to me that unless we could move quickly to improve quality, the IT project would be seen as something that consumes lots of money without much benefit.

Without having that dual role, disease management and clinical IT, we wouldn't have been able to demonstrate benefit as quickly as we did.

What I'm looking forward to in KP HealthConnect is the robust decision support capability, such as drug-drug and drug-disease interaction reminders generated by the order entry system. Our current system doesn't have this functionality. We should be able to reduce admissions from errors in outpatient drug ordering by as much as two thirds. That's pretty compelling.

There are some things that KP



With an initial budget of just \$83,000, Dr Allan Khoury (shown here in front of KP-Ohio's "GuitarMania II" art piece) lead the creation of a home-grown electronic medical record for KP Ohio a decade ago. His vision of the EMR as a key tool for quality improvement has helped pave the long road to KP HealthConnect.

HealthConnect won't do. I'd like there to be an artificial intelligence engine overlooking what the physician is doing. Since KP HealthConnect will be able to code patient symptoms and capture test results, it should be able to evaluate the diagnoses recorded by the doctor and, if necessary, suggest alternatives. Also, I think as the hardware gets better, we'll even-

tually have notepad computers that are light enough to carry around, permit charting anywhere, and allow clinicians to draw pictures, which will help dermatology, ophthalmology and some other specialties. We're not there yet, but all this is possible.

Special Feature

THE PROMISE

The Dream: Availability of Information 24/7 Peggy Latare, MD

In this day and age, with the number of diagnostic tests and the complexity of medical science being what it is, it feels so backward to try to still practice medicine in the way we did before we had a clinical information system, when the only information we had was what we could piece together from the mainframe system and what the patient might remember. That's really the prize that I've kept my eyes on for so long—that availability of information 24/7. No matter what else the electronic medical record does, that's the dream: to have that information available and to have people out there making decisions with all the information they need.

Here in Hawaii, we're on our third implementation of an Information Technology solution—two less robust technologies preceded the KP HealthConnect

implementation—and it's quite remarkable that people still have the energy and the excitement to do it one more time. But it's because of the power of having that information available and the connectivity from primary care to specialty care, from small clinic to large clinic and from island to island, that the excitement is still there.

Since we first began to implement the earlier CIS system here, the objectives have evolved. Although the availability of the medical record is still key, the amazing decision-support capabilities in Epic compared with the earlier systems is now a key driver—the ability to reduce variation and track results and outcomes. The other thing that's different now is that Epic has brought our business colleagues

and inpatient colleagues into the picture, and so now the vision of truly being able to follow information across the continuum of inpatient/outpatient and ER is a major part of the excitement.

In terms of transformation, we saw that even within three or four months of implementation, some

... with the MyChart and messaging capabilities of KP HealthConnect, we're going to end up having a good deal of our care happen virtually.

really innovative things were happening—such as physicians spending an hour or two a few days a week on the phone, just doing triage to handle patients' concerns and avoid some appointments. That practice is still diffusing, so that in a number of our clinics three or four days a week, one of

the doctors will be on the phone working on follow-up questions that are easily handled on the phone. Eventually, I see that



Peggy Latare, MD, is the KP HealthConnect Project Executive for the Hawaii Permanente Medical Group.

happening all over the region and not just in primary care but in specialty care, where we can offer a lot more alternatives to care. And with the MyChart and messaging capabilities of KP HealthConnect, we're going to end up having a good deal of our care happen virtually. That's very exciting. ❖

The Future

The future belongs to those who dare.

— Anonymous

Entering the Decade of Health Information Technology

By Brian Raymond, MPH

Health information technology (HIT) is the underpinning of a vision for the future of American medicine that is gaining consensus among public and private policymakers nationwide. As envisioned today, Americans will one day experience a health care system in which disparate providers across an otherwise fragmented delivery system will share health records in real time by means of a national network of electronic medical record systems. The architects drafting the IT blueprints for an interconnected electronic health infrastructure represent a public-private partnership that is actively paving the way toward what the Bush Administration calls the “decade of health information technology.”

A National Health Information Infrastructure

The National Committee for Vital and Health Statistics (NCVHS) has set forth perhaps the clearest articulation of the vision for health information technology in its description of a National Health Information Infrastructure (NHII). It is described as “a comprehensive knowledge-based network of interoperable systems of clinical, public health, and personal health information that would improve decision making by making health information available when and where it is needed.” The NHII is not just a network of information systems but the standards, applications, and rules that support all facets of individual health, health care, and public health. The NHII as envisioned by the NCVHS is based on decentralized networks of voluntary health information.

The federal government has ramped up its leadership role in accelerating health information technology, and recent national policy developments targeting rapid HIT adoption are worth highlighting.

- On March 21, 2003, the federal government announced the first set of uniform standards for the

electronic exchange of clinical health information to be adopted across the federal government as part of the Consolidated Health Informatics (CHI) initiative.

- On July 1, 2003, the Department of Health and Human Services announced its purchase of a license that allows all public and private sector parties to use a medical vocabulary known as the Systematized Nomenclature of Medicine, Clinical Terms (SNOMED-CT) at no cost.
- On December 8, 2003, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) was signed into law. The landmark legislation establishes a voluntary electronic prescribing program and creates financial incentives for acquiring information technology and authorizes several demonstration projects on using information technology to improve quality.
- In January 2004, President Bush emphasized the importance of electronic records in his State of the Union address stating that “by computerizing health records, we can avoid dangerous medical mistakes, reduce costs, and improve care.”
- On February 25, 2004, the Food and Drug Administration issued a rule that requires “barcodes” on most prescription drugs and on certain over-the-counter drugs as a means to reducing medication errors in hospital settings. Barcodes on drugs and barcode patient wristbands reduce the potential for medication errors when used with a barcode scanning information system.
- On April 26, 2004, President Bush established a goal for every American to have a personal electronic medical record within ten years as part of an aggressive health information technology plan. He created the new Office of the National Coordinator for Health Information Technology within the Department of Health and Human Services to lead the national HIT effort. In addition, the Presi-

... Americans will one day experience a health care system in which disparate providers across an otherwise fragmented delivery system will share health records in real time by means of a national network of electronic medical record systems.

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Special Feature

THE PROMISE

dent doubled funding to \$100 million for demonstration projects on health information technology.

- On July 21, 2004, Health and Human Services Secretary, Tommy G Thompson, and the new National Coordinator for Health Information Technology, David J Brailer, MD, PhD, unveiled a strategic plan¹ for health information technology promotion over the next ten years. The plan identifies four major goals:
 - “Inform clinical practice” by bringing information tools to the point of care, especially by investing in EHR systems in physician offices and hospitals.
 - “Interconnect clinicians” by building a health information infrastructure.
 - “Personalize care” by using technology to give consumers more access and involvement in health decisions.
 - “Improve population health” by expanding the capacity for public health monitoring and by implementing research advances in public health care.

Although health care still lags far behind other industries in information technology investment, many observers view the recent policy development as a sign of new momentum gathering the critical mass needed to galvanize the HIT vision. Whether we are at or near the “tipping point” for HIT—where the technology adoption rate suddenly switches from incremental to exponential growth—is yet to be determined. Nevertheless, the health policy community has clearly moved from talk to aggressive action on health care transformation with information technology. ❖

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Lessons of Wisdom

When you make a mistake, don't look back at it long. Take the reason of the thing into your mind and then look forward. Mistakes are lessons of wisdom. The past cannot be changed. The future is yet in your power.

— *Hugh White, 1773-1840, US politician*

Adopting an Enterprise Health Care Automation and Information System: The Initial Implementation

By Peter DeVault

Epic's experience in implementing a wide variety of clinical, access, and financial systems extends back 25 years. As a growing company dedicated to changing the way health care is delivered for the better, much of what we encounter is necessarily new and challenging. There are, however, as in any field, certain constants and useful propositions that can be shared and employed to the same profit in new endeavors as well as they were in the old. Although the idea—and, even more so, the fact—of an enterprisewide health care information and automation system is relatively recent, successfully installing one depends on many of the same facts as other implementations. We would like to share with you what we have learned during the many years of implementation.

The initial implementation of a health care automation and information system forms part of the foundation for the transformation of health care. It is not that transformation itself. Although it is important not to replicate inefficient workflows or poor data collection, the focus of the initial implementation should not be to explore brave new worlds but it should be on building the ship and learning to navigate.

More concretely, the proper focus of the initial implementation should be on those things that will allow the greatest long-term benefits: achieving widespread use of the system across as many care settings, specialties, and departments as possible; standardizing data representations; and establishing long-term interaction and communication plans with the user community. If these three goals are achieved, an organization will be well poised to take advantage of sophisticated tools and techniques that will change the way health care is delivered.

Three major areas of an implementation must be well understood in order to maximize the chances of its success: standardization, variations across care settings, and training strategies.

Adaptation and Standardization

The process of implementing a health care automation and information system begins with modeling the organization in software. The degree to which adaptation of the system to the organization is successful places an upper limit on the degree to which adoption will be successful. A mature and well-designed system will allow an organization to dictate how the software works rather than the other way around, and the system will allow for a great deal of variation in how different parts of the organization operate. Although that is the case, choices must be made about how detailed a model is necessary for a complex organization. In a very large organization, a precise model is far too expensive to be a realistic proposition.

We can liken the software modeling phase of the implementation to making a map of a geographic region. The more details there are, the more topography represented, the larger the map must be, and the longer it will take to create it. Its size may make it impractical to wield as a tool; its expense in time and resources may make it impossible to afford. A pocket-sized map giving a general but accurate knowledge of the terrain is much more useful and can be created in a reasonable amount of time, making it also affordable. It won't indicate every tree root to step over or every stream to cross, but if you know how to step over roots and cross streams, you don't usually need that information anyway.

With a health care software system, you don't need a specialized workflow or data collection form for every possible clinical presentation or registration situation. You need a few tools that encapsulate the variation in a majority of your work practices, some special tools for infrequent but important situations, and the ability to branch away from standard templates in the remaining situations. That means that you can model the large-scale features of the organization, mapping them to system functionality and tools, teach users how to

... the focus of the initial implementation should not be to explore brave new worlds but it should be on building the ship and learning to navigate.

Peter DeVault helped develop Epic's implementation methodology and contributed to the design and development of Epic's clinical systems. He is also very active in the development of industry standards for electronic health records and interoperability and is an author of *HL-7's Functional Model of an Electronic Health Record System*. E-mail: pdevault@epic.com.



Special Feature

IMPLEMENTATION

handle unknown terrain, and get them using the system in a reasonable amount of time.

The question inevitably arises—which organization to model, the existing one or an ideal one? This question leads to a discussion of standardization and rationalization. Standardization, improperly pursued, is often the rock on which good implementation founders. Two kinds of standardization deserve attention: that of workflow and that of data representation.

Standardizing Workflow

Workflow standardization simply means taking two or more similar parts of an organization and having them perform some work function in the same way. As a result, people in similar roles in the different parts of the organization perform the same tasks in the same sequence using the same tools and interact with users in other similar roles in the same way.

Two kinds of motivation generally exist for standardizing workflows during an implementation. The first is that it is easier for an implementation team to design a system around one workflow for everybody rather than around everybody's individual workflows, even though a properly designed workflow automation system will allow for a great deal of practice variation. The second motivation exists when there is an agreed-upon best practice workflow that the organization would like to adopt or when there is reason to think that such a workflow might be discoverable.

The ease-of-implementation motivation typically leads an organization to analyze workflows to find commonality in the component steps and wherever there is commonality to make it standard. The sum of these steps then becomes the standard around which a workflow system is modeled. In this form, workflow standardization can be highly artificial and abstracted from the concrete realities of the clinical workplace. Lacking any real motivation to comply with the standard, users of the system will find ways to subvert the standard to reproduce necessary pieces of the original workflow or pieces perceived as necessary. In many cases, this will lead to a breakdown in the standardization of data representation as well. The tradeoff in this method of standardization is between ease of implementation and risking the integrity of the design and the data generated during the execution of the workflows.

The second motivation to standardize workflows assumes there is a best practice or that one is discoverable. Agreement on a best practice or even the necessary criteria in the organization is very rare prior to the

implementation. The larger the organization and the more vague the criteria for what counts as a best practice, the more difficult it is to arrive at this level of agreement. A more difficult tradeoff is involved here: implementing best practices for clinical care, shorter registration times, or reduced billing cycle times are often key factors in deciding to implement a system. On the other hand, a requirement to implement best practices in a large organization, whatever the criteria, can easily increase the time to go live beyond an interval that will be considered acceptable, successful, or affordable.

Epic's experience suggests that workflow standardization should play a minor role during the initial implementation. This isn't to say that there aren't some workflows that couldn't be standardized: if there is already general agreement on some key workflows, they should be standardized. In general, however, standardization, especially in the best-practice sense, is best addressed during subsequent optimization efforts rather than during the initial push to go live and rollout.

Workflow standardization can usefully be contrasted with workflow rationalization. The latter involves analyzing a process into information and patient flows, analyzing these into their component steps, and then improving efficiencies or removing redundancies. Once this has been accomplished, system modeling should address the rationalized workflow.

Rationalized workflows need not be the same across an organization. Although a good argument could be made that only rationalized workflows should be standardized, it does not follow that all rationalized workflows should be. There may well be defensible reasons behind workflow variations across the organization, but there is usually no justification for redundancies.

Standardizing Data Representation

Although workflow standardization serves a minor purpose during the initial implementation of a successful health care automation system, the standardization of data representation should occupy a large slice of the system modeling time. Data representation determines how information that is collected during patient care, registration, or other use of the system is stored and retrievable at a later time, how it can be compared with other data, and the ease with which both of these can be done.

Let's take the example of a lab test. We'd like a red blood count value to be stored the same way in the information repository whether it was obtained in the

hospital, in a clinic, in California, or in Ohio. Similarly, when we query the system for all of a patient's red blood count values, we'd like to retrieve them all—regardless of their origin—and be able to trend them over time. This task requires a common vocabulary for describing lab values. We would also like a common vocabulary for describing flowsheet rows, care plan interventions, diagnoses, and any number of other data elements. Standard vocabularies are available for same data elements, such as CPT codes for performed procedures or ICD for diagnoses. Many data elements, however, require standardization during the course of implementation.

But data retrieval at the point of patient care is not the only purpose for standardizing vocabularies. A standardized vocabulary is also a prerequisite for sophisticated clinical studies, population management, solving billing problems, and a number of other transformational activities that can be pursued after the initial implementation and rollout are complete.

Care Setting Variations

Installing an enterprise typically involves two or more care settings, including hospitals, physician offices, or ancillary service departments. Many of the systems' users will work in more than one care setting. For example, physicians often work in their offices and one or more hospitals. Different care settings obviously have different workflow and data collection requirements. A well-integrated system will account for this variation by using similar pieces put together in different ways rather than as different pieces altogether, as you would find in a nonintegrated or interfaced system solution.

Another variation to account for is that of the linearity of workflows. For example, a physician office visit is typically very linear, flowing from registration to check-in to collecting vital signs, placing orders, writing a note, and signing an encounter. During the course of a hospital admission, however, many caregivers and other users will interact with the patient in an unpredictable sequence. Nor will the data collection and data presentation requirements of these interactions be completely predictable.

When analyzed, it is typical that component pieces of these interactions show themselves to be linear, even though the course of care may not be. An enterprise system should account for these variations in linearity by using similar workflow navigation tools as in linearized care settings but to allow for easy departures from linearity. For example, a rounding navigator can collect together all of the component pieces of system in-

teraction required for a physician doing rounds (reviewing meds and vitals, placing orders, writing a progress note) while keeping I&O flowsheets, results review, and the interdisciplinary care plan for the patient one click away from the navigator. The rounding navigator will be instantly familiar to someone who sees patients in the office, having similar components but with the required variations in order and content.

An enterprise system should also use similar data representation methods in different care settings. Even though the data originates in a variety of settings, it is often very similar data and should be represented comparably. For example, vitals taken at home, in the office, or in the ICU should all be represented in the enterprise information system in a way that allows their direct comparison. The same is true of lab values, allergies, and medications.

A well-integrated enterprise automation and information system will reduce training time by using similar navigation and data collection tools across the variety of care settings and will allow viewing and interaction with data, regardless of its source, in a comparable fashion, thus improving patient care and the user experience.

Training Strategies

Different training strategies are suited to the nature of different care settings. In a typical physician office, the users are to some degree a captive audience. There is not a need to teach the users everything at once because you only have one shot at getting their time. Individual groups of physicians may come up on the system independently of their neighbors. In a hospital, on the other hand, there are many shifts of users, some of whom may only be in the hospital a few hours a week or even less. Furthermore, so many different clinicians and other potential system users interact with a patient that it becomes very important for all of them to be using the same system to document their patient care.

The virtues of a well-integrated enterprise health care information system allow an organization to tailor the training experience to fit the needs of users in these different care settings. Importantly, a system that uses similar or identical tools and navigation methods regardless of care setting allows a user to become comfortable using the system in one care setting and then leverage that knowledge using the system in other care settings.

For ambulatory sites, Epic has developed over several years a highly successful incremental training approach. During the course of three to four weeks, clinicians learn incremental sets of functionality. During the first week, basic navigation, chart and results

The virtues of a well-integrated enterprise health care information system allow an organization to tailor the training experience to fit the needs of users in these different care settings.

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review, and “In-Basket” tools are taught and used for the duration of the week. The following week, clinicians learn to place orders and document diagnoses. Finally, general charting and more advanced functionality are taught the third week. The training is typically a combination of classroom-based scenario development and one-on-one support. Computer-based training may also be a useful adjunct.

In the hospital setting, it is important that clinical users in particular learn most of the basic functionality for a given phase of the implementation before seeing patients. Longer blocks of training are required to support this strategy, and large sections of a hospital typically go live all at once on a particular set of functionality.

However, because tools are so similar across care settings, if clinicians go live first in their offices or clinics, the transition to using the same system in the inpatient setting is much easier. If it is possible to stage the rollout in this fashion, the benefits can be substantial—both with regard to training time as well as to ease of adoption by users.

In any case, it is important to keep the scope of the training narrowed to the basics required for day-to-day patient care and related work. More sophisticated use of the system can be nurtured through regular user group meetings, online forums, or other forms of communication. Maintaining a manageable scope is just as important for training as it is for standardization and other aspects of the implementation.

Setting and Managing Expectations and Scope

Armed with this information about standardization, variation, and training practices, an implementing organization should spend some time thinking about what will and what will not be accomplished during

the initial implementation and communicate that consistently to its user community. What will count as a successful implementation? This must be defined at the outset. Decide that, and then set the expectations to match the definition. Expectations set too low will result in employees asking pointed questions about the expense of the implementation and the scope of the changes they'll be asked to make in their work practices. Setting expectations too high will result in incredulity during the implementation (and unwillingness to be associated with it) as well as inevitable disappointment after the system is live.

Although “internal sales” is an important activity during an implementation, it is possible to oversell the system being implemented, thus raising expectations beyond what is reasonable. The implementation's champions should publicly recognize the system's weaknesses as well as its strengths. For example, some tasks will definitely take longer using an electronic system (think CPOE). Acknowledge this, and also stress the workflow points where time will be gained, such as in locating clinical information, rather than downplaying justified worries about extra time spent placing orders.

Managing expectations is inseparable from managing scope, which describes the schedule of modules and functionality as well as the breadth of user interaction expected at key points during the implementation timeline. It has been Epic's consistent finding that a successful implementation is one that defines a manageable scope for the initial implementation with the idea in mind that it will be the foundation for more sophisticated practices later. Focusing on the right kind and level of standardization and the encapsulation of variation across care settings will ensure that the implementation scope, in addition to being manageable, will also lead to success. ❖

Vacuum Tubes

Where a calculator on the ENIAC is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1000 vacuum tubes and perhaps weigh 1 1/2 tons.

— *Popular Mechanics*, March 1949

The Reality of EMR Implementation: Lessons from the Field

By Homer L Chin, MD, MS

Kaiser Permanente Northwest (KPNW) has more than a decade of experience working with Epic Systems in the development, implementation, maintenance, and continued improvement of the electronic medical record (EMR). EpicCare was initially implemented in two primary care clinics in 1994 and was completely rolled-out to the rest of the region by year-end 1997. This article will describe the most salient lessons that KPNW has learned in the interest of informing other KP regions as they embark on implementing KP HealthConnect (KPHC).

Some of these lessons were learned the hard way. Some things we "lucked into" naturally. Some of these lessons are backed up by hard data; some were gleaned through our experience and have been reinforced by similar learnings from other organizations. We have learned many more lessons than we are able to encapsulate in this short article. For anyone who has additional questions that are not answered here, please contact me directly and I will share whatever experience and knowledge we might have in a particular area. There are very few aspects of implementing an outpatient EMR with which we have not had some experience.

Overview

KPNW began the implementation of the EMR by developing and deploying an extensive Results Report-

ing System in 1992. In 1993, after an extensive evaluation of vendors, KPNW chose Epic Systems as our partner to deploy EpicCare, a comprehensive outpatient EMR. In 1994, we began a pilot deployment of EpicCare in two primary care clinics, involving approximately 50 primary care clinicians. After Epic Systems enhanced their system in response to our requirements, we embarked on a rollout of EpicCare to the rest of primary care, clinic by clinic. In 1996, we started the rollout of EpicCare to our specialty clinicians, department by department. After additional software enhancements, including the implementation of a prenatal record, we completed our rollout to our Ob/Gyn clinicians and to the rest of the specialty departments in 1997. In 1998, we implemented our Emergency Department and installed a document scanning system for any residual paper. At that time, we fully retired the paper chart. For members who have joined us since 1998, no paper record is created. Over the years of implementation, our geographically based chart rooms were gradually downsized and consolidated, and the personnel were retrained for other roles and functions throughout our organization.

EpicCare is not only an electronic version of the outpatient medical record; it also automates all information transmission processes in the outpatient setting. Health care pro-

viders use this system to document, order, refer, and message other health care staff. EpicCare has a two-way interface for order and results transmittal to our lab and pharmacy systems, giving our clinicians a complete and accurate picture of the laboratory and medication status of a patient. Guidelines, information, and medication suggestions are provided "in-line" to clinicians as they use the system to provide care for their patients. With the implementation of Epic's MyChart and Epic's Home Health System, we are extending secure access to the medical record and messaging into our members' homes.

Lessons Learned

I have organized our experience and learnings under the following themes: Organizational decision making and project management, system deployment, application software, benefits realization, content management, and other insights that transcend categorization.

Organizational Decision Making and Project Management Empower Project Leaders Who Are Close to The Ground

Although the high-level budgeting and direction were set by the leaders of the Health Plan and Medical Group, the project team was empowered, within broad bound-

For members
who have
joined us since
1998, no paper
record is
created.

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aries, to make decisions—enabling quick resolution of issues that arose during system deployment. Many of the project team members were end users of the system, providing a close link between decisions made and the impact of those decisions.

The Three-Legged Stool

The close coordination and cooperation of Operations, Permanente Medical Group, and Information Technology in joint management and decision making was an important factor in our success. For efforts in which we had only one or two legs of the three-legged stool, progress was often slow, the result somewhat off-target, or the effort unsuccessful. The close coordination

of Operations for project management expertise, the Medical Group for the clinical expertise, and Information Technology (IT) for technical expertise was an important ingredient in our success.

Beware “Scope Creep”

As an information systems project progresses, it is easy for additional functional requirements to creep into the project. Most additional requirements that are added in this way appear benign at first but have significant hidden downstream impacts. For large, complex projects, scope creep may introduce a lack of clarity that may result in significant delays and rework. Although some increases in scope cannot be avoided, it is important to understand that any change in scope may reduce the probability of success of the overall project.

Begin With the End in Mind (and Think of Everything in Between)

It is important to think through all the steps in a project from beginning to end. We embarked on a number of efforts only to find that we had not thought through the intermediate steps required to reach our goal. If we had done a more complete analysis of all the steps necessary to achieve an objective, we would have realized that our approach was missing critical steps, dooming it to failure from the start.

Bridgers

Bridgers are special people who are able to bridge the gap and the cultural divide between the end user, the organization, and IT. These people are able to think systematically and can understand and translate between end users, the project team, and the organization. They are often able to trade-off the benefit of

a specific functionality against the effort and risks in developing and implementing that functionality. By focusing on the end goal and thinking globally, they are often able to find the 80/20 solution—where 80% of the benefit can be achieved at 20% of the effort. These Bridgers are often able to identify easy-to-implement functionality that will have significant benefit and distinguish them from requests for functionality that are difficult to implement and have unclear long-term benefits.

System Deployment and Roll-out

You Won’t Get It Right (Don’t Try For Perfection)

Implementing an EMR is analogous to trying to find your way through a dimly lit forest. You have a general sense of the direction to head in and a general timeframe as to when you will reach the other side, but you would not be successful if you charted a rigid course in advance. Implementing an EMR is still more art than science. Tried and true methods for implementation do not exist. And you will not implement it without significant problems the first time. In the deployment, be prepared to make changes “on the fly” in response to identified issues. Trying to reach perfection prior to go-live will add effort and precision that is not warranted for the situation.

Pilot and Improve, Rollout and Improve

As a corollary to the “don’t try for perfection,” the flip side is don’t roll it out further until the system is at least “good enough” in the locations that you have already implemented. In other words, if you have identified significant problems or issues, fix them and delay further roll out until those



Homer Chin is the medical group leader responsible for the pioneering implementation of EpicCare in the Northwest Region in the 1990s. His continued persistence in demonstrating success helped lead the way for the eventual adoption of KP HealthConnect as the information system strategy for the KP Program. His firm belief is that Kaiser Permanente is in a unique position to leverage information systems technology to support its unique strength—integrated comprehensive health care.

issues or problems are sufficiently addressed. Another way to put it is to “put out the fire” before rolling the system out to further locations. Keeping to a rigid schedule for rollout before “putting out the fire” in implemented locations may result in an uncontrolled blaze that will eventually engulf the entire project in flames.

Value the Curmudgeons

End user critics of an implementation are a godsend. Listen to, carefully evaluate, and respond to any complaints about the system. By the time you hear of a complaint, many others will probably have silently suffered through similar problems. Although each of these problems and issues may be small, the cumulation of a large number of these “small problems” can be overwhelming. Some organizations have gone as far as to add a “complaint” button to their system, allowing end users to complain at any time and at any point in their use of the system. Although these complaints are occasionally misdirected, they are often warning signs as to where the road may be in need of repair. Ignore these signs at your peril!

Get Feedback and Use It

A corollary to “value the curmudgeons” is to solicit feedback about an implementation early and often. The system will not be perfect, and it will need improvement. If you are not hearing from clinicians, actively solicit feedback so that you can implement improvements in advance of significant problems.

Look for the Opportunity and the Easy Win

In implementing a system, you will occasionally come across an opportunity where a “tweak” to the system or use of the system in a way that

was not previously foreseen may result in significant improvements in efficiency or quality. An example of this was in our development of the SmartRx functionality within EpicCare. EpicCare had an Alternative Medication functionality that would alert clinicians to potentially better alternatives to the medication they were prescribing. Our pharmacists tweaked this functionality slightly by adding disease conditions to our medication file (Acute Sinusitis SmartRx, for instance) that allowed clinicians to enter a disease name in the medication field to get guidance on recommended therapy while improving the efficiency of the prescribing process.

Training Never Ends

Many people believe that the training task is done when a clinician has undergone initial training and is using the EMR. In our experience, clinicians know enough to “get by,” but most quickly forget much of what they learned in the initial system training. In an evaluation of our clinicians, we found that more than 50% of our clinicians remembered less than 50% of what we felt was essential material taught to them in the initial system deployment. In addition, information systems and capabilities are constantly changing. Ongoing and continued evaluation, education, and training are necessary to optimize clinician efficiency and effectiveness.

Implementation Never Ends

Many system implementers believe that once a system is implemented, their work is done. The truth of the matter is that these systems are constantly changing. Application software, operating systems, hardware, technology, and medical knowledge about diagnosis and treatment are constantly changing. The myriad combinations and interactions of all

these changes will keep a project team “implementing” at all times.

Your Users Are Beta-Testers

It is impossible to completely replicate the production use of a system in a test environment. This results in a system that is not fully tested prior to deployment. At the time of an initial go-live or significant upgrade, your end users become beta-testers of the system. It is not unusual for hundreds of issues, problems, and bugs to surface soon after go-live.

Jack Be Nimble, Jack Be Quick

In systems that are used for patient care, problems and “bugs” may have patient safety and medical-legal implications. The project team will need to be nimble and quick to fix identified problems—especially those that affect patient safety. Slow resolution of clearly identified problems may also demoralize end users and result in loss of credibility in the project team. A quick identification and resolution process is critical during the first few weeks of go-live.

Clinician Efficiency Comes First!

Implement the system in a way that tries to maximize a clinician’s efficiency at first. After successful implementation, additional tasks can be gradually added as clinician capacity to absorb these additional tasks increases. If a clinician is saddled with many additional tasks at go-live, the clinician may never learn the system well enough to achieve a good level of comfort and efficiency.

Application Software Keep It Simple!

With EMR software, transparency, reliability, and simplicity are impor-

In an evaluation of our clinicians, we found that more than 50% of our clinicians remembered less than 50% of what we felt was essential material taught to them in the initial system deployment.

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tant characteristics that should be valued over system sophistication. In some cases, EMR software is becoming so complex that it is difficult to tell in advance what the system will do in a given situation. When it comes to an EMR, transparency, reliability, and simplicity allow easier detection of errors that may adversely affect patient safety.

Efficiency and Response Time

The top three important factors in an EMR are: 1) Clinician Efficiency, 2) Clinician Efficiency, and 3) Clinician Efficiency. Having a quick response time is a prerequisite to supporting clinician efficiency.

Clinical Content Simple and Effective Ways to Embed Decision-Support Content

With an EMR, the opportunity exists to use an order requisition as a way to communicate not only from the clinician to the ancillary department but also as a way for the organization to communicate to the clinician at the time of ordering. By embedding guiding information in an order requisition, guidance can be provided to the clinician seamlessly during the ordering process. Another example of a simple but effective way to embed useful content is to automatically print patient information related to an order on the after-visit summary that is given to the patient at the end of the visit. Decision support can also be embedded through Alternative Orders, Smart Orders, Alternative Meds, and SmartRx. Medication content and decision support include for-

mulary and cost information for medications, drug-drug and drug-allergy interaction checking, and disease-specific interaction checking. Additional types of decision support include Order Panels, Smart Text, Smart Phrases, and Smart Sets. In general, the goal is to embed decision support in a seamless way that makes doing the right thing the easiest option in most cases. EpicCare allows the easy embedding of content in a myriad number of ways throughout the system.

Content that Supports Clinician Efficiency

Report formatting, layout, and content can have a significant impact on efficiency and effectiveness. For instance, our Previsit Summary automatically scans the last three lab test results for each lab test type. If any of the last three CBCs, for instance, are abnormal, a spreadsheet of the CBCs is printed. In this way, the system supports a quick and comprehensive review of the laboratory status for the patient. Other content areas that support clinician efficiency include key word synonyms that significantly improve the efficiency of ordering, prescribing, and diagnosis entry and well-thought-out departmental preference lists that improve clinicians' ability to find the terms they are looking for. Careful thought and work in these areas will yield significant benefits in clinician efficiency and system usability.

Keep a Tight Loop Between Content Management and the End User

End users determine the success or failure of content that is implemented in the system. Because the content in the system directly affects the end user, it is important to have a tight loop between the end user and the content embed-

ded in the system. Content management in EpicCare is easy enough to learn and use that it is possible to teach designated end users how to build content and to make them responsible and accountable for developing useful content for a given constituency of users. One of our areas of success is in developing and maintaining pharmacy content. Decisions made by our Pharmacy and Therapeutics Committee are immediately programmed into EpicCare by a pharmacist that same afternoon. We are attempting to disseminate that model of increased end user accountability for content to our clinician group.

Content Maintenance Never Ends!

Because medical care is constantly advancing and changing, the content within an EMR will need constant updating. Because content is embedded in many different ways and in varied locations in the EMR, the need to determine all the areas in which a change in content needs to be propagated is not a trivial task. KP is in the process of working with Epic Systems on tools to improve our maintenance of embedded content within KPHC.

Benefits Realization Implementation of Information Technology is Just a Tool

It is important to realize that the implementation of information technology, in and of itself, is not the goal. The goal should be to improve the efficiency and effectiveness of our health care delivery system. One of our goals is to improve the efficiency of our clinicians. We have found that for some tasks, reviewing information on paper is still the most efficient way to impart information quickly and effec-

Decisions made by our Pharmacy and Therapeutics Committee are immediately programmed into EpicCare by a pharmacist that same afternoon.

tively. Because of this, our costs for paper (for Previsit and After-visit summaries) have gone up rather than down.

Organizational Policies Should Reinforce the Behavior Promoted in KPHC

Programming functionality into the system without supporting organizational policies and efforts yields less than optimum results. EpicCare clearly and effectively informs the clinician of the formulary status of medications. However, because our organizational policies do not enforce restrictions around formulary ordering, our compliance with formulary prescribing is not where we would like it to be.

Enabling a More Effective Data Warehouse

With the implementation of an EMR, the ability to evaluate organizational performance and to systematize health care is significantly enhanced. New paradigms and models for case identification, tracking, monitoring, alerting, and providing feedback are possible. Regions must look carefully at these new capabilities and leverage those that will improve cost-effective high-quality care.

Clinicians Are Not Optimized for Population Care

Clinicians are optimized for one-on-one care for members. With the implementation of the EMR, significant capabilities to systematize care through care, case, and disease management are enabled. Because these population care approaches are an effective way to reduce cost and improve quality, it is possible to off-load work from the clinician by systematizing care, leaving the clinician more time to devote to the one-on-one care for which they are essential.

Other Insights Clinicians Won't Necessarily Be Faster, But They Should Be Better

It was often assumed that unless the EMR made the clinician "faster" it would not be accepted. In our experience, clinicians are initially slower after EMR implementation. Over time, some clinicians will become faster than they were before, but many will remain slower. Even the slower clinicians recognize the value of information technology—and given the choice, would not want to return to the pre-EMR days. Our theory is that clinicians are able to trade-off their own increased workload against the improvement in care and professional satisfaction that they see with the use of the EMR. With changes in the paradigm of care delivery that the EMR enables, even the "slower" physicians will be more efficient in their overall care of a given population of members.

The Great Magnifier

The EMR is the "great magnifier." If an organization already does something very well, then the implementation of information technology will probably further improve its performance in that area. However, if an organization is dysfunctional in an area, then the implementation of an EMR will probably magnify that dysfunction. Identifying and addressing potential areas of organizational dysfunction prior to implementing the EMR may improve the overall results of EMR implementation.

Conclusion

Implementing an EMR is a complex and difficult multidisciplinary effort that will stretch an organization's skills and capacity for change. It will be a challenging and occasionally stressful continuous

learning experience. Seeing the systematic benefits of an EMR in improving the care of a large population of members, however, is a gratifying experience that makes the effort of EMR implementation worthwhile. Even after a decade of EpicCare experience, we continue to learn and find ways to use information technology to more fully realize the potential of our integrated health care delivery system. ❖

Acknowledgments

I would like to thank the clinicians and staff of Kaiser Permanente Northwest and Epic Systems. Their partnership, teamwork, dedication, mutual accountability, and commitment to the end-user are responsible for our success. I would also like to thank Allan Weiland, MD, Medical Director, and Mike Katcher, the Regional President who, in 1993, made the courageous decision to move forward with EpicCare when there were few other examples of success in EMR implementation.

The lessons that we have learned from our EMR implementation have been gradually compiled through years of experience on the part of many people. I would like to especially thank the "thought leaders" who have contributed directly or indirectly to this article. Larry Dworkin, MD; Dawn Hayami; Brad Hochhalter; Michael Krall, MD; Michael McNamara, MD; Nan Robertson; Dean Sittig, PhD; Nick Socotch, RN; and many others through the years, identified and labeled many of the lessons described above. Thanks to Michael Kirshner; Nan Robertson; Tom Stibolt, MD; and Allan Weiland, MD, for their help in editing this manuscript.

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Inspiring a Shared Vision

A leader who Inspires a Shared Vision is one who describes ideal capabilities; looks ahead and communicates the future; is an upbeat and positive communicator; finds common ground; communicates purpose and meaning and/or is enthusiastic about the possibilities.

— *The Leadership Challenge, J Kouzes and B Posner, Jossey-Bass*

Computers in the Exam Room— Friend or Foe?

By Ward R Mann, MSN, FNP
Joanne Slaboch, MBA

At first, it might be hard to imagine how using an electronic medical record in your practice and in the exam room could improve communication with patients. In fact, it may be easier to see the computer as just another thing that gets in the way of our having meaningful interactions with patients—a third wheel, so to speak. Because patients view communication as the most important factor in the clinician-patient relationship, we certainly don't want to compromise it in any way.¹ Does the computer in the exam room assist or hinder good clinician-patient communication?

The Experience

Our experiences in Kaiser Permanente's Northwest and Colo-

rado Regions have shown that patients give a positive rating to clinicians' use of computers in the exam room. Initially, clinicians experienced a period of time in which they were not as efficient as they were with the paper record. There might be some discomfort with the new equipment, with necessary new computing skills, with the changes in workflow and, importantly, discomfort in the conversations with members related to the computer.

We learned that this discomfort fades as confidence is gained in new skills, in a sense of consistency and reliability about critical patient data, and in satisfaction with the comprehensive level of care that the clinicians are able to provide. The information available from computers



helps to demonstrate comprehensive knowledge of the patient. Additionally, exam room computing helps involve patients in decisions about medical care, something patients highly value. As reflected in the chart, A Synthesis of Recent Evidence (Figure 1), shows ample evidence that exam room computing can enhance the overall clinician-patient interaction in the exam room.

Personal Challenges

What about you and your practice? How are you supposed to maintain good communication with

Table 1. Interregional Clinician-Patient Communication HealthConnect work group members

Sara Faulkner, MD (Group Health)
Rich Frankel, PhD (Indiana University)
Diana Burks-Goodman, MPA (Southern California)
Jim Hardee, MD (Colorado)
Charles James Kinsman, BA (Garfield Memorial Fund)
Peggy Latare, MD (Hawaii)
Maureen Leahy, MBA, MPH (Mid-Atlantic States)
Ward R Mann, NP, Chair (Northwest)
Debra Mipos, MPA (The Permanente Federation)
Jan Nedin, MS, CCDC, CEAP (Ohio)
Vivian Nagy, PhD (Southern California)
Joanne Slaboch, MBA (The Permanente Federation)
Sue Hee Sung, MPH (Garfield Memorial Fund)
Richele Thornburg, MS (Hawaii)
Robert Tull, PhD (Group Health)
Elizabeth Wu, MA (Southern California)

Ward R Mann, MSN, FNP, (right) is a clinician and consultant for NWP in Portland, OR. Most recently he's helped to create curriculum for regions to use as they implement KP HealthConnect. E-mail: ward.r.mann@kp.org.
Joanne Slaboch, MBA, (left) has been a Project Manager for the Care Experience Council since 2001, focusing on issues related to technology-enabled care. E-mail: joanne.m.slaboch@kp.org.



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your patient and deal with this new “thing” in the exam room? Will you be able to make eye contact and type your note? Will you be able to keep the patient involved and not be distracted by the computer? Will you remember to secure the screen? Sound a little overwhelming? We believe that you will find the following suggestions helpful to make certain that the computer becomes

a solid friend of yours in the exam room, and definitely not a foe.

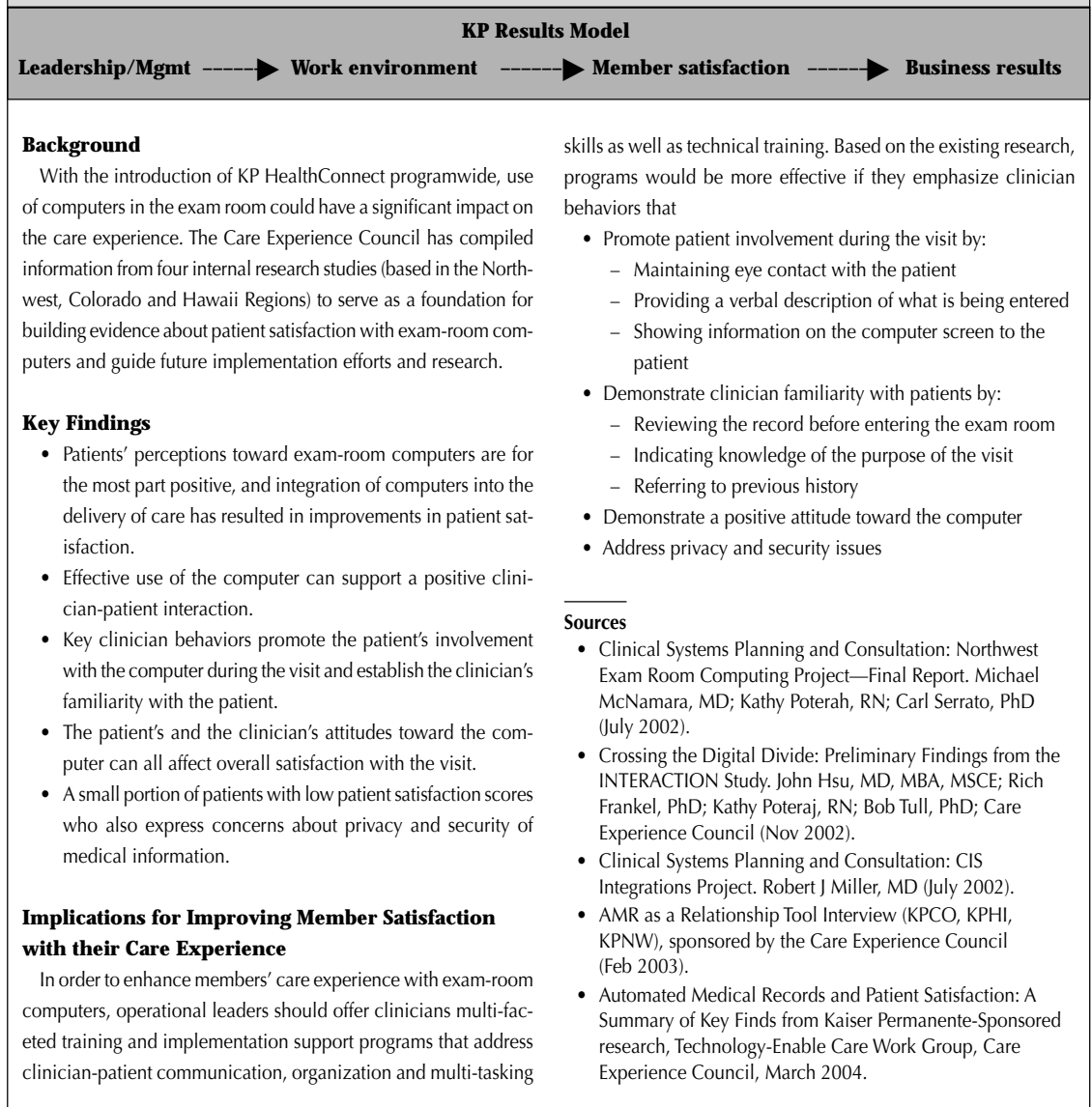
Solutions

The Interregional Clinician-Patient Communication (IRCPC) Leaders of Kaiser Permanente (Table 1) have pooled their collective experience and understanding about clinician-patient communication and exam room computing. As a

result they have identified five key communication behaviors to foster smooth integration of computers into practice:

- L**et the patient look on
 - E**ye contact with the patient
 - V**alue the computer as a tool
 - E**xplain what you are doing
 - L**og off and say you are doing so
- The accompanying chart, Do Your LEVEL Best With the Computer in

Figure 1. A synthesis of recent evidence—member satisfaction with exam room computers



the Exam Room (Figure 2), applies these five communication behaviors and details some recommended actions to use and scripts to say to effectively integrate the computer into your exam-room interaction with your patient. The IRCPC has developed five courses to help clinicians and support staff integrate the computer into the patient visit using these LEVEL skills (Table 2).

By including a few new communication behaviors into everyday practice, a computer in the exam room will enhance the overall care experience for the patient. ❖

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Introduction to CPC Issues and Future Support	10-15 minutes
LEVEL Tips for Technical Training	5-15 minutes
Connected Communicating and Computing in the Exam Room Web-Based Training Course http://internal.or.kp.org/cis/training/erc.html	30 minutes
CONNECTED CONDENSED	a two-hour workshop session
Course for Exam Room Coaches	RECONNECTED

Skills	Actions	What to say
Let the patient look on	<ul style="list-style-type: none"> • Move the screen for patient to see. • Invite the patient to move closer to the screen to view information. • Ask the patient to verify information as you type. <p><i>(This builds trust, actively involves the patient, and demonstrates “we know you.”)</i></p>	<p>“Let’s look at the lab results to see how your cholesterol is doing.”</p> <p>“Let me show you this part of the medical record so we can confirm some information together.”</p> <p>“Here are the injections we have in our records. Have you had other injections outside KP that we need to add?”</p>
Eye contact with the patient	<ul style="list-style-type: none"> • Greet the patient. Make a personal connection away from the computer • Keep that connection throughout the visit by: <ul style="list-style-type: none"> - Maintaining eye contact with the patient. - Turning toward the patient when the patient speaks or engaging in conversation. <p><i>(Maintaining eye contact promotes active involvement.)</i></p>	<p>“Good morning, Mr Jones. I see you hurt your ankle.”</p> <p>“Let’s spend a few minutes discussing your options.”</p>
Value the computer as a tool	<ul style="list-style-type: none"> • Acknowledge the computer. • Let the patient know how the computer improves care. • Stay positive when faced with computer challenges. <p><i>(From the patient’s perspective, great medical technology is equated with great medical care.)</i></p>	<p>“The computer makes getting and sharing information with other health care team members so easy and efficient.”</p> <p>“This computer is great. I have all your background information at my fingertips—medications, prior visit notes, and lab results from all KP visits.”</p>
Explain what you are doing	<ul style="list-style-type: none"> • Keep the patient informed about your thought process and actions. • As you are documenting, let the patient know what you are doing—entering information you have just discussed, ordering lab tests/medicines, accessing patient information. <p><i>(Patients who receive no explanation about what you are doing may think you are working on unrelated business.)</i></p>	<p>“I am printing some instructions, which we can go over together in a moment.”</p> <p>“I am recording the details of your sore throat so our records will be complete. I’ll order the medication we just discussed, so it will be available at the pharmacy.”</p> <p>“I’ll add the leg swelling to your problem list, so we can keep it in mind for future visits.”</p>
Log off and say you are doing so	<ul style="list-style-type: none"> • Tell the patient that you are “logging off the computer” to safeguard their information. <p><i>(Some members are concerned about privacy and confidentiality. If their concerns are not addressed, satisfaction may decrease.)</i></p>	<p>“I’m logging off the computer now to keep your information private.”</p>

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Making the Right Thing Easier to Do

Paul Wallace, MD
Executive Director
Care Management
Institute

At the Care Management Institute (CMI), our guiding philosophy is to make the right thing easier to do, and the implementation of KP HealthConnect expands dramatically the possibilities for us to make this philosophy a reality. With the advent of KP HealthConnect, we have at our disposal new tools to answer our perennial question: How can we most effectively support clinicians and members in having the best possible information they need, when they need it? Assembling and clearly presenting the right clinical information and knowledge—what’s known as well as what isn’t—is the core of evidence-based medicine (EBM). CMI has been able to benefit from and complement decade-old efforts within the KP Regions to rigorously engage in developing and disseminating EBM. Our multiple and evolving efforts seek always to improve health outcomes through the identification, implementation, and evaluation of nationally consistent, evidence-based, population-oriented, cost-effective health care programs. To the extent that we bring the right information to the right people at the right point in a clinical encounter, clinicians and members can be optimally prepared to make key decisions.

Knowledge Management

The process of knowledge management is vital to providing content for KP HealthConnect, and the input and experiences of practicing clinicians in the KP Regions are foundational at every step. Knowledge management assembles existing knowledge in medicine and identifies concerns and inquiries that are critical to clinicians. We investigate the degree to which evidence exists to answer these pivotal clinical questions and identify key elements of evidence that should be available during practice.

Once knowledge has been assembled and distilled into core elements, it must be “triaged” into an appropriate level of decision support. What point in the clinical encounter is the right one at which to present the evidence? Is it appropriate to “intrude” in the visit with alerts, reminders, and redirection of care? What infor-

mation needs to be just “a click away”?

The answers are evolving out of an increasingly clear understanding of the process of clinical decision-making. Clinical decision-making involves understanding the evidence and interpreting its implications depending on individual circumstances as well as on the preferences and values of the involved parties. When rigorous evidence is readily available at the right time and in the right way, clinicians are liberated to address preferences and values—theirs and those of members—in clinical encounters.

With the homework of discovering and distilling the evidence addressed before the clinician even begins work with a patient, visits can be increasingly devoted to the unique aspects of individual situations. For this reason, EBM is a key enabler of the ultimate goal of patient-centered care.

When rigorous evidence is readily available at the right time and in the right way, clinicians are liberated to address preferences and values—theirs and those of members—in clinical encounters.

Visit Workflow

Workflow—how exams and discussions proceed—is of central importance to both clinicians and members. The unique relationship that goes on behind the closed door of an exam room must always be respected. KP HealthConnect offers a system with a range of ways to provide evidence and support decision-making within the clinical encounter.

Some clinical issues are important enough to justify interrupting workflow in order to present pertinent information. For instance, missed screening tests and medication incompatibilities are generally worth interrupting the flow of a visit to prompt clinicians and members to do something differently. Alerts and reminders represent the first order of intrusiveness. Instances like these, in which the evidence is strongest and the risks of overlooking it are highest, are relatively rare.

The second order of intrusiveness makes information available the instant a question is posed within the visit workflow. For instance, one medication may be more cost-effective or appropriate than another initially selected. Redirection can be provided with the option to preserve the original order. References are provided on demand, supporting the clinician’s need for more

details about options and choices. In KP HealthConnect, an alternative medication functionality provides this type of information and facilitates redirection if the clinician agrees this is best for the patient.

The third order of intrusiveness provides facilitated access to decision supports such as clinical guidelines and other references. One example is treating acid peptic disease caused by *H pylori*, which requires a mixture of antibiotics that changes frequently and is difficult to remember. KP HealthConnect can leverage what several KP Regions have previously achieved through protocols and clinician agreement to field and help fill a pharmacy order for treating *H pylori* that brings all currently recommended medications up for approval. Additionally, a clinician may have started to order a diagnostic test and have a question about it. Within the order form, s/he can find links out to general reference information on the Web through the Clinical Library.

Alerts and reminders, redirection and reference on demand, and general reference availability support the whole range of clinical inquiry, and the flexibility of the KP HealthConnect system allows us to triage evidence into the appropriate level of decision support. Most important, the leverage of knowledge, including the degree of intrusiveness for knowledge within the encounter—like the actual guidelines themselves—is under the guidance and oversight of practicing KP clinicians.

Quality Assurance Process

Completing the knowledge management cycle is the need for a consistent quality assurance process in which we ask the question: Does the information that appears in KP HealthConnect accurately represent the evidence on which it is based? The ability to make something easier carries with it the accountability to insure that facilitated care is indeed the right care.

Involving the Member

An integrated knowledge management process needs to also take into account the fact that members must have a view into existing knowledge. This is key for self-care of some acute illnesses, such as uncomplicated respiratory infections; support for members in sharing in decisions about their care; and support and engagement of members in their own self-management of chronic medical conditions such as diabetes, heart failure, and asthma. Patient information concordant with that available to cli-



"Making the right thing easier to do" has been the guiding philosophy behind Dr Paul Wallace's inspired leadership in bringing information technology to bear in realizing the promises of evidence-based medicine within Kaiser Permanente, first in the Northwest Region, and now as director of the KP Care Management Institute.

nicians is being made readily available to members. The member functionality (referred to as "MyChart" by Epic) creates a new forum for communicating medical knowledge with our members and empowering them to determine their own health status.

Final Comments

Finally, although our efforts to date have focused on putting the right thing into KP HealthConnect to support care for our members, as we look toward the future, we can anticipate harvesting an expanded and extended knowledge base about our members and their clinical experience from KP HealthConnect. Despite the best efforts of CMI, regional experts, and trusted third-party sources, gaps in the evidence base persist and will continue to do so for the foreseeable future. KP HealthConnect will generate an unprecedented data stream reflecting the clinical paths of millions of people. It is incumbent on all of us to use it optimally for research purposes to address these gaps.

It is, in short, the right thing to do. ❖

Population Care Information Systems (PCIS): Managing the Health of Populations with KP HealthConnect

By Joel Hyatt, MD
Warren Taylor, MD
Leslee Budge, MBA

KP HealthConnect creates an opportunity for Kaiser Permanente (KP) to practice population care management (PCM) on a scale unparalleled elsewhere on the planet. The Care Management Institute (CMI) is spearheading an effort to make sure that this potential is realized.

PCM, conducted by the KP Regions in collaboration with CMI leadership and support, is already a core strength of KP. Regions, learning from one another and building on innovations, have developed

PCM programs that demonstrate a clear impact on health outcomes.¹

Information systems that identify and stratify populations, support inreach decision support (member-specific point-of-service messages to providers that prompt certain actions) and outreach (communication to members by mail, telephone, or e-mail), and track outcomes are key to PCM. All eight KP Regions independently developed PCM

information systems and migrated toward interregionally consistent population definitions and outcomes measures. From a KP Program perspective, regional information systems currently support PCM in patch-

work fashion. The advent of KP HealthConnect, on the other hand, represents an opportunity to create a finely woven tapestry of PCM that covers every KP member programwide—consistently, effectively, and efficiently.

What's Possible

As an example, consider important research findings like those of the recent Heart Protection Study.² The finding that a moderate dose of lipid-lowering statins protects against adverse cardiovascular (CV) events in members with coronary artery disease and diabetes has clear implications for managing the population at risk for adverse CV events. Currently, ongoing outreach efforts in all KP Regions seek to make sure that every member at risk for an adverse CV event has the opportunity to benefit from the protective effect of statins. Outreach efforts vary between the regions; so, too, does the rate at which the percentage of members with diabetes on statins increases.

Once KP HealthConnect—and customer relationship management (CRM) software—is fully in place, every KP member throughout the program could receive notification in the manner of their choosing about the importance of taking new

medication, such as statins. Members would also benefit from the best and most recently published research as soon as it became accepted policy; PCM staff could send prescriptions for the newest appropriate and affordable medication to hundreds and even thousands of members at a time—with little effort or technical expertise. Similarly, depending on their preferences—which would be available in the electronic health record—some KP members would receive personalized outreach messages by mail or phone. Others would prefer to access them through MyChart, the member interface into KP HealthConnect.

Depending on their preferences, which would be stored in the electronic health record, some KP members would receive personalized outreach messages in the mail or over the phone. Others would receive them through MyChart.

MyChart has significant potential to enhance PCM by helping individuals access both the information and health resources to take the steps they need to manage their own health care. Particularly in chronic disease, the member and the member's family must take key steps toward lifestyle modification and improving health status.

The advent of KP HealthConnect, on the other hand, represents an opportunity to create a finely woven tapestry of PCM that covers every KP member programwide—consistently, effectively, and efficiently.



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MyChart also holds the potential to liberate some health care from the confines of inpatient and outpatient settings. Although clinic visits and hospital stays will continue to be necessary elements of health care, the potential for fast, direct communication between clinician and member means that some care can take place outside both traditional settings. One likely scenario is in diabetes care. If members are able to electronically transmit data on blood glucose home monitoring and clinicians can recommend insulin or oral hypoglycemic changes via e-mail, the member's home becomes the locus of care.

KP HealthConnect will also create the largest and most diverse database in the country—and in the world. Cradle-to-grave data will be available on eight million people. The potential for research into disease risk factors and causative factors, including genomics, and for effective treatment is staggering.

But none of this will happen overnight—or without concerted effort.

Population Care Information Systems

To make sure that KP receives the maximum PCM benefit from KP HealthConnect, an interregional group of stakeholders, KP HealthConnect management, and representatives from Epic, KP-IT, and the Regions assembled to address the question: How can KP HealthConnect support PCM in the near future and over the long term? The process of finding answers is called Population Care Information Systems (PCIS). Co-led by Joel Hyatt, MD, Assistant Associate Medical Director (SCPMG), and Warren Taylor, MD, Regional Director of Chronic Conditions Management (KP Northern California), PCIS involves CMI staff and regional contacts.

It was clear to PCIS members that KP HealthConnect supports encounter care superbly. However, the potential for population-based functions within KP HealthConnect hadn't been addressed by Epic, KP HealthConnect's vendor, in any previous application. Nor was there a precise picture of the key elements of PCM that KP HealthConnect, or any enterprise-level information system, should support.

Defining the Elements

A first step for PCIS was to define core requirements for PCM. That required a close examination of the existing PCM mix, including visits to all eight KP Regions, interviews with more than 100 staff and clinical and operational leaders, observations of over 30 population care management systems, and documentation of more than 300 PCM requirements. Led by CMI Practice Leader Leslee Budge, the exhaustive investigation yielded a clear idea of what KP HealthConnect needs to do to support PCM well.

As a result, PCIS specified eight key functions needed to support PCM in the KP HealthConnect environment:

- population identification—determining population membership through reproducible processes and criteria
- population stratification—identifying population subsets according to level of illness or risk
- member tracking—following members through episodes of care
- care/case management—care plan documentation, communication, prioritized list of members, and smart algorithms to maximize care/case management efficiency
- inreach—alerts and reminders

triggered at any point of service (decision support)

- outreach—individual or mass communication with members by telephone, mail, or Internet
- member data entry into KP HealthConnect—input of data from MyChart, devices, or questionnaires
- monitoring and reporting—generating reports to meet strategic and quality needs

In partnership with Epic and KP-IT, PCIS began a process of matching these functions to KP HealthConnect. Where gaps existed, the group identified KP HealthConnect functionalities that could be adapted to meet PCM needs. Epic proved robust and flexible; as members of PCIS brought detailed questions to the table, they found functionalities to support many identified PCM needs. Where there were gaps, analysis of alternative solutions yielded a workplan, which was approved and funded by the Care Delivery Portfolio Approval Council.

Several groups within KP are collaborating with and supporting the efforts of PCIS. For example, the clinical data warehouse project is working with PCIS to create a programwide dataset, starting with data for Clarity, Epic's database, and other sources such as some lab and claims data. PCIS is working in partnership with that project and with Information Management to select software for back-end data-mining functions. Enterprise Architecture-Health Plan Operations is working on the applicability of CRM software to support outreach efforts. CRM will eventually hold all member information, including contact preferences, and be able to support campaignlike marketing efforts to reach members. PCM will be able to take full advantage of CRM service capabilities to target specific patient audiences and receive feed-

Special Feature

SOPHISTICATION

When the electronic health record is live, information about care plans for individual members will be shared instantaneously and continuously. This represents a quantum leap in communications at KP.

back on the results. Patient encounters through CRM will be stored in the medial record.

An important byproduct of PCIS is a meeting of minds about PCM. For the first time, operational and clinical leaders from the KP Regions have gathered with staff and consultants from CMI, PCM's home within KP, to develop a shared vision of what PCM could look like in an integrated health care delivery system and what functionalities within KP HealthConnect support that vision. Regional and CMI leaders collaborate frequently; until now, they've focused on best practices for clinical priority areas. PCIS is their first opportunity to look across the PCM landscape and toward the horizon.

Between Here and There

There are some intermediate landmarks between the current state of PCM at KP and the PCIS vision outlined above.

For one, consider the impact of KP HealthConnect on communications. When the electronic health record is live, information about care plans for individual members will be shared instantaneously and continuously. This represents a quantum leap in communications at KP.

Take the care of a member with chronic pain, for instance. The care

team may consist of a behavioral medicine specialist, a physical therapist, a care manager, and a pain specialist, in addition to the primary care provider. Often, documentation about care management is siloed from the medical record and maintained separately. Primary care providers often find it difficult to have a clear picture of the plan of care for chronically ill members. With the advent of KP HealthConnect, the care plan will be readily available to the primary care provider, making that clinician an active part of the team and ensuring that his or her time is well spent.

Increased communication can only improve PCM. So, too, will SmartTools that incorporate clinical practice guidelines improve PCM.

Back end data queries will allow care managers or support staff to identify population members who, for instance, need better glucose or lipid control or who need to be on an ACE inhibitor.

EpicCare's Reporting Workbench will enable providers to easily create queries that provide panel-level information about members who may be at risk and need some form of intervention or monitoring. As this process gets refined, the health care team will be able to produce a summary on specific subsets of members.

As KP HealthConnect rolls out

over the next few years, it's essential that population care management activities continue uninterrupted. To that end, the KP Regions will maintain parallel PCM systems until the last regional medical center goes live with KP HealthConnect.

A methodical approach to transitioning from existing systems to KP HealthConnect-based PCM systems will ensure that, while providers are busy learning the ins and outs of the encounter-focused electronic health record, PCM continues. CMI will take a leading role in ensuring that no members fall through PCM cracks. Individual PCM resources, like care management summary sheets, will be transitioned gradually to KP HealthConnect-embedded information. The vision of PCIS is that from the perspective of care providers, the transition from current systems to the PCM of the future will be incremental and seamless. ❖

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Discovery

The real voyage of discovery consists not in seeking new landscapes but in having new eyes.

— Marcel Proust, 1871-1922, French novelist

The Clinical Knowledge Management Process Behind KP HealthConnect

By Karen Woods
Melodi Licht, RN, MS
William Caplan, MD

Clinical Knowledge Management and Patient Care Intersect in SmartTools

SmartTools are the part of clinical knowledge management that clinicians will see as they use KP HealthConnect. Some SmartTools, like preference lists, SmartText^a and SmartLists^b streamline workflow for clinicians by, for instance, reducing repetitive documentation or making orders or diagnoses easier. Others offer more pointed decision support. SmartSets, for example, bring together diagnoses, lab and imaging orders, medication and procedure orders, patient information, and supporting documentation in a template.

The Care Management Institute (CMI) is coordinating an ongoing effort to make high-quality knowledge available to clinicians at the point of care in these tools.

Creating Clinical Content

The primary focus of the clinical knowledge management process behind KP HealthConnect is the collaborative creation of rigorous, evidence-based content for clinicians to use at the point of care.

The CMI clinical knowledge management process is well established. Interregional workgroups consisting of clinical experts from medicine, pharmacy, and nursing, evidence-based methodologists, and CMI care management consultants have created clinical practice guidelines for a core set of conditions and health care issues: asthma, coronary artery disease, chronic pain, cancer, depression, diabetes, elder care, heart failure, and self-care and shared decision-making. These guidelines have been approved on a national level by the Guideline Directors Group and are revised at least every two years.

Clinical practice guidelines appear in a variety of print formats, including full-length technical and summary documents, as well as on the Clinical Library (CL), (<http://cl.kp.org>) formerly called Permanente Knowledge Connection (PKC). CMI care management consultants also developed clinician-friendly tools, like trifold brochures and pocket cards, to facilitate guideline implementation.

For conditions outside its core list, CMI is facilitating the work of interregional domain (specialty) groups. Each domain group, consisting of clinical experts, chooses three clinical conditions to address with KP HealthConnect SmartTools. Within these conditions, domain group members submit questions or clinical issues for the evidence consultants to research. For example, the rheumatology domain group chose to examine the efficacy of recently introduced medications compared with long-standing treatment options.

A CMI evidence consultant, working under a physician evidence-based medicine methodologist, then follows a specified procedure for synthesizing available evidence on the topic. The knowledge synopsis is delivered to the domain group, whose responsibility it then is to build clinical content in collaboration with regionally based KP HealthConnect builders.

CMI also facilitates design, build, and validate (DBV) sessions (see sidebar). DBV sessions bring together physicians, nurses, pharmacists, evidence methodologists, coders, representatives from patient safety and health education, and other experts from across the program to Oakland to create content for KP HealthConnect.

The effort to create high-quality, evidence-based knowledge and decision support for KP HealthConnect also extends to the emergency department and inpatient settings. More than 40 people, including emergency room physicians, hospitalists, and nurses, are working on the inpatient content to support KP Regions with KP hospitals.

The goal of all processes is the synthesis of the best available evidence and information. The domain group, DBV—or the CMI core condition workgroup—then considers how to represent it within KP HealthConnect.

Plugging it into the Right Point of Care

Once an evidence synopsis exists, the recommendations are integrated into the process of care. Statins, for instance, are indicated for the prevention of acute car-



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Special Feature

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diovascular events in members with diabetes over the age of 55. A prompt should appear at some point in a clinic visit to alert the provider if an appropriate candidate for treatment isn't receiving a statin.

CMI priority area workgroups and domain groups make sure that the processes of care drive the creation of tools—not the other way around. The focus is on creating solid knowledge and making it available at the right point in the process of care by using the possibilities that SmartTools present.

All this means thinking about guideline content in a new way. Even though previous tools like pocket cards have aimed at making guideline implementation easy for clinicians, the process of creating SmartTools requires content experts to think in great detail about the moment-by-moment flow of care within a clinic

visit. At exactly what point in the visit should a statin alert appear? When the provider is reviewing the list of current medications? When he or she is signing off on any orders or plans? Within domain groups, clinicians, pharmacists, nurses, and representatives from utilization management and health education also discuss the flow of clinic visits at the same level of detail.

With a solid understanding of the process of care, KP HealthConnect builders can begin to create documentation and decision support tools that support the process and reflect the evidence.

A good understanding of the process of care allows both consistency and flexibility. Consistent standards about documenting orders and plans must be maintained across Regions; at the same time, local preferences for KP HealthConnect tools must be accommodated. For example, some users might want a pull-down menu for documentation; others might prefer a SmartText module that they can further personalize to reflect their individual practice patterns.

Design, Build, Validate

Clinical decision support tools for ambulatory KP HealthConnect are created in three-day sessions called Design/Build/Validate. Physicians, nurses, pharmacists, utilization management representatives, evidence methodologists, regionally based KP HealthConnect clinical content builders, and representatives from Epic meet to plan, build, and perform quality assurance on KP HealthConnect tools. Adult primary care was the topic of a DBV session in February 2004; a July session targeted pediatric ambulatory care. These sessions yielded content for 10 to 20 conditions.

DBVs are also conducted for the inpatient application. These DBVs typically run one to three weeks and address workflows, configuration design, documentation tools, and order sets. Starter sets have been completed for hospitalists, general surgery, medical/surgical nursing, and emergency departments. An integrated inpatient/outpatient DBV to address obstetrics is planned for October/November.

Lengthy preparation on the part of involved clinicians and representatives precedes the meetings. Evidence synopses and clinical practice guidelines, posted on the Clinical Library and the I KNOW Web site, form a critical foundation. Armed with this information, participants determine how best to incorporate recommendations into workflow by mentally walking through a clinic visit moment by moment. "There's only so much time in the flow of care. Our goal is to prioritize the key points in a clinical practice guideline. We focus on creating SmartTools that clinicians will find easy to use and that also support them in making the right decisions," says Michelle Wong, MPH, MPP, CMI Care Management Consultant.

Builders then create the suggested tools, and the entire group validates that their input has been accurately translated into KP HealthConnect. Clinicians participating in the process feel their time is well spent. "Clinicians are really energized and excited, despite the very tight timelines involved," says Ms Wong.

Validating the Tools

Quality assurance (QA) is a key part of the process of creating KP HealthConnect content, and QA's primary aim is to ensure that SmartTools reflect the evidence on which they are based. In 2003, more than 400 SmartSets from the KPNW EpicCare system were reviewed for consistency with CMI-generated evidence-based summaries and clinical guidelines.

For content created de novo, validation sessions take place as Web and teleconferences, at which the builder responsible for creating the SmartTools posts them online for participants to view. Domain group members review each section, making sure that their input has been accurately translated. Constituent members, such as lab, pharmacy, utilization management, and evidence-based medicine methodology representatives, sign off on the SmartTool or request changes.

To shorten the feedback loop, the builder responds to requests for changes in real time. The goal is to revise the SmartTools to the satisfaction of all participants during the course of the Web conference.

Lively discussions can arise, all leading to the eventual betterment of the SmartTool. Notable recent debates included the utility of MRIs for diagnosing early-stage breast cancer and the routine use of brain natriuretic peptide (BNP) for diagnosing heart failure in inpatient settings; both tests were ultimately removed as default options from the SmartTool being discussed on the basis of the published evidence.

When—and How Much—to Roll Out

Content for KP HealthConnect is built in the order in which it's needed. In April of 2004, the Hawaii Region went live with HealthConnect in internal medicine, family practice, pediatrics, gynecology, and behavioral health. As medical and surgical specialties come online, clinical content will be ready.

The efforts to date don't yet cover the vast array of clinical conditions that KP primary and specialty care providers may encounter. Clinical knowledge management in the context of KP HealthConnect is best thought of as a process, not an end. As clinicians become familiar with the electronic health record and its potential for offering decision support, the clinical knowledge management processes will already be in place to meet accelerating demand for more SmartTools. New technologies under study, like active guidelines and Web-enabled documentation templates and order sets, will also enable new kinds of SmartTools.

Regional Variations

The process described above will yield a collaborative national version of KP HealthConnect, which

maximizes the economies of scale involved. However, KP Regions can customize it to create versions sensitive to local conditions and preferences.

The ultimate goal of the KP HealthConnect clinical knowledge management process, though, is standardized, high-quality care and improved health outcomes throughout the KP Program. Members with diabetes, asthma, coronary artery disease, or any one of the conditions identified by the domain groups should receive the same standard of care across all the regions. The SmartTools within KP HealthConnect are a key mechanism for making that happen. ❖

- ^a Standardized text templates that streamline documentation by presenting prewritten elements of patient care notes. They can also include patient care instructions, care protocols, or other text-based information.
- ^b Predetermined lists of symptoms, physical findings, pertinent patient history, and the like. They can also appear within SmartText as options for individualizing patient care notes.

Walk Into The Future

You need people who can walk their companies into the future rather than back them into the future.

— Warren G Bennis, b 1925, Professor of Business Administration and author of books on leadership

A Universe at Your Fingertips: The Clinical Library and KP HealthConnect

By Brad Hochhalter
Tom Stibolt, MD
Aaron Snyder, MD
David Levy, MD
Robert H Dolin, MD

Imagine you're in the middle of a Kaiser Permanente (KP) clinic visit and wondering if there's any evidence for using aspirin in members with heart failure. Or when you next need to see the person for whom you're prescribing an antidepressant medication. Or how long your patient with diabetes needs to be NPO before a colonoscopy.

What Do You Do?

Here's a likely scenario—before the implementation of KP HealthConnect. You instantly decide how important your question is. You only have time to pursue critical information, because three more patients are waiting to be seen. So the question about aspirin gets sidelined; you'll look it up later. You guess that six weeks is about the right interval for a return visit. But you have to know how to help your patient adjust insulin, so you leave the exam room and make a quick call to the GI lab.

Thanks to Web-based resources provided by KP's National Clinical Library (<http://cl.kp.org>), KP HealthConnect can provide the answers to these questions—and an infinite number of others—almost instantaneously. In the exam room with your patient, you run a quick Google™ search of the site and find no evidence to support adding aspirin for your patient with heart fail-

ure. You click on a hyperlink within the visit page to go directly to the section of the depression clinical practice guideline pertaining to follow-up, then ask your patient to return in a month. You click on a link to your personal home page, MyEpic, and find links to departmental home pages. Two more clicks take you to the prep instructions for colonoscopy.

The Clinical Library (CL) makes sure that all the information clinicians need is only a click or two away. From a single user interface, KP care providers can deliver and document care and quickly find reliable, up-to-date medical knowledge.

Portal to Resources

The KP CL, sponsored by the Care Management Institute (CMI) and the Regional Permanente Medical Groups, is a clinical knowledge Web portal and the Web-based reference library in the KP HealthConnect environment. Formerly named Permanente Knowledge Connection (PKC), CL has long been the reference library resource link for KP clinicians. In keeping with the CMI mission of “making the right thing easy to do,” CL/PKC houses a rapidly expanding base of clinical knowledge that is available to KP clinicians, researchers, and employees KP Programwide. The new name

reflects a merger between PKC and online clinical libraries in KP Northern California (KPNC) and KP Northwest (KPNW) and a nod to regional constituencies that both use and fund centralized CL resources.

Long before KP HealthConnect was identified as the electronic health record vendor, CMI staff ensured that the CL would be compatible with whatever application eventually supported patient care documentation. Instead of embarking on a plan to embed CL resources into KP HealthConnect, planners pursued a portal strategy. While a Web site has static pages that are designed and posted, a portal links users to other sites as well as having content directly on the site. The CL functions as the gateway between KP HealthConnect and an expanding universe of medical knowledge.

It's a largely invisible gateway though. Unlike previous versions of PKC, no log-in is required except for online continuing medical education. The CL provides a seamless interface between the processes of caring for KP members and finding rapid, precise, and reliable medical knowledge.

That knowledge is in the form of KP-created clinical content like national, CMI-sponsored clinical practice guidelines, content from the KPNC, KP Southern California,

The Clinical Library functions as the gateway between KP HealthConnect and an expanding universe of medical knowledge.

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and KPNW regional clinical libraries, and other internal content. The CL also provides third-party resources such as more than 1200 full text journals and 180 textbooks, OVID, and a secure link to Clin-eguide, a proprietary subsidiary of Wolters Kluwer Health with evidence-based and consensus guidelines for 300 conditions that are tailored specifically to Permanente Medicine. Ultimately, the Clin-eguide content alone will bring 84,000 pages of KP-modified documentation to clinicians.

In terms of cancer care alone, for instance, clinicians can access CMI-generated tools like an oncology resources page with links to internal and external sites and content resources. There are guidelines; member education resources; and reference links to textbooks, data-

bases, and all noteworthy national organizations—all focused on oncology and hematology care.

The CL functions as a database that links to all these data sources. Each source document is categorized along criteria such as keywords, approving body, clinical category, intended audience, type of document, and so forth. Whereas Google™ returns results ranked by relevance, the CL search functionalities can return results sorted by any of these criteria in combination. One particularly useful search process pulls up documents by type. For example, a clinician could quickly find diabetes-related documents that are patient education tools.

Personalizable

KP HealthConnect includes a page called MyEpic within the visit navigator. MyEpic is like a personal

home page from which clinicians can link directly to the Web-based information and services most important to them. Access to the CL will appear here, and in hyperlinks throughout the KP HealthConnect environment.

CL is rendered as one of eight regional and a single national version, depending on the physical location from which clinicians access it. All sites have the same look and feel, but each Region decides what to put on their version of the MyEpic home page. For example, the KPNW CL site emphasizes protocols and provides call lists to serve up the kind of operational information clinicians need (see sidebar). With MyEpic, individual clinicians can further customize their Web access by adding links to clinical practice guidelines, OVID, or any other Web-based resource.

What Kind of Information Do Clinicians Really Need?

Early on, the CL Advisory Board asked a fundamental question. *What kind of information do clinicians need?* A CMI-sponsored study examining the information-seeking behavior of KP clinicians provided insight. Researchers found that clinicians sought four general kinds of information, as depicted below.

	Patient-specific	Nonpatient-specific
Medical	Patient medical record	Medical science
Nonmedical	Social/demographic	Operational

- Patient Medical Record—Medical questions about the individual patient in a clinical visit
- Social—Nonmedical questions about a specific patient
- Medical Science—Clinical questions of a general nature. This is the domain of most decision-support systems. Most previous studies of clinical questions have been limited to this question type.
- Operational—General nonmedical questions that often have to do with workflow issues.

KP HealthConnect will provide patient-specific medical information key to any clinical encounter. How important to clinicians are the other types of information?

Operational information about topics like how to refer a patient for a particular service, which physicians are on call, and what services are covered is the most frequent type of query for clinicians. This finding helped identify priorities for the MyEpic page of KP HealthConnect.

Social information is also quite important, allowing clinicians to ascertain whether they've seen a particular member before, to plan care that's appropriate to the context of the member's life, and to build effective relationships.

When medical science information was sought, it was important to clinicians that the process reliably yielded meaningful results. To that end, the CL assembles top-of-the-line medical resources and makes them optimally accessible to clinicians through hyperlinks embedded in KP HealthConnect and familiar search tools like Google™.

Special Feature

SOPHISTICATION

Interoperability

Simultaneous computer applications typically run in parallel fashion; you can't work on a PowerPoint presentation, for instance, from within a Word document.

Interoperability is the opposite of parallel operation, and maximizing interoperability between KP HealthConnect and the CL is the ultimate goal. Users can already run Web-based searches from within the KP HealthConnect environment, and much work has gone into making that happen.

For a start, the two programs have a vocabulary that allows them to "talk" to each other with precision. Convergent Medical Terminology (CMT) is the lingua franca between KP HealthConnect and the CL. CMT is the result of nearly a decade of work within KP that began as an effort to create a terminology database to serve the needs of KP Colorado's clinical information system. Leaders in that effort embarked on a collaboration with the developers of SNOMED (Systematized Nomenclature of Medicine) to enhance its usefulness for KP, so CMT and SNOMED developed as closely related systems. Years later, SNOMED CT emerged as

the lexicon of choice for electronic health records and resources.

This base of common terminology forms the foundation for more complete interoperability between KP HealthConnect and the CL, which, in turn, offers considerable potential for streamlining high-quality patient care.

The Future of the Clinical Library

Active clinical guidelines are an interoperability function looming in the not-too-distant future. Here's how they might work: A clinician, working in KP HealthConnect while seeing a patient with diabetes, enters SmartText pertaining to the patient's cardiovascular status. An icon labeled "evidence-based guideline" pops up. The patient clicks on it and goes directly to the portion of the diabetes clinical guideline addressing the role of aspirin, lisinopril, and lovastatin in preventing adverse cardiovascular events.

Referring to the guideline for statin use, s/he decides it's indicated for the patient and clicks on the suggested medication and dose. This information appears in the patient's record as a pending order. The cli-

nician signs off on it, and a prescription is generated in the pharmacy two floors down.

Still working in the patient's record, s/he initiates a patient-specific CL query built automatically by KP HealthConnect, selecting patient education tools as "document type" from a pull-down menu. S/he finds a handout that covers starting statins and prints it out for the patient.

Building the interoperability to enable this scenario takes imagination, time, and clinical and information technology expertise, but this kind of workflow-integrated knowledge resource is the ultimate goal of the CL.

Initially, users may feel hard-pressed to use even the Web portal functions available when KP HealthConnect goes live. Their priorities will necessarily be on mastering key tasks: accessing the patient record, charting care and entering orders, diagnoses, and level of service. As their comfort with KP HealthConnect grows, though, they'll find more use for the knowledge efficiencies built in. And, as user sophistication increases, so will the sophistication of interoperability between KP HealthConnect and the CL. ❖

A Moment

There's a moment coming. It's not here yet.

It's still on the way.

It's in the future. It hasn't arrived.

Here it comes. Here it is ...!

It's gone.

— George Carlin, b 1937, comedian

KP HealthConnect as a Transformational Tool

By Allan Weiland, MD

A Vision of Better Health Care Enabled by Information Technology

Telemedicine applications are commonplace. Specialists use videoconferencing and telesensing methods to interview and even to examine patients who may be hundreds of miles away. Computer-aided surgery with Internet-based video is used to demonstrate surgical procedures to others. Powerful high-end systems provide expert advice based on sophisticated analysis of huge amounts of medical information. Patients are empowered in making decisions about their own care through new models of interaction with their physicians and ever-increasing access to biomedical information via digital medical libraries and the Internet. New communications and monitoring technologies support treatment of patients comfortably from their own homes.¹

We are early into the information age of health care, and Kaiser Permanente (KP) is investing large sums of money and effort to implement KP HealthConnect to lead American health care into this new age. Since the late 1950s and early 1960s, when Permanente pioneer Morris Collen, MD, developed his computerized medical record prototype, we have been trailblazers in the use of just about every type of clinical information technology to improve medical practice (see Debley article, page 32).²

Introduction

In this article, I call on work done by the Blue Sky Vision group for the KP Care Delivery Portfolio, the KP research community and many others, to paint a picture of how clinical practice could be transformed through the use of these technological tools over the next few years. Technology has the potential to change health care drastically by increasing access to patient and medical information, by increasing efficiency and timeliness of care, by simplifying complex tasks, by reducing medical errors, and by facilitating the tracking of outcomes and development of outcomes-based research.³

Imagine the health care system of the future. Every encounter is “paperless” from the

reception desk to the exam room, laboratory, and pharmacy. All data are electronic, and most data enter the system automatically. A larger system, or data warehouse, stores the data and generates reports about patients and populations (across conditions and over time) as well as longitudinal studies of diseases and treatment patterns. Communication is seamless, with orders and test results transmitted almost instantaneously across departments and with real-time sharing of information among clinicians, no matter their physical location. Clinical encounters aren't confined to the clinic—they meet patients' varying needs, including “virtual” visits with clinicians and home-based monitoring of chronic conditions.

As attributed to William Gibson, a science fiction author, “The future is already here, it's just not evenly distributed yet.” Much of what I described above is happening right now in many KP regions and elsewhere.

Assumptions

In order to describe potential transformations achieved through KP HealthConnect, first we need to make some assumptions about the delivery of health care in the future. These are extensions of current trends, with no major discontinuities.

Assumption 1: Health care information continues to grow at an exponential rate and is widely accessible via the Internet.

This is a safe bet and recognizes current growth trends of health care information plus the increasing amount of knowledge spinning off from the Human Genome Project. Not only is the rate of knowledge creation increasing but also accessibility of knowledge to consumers, primarily through the Internet and World Wide Web. In several markets, at least 70% of KP members have computer access, and the number of “hits” on health-related Web sites is now well over 100 million annually.

The amount of medical knowledge available to clinicians is also increasing dramatically. On top of newsletters, updates from specialty societies, and online information, about 1500 medical articles are published each day.⁴ In this age of medical malpractice, physicians are expected to keep current on best practices, yet the amount of medical knowledge that we have gained in the last 20 years surpasses humankind's total prior understanding of medicine.³

Assumption 2: Point of care (home-based) testing and therapeutic interventions will grow rapidly.

Multiple home monitoring systems are currently available, all linked to information networks, including “smart houses” that monitor physiologic functions and “smart toilets” with diagnostic capabilities. Remote cardiac and uterine contraction monitoring have been available for years, and other types of monitoring are possible. NASA, for example, conducts remote physiologic testing on its astronauts in space, monitoring an enormous amount of information. Additional home-based interactive capabilities are being de-

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Special Feature

TRANSFORMATION

veloped all the time and will shift much of our office-based care to the home setting.

Assumption 3: Many specialized technologies will be “global,” bridging both time and space.

Electronic transfer of information now makes it possible to read imaging studies in other locations, regardless of where the image was generated. Robotics, miniaturization of cameras into swallowable or implantable sizes, and nanotechnology will all allow remote diagnostic and therapeutic care interactions. We will move information, not people. Individual experts can be housed anywhere and connected everywhere to support specific technologies. We are already using remote radiologic-imaging reading services in a number of regions.

Assumption 4: KP will have successfully implemented the entire suite of HealthConnect products across the whole program.

HealthConnect will unify existing and new technologies across all KP regions and will do more than just digitize current information. Although it includes a unified electronic medical record for each patient, which spans the spectrum of care and can be immediately accessible, HealthConnect is more than that. It will be supported by robust data warehousing, allowing aggregation of information by episode of care, diagnosis, treatment, complication, cost, frequency, and individual. The inpatient and outpatient clinical decision support and other functions enabled by HealthConnect will create synergies that move clinical care into a new realm.

Transformations

Assuming the above, one can imagine major transformations over the next few years in the nature of clinical interactions at KP: interactions between clinicians, members, and the organization as a whole, clinician-clinician interaction, and clinician-patient interaction.

Organization-Member Interaction

Member interactions with the organization will be much closer to seamless. Billing, sched-

uling, prescription refills, and benefit information will all be accessible online at www.kp.org. Each new member will be enrolled in a primary care panel and take a health risk assessment that allows us to tailor services to add value to their care. All members will be automatically enrolled in chronic disease registries, health education classes, and medication counseling sessions, as appropriate. In the not-to-distant future, members will have interactive audio-visual capabilities in their home, through which they can access a variety of KP services.

KP will be considered a reliable source of information about care, and the existence of the technology itself will give members confidence in the care they receive. We will provide members with training on accessing and interacting with their medical records, libraries of medical knowledge, and clinical guidelines for all health conditions. Use of current information sources, such as the HealthWise handbook, will be much expanded and enhanced by interactive triaging of questions to the appropriate KP resource. We will use technology to enhance communication with members about how we can provide assistance in acute situations or with chronic illnesses, and what resources are available to optimize health. Interactions with KP will be supported with a robust technologically enhanced system that helps members more easily navigate the complexities of care.

Organization-Clinician Interaction

The interaction between KP and clinicians will be transformed to better support provision of care in the “information age.” The growing body of medical knowledge adds complexity, which can be simplified using technology. KP will provide tools that integrate the most up-to-date and relevant practice data, drug information, patient history, clinical guidelines, and screening recommendations into electronic reminders and prompts, enabling clinicians to provide informed and specific care. When a patient has a specific question about their health, clinicians will be able to draw from a database of aggregate experience to provide the evidence for a recommendation. For instance: “In your specific circumstance, with your genetic

makeup, this is the probability of a future problem, and these therapies are consistent with being effective for you.”

KP will create new models for organizing the daily work of all KP employees, as technology changes the way care is delivered. Support staff may be trained to manage information flow, more and more triage will occur electronically, and many needs will be met remotely. Instead of call centers, KP may have “information centers” or “electronic patient care centers” that can match the type of issue to the appropriate resource, no matter where in the system it happens to be.

Clinicians will also be supported by the further automation of many care processes. Laboratories can do “cascades” of diagnostic testing, using guidelines and algorithms established from our enormous data capture and analysis. Instead of ordering one test and waiting for the result, the lab could automatically do all subsequent tests based on the results of the first one, until the full complement of testing is done to get to the diagnosis on the first specimen. This specific and membership-wide data will also tie into care protocols that enhance clinician decision-making.

Clinician-Patient Interaction

The basis for creating value in the health care interaction between clinicians and patients is the transfer of knowledge, in a form that is customized to the needs of the patient. The majority of health care decisions are made by individuals, in their homes, with the advice of trusted others, not in our traditional doctor/office milieu. These technologies will enable us to use what tools we have available to bring the best evidence of effectiveness and cost-effectiveness to our patients in the “teachable moment,” when a problem arises and a decision needs to be made.

Interactions will be more flexible and continuous and less beholden to geographic barriers. As the availability and use of clinical information expands, clinicians will interact more robustly with members’ health care decision making that occurs on a 24/7 basis. Nonprocedural interactions will move beyond the exam room, since many types of lab testing and physiologic monitoring will be done

at home, and KP members will be communicating with clinicians online. Patients in nonmetropolitan areas will have greater ability to interact with their providers, and some surgeries will even be performed remotely.⁵

Clinical decisions will be more transparent to members, and navigation through the system can occur efficiently. The electronic health record will be an interactive tool to be accessed along with the member. It will provide in-the-moment information about continuity of care (particularly for chronic conditions) and will incorporate the best available evidence relevant to that member's needs. Further procedures and testing can be scheduled before the patient leaves the exam room, and results of previous tests can be called up and discussed. Medications can be prescribed and transmitted to the pharmacy online, mitigating medication errors and eliciting conversations about possible allergies or contraindications.

Clinician-Clinician Interactions

This area is likely to change dramatically over the next few years. The capability of having a small group of highly specialized consultants available to all KP clinicians, no matter what region, will be very helpful—particularly in the field of genetics and in other areas where there is likely to be a supply shortage. Today, in the Northwest Region we have electronic chart consults, so patients don't have to physically go to the consultant's office. In the future, we could have videoconferences to coordinate patient care, convened by the primary care clinician and involving multiple caregivers, potentially in distant geographic areas. Health care teams will be both physical (at the care site) and virtual (across the care system). No matter where in the system a member receives care, his/her "care team" will have simultaneous access to his/her medical information, and when the team needs to confer about his/her care, they will be looking at the same updated information.⁶

The wide availability of clinical information systems, linked seamlessly together, will have an enormous impact on the ability to provide high quality, culturally sensitive, cost-effective health care.

Our ability to rapidly assess new technologies and disseminate the results will be enhanced by common information platforms. Optimizing the use of these tools will take a concerted effort to create common definitions of terms, agreement about how information will be formatted and displayed, and rules about how we decide what constitutes good evidence. Work is going on in all of these areas but requires a mindset shift from locally autonomous decision making to "community standard." The KP community becomes all of us, leveraging the capabilities and values of our group practice model to lead the next revolution in health care.

Conclusion

The wide availability of clinical information systems, linked seamlessly together, will have an enormous impact on the ability to provide high quality, culturally sensitive, cost-effective health care. While the locus of much of the care will shift toward the home; there will be process improvements across the entire continuum of care.

Will KP be able to compete and differentiate itself in this world? We are uniquely qualified to succeed. Our clinicians, working in and supported by our systems, can be world-class information managers and knowledge-transferers. As a national group of Permanente staff, we can leverage our size and our approach to Permanente Medicine to provide value seamlessly. KP is committed to preventive care and chronic care management, both of which are greatly supported by HealthConnect. It will be very difficult for other, nonintegrated systems of health care to have the same types of information available at their fingertips.

These changes will be more evolutionary than revolutionary, because they all exist now. Our challenge will be to identify those technologies with the most potential, to incorporate them into practice, and to disseminate them quickly. What a challenge! What an opportunity! ❖

Acknowledgment

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"Mélange"

oil on canvas

By Jeffrey Brown, MD

More of Dr Brown's art can be found on page 18.

Permanente Physicians in the Combat Zone

As we have read in past issues of *The Permanente Journal*, Permanente clinicians have an extensive record of giving time back to their community. It is always interesting to hear how members of the Permanente family spend their time when not providing care in KP offices. The following are stories of two such physicians who have served their country in Iraq and Afghanistan. These Permanente physicians have agreed to share with our readers their experiences in these combat areas.

The first commentary is from John Murray, MD, the acting Chief of Emergency Services with the Hawaii Permanente Medical Group.

Dr Murray served with a US Marine Corp surgical unit in Kuwait and in the town of An Najaf in Central Iraq. The second is from William Goldsmith, MD, a four-year per diem psychiatrist who was stationed in a flight medicine clinic in Uzbekistan and flew combat support flights to Afghanistan.

On behalf of our readers, I want to thank you both for your service to our country. We know this experience has had to be incredibly difficult for you and your family. Many thanks!

— Lee Jacobs, MD, Section Editor

John Murray, MD—Operation Iraqi Freedom

By John Murray, MD

Permanente History

I am currently acting Chief of Emergency Services at Kaiser Permanente in Hawaii. Residency trained and board certified in Emergency Medicine, I have worked for the Hawaii Permanente Medical Group (HPMG) full time since September 1998. My wife Cindy and I have been married since 1997. She is a nurse and recently graduated with her degree in Culinary Arts.

Military Background

Being activated and deployed to Operation Iraqi Freedom was my first active duty experience.

In early 1997, I affiliated with the Navy Reserves while living in Pittsburgh, PA. I quickly found my way to a unit that provided medical support to the Marine Corps. The Marines receive their medical support from a specific subsection of Navy medical providers. Emergency Medicine physicians are sought as assets for this type of unit, so the arrangement has worked out well.

Upon relocating, I began to perform my required drill periods with the Fourth Force

Reconnaissance Company Marine Reserve Unit in Hawaii. With the onset of Operation Iraqi Freedom, the entire Fourth Medical Battalion, my parent command, was activated, and most of us were deployed overseas.

Assignment

Initially we were deployed to northern Kuwait, where we manned Surgical Company “E,” set up in the desert at Camp Coyote. After about six weeks in this location, a subset of us was moved north into Iraq. I spent about four months in Iraq attached to the 1st Battalion/ 7th Marine Regiment, mostly in and around the town of An Najaf in Central Iraq, among the holiest of sites for the Shi’a branch of the Muslim faith. This area was rarely highlighted on the news during most of my stay because it was fairly well controlled, though lately it has received a great deal of coverage as the epicenter of some of the most recent unrest.



LCDR Murray (center) discusses arriving patients with other physicians.

Professional Experience

Initially I went into Kuwait as Officer in Charge (OIC) of an 80-person Advanced Party element of the activated reservists. By the time the war started, I was involved in sending replacement medical providers north into Iraq as well as planning the integration of our arriving personnel into the medical assets already in theater.

After the remainder of our battalion arrived, I moved back into a strictly clinical

role. In the current model of operation, emergency physicians are utilized in one of two roles. One is in the Surgical Company Hospital Receiving Area, serving a function much like the emergency department of a typical hospital. The other role is in a smaller, more mobile unit called a Shock Trauma Platoon (STP), designed to bring more advanced medical capability out to the Marines in the field.

I served most of my initial month and a half working in the Surgical Company's "ER." Here we saw a mixture of traumatic injury (some weapons-related and an unfortunate number of accidents) and medical illnesses. The Surgical Company, although tent-based, contained a fairly high level of care, including digital x-ray, laboratory, operating "rooms," and bed space for about 180 patients. We mixed continued training for mass casualty care and more austere field operation with working in this clinical setting.

After about six to eight weeks, I was placed into Iraq as OIC for one of the Shock Trauma Platoons that was located with the 1/7 Marines in Najaf. Our group consisted of one ED physician (me), one PA, one ER nurse, and several corpsmen. In addition to providing care, we took part in attempts to assess and rehabilitate the local health care system. Assessments of local hospitals and clinics, teaching to local ambulance crews and hospital personnel, consultation and, at times, direct care of ill or injured Iraqi nationals and some assessment of local water and sewage systems took place.

Interaction with the local community was among the most challenging and rewarding of the tasks we undertook. Surprising to me was the fact that all of the physicians spoke English, having had their medical training in English within Iraq. The knowledge base was good, but the care was often hampered by a lack of supplies and equipment.

Interaction with the local community was among the most challenging and rewarding of the tasks we undertook.

On one notable occasion, our interaction with the local health care system was more direct. Just prior to one of our expected rotation dates (there were a few that came and went without us leaving), a louder than usual explosion from the center of town jarred our afternoon. The assassination car bombing of one of the most influential Shi'a clerics at the Ali Shrine in Najaf brought with it a mass casualty incident involving Iraqi nationals. After security was assured, we had a chance to go into the major hospital in Najaf and offer some assistance. We had an opportunity to work in the local health care system during a most stressful time. In reflection, it was interesting that except for the fact that most of the people in the crowd gathered at the hospital held AK-47's, the basic chal-

lenges of such a disaster scenario did not differ that much from what we practice and drill for here within KP.

Personal Observations—Were Our News Reports Accurate?

Although my personal experience is now a bit dated, my observations did not match well with the predominant stories we were able to see on the news.

Overall at that time, I found the vast majority of Iraqis in the area we frequented to be friendly and happy to see the US presence. My view may be skewed because I was mostly in the Shi'a-dominated section of Iraq, an area that had been persecuted by Saddam's regime. Although at times frustrated by a lack of rapid progress toward what they expected to be the "spoils" of liberation, most were friendly. When we were poised to leave and turn over control to some of the other nations in the coalition, many were reluctant to see us and the security they felt in our presence go away.

The news media that we were eventually able to view at that time tended to empha-

size the areas with sensational and negative happenings. Not much was seen of areas where some progress and relative calm were the norm. We did not see much of our area in the press except when bad things happened there.

Again, one notable occasion was in the somewhat tense days after the above assassination when the news media came to town in force. While sitting in our command center and able to watch some media coverage, we would hear of bad things we knew were not truly happening. At one point, they were so convincing that I actually had to go out to check for myself to verify which account was correct. Fortunately, my impression was accurate, but those watching television at home (including my wife) had no idea that was true.

Most Difficult Moment

Leaving my wife at the Honolulu Airport for the initial flight to California was the hardest part.

Thoughts on How This Experience Changed Me

This is a tougher question! The day-to-day hassles of traffic or other minor inconveniences no longer drive me as crazy. Most important, the time I get to spend with my wife, friends, and family are seen as more special.

Although these realizations are real and important, I have found that even after just a few months back home, I have started to forget "lessons." Part of returning to everyday life seemed to be putting the specific memories of my "vacation" in a "box" to be opened and examined at times. Although this may be healthy, it has the negative effect of not allowing me to apply the good lessons I've learned. Despite my experiences in Iraq, sometimes I still find myself saying, "Boy it's hot today," when it's only 90° instead of 126°!

William Goldsmith, MD—Uzbekistan

By William Goldsmith, MD

Permanente History

I have been with Kaiser Permanente (KP) for about four years as a per diem psychiatrist. I have worked primarily in Lancaster, CA, for a while at Sherman Terrace, and did some Urgent Care at Panorama City. I am married, have two sons, two dogs, and one cat. I'm 65.

Military Background

I am a Lieutenant Colonel, Senior Flight Surgeon, 146th Medical Squadron California Air National Guard, and a veteran of the Vietnam and Gulf Wars.

Assignment

I was stationed for about six weeks in Uzbekistan at Karshi-Khanabad, a former Russian airbase now used by the Uzbek Air Force and the US. It is austere, with gravel roads and a tent city, with some permanent buildings and several more on the way. Kellogg, Brown, and Root, a Halliburton Company, runs the physical plant, water, power, mess and construction and does an excellent job. The food was great: on Saturday nights, it was steak or crablegs. The tents have air conditioning. There are hot water showers and some flush toilets.



A C-130—Stay on the Runway—Danger—Mines.

Professional Experience

I practiced in a flight medicine clinic at Karshi-Khanabad, seeing mainly minor medical problems related to the dusty environment and many orthopedic injuries from the rocky terrain and sports, especially soccer. My only suture job was the result of a soccer injury. The hospital patients were managed in an Army MASH next door. A case of Henoch-Schönlein purpura was evacuated to Germany. I alternated the clinic time with flying about 18 combat and combat support missions to Afghanistan, Kyrgyzstan, and Pakistan on C-130 aircraft. There was little medical work on missions; I went mainly for experience. Flight surgeons are required to fly regularly to be aware of crew duties and stresses and thus are better able to determine if a crew member is fit to fly.

Personal Observations—Were our News Reports Accurate?

Morale was excellent. In my opinion, we should establish permanent bases in Iraq, Afghanistan, Uzbekistan, Pakistan, and Saudi Arabia to protect the US and not involve ourselves with the locals except as it relates to the safety and interests of our country. Seven



My crew position.

California National Guard members have died in this war, so far, of 175 Guard and Reserve dead nationwide.

Most Difficult Moment

Leaving Uzbekistan. There was nowhere I would rather have been. I had this epiphany on the flight deck of a C-130 over Afghanistan.

Thoughts on How This Experience Changed Me

I'm glad I went and wish I could have done more.

Contrast Your Over-There Experiences in the Different Conflicts

This war, as was Vietnam, is frustrating with no clear victory in sight. Desert Storm was an incomplete victory, which paved the way for the sequel. I hate the cruel, ignorant, mindless enemy, though oddly we're not supposed to say so in this politically correct era. I hope I was of some help to our personnel and our country. I'd go again. ❖

■ permanente in the news

A compilation of news, significant awards, and accomplishments about Permanente clinicians and employees and the Permanente Medical Groups.

KP News Roundup

KP Clinicians 'Star' in Thrive TV Ad

The Thrive advertising campaign kicked off August 2 in all Kaiser Permanente (KP) regions, except for Hawaii, where it will debut this winter. There are four TV ads: "Winner," "We Stand for Health" (also known as the "Broccoli Credo"), "Another Day," and the Spanish language ad, "Viva Bien." One of the television ads, "Another Day," features a fictitious Health Plan member surrounded by his KP entourage of providers. Featured in the commercial are clinicians from KP's Northern California, Colorado, and Ohio regions. **Debbie Murphy, OD**, an optometrist at KP's Arapahoe Medical Offices in the Colorado Region, is seen handing the member a pair of glasses; **Alan Kroll, MSPT**, physical therapist at the Westminster Medical Offices in the Colorado Region, is massaging the member's shoulders as he drives home from work; **Dana Weisshaar, MD**, a heart failure and transplant cardiologist at KP's Santa Teresa Medical Center in Northern California, is checking the Health Plan member's blood pressure; the guy with the stethoscope is **Thomas Connolly, MD**, an internist at KP's Park Shadelands Medical Center in Northern California; **Melena Perdomo, RD**, a registered dietician at the Skyline Medical Offices Clinica de la Familia, KP Colorado, is replacing the member's "bad-carb" meal with healthier choices; and standing outside the bedroom door is **Eddie Wills Jr, MD**, pediatrician and Assistant Medical Director, Professional Development and Support Services, Ohio Region. (You may recognize Dr Wills from a previous ad campaign as the pediatrician signing the cast on the boy's arm.)

KP HealthConnect Gets a Hearing in the Halls of Congress



Andrew M Wiesenthal, MD, Associate Executive Director, The Permanente Federation, provided testimony on the benefits of KP HealthConnect to the Subcommittee on Health of the House Committee on Ways and Means this past summer. The subcommittee has been investigating the need to develop an electronic medical record standard for the nation's various health care systems.

"Having the complete medical record available makes it possible for physicians to be aware immediately of comorbidities, past visits, and patient concerns, as well as recommendations the patient has received from other clinicians," Dr Wiesenthal told the subcommittee members. "In addition, test results will be immediately available electronically. This means clinicians will always be able to work with the most current information and provide the best service possible."

In his remarks, Dr Wiesenthal called on subcommittee members to urge Congress to mitigate the risk of obsolete systems by creating a set of standards for the adoption of electronic medical record systems. He also called for the federal government to provide financial means and incentives to invest in electronic medical systems by increasing Medicare and Medicaid payments to providers.

Former TPMG Physician Leader Morris Collen, MD, Receives Honorary Doctor of Science

Morris Collen, MD, a founding partner in The Permanente Medical Group, recently received an honorary Doctor of Science degree from the University of Victoria, Victoria, BC, Canada. Dr Collen received the degree "in recognition of devotion in the service of others and of contribution to the advancement of knowledge."



At the awards ceremony, Dr Collen was described as a "rare combination of scientist, humanist, politician, and family man" and was also honored for his role as one of the early pioneers of medical informatics. It was noted that Dr Collen's early training and degree in electrical engineering gave him the insight to recognize that the computer would be a revolutionary new tool of medicine. In fact, Dr Collen predicted that "the computer will probably have the greatest impact on medical science since the invention of the microscope."

By Barbara Caruso, BA



Barbara Caruso, BA, is a Communications Consultant for The Permanente Federation. E-mail: barbara.caruso@kp.org.

Dr Collen joined KP in 1942 as Chief of Medicine at the Oakland Medical Center and worked closely with Sidney Garfield, MD, and Cecil Cutting, MD. He was also the first director of KP's Division of Research. Despite the cumbersome technology in the 1950s and 1960s, Dr Collen used computers to track his members' health status, screening more than a million patients, sick and healthy, which provided the foundation of hospital information systems.

In 1993, the American Medical Informatics Association and the American College of Medical Informatics established the Morris F Collen Award, which is presented to individuals whose personal commitment and dedication have made a lasting impression on the field of medical informatics and whose work best exemplifies the teachings and practices of Dr Collen, who was the award's first recipient. He retired from TPMG in 1983. Over his 60-year career as a physician and educator, Dr Collen has become respected worldwide for his work in the field of medical informatics, his ability as a physician, and his link to the very beginnings of KP. The research and projects Dr Collen completed throughout his career can also be seen as early recognition of the need for automated medical records and modern clinical information systems, such as KP HealthConnect.

Colorado Permanente Medical Group (CPMG)

Colorado Physicians Named "Denver's Top Docs"

Seven CPMG physicians were named "Denver's Top Docs" by the Denver magazine *5280*. The physicians are: **Royal Gerow, MD, Nora Morgenstern, MD, Sally Berga, MD, William Warmath, MD, William Bentley, MD, Chris Lang, MD, and Allan Graham, MD.**

Mid-Atlantic Permanente Medical Group (MAPMG)

KP Mid-Atlantic States Achieves NCQA's Highest Rating

The National Committee for Quality Assurance has awarded its highest accreditation status of "Excellent" to the Mid-Atlantic States Region for its commercial and Medicare products.

The region now joins all of the other KP regions in achieving "Excellent" accreditation status in those categories. When it was previously surveyed in 2001, the region was awarded the next highest accreditation status of "Commendable."

NCQA is an independent, nonprofit organization dedi-

cated to measuring the quality of America's health care. Its "Excellent" accreditation status is granted only to health plans that meet or exceed NCQA's rigorous requirements for consumer protection and quality improvement and whose HEDIS (Health Plan Employer Data Information Set) results are in the highest range of national performance.

The Permanente Medical Group (TPMG)

National Recognition for KP Medical Research

The lead article in the June 3, 2004 issue of *The New England Journal of Medicine (NEJM)* is a study entitled "Bevacizumab plus Irinotecan, Fluorouracil, and Leucovorin for Metastatic Colorectal Cancer." The second author of the study was **Lou Fehrenbacher, MD**, head of the Oncology Clinic research trials.

The study indicates that, in combination with chemotherapy, use of bevacizumab has shown promising results in treating patients with metastatic colorectal cancer.

Northern California Nursing Research Awards

The recipients of the 2004 Northern California Nursing Research Awards were announced, with the following honorees: Staff Nurse Award: **Chris Kowlaski**, Hayward, for her dedication and commitment to research through involvement in the nursing research committee and promoting research at her facility; Manager Award: **Deborah Zachau**, Hayward, for her support and leadership in moving projects beyond the "idea" stage into reality; and Research Award: **Carol Evans**, Walnut Creek, for her research study titled, "Effect of Megestrol Acetate on the Control of Weight Loss in the Nursing Home Patient who has not Responded to Nutritional Supplementation."

Assistant Physician-in-Chief Honored by Society of Hospital Medicine

Congratulations to **Diane Craig, MD**, Assistant Physician-in-Chief, Santa Clara, who was honored by the Society of Hospital Medicine, as one of four hospitalists whose work and research have contributed significantly to hospital medicine and to the betterment of hospital care across America.

Division of Research Geneticist to Head New UCSF Center for Human Genetics

Neil Risch, PhD, Adjunct Investigator at the Division of Research, was recently named Director of the



new Center for Human Genetics at University of California San Francisco (UCSF). Dr Risch will also serve as the first Lamond Distinguished Professor in Human Genetics at UCSF.

Dr Risch is recognized internationally for his innovative genetics research on a range of diseases. He collaborates as an adjunct investigator at the Division of Research on population-based genetic epidemiology studies. He is also a professor of genetics, statistics, and health research and policy at Stanford University.

The Center for Human Genetics brings together scientists from a very broad spectrum of human genetic studies—from basic and behavioral researchers to physician scientists, and from psychiatry to cardiovascular research—to identify genes that contribute to human diseases and variation in response to drugs. Pharmacogenomics research, which determines the genetic basis of variation in drug response, will be a strong component of the Center, which is a unique dimension among human genetics programs nationally.

Retired TPMG Physician Wins National Honors

Adjunct Investigator for the Division of Research and former TPMG physician **Jim Allison, MD, FACP**, received the Distinguished Clinician Award of the American Gastroenterological Association (AGA) in a recent ceremony in New Orleans. He is the first KP physician to receive the national honor.

The Distinguished Clinician Awards were established in 1995 to recognize members of the practicing community who, by example, combine the art of medicine with research efforts in service to their patients. Eight awards were given this year, four to clinicians in private practice and four to academic clinicians.

Dr Allison is a former TPMG physician who retired in June 1998 after 24 years of service. He was a full-time gastroenterologist and educator at the Oakland Medical Center, where he devoted the majority of his time to patient care, clinical research, and teaching. He credits his success to his talented and supportive TPMG colleagues and to the wonderful academic atmosphere at the Oakland Medical Center and at KP's Division of Research. Since his retirement from TPMG, he has been a member of the University of California San Francisco faculty, an Adjunct Investigator at the Division of Research, and a consultant to the pharmaceutical and biotechnology industry.

Northwest Permanente (NWP)

NCQA Rates KP Northwest "Excellent"

KP Northwest has once again received "Excellent" accreditation status from the National Committee on Quality Assurance for both its commercial and Medicare lines of business.

Some of the major strengths identified by the NCQA team that reviewed the Northwest Region's performance were:

- Strong top-down leadership and knowledgeable staff
- A high level of integration among all divisions of the organization
- Sophisticated information technology systems
- Active practitioner involvement in the quality improvement program
- Innovative approaches to health care delivery
- An extensive patient safety program

Southern California Permanente Medical Group (SCPMG)

Kudos for Riverside Physician's Innovative CME Program

Doug Tang, MD, Director of Medical Education at the Riverside Medical Center, in working with the Physician Education team, developed an innovative solution to help physicians receive practice updates as part of their Continuing Medical Education (CME). Noting that many physicians worked in outlying clinics and with busy workloads, regular attendance at KP Riverside's lunchtime CME lectures had become a real challenge.

Dr Tang developed Mobile ET, a series of audio CDs featuring interviews with local physician leaders and experts on key topics requested by Riverside physicians. Mobile ET was initially launched in the Family Medicine Department and generated a 100% participation rate and received a 88% "good to very good" satisfaction rate.

Last Spring, the California Medical Association's Institute for Medical Quality awarded its 2004 Samuel R Sherman, MD, Award to KP Riverside for Meritorious Achievement in Continuing Medical Education in the category of Innovative Program Planning. Congratulations to Dr Tang and the entire Physician Education team!

Physicians Honored for Community Service

Three physicians at the Los Angeles Medical Center were recently recognized by LA Metro Medical Director

Tom Godfrey, MD, for their work in the community, providing health care to the uninsured. They are:

- **Ron Rosengart, MD**—On hearing the need of low-income, uninsured children at the Eisner Pediatric and Family Medicine Center in 2001, Dr Rosengart offered to bring these children into the KP system for care. He met with the clinic's Medical Director and set up a system to get the children specialty care appointments at the Los Angeles Medical Center. He acts as the referring physician, and working with one of his nurses, he gets the children KP medical record numbers and specialty appointments. He also does all of the follow-up with the Eisner Clinic physicians.
- **Jimmy Hara, MD**—Dr Hara has been leading residents weekly to both the Venice Family Clinic and the Los Angeles Free Clinic for years, where they have been caring for the poor and uninsured populations of Los Angeles. In addition, Dr Hara treats patients at the Salvation Army medical outreach clinic, has residents going to Clinica Oscar Romero, and also works with the UCLA Mobile Clinic that serves the homeless. Dr Hara averages more than 250 hours every year volunteering.
- **Maureen Spell, MD**—Dr Spell has volunteered her time treating patients at the Hollywood Sunset Free Clinic for 13 years and has served on its board since 1997. In addition to seeing patients, Dr Spell's work on the clinic's board includes fundraising and sharing her clinical expertise on the best delivery of medical care to the medically underserved. Largely due to her influence, the

clinic has expanded its services to include a pediatrics clinic and a women's clinic staffed by volunteer physicians and residents from the Los Angeles Medical Center. KP physicians provide full women's health evaluation, including Pap smear and breast cancer screenings, and also discuss preventive health issues and deal with urgent care issues for female patients.

The Southeast Permanente Medical Group (TSPMG)

TSPMG Director of Continuing Education Given Covey Award

Sandra Gauthier, Director of Continuing Education for TSPMG, was awarded the Franklin Covey 2004 "Award for Excellence in Solution Design" earlier this spring. Recipients of this award are recognized by Franklin Covey for creating transformational change within their company—change that strengthens the company.

Ms Gauthier played a pivotal role in leading a transformation of corporate culture within KP Georgia. Several years ago, she worked hard to become a teacher/facilitator for early Covey programs and offered these programs as part of the CME offerings for TSPMG by the late 1990s. She later brought other Covey programs to TSPMG and Health Plan.

The teachings of these Covey programs have been crucial in enhancing KP Georgia's corporate culture, providing a common language for staff to use in creating self-improvement, and thus, corporate improvement. ❖

Barbara Caruso compiled this material from *California Wire*, *Partner News*, and other PMG newsletters and sources. To submit news of physician or PMG awards and recognitions, contact Ms Caruso at barbara.caruso@kp.org.



"Reflective Moments"
photograph
By Anna Marie Aguiar, PTA

More of Ms Aguiar's art can be found on page 5.

Recollections of Internship

J Richard Gaskill, MD

July 1st, '59, Dallas
Parkland Memorial Hospital
Before copiers and pagers
Concerns about smoking
ICUs and Medicare
Lee Harvey Oswald and JFK.

Segregated wards oppressive
With no air conditioning
All-white medical staff
Nurses' starched uniforms and caps
Page operator's seductive voice
Often disappointing in person.

Dozens of multip deliveries
Work-ups, IVs, and scut
On call every other or 3rd
Sleep deprivation the norm
Call rooms a-whirr with fans
Staff lounge a welcome refuge.

Alphabetic array of disease
On crowded Medicine floors
Ascites, Bacteremia, Cirrhosis
Diabetes, Emphysema, FUOs ...
Sickle cell children on Peds
Anemia, jaundice, and crises.

Variety of problems in the ER
From trauma to rare and weird
Fatal tetanus after abortion
Women with "fallin'-out spells"
Dehydrated infants, barely alive
Sunken fontanelles restored with clay.

Endless flow of surgical admits
Outpatient surgery unknown
Long cases as second assistant
Abdominal retractor in hand
Sunrise sometimes from the OR
Never again after the 30th of June.

J Richard Gaskill, MD, has been a physician with The Permanente Medical Group since 1990. His interests include biking, skiing, hiking, climbing, photography, and travel. E-mail: dick.gaskill@kp.org.

Save the Date!

THE 8TH ANNUAL NEPHROLOGY SYMPOSIUM

July 22 and 23, 2005 at the Grand Californian Hotel in Anaheim, California, at the Disneyland Resort

This is a change from the usual symposium date in May. During 2005 the Disneyland Resort will be celebrating the 50th anniversary of Disneyland. This symposium will be occurring the week after the actual anniversary and we're excited to offer you the opportunity to participate in this very special occasion!

Discount tickets may be purchased through a special Web site Disney has set up for conferences happening at the resort approximately one month prior to the symposium. A Web site address will be provided in the brochure which will be available after the beginning of 2005.

For further information contact Karin Hubbard-Luster at 626-564-5338 or visit the KP Intranet at <http://kpsymposia.kp.org>.

Calling All Artists ...

Join in a medical artistic tradition of seven years

The Permanente Journal is always interested in considering artwork by Kaiser Permanente clinicians and employees.

Submit a sample of your artwork today.

To submit art for consideration for the cover or interior pages of *The Permanente Journal*, please use the following guidelines: Send us a high-quality color photograph of your artwork no smaller than 4"x5" and no larger than 8"x10". Slides and digital images may also be submitted.

Include a cover letter explaining your KP association, art background, medium, and a brief statement about the artwork (description, inspiration, etc).

Send artwork samples to:

Managing Editor, *The Permanente Journal*, 500 NE Multnomah St, Suite 100, Portland, Oregon 97232
E-mail: permanente.journal@kp.org

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Care Management Institute and
The Permanente Journal
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Evidence-Based Medicine Symposium

Friday and Saturday
December 3 and 4, 2004

Hilton Hotel
3050 Bristol Street
Costa Mesa, CA

For further information contact Karin Hubbard-Luster at 626-564-5338 or visit the KP Intranet at <http://kpsymposia.kp.org>.

Completed registration form must be received by November 19, 2004, in order to confirm registration. Space is limited. Registrations will be taken on a first-come, first-serve basis.

*CME sponsored by the
Kaiser Permanente National CME Program*

Primary Care 2004

March 20-25, 2005
The Marriott Wailea
Maui, Hawaii

For registration or program information:
visit www.kpprimarycareconference.org
or call 510-625-6374 • Fax: 510-625-3037
E-mail: primary.care.conference@kp.org

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“Numeric Endings” in Medicine



Created by Kenneth J Berniker, MD

Across

- 1 TB tests
- 5 ___ Wrap
- 10 Took advantage of
- 14 Zygomatic ___
- 15 Flexor ___ ulnaris
- 16 Right away
- 17 Administers a powerful diuretic
- 19 The healing ___
- 20 Give more than recommended, as a dose
- 21 Feeling nice and cozy
- 23 Desirable EKG pattern (abbr)
- 24 TV personality Jay
- 25 ___-square (statistical term)
- 28 Overseas mailing abbreviation
- 31 Port on the Black Sea
- 33 Quarrelsome wife
- 34 Negated the effect of, as a drug
- 37 Trademark inscriptions by Al Hirschfeld
- 39 Singers Nicks and Wonder

- 40 Designations of professors honored in retirement
- 42 Goofed
- 43 Enraged
- 44 Mexico or England preceder
- 45 Mariners' Suzuki
- 48 Before, poetically
- 49 Bullring call
- 50 Film ___
- 51 Org for Shaq (abbr)
- 54 Gold bar
- 56 Brief rest
- 60 Liver feature
- 62 Calcaneus or 2nd cuneiform, for example
- 65 Actor who played The Cowardly Lion
- 66 Semiconductor powerhouse
- 67 ___ Vista
- 68 Is ___ (enjoys a lot)
- 69 Automotive symbol of failure
- 70 Digits

Down

- 1 Attempt to reach, as a consultant
- 2 Grand ___
- 3 695, to Caesar
- 4 Actor Charlie or Martin
- 5 Become hard and fibrotic
- 6 Life-threatening condition in the belly (abbr)
- 7 Reading, B&O, and others (abbr)
- 8 Upper portions of the lungs
- 9 Richard and Pat
- 10 Org for pilots and ground crews (abbr)
- 11 Deadly poison
- 12 Ingest
- 13 Dangerous complication of EtOH abuse (abbr)
- 18 Radical org of the 60s (abbr)
- 22 Indicated the occurrence of pain
- 24 Was in front
- 26 Potential source of CO poisoning in a room
- 27 Confidential, as of knowledge
- 28 Prefix indicating poisonous element
- 29 Stormy ___
- 30 Too heavy
- 32 Hormone that causes cancer in offspring (abbr)
- 35 Christmas or New Year's preceder
- 36 Atop, as a horse
- 38 Anger
- 40 Pinna location
- 41 Doc carrying the beeper (expression including abbr)
- 43 Russian spaceship
- 46 Body louse, especially in kid talk
- 47 ___-run (possible play for 45-Across)
- 52 Dimercaprol, for short
- 53 Taking one's turn to hit (2 words)
- 55 "Fiddling" emperor
- 57 ___ contendere
- 58 Pay to get in the game
- 59 Legumes
- 60 Actor Wallach
- 61 Steely ___
- 63 Ventilator adjustors (abbr)
- 64 Get the picture

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



Kenneth J Berniker, MD, is a board certified emergency physician at the Vallejo Medical Center, and a medical writer and editor. He attended the Massachusetts Institute of Technology and New York Medical College. Dr Berniker has written for audiences including physicians, nurses/allied health professionals, and the public. His interests include bridge, digital photography, and both standard and cryptic crossword puzzles. Please e-mail your comments: kenneth.berniker@kp.org.

Complications: A Surgeon's Notes on an Imperfect Science

By Atul Gawande, MD

Review by KM Tan, MD



New York: Metropolitan Books, 2002. ISBN 0-8050-6319-6, 288 pages. \$24.00

Once in a while, you run across a book that grabs your serious attention for being topical, well written, courageous, and timely. Atul Gawande's *Complications: A Surgeon's Notes on an Imperfect Science* is such a book.

Trained at Stanford and Harvard—with a side trip to Oxford University for a master's degree in ethics and philosophy as a Rhodes Scholar and a stint as a senior health advisor with the Clinton Administration while in medical school—Dr Gawande writes eloquently of both the fallibility and the pleasure of medicine, calling it an “enterprise of constantly changing knowledge, uncertain information, fallible individuals, and at the same time lives on the line.”

Published while Dr Gawande was a senior surgical resident at Boston's Brigham and Women's Hospital, *Complications* consists of a series of vignettes, some of which were published previously in *The New Yorker*. An erudite writer, Gawande's selection of topics accompanied by scientific review and reflection is challenging, thought-provoking, and easily read in one or two sittings.

In “Fallibility,” one of the book's three sections (and to me the most engrossing), Gawande reports and reflects on what we as physicians are all too aware of: the need to “steal learning” from the public as we learn and relearn our trade as trainees, almost always at the expense of John Q Public. In the vignette on “When Doctors Make Mistakes,” Gawande presents an elo-

quent treatise on medical errors (currently the topic du jour at most health care institutions) by reflecting not so much on the limitations of individuals as on the need to attend to and correct systems and processes to avoid constantly repeating mistakes.

In the section on “Mystery,” Gawande relates multiple instances where explanations defy both logic and science and where cultural belief in superstition may play a role. The best discussion here centers on the origins of pain (a discussion well worth visiting and eminently rereadable) and provides examples of intractable nausea and pathologic blushing.

In “Uncertainty,” the complexity of individuals renders medicine an “imperfect science,” even in a perfect world where error is eliminated and science is rock solid.

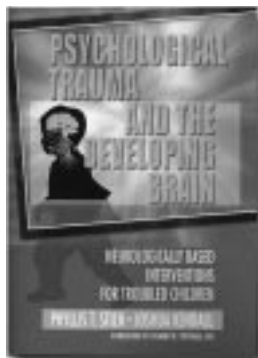
Following in the footsteps of William Carlos Williams, Oliver Sacks, Lewis Thomas, and many other eminent physician-writers, Atul Gawande is a rising star to be reckoned with. Although his stories—each of which centers around an anecdote—are followed by thorough review of the relevant scientific literature, personal reflections, and excursions into the realms of politics, ethics, and philosophy, Gawande remains both an unusually humble surgeon and a lucid, likable storyteller. His first book is a refreshing attempt at humanizing doctors and removing them from their often-unwarranted pedestal. I suggest that you buy the book and spend a few good hours absorbing it—if you have not already done so. ♦

KM Tan, MD, is the Chief of Radiology, San Rafael KP, Northern California. He is a member of the Editorial Team for *TPJ* and has served in multiple state and national positions in CME, including the KP National CME Committee. E-mail: km.tan@kp.org.

The Universal

It is the job of the artist to find the universal in the particular.

— William Carlos Williams, 1883-1963, physician and poet



Binghamton (NY):
Haworth Maltreatment
and Trauma Press; 2003.
270 p. ISBN: 0789017873
(hardcover). \$59.95.
ISBN: 0789017881
(softcover). \$39.95.

Psychological Trauma and the Developing Brain: Neurologically Based Interventions for Troubled Children

By Phyllis T Stien and Joshua C Kendall

Review by Richard J Moldawsky, MD

In the past, psychiatric diagnostic systems divided syndromes into organic (brain-based) and nonorganic (mind-based) syndromes. Conceptualized this way, brain disorders were treated with somatic therapy, and mind disorders were treated with psychotherapy. In recent years, both research and clinical practice support the view that the progress of diagnosis and treatment is slowed by traditional dichotomies—for example, genes vs environment, biology vs psychology, and medication vs psychotherapy.¹ Today's perspective demands that we stop asking, “mind or brain?” and instead acknowledge that mind and brain are inseparable. There is no mind without brain. Treating people with mental illness (indeed, any illness) requires an appreciation of both mind and brain.

Psychological Trauma and the Developing Brain examines posttraumatic stress disorder (PTSD) in children. Defined by presence of an extraordinary stressor and certain emotional and behavioral symptoms, PTSD has been associated with structural and functional effects on the brain. The authors, Phyllis T Stien (a psychiatric nurse and child therapist) and Joshua C Kendall (a freelance journalist) endeavor to “connect the dots” between trauma, brain, emotion, and behavior. The authors posit that optimal treatment must address the neurobiologic as well as the psychologic. This book, which seems to be geared for child psychotherapists, thus encourages a sort of consciousness-raising for that group of professionals trained to think more of mind than of brain. The book will also interest psychiatrists, pediatricians, family practitioners, and parents.

After reviewing elements of brain development and structure (a rewarding challenge for most nonmedical psychotherapists), the authors summarize research on the relations between the hypothalamic-pituitary-adrenal (HPA) axis, neural pathways (ie, between the cortex, thalamus, and limbic system), and the functions of serotonin. The authors explain, for ex-

ample, that chronic or severe stress causes release of corticotropin-releasing factor (CRF) from the hypothalamus. CRF stimulates pituitary release of ACTH, which stimulates release of adrenal cortisol, which then, when produced in excess, impairs the hippocampus. Most readers are familiar with the HPA axis as a mediator of stress; however, that the hippocampus is especially sensitive to cortisol is not so well known. As part of the limbic system, the hippocampus is central to memory processing. Memory disturbance (eg, amnesia, intrusive flashbacks) is a cardinal finding in PTSD. A generally held belief is that serotonin-reuptake inhibitors are effective drugs for

PTSD symptoms. These links, although not conclusively proven, do help us understand the nature of PTSD.

The authors propose specific types of treatment for childhood PTSD that purportedly capitalize on the ability of the child's brain to grow and to repair “faulty connections” caused by the trauma. These types of treatment include proven psychotherapeutic methods as well as judicious use of medication. The authors also see a useful role for more controversial treatment methods, such as eye-movement desensitization and reprocessing

(EMDR) as well as touch therapy. Sprinkled throughout the book are case examples illustrating use of these techniques. The authors cite the findings of other researchers as support for the idea that the brain is truly being repaired; as written, however, the authors' text appears to reflect their own conclusions, which these experts have not stated.

Using published references as current as 2002, Stien and Kendall have pulled together research and theory from developmental neuroscientists and trauma researchers. Much of this information seems to fit with clinical observations but cannot be said to completely explain PTSD. At times, the authors blur the distinction between correlation and causation. They seem aware of this pitfall, yet their conclusions are not fully supported by the

Today's perspective demands that we stop asking, “mind or brain?” and instead acknowledge that mind and brain are inseparable.

Richard J Moldawsky, MD, has been a psychiatrist with SCPMG since 1983. He works at the Aliso Viejo and Euclid Medical Offices in Orange County. This is his second book review for *The Permanente Journal*. E-mail: richard.j.moldawsky@kp.org.

data. In one such example of overreaching, the authors describe a boy's improvement as the result of "his brain growth [being] back on track" (p 67).

The writing style ranges from scholarly to colloquial. The introduction to a review of the psychobiology of PTSD includes the comment, "trauma causes the stress response to go out of whack ..." (p 81). The final chapter advocates funding for social programs that the authors believe will help prevent child abuse and facilitate better mental health services for children. A closing summary of the earlier chapters would have been more useful.

Emerson M Pugh, late professor of physics at Carnegie Mellon University, taught that "if the human brain were so simple that we could understand it, we would be so simple that we couldn't." Whether effective PTSD treatment repairs trauma's impact on neurobiology is an open question; the exact nature of these effects is still being elaborated. This book's broad perspective does increase our understanding, but readers are reminded how far we've yet to go. ❖

Reference

1. Cloninger CR. *Feeling good: the science of well-being*. Oxford: Oxford University Press; 2004.

Sky Dwellers

The sky begins at the ground
It goes all the way up to the stars.
This means that we are all sky dwellers,
albeit in the bottom of the sky.

— Fred Schaaf, astronomer



New York: Scribner, 2002.
ISBN 0-7432-1156-1 352
pages. \$25.00

Odysseus in America: Combat trauma and the trials of homecoming

By Jonathan Shay, MD, PhD

Foreword by Senator Max Cleland and Senator John McCain

Review by Helen A Williams, MS

Those moved by Jonathan Shay's first book, *Achilles in Vietnam* (1995)¹—an inquiry into Homer's *Iliad* as metaphor for the deforming effects of military combat on character—are in for another compelling read. This time, Shay examines *The Odyssey* and discovers that Odysseus' adventures look a lot like the symptoms of what we now call posttraumatic stress disorder, or PTSD. Shay's gift is to convey these symptoms as *dramatis personae* from *The Odyssey* cannibalizing the inner life of the Vietnam veteran.

Jonathan Shay is a psychiatrist in the US Department of Veteran Affairs Outpatient Clinic in Boston, where he began his career in 1987 working with Vietnam veterans suffering with PTSD. Based on Shay's work with these vets, his second book culminates in a plea for changing the way the US military organizes itself to fight a war—or, at least, for changing the way the military had organized itself through December 2001. The book went to press in 2002, before the war in Iraq began (in March 2003). After reading Shay's argument for strengthening the mental health of combat soldiers through policy change, readers might more than wonder about the military's response, if any, and what the outcome might be.

Structurally, the book is organized into three sections. Part 1 consists of veterans' narratives interwoven with the adventures of Odysseus; Part 2 presents a treatment plan for vets suffering with PTSD; and Part 3 puts forth an argument for preventing mental injury through policy change regarding deployment of US military personnel.

This is no ordinary book: it is full of poetry on several levels. What makes Part 1 so pleasurable to read is the way Shay links his amazing psychological insight into *The Odyssey* to present-day American military veterans. The writing is clear, colorful, and filled with memorable imagery, as shown in the following passage:

"Odysseus has no hope against the Cyclops [the one-eyed giant cannibal] in a force-on-force match-

up. This is the way some veterans I work with feel when they face the *government*. They see themselves as powerless, liable to be eaten alive. Cunning, they believe, is their only defense. Like any one-eyed creature, government bureaucracies lack depth perception. They tend to see only the one thing they were set up for, and are blind to how things interconnect" [italics in original] (p 47).

One need not be a student of the classics or of Homer to be captivated by Shay's work or to marvel at his perceptiveness. Appendix I, titled *A Pocket Guide to Homer's Odyssey*, acquaints readers with enough information to follow the narrative. Those in the healing professions who have veterans as patients will find it

an intriguing and helpful resource. And those who like stories and metaphor and who are curious about their own inner lives will enjoy the book for Homer's poetry and Shay's insight into it. That is not to say that case studies of contemporary vets with PTSD interwoven throughout are not painful to read. They are. And one gets it. Shay gives readers a reasoned appreciation for the horrors that color the inner landscapes of these walking wounded.

The clarity with which Shay articulates his vision is noteworthy. His words add new color and relevance to the timeless stories told by Homer. When Shay adds his own insights into Homer's words, they at once

seem obvious. He brilliantly portrays the postcombat Odysseus as a life on the rocks, an outsider who, 20 years after the Trojan War, remains at a loss to return home to normal life. Shay relates this lost feeling of the outsider to the modern combat-battered vet struggling to return to normal life as a civilian.

Shay's fascination with Odysseus, his decisions, and his behaviors is so present on the page that the reader might feel like a fly on the wall inside the consulting room (pp 140, 142). Shay studies his would-be patient of 25 centuries ago as if he were here now. Shay con-

Shay's gift is to convey these symptoms as *dramatis personae* from *The Odyssey* cannibalizing the inner life of the Vietnam veteran.

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tends, however, that Odysseus would not have sought treatment; otherwise, he would not have wasted 20 years going nowhere instead of home. Whatever one's point of view on that matter, if by some miracle Odysseus were to have found his way into treatment back then, Shay would have prescribed group therapy to foster a sense of community, the necessary mechanism for recovery. Group is where veterans who "have seen the elephant," ie, who have been in combat, can communicate their experiences without fear of disgusting others or driving them away in revulsion.

Part 2 is required reading for those wanting basic information on PTSD and its treatment. Shay's treatment program is based on Judith Hermann's² three-stage recovery model (p 168).

Part 3 is an impassioned plea to the military and all who might influence policymakers. Several arguments are made, but Shay's main point is that deploying soldiers into battle as military units—and not singly as replacements—would strengthen their mental health and thus their fighting effectiveness. It would seem plain common sense that soldiers who train together be deployed together, do battle together, and be discharged

together. It makes sense that they would be stronger and better prepared to fight than soldiers rotated into battle as "replacement parts" along with strangers. One might wonder at the need to argue something so obvious. But that was the policy in effect during the Vietnam War—with disastrous results for the mental health of our combat veterans. The future effects of current military activity in Iraq remain to be seen.

For medical practitioners sensitive to the mind-body connection and the latent effects of violence on health, this book is a wonderful resource. The grounding that this book affords should serve as a valuable tool for the clinician. Additionally, *Odysseus in America* should be assigned reading in military schools and should be on the shelves of libraries that serve our soldiers, veterans, their families, and all those who provide them care. ❖

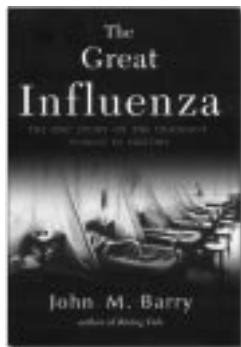
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1. Shay J. *Achilles in Vietnam: combat trauma and the undoing of character*. New York: Scribner; 1995.
2. Hermann J. *Trauma and recovery*. Revised ed. New York: Basic Books; 1997.

A Real Hero

Anyone can slay a dragon, he told me, but try
waking up every morning and loving the world
all over again. That's what takes a real hero.

— Brian Andreas, *American storyteller*



New York: Penguin
Viking, 2004.
ISBN: 0670894737.
546 pages. \$29.95

The Great Influenza: The Epic Story of the Deadliest Plague in History

By John M Barry

Review by T L Max McMillen

In 1918, during the nascent years of modern medical science, nature chose to rage. More devastating than the 1906 San Francisco earthquake and with more quiet ferocity than the most devastating hurricane, storm, tornado—or even World War I—nature chose to demonstrate its simple, awesome, and ultimate power in the form of influenza. Unlike any ever seen before, this influenza demanded as much from a world just embracing science as the AIDS pandemic demands today but in a far shorter time period and with far more immediate results.

The Great Influenza chronicles the beginning of our modern medical world—a world rooted in scientific method, education, and analytic rigor. The founding of Johns Hopkins and the Rockefeller Institute just a few decades earlier than the onset of the 1918 influenza pandemic set the stage, and these institutions had become the “West Point” and “Annapolis” of the American medical forces by launching a defense against the bacteriologic horrors of nature. The first immunizations were being developed, a beginning of understanding of disease and the role of bacteriology was blooming, and disease was beginning to be understood as this most daunting of events was unfolding. Science was poised to understand this field but not to conquer it.

By tracing the scientific lives of the major researchers working at the beginning of the 20th century, John M Barry parallels the story of the pandemic and gives full voice to the naive notion that “this was only the flu.” Supporting the argument that the pandemic began in a small town in middle America, Mr Barry explores the science used to decipher this illness, which expressed itself in such diverse and devastating ways. He discusses the sudden onset of influenza and the rapid death of its victims and the efforts to find staphylococci, streptococci, and pneumococci in the victims’ lungs; the development of acute respiratory distress syndrome (ARDS); observation of patients’ skin turning blue, then purple, then black; and Ebola-like symptoms of bleeding from eyes, ears, and nose. Mr Barry relates stories of people who went to work feeling well and dropped dead on the job with no warning. These stories caused researchers to doubt their theories of

this illness and to reevaluate their research findings over and over again.

Richard Pfeiffer, following the influenza epidemic of 1889-1890, discovered the influenza bacillus (*Hemophilus influenzae*) that many people believed was the cause of the 1918 illness. This belief was supported by finding the bacteria in the mucous membranes of some, but not all, influenza victims. Not until 1931 was the cause of the 1918 pandemic discovered to be a virus with *Hemophilus influenzae* as a secondary invader.

Over a two-year period, an estimated 50 to 100 million people died worldwide from influenza, but most of the deaths occurred within a 12-week period. Adjusted to today’s population, the 1918 figure would equal 175 to 300 million dead. Although medicine has made great strides in treating influenza and its complications, widespread immunization is hampered by the long length of vaccine production times and by inefficiency of distribution methods of vaccines. Medical advances are also offset by modern travel patterns, which can spread the influenza virus far more quickly than in geographically stable populations. Even now, the proper mutation of the influenza virus easily could overwhelm hospitals, cities, towns, and medical science.

Mr Barry states that he “... started this book intending to explore not only the 1918 pandemic itself, but ... how the larger society reacted to an immense challenge ... [and] ... how an investigator should do science”¹ His thoughtful and insightful exploration into the lives and motives of such researchers as William Park, Oswald Avery, and Paul Lewis examines the world of research in the early 20th century in a personal and intimate way. Finally, the author connects the 1918 influenza pandemic to us today by relating it to the HIV/AIDS epidemic, to SARS, to bioterrorism, and to the potential for another devastating mutation of the influenza virus. Among the many lessons to be learned from this study is that saying, “It’s only the flu” is a singularly inept adage. ♦

Reference

1. Barry JM. The great influenza: the epic story of the deadliest plague in history. New York: Viking Penguin; 2004.

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What I Learned in Medical School: Personal Stories of Young Doctors

Edited by Kevin M Takakuwa, Nick Rubashin, and Karen E Herzig

With a foreword by Jocelyn Elders, former US Surgeon General



Berkeley: University of California Press; 2004. ISBN 0520239369. 230 pages; \$24.95.

Review by Anna Luise Kirkengen, MD, PhD

During a recent voyage from Norway to Rome, I carried five different texts for study purposes. These texts included a study about the increasing self-medication of Finnish physicians during the latest decade; an editorial about Norwegian physicians who, due to alcohol and drug abuse, lost their medical licensure for a given period; a story told by a male physician who, as the father of a seriously ill physician, sees how his own and his son's profession jeopardizes the son's health and future and how his colleagues ignore the father's professional skills and competence; a draft of my own contribution to a critical anthology on health care research; and another book, *What I Learned in Medical School*, a collection of 23 different voices telling about the general-yet-particular experience of studying medicine.

All five texts shared a common theme, the way a physician lives in the world—or, more precisely, how each physician strives to retain his or her selfhood while becoming or being a doctor. This premise may seem strange; after all, there ought to be no tension—let alone mutual exclusion—between being one's own person and being a physician, a helper for other people. Nonetheless, this tension is what all five of my texts—the study, the editorial, the story, the draft, and the book—were about. This tension is exactly what is discussed by the 23 young colleagues in *What I Learned in Medical School*, who reflect about their personal experiences of entering medical school and becoming socialized into the practice of medicine.

In highly different ways, these 23 physicians describe their particular backgrounds, which reflect great variety: A female Korean naval officer strives to unite family life, gender roles, and her own ambitions; a single, black, previously teenage mother encounters humiliating structural prejudices in the obstetrical delivery ward; a Vietnamese boat refugee alienates himself by denying his past until he understands that he cannot heal others unless he heals himself; the grandson of four Holocaust survivors feels obliged to fulfill their lives' purpose; a married young woman from a small town in Texas becomes “different” and strange in familiar

places; a member of Alcoholics Anonymous is always aware of hiding an incontestably abusive past; a Muslim woman tries to define and defend her white coat and black hijab (headdress) in her own way; a former student of anthropology gains a reputation as a “radical” by allowing herself to pose critical questions in medical classes; a self-mutilating young woman learns in psychiatry class how to think “correctly” about something she knows at a deeper level; a Mayan illegal immigrant from Mexico reminds herself that only her seniors—and not Hippocrates—talk about “illegal aliens.” These colleagues are just a few of the remarkable group described in the book.

These young physicians share—and need to express—a conviction that their particular lives matter, that their special experiences are important, and that their being different has an impact for and on the way they will act as professionals. At the same time, however, they are trained to think of these experiences as either “private,” “irrelevant,” or “erroneous” knowledge compared with professional knowledge. This common experience leads each of the physicians to witness how, despite claims of being inspired by objective knowledge and correct professionalism, medical training and the medical community are arenas of strong and discriminating prejudices. Indeed, the physicians are taught that medical practice is the application of value-free, scientific evidence. However, despite being selected to a field in which peers traditionally share a strong loyalty, the physicians learn that they are still “others”—even in a group to which they are supposed to belong. Through this experience, they never doubt that their “otherness” makes them valuable and able to contribute to the demanding task—altruism—that they have imposed upon themselves. Within the framework of professional medical encounters, altruism means nearly unconditional devotion to respectfully meeting other people's needs and responding to vulnerable persons without insulting or exploiting them. In this context, respect for another person's integrity and respect for self are mutually conditional on each other.

Anna Luise Kirkengen, MD, PhD, has been a family physician in Oslo, Norway, since 1975. In 1998, she defended her thesis, “Health impact of childhood sexual abuse,” for a PhD degree in Medicine at the University of Oslo, Norway. This became the internationally recognized medical book, *Inscribed Bodies: Health Impact of Childhood Sexual Abuse*, that we reviewed in the Spring 2003 issue of *TPJ*, 7(2):p 84. Dr Kirkengen is a family doctor (general practitioner) for 900 persons.

Here, the five texts meet and testify to the fact that medical training and professional standards alienate physicians from themselves, from their lives, and from their needs unless these physicians invest personal effort and awareness into defeating this alienation.

The Finnish doctors described in one of the texts fail to ask their peers for help and advice and medicate themselves increasingly, particularly for certain conditions. In general, this behavior may show that being ill, impaired, or incapacitated is even less acceptable for high achievers (ie, physicians) than for other people. In particular, this behavior may show that even more than other people, doctors are aware of social shame and stigma linked to certain categories of illness. According to the authors of the study, this more acute awareness may explain why the highest proportion of self-medication cases—two thirds to three fourths—are connected to mental disorders, asthma, and gastrointestinal diseases. In contrast, only one out of four doctors who self-medicate do so for cardiovascular disease, apparently perceived as a more respectable condition.

Like their Finnish peers, Norwegian doctors fail to seek help from their own profession when they need it most: during episodes of crisis and “overload.” Drugging themselves without asking for help and counseling, they endanger not only themselves but also their patients. In doing what they never would advise other people to do, they implicitly admit an awareness of shame despite their professional training in nonjudgmental approaches to impairment. In practicing self-neglect, they explicitly reveal an area of conflict engendered by medical training.

This is where the story of father and son (both of whom are peers of the son’s doctors) allows insight into the medical profession’s deepest shortcomings. In the role of seriously sick patient, the son dares not challenge his own colleagues despite the fact that they have endangered not only his future as a physician but his life by overruling or ignoring his wishes and needs. Suddenly, his most salient existential interests begin to conflict with both his training in professional loyalty and his professional confidence in objectivity. The father, in his roles as father (of the patient), colleague (of his son and son’s doctors), and medical teacher, dares not object when his peers insult him by ignoring his professionally grounded reservations and objections to the medical interventions taken. On behalf of his son and himself, he is shaken by the display of power—or, rather, abuse of power—exercised by his peers and linked to presumably objective knowledge, shared by apparent equals.

This phenomenon has led me to contribute a critical appraisal of current health care research with regard to patient satisfaction, quality of care, work satisfaction, and patient empowerment. I argue that numerically grounded studies in the arena of socioculturally structured meanings and values represent categorical mistakes. Thus, information derived from such studies may be quite correct in the sense of statistical calculation yet may be flawed to the point of being irrelevant to social reality. Moreover, by offering to informants options that validate only the surface aspects of current clinical practice, informants are methodologically blocked from criticizing structural phenomena. As long as patients are not allowed to object to being fragmented into organs during medical intervention, no benefit can be found in having a choice between several hospitals; organs, tissues, and cells determine the architecture of our whole medical enterprise, even our most modern clinics. As long as objective knowledge expressed in questionnaires systematically overrules subjective knowledge by presenting only preformulated options for answers, people’s own utterances are literally not given space. As long as the human life-world is, due to medical theory, nearly excluded and eliminated from medical knowledge production, “scientific” interest about people’s experiences and opinions is nothing but pretense.

The aforementioned texts show that Finnish and Norwegian doctors avoid current health care when they have the greatest personal need for it. Perhaps they, better than others, are familiar with the inherent, systematic contempt for disability and the tendency to blame those who are weak. Even doctors, such as the physician father and physician son, experience the discrimination exercised by a powerful system the very moment they, as members and equals, question the legitimacy of this power. These two, and probably many other physicians, have come to acknowledge the structurally grounded insufficiency of medicine when it comes to the core of human existence.

And here are our 23 young colleagues, who believe that not only their own but also their patients’ lives and experiences matter in every medical encounter. We may hope that professional knowledge will soon be brought to a collective awareness that doctors as well as patients are persons. And we may also hope that these young people will not be forced by their own discipline to regret their own contribution to praising diversity and considering human life as a source of medical wisdom. ♦

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Section A.

page 19

Article 1. *Initial Kaiser Permanente Southern California Experience Embracing the New Technology of Transcatheter Closure of Atrial Septal Defects*

Which statement is incorrect? The AMPLATZ device:

- is durable and simply placed
- is less likely to move and potentially embolize
- can be withdrawn and repositioned
- can be used only in closing small defects
- provides more complete closure of the defect

Which statement is correct?

- the SCPMG results show similar outcome improvements in the two cohorts described
- although the device is simple to insert, postprocedure care is prolonged and complicated
- multiple postprocedure complications were observed
- successful deployment of the device increased in 2003 to 93%, a figure comparable to published studies

page 24

Article 2. *How Should We Screen Patients for Major Depression?*

According to the author, which of the following patients should be screened for major depression?

- 63-year-old diabetic female
- 45-year-old male with chronic pain
- 17-year-old female in for a pre-college health maintenance visit
- a and b
- all of the above

You are seeing a 70-year-old male with known coronary artery disease for follow-up three months after a mild stroke. He has no residual neurological deficits. Since the stroke, his wife reports that he has not returned to fishing, which he previously found enjoyable. When you ask him about this, the patient indicates that he hasn't been interested in fishing lately. Based on this information, which of the following actions is most appropriate at this time?

- attribute his loss of interest to normal stroke recovery and observe
- administer a more detailed depression diagnostic instrument
- diagnose him with major depression
- diagnose him with major depression only if he admits to being depressed

page 28

Article 3. *Reengineering Care with KP HealthConnect*

Which statement, in the present environment, is incorrect?

- the present system of maintaining patient records is inefficient and outmoded
- about half of diabetics and hypertensives in the US receive appropriate levels of care
- health care providers are able to easily determine that their diagnostic and treatment capabilities match evidence-based best practices
- the normal compliance level with best practice typically falls short for many important care approaches

(Continued on next page)

Return
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(Continued from previous page)

Which of the following statements is inaccurate?

- a. electronic medical or patient record systems and treatment protocols are the best way of achieving optimal care
- b. generating easy-to-use information for patients about their condition and care is critical
- c. such systems can improve safety, efficiency, timeliness, and quality
- d. Use of electronic medical records is expensive and depletes resources

page 43

Article 4. The Reality of EMR Implementation: Lessons from the Field

An important organizational factor in the success of EMR implementation is the close cooperation and coordination of

- a. information technology, Permanente clinicians, and clinical support staff
- b. operations and information technology
- c. operations and Permanente clinicians
- d. operations, Permanente clinicians, and information technology
- e. information technology and clinical support staff

What was the recommended approach for successful system implementation?

- a. do a significant amount of up-front work to make sure the system is perfect before deploying in the first location
- b. have a firm schedule and adjust the amount of functionality that you implement to fit the schedule
- c. have a firm schedule and hire more people if necessary so that you keep to the schedule
- d. pilot the system and make sure that most of the identified significant problems are fixed prior to rolling it out further
- e. roll out the system in a "big bang" approach to all locations at the same time

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.

	Article 1					Article 2					Article 3					Article 4				
	Strongly Agree		Strongly Disagree			Strongly Agree		Strongly Disagree			Strongly Agree		Strongly Disagree			Strongly Agree		Strongly Disagree		
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The article covered the stated objectives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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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)

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