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75 Dissemination of Innovation: The Will to Change an Organization
In the area of Santa Clara County, California, is the Santa Clara Valley. This is Yosemite Valley:

This is Yosemite National Park.
Where Do Teens Go to Get the 411 on Sexual Health? A Teen Intern in Clinical Research with Teens.

Yana Reznik; Kathleen Tebb, PhD

Teens who perceived that their clinician communicated with respect, explained information in ways that they could understand, and had time alone (confidentiality) with a clinician who asked about sex (at least for males) were more likely to cite their clinician as a source of sexual health information.

CLINICAL MEDICINE

Image Diagnosis: Appendicitis and Appendicolith.

Gus M Garriel, MD, FACEP, FAAEM

The images from a Computed Tomography scan with oral and IV contrast demonstrates a large, distended tubular structure in the right lower abdomen consistent with an inflamed appendix and an appendicolith within the center.

A Clinical Communication Strategy to Enhance Effectiveness and CAHPS Scores: The ALERT Model.

James T Hardee, MD; Ilene K Kasper, MS

The US Agency for Healthcare Research and Quality surveys patients and rates health plans on metrics, including four questions assessing the patients impression of the physicians communication skills. 

NARRATIVE MEDICINE

Rosie the Riveter's Wartime Medical Records. Morris F Colleen, MD; Bryan Culp; Tom Debley

In excerpts from his memoir, the physician-author describes two scenarios that demonstrate, through actual clinical experiences, appropriate actions recommended by Addiction Medicine specialists.

COMMENTARIES

Dissemination of Innovation: The Will to Change an Organization.

James W Dearing, PhD

For an innovative organization to become a learning organization and achieve greatness requires innovation dissemination. The top ten dissemination mistakes in organizational change are cited, including assuming that information alone will influence decision making and advocating single interventions as the solution to a problem.

Alcohol Abuse in the Workplace: When You Smell It, Do You Ask?

Peter Washburn, MD

In excerpts from his memoir, the physician-author describes two scenarios that demonstrate, through actual clinical experiences, appropriate actions recommended by Addiction Medicine specialists.
Online CME Evaluation Program

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- **Article 1. Collaborative Cardiac Care Service: A Multidisciplinary Approach to Caring for Patients with Coronary Artery Disease** (page 4)
- **Article 2. The Kaiser Permanente National Total Joint Replacement Registry** (page 12)
- **Article 3. Computed Tomography Findings of Unanticipated Prolonged Ileocolic Intussusception in Children** (page 22)
- **Article 4. Integrating Herbs and Supplements in Managed Care: A Pharmacy Perspective** (page 52)

The Kaiser Permanente National Continuing Medical Education Program (KPNCMEP) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The KPNCMEP designates this educational activity for 4 AMA PRA Category 1 credits. Each physician should claim only those hours of credit that s/he actually spent in the educational activity. All authors in this issue report no conflict of interest.

The Permanente Journal has been reviewed and is acceptable for up to 8 Prescribed credits by the American Academy of Family Physicians. AAFP accreditation begins 01/01/08. Term of approval is for one year from this date. This issue is approved for 2 Prescribed credits. Credit may be claimed for one year from the date of this issue.

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Collaborative Cardiac Care Service: A Multidisciplinary Approach to Caring for Patients with Coronary Artery Disease

Brian G Sandhoff, PharmD
Susan Kuca, RN
Jon Rasmussen, PharmD
John A Merenich, MD

ABSTRACT

Background: Coronary artery disease (CAD) remains the leading cause of death in the US. In 1996, Kaiser Permanente of Colorado (KPCO) developed the Collaborative Cardiac Care Service (CCCS) with the goal of improving the health of patients with CAD.

Description: CCCS consists of a nursing team (the KP Cardiac Rehabilitation program) and a pharmacy team (the Clinical Pharmacy Cardiac Risk Service). CCCS works collaboratively with patients, primary care physicians, cardiologists, and other health care professionals to coordinate proven cardiac risk reduction strategies for patients with CAD. Activities such as lifestyle modification, medication initiation and adjustment, patient education, laboratory monitoring, and management of adverse events are all coordinated through CCCS. The CCCS uses an electronic medical record and patient-tracking software to document all interactions with patients, track patient appointments, and collect data for evaluation of both short- and long-term outcomes.

Outcomes: The CCCS currently follows over 12,000 patients with CAD. The CCCS has demonstrated improvement in surrogate outcomes including: cholesterol screening (55% to 96.3%), the proportion of patients with a goal of low-density lipoprotein cholesterol (LDL-c) <100 mg/dL (22% to 76.9%), and has reduced the average LDL-c to 78.3 mg/dL for the CAD population it follows. The CCCS has shown a reduction in all-cause mortality associated with CAD by 76% in the patients followed by the service. Patient and physician satisfaction have been high with CCCS.

Conclusion: The CCCS coordinates many aspects of cardiac risk reduction care resulting in excellent continuity of care. The CCCS has continued to grow and expand the number of patients enrolled by using innovative strategies and technology and has resulted in excellent care and improved outcomes of the CAD population at KPCO.
The cause for the treatment gap is multifactorial, but largely related to patient, clinician, and health care system factors. To help close the CAD treatment gap, interventions should address each of these factors. Because of the baseline metrics in the Colorado Region, secondary prevention programs were developed, using multidisciplinary teams that focus on cardiac risk factor management to address the treatment gap.

Since 1996, the Collaborative Cardiac Care Service (CCCS) has improved the health of KPCO patients with CAD. CCCS is made up of a nursing team—the KP Cardiac Rehabilitation program (KPCR)—and a pharmacy team—the Clinical Pharmacy Cardiac Risk Service (CPCRS)—whose patient care activities complement each other (Table 1). The CCCS coordinates the provision of cardiac risk reduction activities by working collaboratively with and supporting patients, primary care physicians, cardiologists, and other health care professionals and focusing on activities that have been shown to improve patient outcomes. The goal of this paper is to describe the development, innovation, and outcomes of the CCCS.

**History**

In 1996, KPCO implemented a registered nurse-managed cardiac rehabilitation program, based on the Multifit program, that focused on management and education of patients discharged from the hospital following acute coronary events. After completion of the cardiac rehabilitation program, the patients were transferred back to their primary care physician for follow-up. There was no formal long-term follow-up for patients following discharge from the rehabilitation program. The nurse-managed cardiac rehabilitation program helped improve the CAD surrogate outcomes of the patients (e.g., cholesterol levels) but, because of the program design, focused on short-term follow-up of patients with recent events.

In 1998, KPCO assessed the use of secondary prevention strategies in the entire CAD population. The results were similar to reports in the literature: 22% of the CAD population had achieved the LDL-c goal of less than 100 mg/dL, 85% were on beta-blockers following myocardial infarction, and 90% were on aspirin. KPCO also participated in the Quality Assurance Program, which showed that of 48,000 patients with CAD, only 44% had annual LDL-c testing, and of these patients 25% had an LDL-c of less than 100 mg/dL. These results suggested that, in addition to modifying the current cardiac rehabilitation program,
The focus of CCCS is on both short-term and long-term outcomes. ... has improved both surrogate and clinical outcomes.

Collaborative Cardiac Care Service: A Multidisciplinary Approach to Caring for Patients with Coronary Artery Disease

another program that focused on the long-term management of patients with CAD was necessary. Additionally, this program would need to follow patients with a history of previous coronary events, not just patients with recent coronary events.

Modifications were made to the nurse-managed cardiac rehabilitation program—primarily the Multifit program. The case-management concept was maintained but more efficiencies were included: consolidating the number of phone calls and having more group visits than one-on-one visits. In April 1998, in an effort to improve adherence and to increase the number of acute coronary syndrome (ACS) patients discharged on HMG Coenzyme-A reductase inhibitors (statin) therapy, a guideline was implemented allowing KPCR nurses to enroll patients, and initiate statin therapy at discharge, without in-patient cholesterol measurement. In addition, the cardiac rehab team targeted patients using tobacco. Guidelines allowed nurses to start pharmacologic therapy at discharge for smoking cessation.

CPCRS was created to improve management and treatment of patients with CAD. The focus of CPCRS is long-term management to ensure appropriate cholesterol-lowering, hypertension, diabetes, and smoking-cessation medications are initiated and adjusted. Follow-up laboratory tests assess achievements of LDL-c, blood pressure, and diabetes goals, to ensure that other medications (shown to reduce the risk of future cardiac events)—aspirin, beta-blockers, and angiotensin-converting enzyme inhibitors (ACEI)—are initiated when appropriate. CPCRS monitors and assists management of disease states that increase cardiovascular risk, provides patient education and recommendations for nonpharmacologic therapy, and acts as a resource to primary care physicians, cardiologists, cardiac rehabilitation nurses, and other health care professionals.

CCCS Approach

All patients diagnosed with an acute coronary event are offered enrollment into CCCS, and can opt out if later not interested. Patients are offered intensive cardiac rehabilitation education, psychosocial support, exercise therapy, and secondary risk-factor modification—smoking cessation and dietary counseling.

KPCR

The KPCR team contacts all patients hospitalized with an acute coronary event within 24 hours of discharge. Patients seen in non-KP hospitals are identified and KPCR is notified and contacts those patients to enroll them. This outreach call is typically divided into safety and risk-factor counseling. The cardiac rehabilitation nurse assesses symptom recognition, current symptoms, incision care, and medication reconciliation. On identifying an issue, the nurse contacts a clinician for orders or disposition (home care, clinic follow-up, or Emergency Department). Medication issues are clarified with the physician. The medical record is updated and the patient is educated. If the patient is not on an appropriate dose of cholesterol-lowering medications or does not have sublingual (SL) nitroglycerin and it is indicated, the medications are ordered per KPCR guidelines. Following the safety assessment and medication reconciliation, the nurse reviews the risk factors for CAD and assists in setting appropriate goals. A detailed plan is developed with the patient including time of contacts, education, and referrals to other specialists, as indicated. Tobacco cessation counseling is provided for all patients who use tobacco. If a patient is ready to quit smoking, the cardiac rehabilitation nurse can order appropriate smoking cessation medications per regional guidelines. During follow-up visits—by phone, in educational sessions, or in-person visits depending on patient need—the nurse assesses the current plan, which, in conjunction with the patient, is modified as necessary, reviewing barriers and solutions for meeting goals. Patients are followed for three to six months, but KPCR is a resource for as long as the patient is a member of KP. Following discharge from KPCR, the patient is referred to CPCRS for enrollment and long-term follow-up.

CPCRS

Primary care physicians may also refer patients to CPCRS. Additionally, patients with a CAD event prior to their enrollment in KPCO are enrolled in CPCRS through the Colorado Region Disease State Management Registry, and assigned to a personal clinical pharmacy specialist, who manages the patient’s medication regimen as long as the patient is a member of KP. The average enrollment time in CPCRS is 4.5 years. The average panel size for a clinical pharmacy specialist is approximately 800 patients. The clinical pharmacy staff at CPCRS ensures that patients receive appropriate cardiac risk-reduction medications, and orders the appropriate laboratory tests to monitor the efficacy and safety of those medications. They provide ongoing diet and exercise education and refer patients to

The focus of CCCS is on both short-term and long-term outcomes. ... has improved both surrogate and clinical outcomes.
KPCO education resources. CPCRS also emphasizes the importance of medication adherence in reducing recurrent cardiac events. The CPCRS staff ensures that patients with major cardiovascular risk factors—uncontrolled diabetes or hypertension—receive the necessary care to improve. Furthermore, patients who smoke are advised to stop and are referred for behavior modification therapy through the Health Education Department at KPCO or the Colorado Quitline. CPCRS ensures that patients with major cardiovascular risk factors—uncontrolled diabetes or hypertension—and a daily aspirin (to reduce the risk of death and recurrent cardiovascular events).

CCCS uses an electronic medical chart, HealthConnect, to document all interactions with patients, to order medications and follow-up laboratory tests, and to notify physicians about abnormal values and adverse drug reactions. With HealthConnect, CCCS staff reviews records for pertinent patient care information and to reinforce prescribed therapies.

CCCS patients are also entered into a Web-based tracking database, HealthTrac, used in conjunction with HealthConnect—and schedule follow-up appointments such as fasting lipid profiles and blood pressure checks. Through these appointments all patients are tracked, allowing identification of patients not receiving follow-up laboratory tests as scheduled.

Monthly queries using HealthTrac identify patients with laboratory tests scheduled for that month, and letters are mailed reminding them. If the patient does not respond after two reminder letters, they receive a telephone call from a pharmacy technician. In addition, HealthTrac generates surrogate outcome reports, such as LDL-c cholesterol or blood pressure measurements, as tracking tools, and is updated daily with administrative, pharmacy, laboratory, diagnosis and procedure, vital sign, and demographic data.

### Outcomes

The focus of CCCS is on both short-term and long-term outcomes. Since its inception, CCCS has improved both surrogate and clinical outcomes. In an early analysis of 100 patients followed by KPCR for one year, improvements in LDL-c control and screening, smoking cessation rates, and patient-reported diet and activity were shown. These preliminary results led to the expansion of KPCR. KPCR also demonstrated improvement in tobacco cessation. In a review of 269 patients, those receiving counseling while still in the hospital resulted in better long-term outcomes on tobacco cessation, 60%, compared with those counseled after discharge, 41%. An early analysis of 1716 patients enrolled in CPCRS showed that the LDL-c screening rates increased from 55% to 97% in less than one year. Additionally, patients with an LDL-c of less than 100mg/dL increased to 48%, from 22%. Patients taking aspirin or other antiplatelet therapy increased from 90% to 97% and patients taking beta-blockers following myocardial infarction improved from 85% to 92% in the initial assessment of the program.

CCCS achieved benchmark status in many clinically important outcome measures for Healthcare Effectiveness Data and Information Set (HEDIS). In 2007, KPCO was in the 90th percentile in the nation for cholesterol control <100mg/dL and number two in the nation for cholesterol screening in patients with cardiovascular disease. KPCO was also number four in the nation for persistence of beta-blockers in postmyocardial infarction patients. HEDIS results from 2001 to 2007 are shown in Table 2.

During the first two years of CCCS, the service only impacted approximately 200 patients. On the basis of the preliminary results, the

<table>
<thead>
<tr>
<th>Measure</th>
<th>Years</th>
<th>Nationwide</th>
<th>Kaiser Permanente Regions</th>
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<td>2001-2005</td>
<td>No. 1</td>
<td>No. 1</td>
</tr>
<tr>
<td>Cholesterol control &lt;100 postcardiac event</td>
<td>2005</td>
<td>No. 1</td>
<td>No. 1</td>
</tr>
<tr>
<td>Cholesterol control &lt;100 in patients with CVD</td>
<td>2007 (90th percentile)</td>
<td>No. 1</td>
<td>No. 1</td>
</tr>
<tr>
<td>Cholesterol screening postcardiac event</td>
<td>2001-2003</td>
<td>No. 1</td>
<td>No. 1</td>
</tr>
<tr>
<td></td>
<td>2004-2005</td>
<td>No. 4</td>
<td>No. 2</td>
</tr>
<tr>
<td>Cholesterol screening in patients with CVD</td>
<td>2007</td>
<td>No. 2</td>
<td>No. 1</td>
</tr>
<tr>
<td>Beta-blocker postmyocardial infarction</td>
<td>2003</td>
<td>No. 1 (tie)</td>
<td>No. 1 (tie)</td>
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<tr>
<td></td>
<td>2005-2007</td>
<td>No. 1 (tie)</td>
<td>No. 1 (tie)</td>
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<tr>
<td>Persistence of beta-blocker postmyocardial infarction</td>
<td>2007</td>
<td>No. 4</td>
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CVD = Cardiovascular disease; CCCS = Collaborative Cardiac Care Services
* Measure not reported in 2006.
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A decision was made to expand the service. To date, more than 27,000 patients have been screened for enrollment into CCCS and more than 25,000 (93%) have been validated for enrollment. CCCS is currently following over 12,000 patients with CAD.

Random surveys sent out to patients followed by KPCR revealed that 95% were “very satisfied” or “extremely satisfied” with the service that KPCR offered. In a survey of CPCRS patients, 94.6% of 491 patients who responded showed they strongly agreed or agreed that they were satisfied with the care they received from CPCRS, and 83.7% strongly agreed or agreed that they could easily contact the CPCRS staff. Also, internal physician satisfaction survey demonstrated that 88% of the respondents were satisfied or very satisfied with the care that CCCS provided their patients.

A retrospective, cohort observational review in 2005 of 8014 patients enrolled in the program showed that screening for cholesterol increased from 66.9% to 97.3% at the end of the evaluation period. The number of patients attaining an LDL-c goal of <100mg/dL increased from 25.5% to 72.7%. Approximately 85% of these patients were receiving statin monotherapy. The average LDL-c for those 8014 patients decreased from 119 mg/dL to 89 mg/dL.

CCCS also demonstrated an improvement in morbidity and mortality. In an analysis of patients enrolled from 1996 to 2004, all-cause and CAD-related mortality decreased when compared with patients not enrolled in CCCS (Figure 1). In this analysis, patients were categorized into four cohorts on the basis of their type of enrollment: 1) early CCCS—enrolled within 90 days of their event and continuously followed; 2) delayed CCCS—enrolled in the program 90 or more days following their event and continuously followed; 3) intermittent CCCS—patients enrolled after their event but not continuously followed; and 4) no CCCS—patients who were not followed at any point by CCCS. Over an average enrollment of 3.6 years, patients experienced a reduced incidence of all-cause mortality by 76% and cardiac-related mortality by 73%. Patients in the early CCCS cohort had an 89% reduction in all-cause mortality and an 88% re-

Figure 1. Kaplan-Meier curves for all-cause and cardiac-related mortality by year: All cause.

Figure 2. Kaplan-Meier curves for all-cause and cardiac-related mortality by year: Cardiac related.

Note: Patients with a CAD event were categorized into one of four cohorts by time to enrollment into the Collaborative Cardiac Care Service relative to cardiac event: enrolled within early (early CCCS) or outside delayed (delayed CCCS) 90 days of cardiac event; enrolled intermittently (intermittent CCCS); or never enrolled (No CCCS).

duction in cardiac-related mortality when compared with those patients with no exposure to CCCS. These results suggest that comprehensive, aggressive, and continuous implementation of secondary prevention strategies using systems that enable close follow-up and monitoring of patients is associated with reduced mortality. Current demographic information and metrics for CCCS are shown in Table 3.

Future

By working as a collaborative team to manage the risk factors of patients with CAD, CCCS, using the skills of both nurses and clinical pharmacy specialists, demonstrated improved cardiovascular care. The CCCS uses technology to quickly and efficiently communicate with clinicians and patients, resulting in seamless care. The CCCS allows primary care physicians and cardiologists to focus on other acute patient issues knowing that their risk factors are being addressed.

CCCS currently follows patients with CAD for the duration of their membership in KP, but is often asked to follow other high-risk populations. To extend services to other high-risk patient populations, CCCS adapted the way it identifies and follows patients. Using administrative reports, nurses identify hospitalized patients without being on-site, and so could expand their focus to include patients with peripheral arterial disease and high-risk cardiology patients. As the patient panels for the clinical pharmacy specialists neared capacity, the large number of well-controlled patients were moved to a new maintenance program that allowed transfer of patients back to their primary care physician. To ensure risk-factor control, queries identify patients due for annual cholesterol screening, nonadherent to their secondary prevention medications, or with uncontrolled cholesterol or blood pressure values. Patients who exceed their targets are re-enrolled into active CCCS management. In 2007, nearly 2500 patients were gradually enrolled into the maintenance program, reducing the number of laboratory tests addressed by CCCS staff by 90%. By focusing resources on only those patients requiring interventions, the services of CCCS can now be offered to other high-risk populations. This innovative program has allowed for the expansion of CCCS so that clinical pharmacy specialists now follow high-risk cardiology and ischemic stroke patients.

Table 3. Demographic and metric information for patients currently enrolled in CCCS

<table>
<thead>
<tr>
<th>Demographics</th>
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<td>Current CCCS enrollment (n)</td>
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<tr>
<td>Average duration of enrollment (years)</td>
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<tr>
<td>Average age (years)</td>
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<tr>
<td>Male (%)</td>
<td>70.6</td>
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<tr>
<td>History of DM (%)</td>
<td>30.6</td>
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<tr>
<td>History of MI (%)</td>
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<td>Current smoker (%)</td>
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<table>
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<td>Cholesterol</td>
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<tr>
<td>Annual Screening rate (%)</td>
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</tr>
<tr>
<td>Average LDL-c (mg/dL)</td>
<td>78.3</td>
</tr>
<tr>
<td>LDL-c &lt; 100 mg/dl (%)</td>
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<td>LDL-c &lt; 70 mg/dL (%)</td>
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</tr>
<tr>
<td>Average diastolic BP (mm Hg)</td>
<td>71.9</td>
</tr>
<tr>
<td>BP &lt;130/80 mm Hg (%)</td>
<td>40.9</td>
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<td>BP &lt;140/90 mm Hg (%)</td>
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<tr>
<td>Aspirin/antiplatelet therapy (%)</td>
<td>99.1</td>
</tr>
<tr>
<td>Current statin use (%)</td>
<td>91.0</td>
</tr>
<tr>
<td>ACEI use in patients with DM (%)</td>
<td>93.1</td>
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</table>

CCCS = Collaborative Cardiac Care Service; DM = Diabetes Mellitus; MI = Myocardial Infarction; LDL-c = Low-Density Lipoprotein; BP = Blood Pressure; ACEI = Angiotensin Converting Enzyme Inhibitor.

* Indicates currently taking medication or a documented reason (contraindication or intolerance) why not taking.

Economic Assessment

The business case for starting CCCS was driven by the Scandinavian Simvastatin Survival Study (4S) trial data, which showed patients who started on simvastatin 20mg daily had a 30% reduction in morbidity and mortality over 5.4 years. Using this data, it was estimated that CCCS would save $9 million in hospitalization costs over six years. CCCS improved the surrogate outcomes in the CAD patients it follows, and demonstrated a decrease in their morbidity and mortality. The indirect costs associated with the improvement in morbidity and mortality has not been evaluated. Using National Committee for Quality Assurance (NCQA) data, it was estimated that CCCS provides...
In 2007, KPCO was in the 90th percentile in the nation for cholesterol control <100mg/dL and number two in the nation for cholesterol screening in patients with cardiovascular disease.

Transferability

Successful implementation of a CCCS in other regions depends on specific key factors. First, identifying appropriate personnel is critical. CCCS is designed to use the strengths of the individual health care professionals involved in the program. The nurses play a critical role educating patients following hospitalization. Patients can be overwhelmed on discharge following a CAD event. Medications play a significant role in the long-term management of patients with CAD. The clinical pharmacy specialists in CP-CRS are medication experts who maximize therapy and minimize problems patients may have with medications. It is necessary to have appropriate systems available to manage and to identify patients enrolled in CCCS—HealthTrac and HealthConnect track patients and minimize patients lost to follow-up. These systems streamline communication of treatment plans and problems to the clinicians in the region. They also generate outcomes reports, which provide feedback to CCCS on performance. Lastly, collaboration between CCCS and physicians is integral to the success of CCCS. The CCCS has been implemented (in modified form) in the KP Georgia Region which has experienced success with this model—they were the #1 HMO in the nation in Cholesterol Screening Post-CAD Event in 2005 as reported by NCQA.23

Conclusion

The CCCS program was developed to provide high-quality care to patients with CAD. Since its inception, CCCS has shown improvement in both surrogate and clinical outcomes. Many aspects of cardiac risk reduction therapy are coordinated through CCCS resulting in excellent continuity of care. Activities such as behavior modification, patient education, laboratory monitoring, medication initiation, adjustment of medications, and management of adverse events are all coordinated through the CCCS. Patients and physicians have been satisfied with the service that CCCS provides. CCCS has continued to grow and expand the number of patients enrolled by using innovative strategies and technology and has resulted in excellent care and improved outcomes of the CAD population at KPCO.4


Disclosure Statement

The author(s) have no conflicts of interest to disclose.

Acknowledgments

The authors would like to thank the many people from the KPPO region that have contributed to the success of the CCCS.

References

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Heart Disease

It is commonly during a hasty walk; or violent exercise, that [the heart disease] exhibits the first sign of its evolution or presence. Thus an individual, being otherwise in health, will from walking or any other exercise, be suddenly stopped by a previous dyspnea, accompanied or followed by palpitations more or less violent; these symptoms will soon disappear, and leave the patient in a state of apparent health, until, in the same circumstances, and often from similar exciting causes, the same symptoms are reproduced.

— Jean-Nicolas, Baron Corvisart-Desmarets, 1755-1821, Organic diseases and lesions of the heart and great vessels, French physician to Napoleon Bonaparte
The Kaiser Permanente National Total Joint Replacement Registry (TJRR) is a national level database designed as a postmarket surveillance system for elective total hip and knee replacement. As of March 31, 2007, the TJRR recorded 16,945 primary total hip arthroplasties (THA), 2144 revisions (11.2%); and 30,815 total knee arthroplasties (TKA), 1794 revisions (5.5%). Statistically significant findings include: older age and higher American Society of Anesthesiology risk scores for revision THAs. Osteoarthritis is the most common diagnosis for THA and TKA, and aseptic loosening and instability are most common in revision THAs and TKAs. The TJRR has provided a mechanism for recalls, identified patients at risk for early revisions and changed practice by providing feedback to physicians.

Introduction

Within the US, over 600,000 total hip and total knee replacements are performed each year. By the year 2030, that number is projected to exceed 4 million. Annual hospital costs associated with these procedures are projected to exceed $65 billion by 2015. Although patients who undergo total joint arthroplasty (TJA) are often of retirement age, recent studies have shown that patients below age 65 represent 35-45% of all TJA recipients in the US. As TJA is marketed more as a lifestyle operation than as a final option to retain mobility for end-stage arthritis, the proportion of patients below age 65 may increase.

The projected increases in TJA demand and the costs associated with these procedures will challenge our already overburdened US health care system. One potential method to address this pending crisis is through comparative safety and clinical effectiveness research aimed at reducing the need for TJA revision surgery. Registries are one example of clinical effectiveness studies that can help surgeons and patients make informed decisions about which implant to use or in which patients the risks and potential costs of failure make surgery unwise. These studies can also identify the relative value of TJA over alternative treatments or the effectiveness of one implant brand or design over another. Although implants vary widely in cost, there is little evidence to support the use of new, more expensive designs instead of more established, traditional designs.

The goals of the Kaiser Permanente (KP) Total Joint Replacement Registry (TJRR) are: 1) to monitor revision, failure, and rates of key complications (eg, infection, venous thromboembolic disease such as blood clots and embolism, and mortality); 2) to identify patients at risk for poor clinical outcomes following TJA; 3) to identify the most effective techniques and implant devices (best practices and implant constructs); 4) to track implant usage and costs; and 5) to monitor and to support implant recalls and advisories in cooperation with the US Food and Drug Administration.

Methods

Data Collection & Sources

The TJRR uses an innovative observational method that collects uniform data at the point of care (collected by surgeons, medical assistants, and circulating registered
The core of the TJRR is standardized total joint replacement preoperative, operative, and postoperative documentation forms that contain a small number of key data elements identified by consensus among all surgeons. The standardized forms replace traditional, nonuniform clinic and operative notes and provide information on patient demographics, implant characteristics, surgical techniques, and clinical outcomes.

Data from the standardized TJRR forms are supplemented with data from independent KP administrative data sources to provide a comprehensive database for TJA surveillance and monitoring (Figure 1). KP administrative databases such the Health Information Management System, Kaiser Anesthesia and Surgery Information System (KASIS), Management and Information Analysis Mortality and Membership datasets, and KP HealthConnect (electronic medical health record) inpatient, ambulatory, operating room management, and emergency department system modules provide additional data on hospital readmissions, patient comorbidities, complications, hospital length of stay, Health Plan (HP) membership, and mortality.

**Volume and Participation**

The TJRR has been fully implemented in five of eight KP Regions (Southern California, Northern California, Hawaii, Northwest, and Colorado). More than 350 surgeons and 50 hospitals contribute to the database. Between April 2001 and March 2008, the registry recorded 68,000 joint replacement procedures.

Participation reports are offered to sites quarterly, at least 90 days after the closing of the current reporting quarter. Clinical support, site education, and mechanisms to enhance participation are also offered by the registry staff. Participation in the TJRR has consistently been over 95% since its inception. Participation in the registry is validated using independent operative administrative databases (KASIS and KP HealthConnect operating room management systems).

**Outcome Validation**

Complications, revisions, and reoperations are identified by TJRR operative and postoperative forms and KP administrative data sources using International Classification of Diseases, Ninth Revision, Clinical Modification codes (ICD 9-CM) as a screening mechanism. Registry clinical staff validate identified complications, revisions, and reoperations through chart review to ensure Centers for Disease Control and Prevention guidelines and Agency for Healthcare Research and Quality Patient Safety Indicators are met.

**Results**

**Current Registry Population**

As of March 31, 2007, the TJRR recorded 16,945 primary total hip arthroplasties (THAs) and 2144 revision THAs for a THA revision burden (number of revision THA procedures per number of primary
and revision THA combined) of 11.2%. During the same time period, the registry contained over 30,815 total knee arthroplasty (TKA) cases and 1794 revision TKAs resulting in a TKA revision burden of 5.5%.

Results indicate that revision THA patients are older than primary THA patients (mean age [SD]: 67 [13] vs 66 [12] years, p < 0.001). The percentage of female patients was slightly higher in the primary compared to revision THA group but the difference was not statistically significant (57.4% vs 55.8%, p = 0.067) (Table 1). Revision THA patients have higher American Society of Anesthesiology (ASA) risk scores than primary THA patients (p < 0.001). Osteoarthritis is the most common diagnosis among primary THAs and aseptic loosening and instability are the most common among revision THAs (Figure 2).

Two thirds of the primary TKAs were performed in female patients but only 51.3% of the revision procedures were performed in female patients (p < 0.001) (Table 2). Mean age is similar between the primary and revision TKA groups. Osteoarthritis is the most common diagnosis in the primary TKA group and infection, aseptic loosening, and instability are the most common reasons for revisions (Figure 3).

### Changes in Practice

A critical component of the TJRR has been the implementation of a dynamic feedback mechanism. Clinical best practices are identified and shared nationally through chiefs and administrator meetings, the TJRR Web site, site visits, newsletters, e-mails, annual reports, quarterly reports, and national conference presentations to improve the quality of care for patients. To date the TJRR has resulted in significant improvement in quality and cost savings, including: 1) successful identification, monitoring, and notification of a hip implant recall and a knee implant advisory; 2) identification of a 10% difference in revision rates of partial and total knees—surgeons used this information to reduce partial knee volumes and prevent 16 revisions with cost savings of more than $550,000 (Figure 4); 3) identification of an uncemented total knee technique that was found to be associated with higher revision rates, reducing the usage of this technique (Figure 5);

<table>
<thead>
<tr>
<th>Table 2. Total knee arthroplasty demographics (04/2001 to 03/2007)</th>
<th>Primary</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (mean, standard deviation)</strong></td>
<td>68</td>
<td>9</td>
</tr>
<tr>
<td><strong>Sex (n, %)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>18524</td>
<td>61.8%</td>
</tr>
<tr>
<td>Male</td>
<td>10528</td>
<td>35.1%</td>
</tr>
<tr>
<td>Unknown</td>
<td>912</td>
<td>3.0%</td>
</tr>
<tr>
<td><strong>ASA risk score (n, %)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>692</td>
<td>2.4%</td>
</tr>
<tr>
<td>2</td>
<td>16917</td>
<td>59.9%</td>
</tr>
<tr>
<td>3</td>
<td>10438</td>
<td>36.9%</td>
</tr>
<tr>
<td>4</td>
<td>205</td>
<td>.7%</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>.0%</td>
</tr>
</tbody>
</table>

ASA = American Society of Anesthesiologists
The Kaiser Permanente National Total Joint Replacement Registry

4) reduced volume of minimally invasive hip and knee procedures, which effectively reduced pain and demonstrated an improvement in subjective patient outcomes (Figures 6 and 7); 5) evaluation of new implant technology that is more costly, with no difference in short-term outcome—this feedback changed practice with respect to implant selection; 6) identification of patient risk factors for postoperative infections, hospital readmissions, deep venous thrombosis, pulmonary embolism, and other complications, leading to significant changes in surgical indications and preoperative care.

Discussion

Using the Swedish Hip registry as a model, we implemented a national KP TJRR to reduce revision rates by identifying the best implants and surgical techniques for the population we serve. The TJRR’s automated postmarket surveillance system tracks more than 68,000 TJA implants in Kaiser Foundation Health Plan, Inc (KFHP) patients. The ultimate purpose of the registry is to glean the highest value from total knee and hip replacements in terms of their effects on the health and productivity of KFHP patients. The TJRR represents a unique and unprecedented partnership between the surgeons who use the implants and the HP that pays for them. The program is entirely voluntary, yet participation rates exceed 95% among more than 350 surgeons in over 50 hospital areas.

Postmarket surveillance systems such as registries provide a mechanism to assess comparative safety and clinical effectiveness. Registries can assist in identifying clinical best practices, optimal implants, and patients at risk for failures and revisions. Identification of these underlying factors can reduce revision surgery. The effectiveness of registries in reducing TJA revision surgery has been demonstrated by the National Swedish Hip registry, which reduced their revision rate 50% by providing feedback to surgeons on clinical best practices.

The TJRR has provided a mecha-
TKA = total knee arthroplasty; MIS = minimally invasive.

Figure 6. Significantly higher pain reported in minimally invasive total knee arthroplasty after providing feedback to surgeons.

Figure 7. Significant decrease in minimally invasive total knee arthroplasty after providing feedback to surgeons.

 TKA = total knee arthroplasty; MIS = minimally invasive.

Disclosure Statement
The author(s) have no conflicts of interest to disclose.

Acknowledgments
We would like to thank the KP surgeons, clinical staff, administrators, and the Surgical Outcomes & Analysis unit of Clinical Analysis for contributing to the success of the TJRR.

References
Incidence Rate of Anterior Cruciate Ligament Reconstructions

Abstract

Context: Anterior cruciate ligament (ACL) reconstructions are among the most common sports medicine procedures performed in the US each year. Differences have been reported in the incidence rates (IRs) of ACL tears among male and female national elite athletes. However, there is little information in the published literature that assesses IRs for ACL reconstructions done in the Health Maintenance Organization (HMO) setting specifically. Different populations may show variation in ACL reconstruction IRs.

Objective: This study reports on the IR of ACL reconstructions in a predefined population and compares the differences in age and sex over time.

Design: A retrospective analysis of 4485 ACL reconstructions performed within Kaiser Permanente Southern California between 2001 and 2005 was completed by a query of an administrative database. Trends in IRs per 100,000 members were calculated and compared across age, sex, and the five-year study period.

Main Outcome Measures: Linear regression was used to test trends in IR. Sex distribution was compared using the \( \chi^2 \) test. Analysis of variance was used to compare the mean age from year to year in males and females. The independent sample t-test was used to compare mean age between males and females for each independent year.

Results: The IR of ACL reconstructions in females rose significantly (p = 0.010) from 14.4 in 2001 (95% confidence interval [CI], 12.6–16.3) to 19.3 in 2005 (95% CI, 17.2–21.5). Within specific age groups, IR increased significantly for females age 14 to 17 (p = 0.013), 18 to 21 (p = 0.017), and 45 to 49 years (p = 0.014). The most dramatic change was seen in the female age category of 14 to 17 years, which increased at a rate of 8.14 cases/100,000 members per year.

Conclusion: Identifying the sex and age groups with most rapidly increasing rates of ACL reconstructions is important in implementing ACL injury-prevention programs.

Introduction

Differences have been reported in the incidence rates (IRs) of anterior cruciate ligament (ACL) tears among male and female national elite athletes. However, IRs have not been assessed for Kaiser Permanente (KP) patients. In fact, there is little information in the published literature that assesses IRs for ACL reconstructions done in the Health Maintenance Organization (HMO) setting specifically. HMO populations are larger and more diverse than elite athlete populations. The elite athlete population also lacks the ethnic and socioeconomic diversity of the KP membership population. Different populations may show variation in ACL reconstruction IRs. Therefore, it is necessary to evaluate the IRs of ACL reconstructions in our HMO population.

ACL reconstructions are among the most common sports medicine procedures performed in the United States, numbering about 100,000 each year. Currently there is no evidence that ACL reconstructions prevent the development of arthritis. Therefore it is not enough to just diagnose and treat ACL tears. The focus of many orthopedic surgeons and of ACL-related research is on the prevention of ACL tears and the development of prevention programs. KP, where our social mission includes improving the overall health of the population we serve, has a responsibility to evaluate the IRs of ACL injuries.

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Maria C S Inacio, MS
Tadashi T Funahashi, MD

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serve, is particularly interested in identifying specific populations at risk for injury. Prevention programs may then be implemented for the highest-risk group. Particularly with respect to complicated and costly procedures such as ACL reconstructions, where much may be gained but much is risked, it is important to identify the IRs of various populations over time.

Our study objectives were to determine the IR of ACL reconstructions in the KP Southern California (KPSC) population and compare the differences in age and sex over time.

**Materials and Methods**

We conducted a retrospective review of the number of ACL reconstructions performed in KPSC between 2001 and 2005. The KPSC institutional review board approved this project. IRs per 100,000 members were calculated and compared across years, sex, and age categories.

The number of ACL reconstruction procedures between 2001 and 2005 was obtained using the KP Anesthesia and Surgery Information System, a surgery-scheduling and case-tracking database. ICD-9-CM codes (International Classification of Diseases, Ninth Revision, Clinical Modification) were used to query the administrative data. Patients who underwent ACL reconstruction were identified by procedure code 81.45. Sex, age, and admitting diagnosis were noted.

We calculated ACL reconstruction IRs by dividing the number of procedures performed each year from 2001 through 2005 by the total number of KP members reported at the end of that calendar year. IRs are reported here per 100,000 members. Sex-specific and age category-specific IRs were also calculated. Linear regression was used to test trends in IRs where IRs were the dependent variable and surgery year was the independent variable.

Sex distribution over the years was compared using the χ² test. Analysis of variance was used to compare the mean age from year to year in males and females. Finally, the independent sample t-test was used to compare mean age between males and females for each independent year.

**Results**

Between 2001 and 2005, 4485 ACL reconstructions were performed. Table 1 shows demographics for the KP ACL reconstruction...
The incidence rate of anterior cruciate ligament (ACL) reconstructions was studied in a population between 2001 and 2005. The number of males is higher than the number of females consistently throughout the years (overall, 68.4% vs 31.0%), but the overall sex distribution did not change over time ($p = 0.282$). The overall male mean age was 29.8 years ($\pm 10.0$ years; range, 12–85 years) and did not change from 2001 to 2005 ($p = 0.226$). The overall female mean age was 26.8 years ($\pm 11.6$ years; range, 13–68 years), and it also did not change over the years studied ($p = 0.335$). Males were consistently older than females in every year studied; see Table 1 for $p$ values.

Detailed incidence rates for ACL reconstructions can be seen in Figure 1. The trend in IR was tested using linear regression. Table 2 presents the overall incidence rate for females per 100,000 members/year from 2001 to 2005 for each age category. Similarly, Table 3 presents the overall incidence rate for males per 100,000 members/year for the same period.

Table 2. Overall incidence rate for females/100,000 members/year

<table>
<thead>
<tr>
<th>Age category (years)</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–13</td>
<td>308,457</td>
<td>0</td>
<td>60,412</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>14–17</td>
<td>96,966</td>
<td>62.1</td>
<td>73,159</td>
<td>48</td>
<td>57.8</td>
</tr>
<tr>
<td>18–21</td>
<td>83,739</td>
<td>59.7</td>
<td>79,159</td>
<td>51</td>
<td>64.4</td>
</tr>
<tr>
<td>22–25</td>
<td>78,394</td>
<td>28.1</td>
<td>74,731</td>
<td>26</td>
<td>34.9</td>
</tr>
<tr>
<td>26–29</td>
<td>82,512</td>
<td>18.2</td>
<td>78,652</td>
<td>26</td>
<td>33.4</td>
</tr>
<tr>
<td>30–34</td>
<td>113,864</td>
<td>22.0</td>
<td>111,405</td>
<td>22</td>
<td>19.4</td>
</tr>
<tr>
<td>35–39</td>
<td>119,420</td>
<td>18.2</td>
<td>117,009</td>
<td>15</td>
<td>12.6</td>
</tr>
<tr>
<td>40–44</td>
<td>126,757</td>
<td>12.0</td>
<td>124,090</td>
<td>12</td>
<td>9.2</td>
</tr>
<tr>
<td>45–49</td>
<td>126,158</td>
<td>8.3</td>
<td>123,845</td>
<td>10</td>
<td>7.1</td>
</tr>
<tr>
<td>50–54</td>
<td>115,871</td>
<td>1.9</td>
<td>113,245</td>
<td>11</td>
<td>9.2</td>
</tr>
<tr>
<td>55–59</td>
<td>92,442</td>
<td>2.2</td>
<td>90,061</td>
<td>7</td>
<td>7.1</td>
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<tr>
<td>60–64</td>
<td>71,814</td>
<td>1.4</td>
<td>69,966</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>65–69</td>
<td>57,354</td>
<td>1.7</td>
<td>55,445</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>70+</td>
<td>112,680</td>
<td>0.0</td>
<td>110,860</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>1,586,144</td>
<td>229</td>
<td>1,614,358</td>
<td>264</td>
<td>16.4</td>
</tr>
</tbody>
</table>

Table 3. Overall incidence rate for males/100,000 members/year

<table>
<thead>
<tr>
<th>Age category (years)</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–13</td>
<td>319,599</td>
<td>2</td>
<td>316,555</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>14–17</td>
<td>99,854</td>
<td>43.1</td>
<td>103,310</td>
<td>53</td>
<td>51.3</td>
</tr>
<tr>
<td>18–21</td>
<td>79,456</td>
<td>122.1</td>
<td>78,957</td>
<td>73</td>
<td>92.5</td>
</tr>
<tr>
<td>22–25</td>
<td>65,289</td>
<td>128.7</td>
<td>67,330</td>
<td>77</td>
<td>114.4</td>
</tr>
<tr>
<td>26–29</td>
<td>70,792</td>
<td>98.9</td>
<td>70,949</td>
<td>76</td>
<td>107.1</td>
</tr>
<tr>
<td>30–34</td>
<td>106,707</td>
<td>113.4</td>
<td>106,809</td>
<td>94</td>
<td>88.0</td>
</tr>
<tr>
<td>35–39</td>
<td>115,039</td>
<td>62.9</td>
<td>114,768</td>
<td>86</td>
<td>74.9</td>
</tr>
<tr>
<td>40–44</td>
<td>119,456</td>
<td>37.1</td>
<td>121,946</td>
<td>64</td>
<td>52.5</td>
</tr>
<tr>
<td>45–49</td>
<td>114,889</td>
<td>20.9</td>
<td>118,834</td>
<td>32</td>
<td>26.9</td>
</tr>
<tr>
<td>50–54</td>
<td>104,612</td>
<td>13.4</td>
<td>106,798</td>
<td>9</td>
<td>8.4</td>
</tr>
<tr>
<td>55–59</td>
<td>83,976</td>
<td>4.8</td>
<td>90,148</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>60–64</td>
<td>65,846</td>
<td>0.0</td>
<td>69,205</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>65–69</td>
<td>53,078</td>
<td>0.0</td>
<td>53,867</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>70+</td>
<td>91,230</td>
<td>1.1</td>
<td>94,968</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>1,489,823</td>
<td>559</td>
<td>1,514,444</td>
<td>571</td>
<td>37.5</td>
</tr>
</tbody>
</table>

ACL = anterior cruciate ligament; IR = incidence rate.
Incidence Rate of Anterior Cruciate Ligament Reconstructions

regression, where the IR was the dependent variable and the calendar year was the independent variable. The IR of ACL reconstruction in females increased significantly (p = 0.010) from 2001 to 2005, going from 14.4 in 2001 (95% confidence interval [CI], 12.6–16.3) to 19.3 in 2005 (95% CI, 17.2–21.5) at a rate of 1.26 cases/100,000 members per year (95% CI, 0.57–1.96). We also calculated IR by sex and by age categories (Tables 2 and 3) and found that in females age 14 to 17 (p = 0.013), 18 to 21 (p = 0.017), and 45 to 49 years (p = 0.014), IR increased significantly, with the IR for the age category of 14 to 17 years increasing fastest, at the rate of 8.14 cases/100,000 members per year. Overall IR and IR for males did not change significantly from year to year.

Discussion

In our study, the IR of ACL reconstructions was clearly increasing in the female population. The largest increase was in female high school students between ages 14 and 17 years, followed by the 18-to-21-year-old and 45-to-49-year-old female age groups. The overall IR of ACL reconstructions was 29.6/100,000 members by the end of the study period. In a population similar to ours, an overall IR of 60 knee ligament injuries per 100,000 persons was seen in a knee injury clinic. About 50% of these ligament injuries were ACL tears, for 30 ACL tears/100,000 persons. Seventy-two percent of the patients were male and 28% were female. Sixty-five percent of the injuries were sustained during sports. The sex distribution in that study was very similar to that in ours. In another study, the sex distribution was also comparable, at 68% male and 32% female. Of the knee injuries, 45% were ACL tears. For both men and women, the highest number of knee injuries was seen in the 20- to 29-year-old age group.

IRs for ACL reconstructions in adolescent soccer and basketball athletes were analyzed according to sex. Girls had a higher adjusted IR of ACL reconstruction in both sports than did boys. The number of ACL surgeries in soccer players increased significantly during the five years studied for both boys and girls; however, the rate of increase was faster among the girls. The frequency of ACL reconstructions among the basketball players also increased for both sexes, although the rate of increase was similar for both sexes. Participation on soccer teams increased by 30% for girls and 10% for boys during the study period. Even after adjustment for participation rates, girls had a significantly higher rate of ACL reconstructions. In another study, the IRs of ACL reconstructions was 1.39/1000 aviators per year among females and 0.50/1000 aviators per year among males. Females, when compared with males, had a significantly increased risk of ACL reconstructions, with the highest risk occurring in the 18- to 29-year-old group. Among competitive alpine ski racers, females were 3.1 times more likely to have sustained an ACL tear than were their male counterparts. In an athletic population of patients undergoing ACL reconstruction, females athletes outnumbered male athletes in high school basketball (9:1) and soccer (1:7:1), whereas there were more male than female participants in amateur basketball (5:1), soccer (2:7:1), and skiing (1:6:1). One of the potential limitations of our study was that the administrative database was not developed for the sole purpose of research and may be subject to coding errors. Another limitation is the IR calculated was of ACL reconstructions, not ACL tears, and might have been influenced by surgeons' changing perceptions of surgical indications over time. This may be reflected in the 45- to 49-year-old female group. Our younger female populations' increasing IR with ACL reconstructions could reflect the increasing participation of these groups in sports, as indicated in earlier studies by other researchers. However, the database did not contain information about whether the population was athletic or about the mechanism of injury.

Conclusion

Our study identified certain female age groups with increasing rates of ACL reconstructions. Future directions may include initiating preventive programs aimed at these high-risk groups, additional study to identify risk factors, and improved methods of data collection.

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

Acknowledgment

The author(s) would like to thank Dr. Scott L. Berson for editorial assistance.

References

Incidence Rate of Anterior Cruciate Ligament Reconstructions


Gathering Up Crumbs

Be careful with the crumbs. Do not overlook them.

Be careful with the crumbs; the little changes to love, the tiny gestures, the morsels that feed, the minims.

Take care of the crumbs; a look, a laugh, a smile, a teardrop, an open hand.

Take care of the crumbs. They are food also.

Do not let them fall. Gather them. Cherish them.

— Becoming Bread: Embracing the Spiritual in the Everyday by Gunilla Brodde Norris, writer, meditation leader, psychotherapist, and children’s book author
Abstract
Background: Attempted nonsurgical reduction of ileocolic intussusception after 48 hours is controversial because of the low probability of reduction and an increased risk of perforation. We sought to retrospectively identify computed tomography (CT) criteria that may help to predict bowel viability and successful enema reduction in children with ileocolic intussusception.

Methods: Unanticipated intussusception was diagnosed using CT in six children with mild, atypical symptoms of four to seven days’ duration at a single institution during a one-year period. All patients underwent laparotomy without prior contrast enema. Surgical findings were compared with preoperative CT scan findings to identify any criteria that may predict successful nonsurgical management.

Results: Contrast CT scan findings were diagnostic of ileocolic intussusception. At the time of laparotomy, three children had easily reducible ileocolic intussusception with nonischemic bowel. Two children had irreducible intussusception with ischemic bowel requiring resection, and one child had a difficult reduction of nonischemic but edematous bowel. Preoperative CT scan findings correlated well with intraoperative findings for all patients. Findings of bowel-wall edema of the intussuscipiens and partial small-bowel obstruction shown on CT were associated with intussusception that was nonreducible or difficult to reduce.

Conclusion: Patients with prolonged intussusception diagnosed using CT scan may safely undergo contrast enema reduction if no bowel-wall edema of the intussuscipiens or obstruction is demonstrated.

Computed Tomography Findings of Unanticipated Prolonged Ileocolic Intussusception in Children

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Steven L Lee, MD, FACS, FAAP  
Gary Radner, MD  
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Contrast enema is the traditional diagnostic test for evaluation and treatment of ileocolic intussusception in children. More recently, reduction with air has also been used. The success of nonsurgical reduction by means of contrast or air enema of ileocolic intussusception is inversely proportional to the duration of symptoms. Prolonged symptoms (>48 hours) are usually associated with a low chance of successful enema reduction and an increased risk of perforation. Despite recent data that contradict this notion, children with a delayed diagnosis of ileocolic intussusception are routinely treated with urgent laparotomy at our institution.

Intraluminal eccentrically located fat and a target sign are computed tomography (CT) findings diagnostic for ileocolic intussusception. At our institution, the increased use of CT scanning to evaluate nonspecific abdominal complaints has led to an increased rate of diagnosis of unsuspected intussusception in children. In an atypical presentation for this disease, these patients had prolonged, relatively minor abdominal pain. We therefore retrospectively attempted to identify specific CT criteria that might have predicted safe and successful enema reduction, despite prolonged symptom duration. These findings could obviate the need for routine exploratory laparotomy in appropriate children.

Materials and Methods

Our study was exempted by the institutional review board at Kaiser Permanente Los Angeles Medical Center. The pediatric surgery database at our institution was analyzed for a one-year period, and a retrospective review of pediatric patients in whom ileocolic intussusception was diagnosed by CT imaging was performed. Because of existing Radiology Department policy,
Computed Tomography Findings of Unanticipated Prolonged Ileocolic Intussusception in Children

**Results**

Six pediatric patients (three boys and three girls with an average age of 13.7 months; range, 5–24 months) with vague abdominal complaints of unclear etiology were shown by CT scan to have ileocolic intussusception (Table 1). The average duration of symptoms before diagnosis was 5.5 days (range, 4–7 days), and the average white blood cell count at the time of admission was 9.4 × 10³/mm³ (range, 4.5–18.0 × 10³/mm³).

Contrast CT scans of patients 1 through 3 showed findings diagnostic of intussusception with no bowel-wall edema and mild inflammatory changes but without evidence of obstruction or perforation (Figure 1). Surgical findings in these patients correlated with CT findings, and all had easily reducible ileocolic intussusception with nonischemic bowel. CT scans of patients 4, 5, and 6 showed intussusception with significant partial small-bowel obstruction and bowel-wall edema (Figure 2), which also correlated well with surgical findings. Patients 4 and 5 required bowel resection because of irreducible intussusception with areas of ischemia and necrosis, whereas patient 6 underwent a difficult manual reduction of nonischemic but edematous bowel.

**Discussion**

Ileocolic intussusception is the most common cause of bowel obstruction in children younger than two years. When the condition is promptly diagnosed, contrast or air enema successfully reduces the intussusception in the majority of patients. However, surgical management has been the standard treatment for patients with a delayed presentation of intussusception (>48 hours). Nonsurgical reduction has been infrequently attempted in these patients because of the decreased probability of success and the increased potential for perforation.1–4 However, recent data have shown that successful hydrostatic reduction is not influenced by symptom duration.5 Despite this finding, surgical intervention has remained the treatment of choice in children with delayed diagnosis at our institution.

With the increasing use of CT scans in patients with atypical abdominal complaints, unsuspected intussusceptions have been more frequently diagnosed. CT appearance of intussusception include a target sign, a sausage-shaped mass of different layers of attenuation, and/or a less-defined kidney-like mass. It is thought that this variation in appearance corresponds to a spectrum of stages in disease progression, representing increasing bowel-wall edema and vascular compromise.7,8

It is important to note that we are not advocating the use of CT scan as the primary imaging modality for patients with suspected intussusception. Rather, all patients in our series were initially suspected of having other intra-abdominal pathology, most commonly appendicitis, and intussusception was an unexpected finding of scanning. This has been an increasingly common occurrence at our institution and may be related to the increased use of CT scanning in the pediatric population.

The ability to correlate CT scan results and surgical findings in children with a delayed diagnosis of intussusception has enabled the development of imaging criteria that may indicate which patients may still safely and effectively undergo cautious attempts at barium enema or air reduction. In our limited series, the absence of significant bowel-wall edema and bowel obstruction on CT scan was a good indication that the bowel remained nonischemic and easily reducible.

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**Table 1. Pediatric patients whose intussusception was diagnosed using computed tomography scanning**

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (months)</th>
<th>Sex</th>
<th>Duration of symptoms (days)</th>
<th>Scan findings</th>
<th>Surgical findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Small bowel obstruction</td>
<td>Bowel edema</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>M</td>
<td>3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>M</td>
<td>7</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>M</td>
<td>7</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
<td>F</td>
<td>5</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>F</td>
<td>4</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>F</td>
<td>5</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
ORIGINAL ARTICLE

Computed Tomography Findings of Unanticipated Prolonged Ileocolic Intussusception in Children

Conclusion
Children presenting with prolonged ileocolic intussusception (i.e., intussusception that has lasted more than 48 hours) may safely undergo contrast enema reduction if no bowel-wall edema of the intussuscipiens or small-bowel obstruction is noted on CT scanning, no peritonitis is found on examination, and no free air is seen on radiographic imaging.

Disclosure Statement
The author(s) have no conflicts of interest to disclose.

Acknowledgment
Katharine O’Moore-Klopf of KOK Edit provided editorial assistance.

References
A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time?

Abstract

Context: Nurses are the primary hospital caregivers. Increasing the efficiency and effectiveness of nursing care is essential to hospital function and the delivery of safe patient care.

Objective: We undertook a time and motion study to document how nurses spend their time. The goal was to identify drivers of inefficiency in nursing work processes and nursing unit design.

Design: Nurses from 36 medical-surgical units were invited to participate in research protocols designed to assess how nurses spend their time, nurse location and movement, and nurse physiologic response.

Main Outcome Measures: Nurses’ time was divided into categories of activities (nursing practice, unit-related functions, nonclinical activities, and waste) and locations (patient room, nurse station, on-unit, off-unit). Total distance traveled and energy expenditure were assessed. Distance traveled was evaluated across types of unit design.

Results: A total of 767 nurses participated. More than three-quarters of all reported time was devoted to nursing practice. Three subcategories accounted for most of nursing practice time: documentation (35.3%; 147.5 minutes), medication administration (17.2%; 72 minutes), and care coordination (20.6%; 86 minutes). Patient care activities accounted for 19.3% (81 minutes) of nursing practice time, and only 7.2% (31 minutes) of nursing practice time was considered to be used for patient assessment and reading of vital signs.

Conclusion: The time and motion study identified three main targets for improving the efficiency of nursing care: documentation, medication administration, and care coordination. Changes in technology, work processes, and unit organization and design may allow for substantial improvements in the use of nurses’ time and the safe delivery of care.

Introduction

The US hospital system is in a state of transition. Hospitals face daunting challenges, such as evolving technologies and reimbursement policies, demographic trends, competing fiscal demands, and a worsening workforce shortage. This point in time also affords a unique opportunity, as the US is in the midst of one of the largest hospital-building and renovation booms in history.1 A reconsideration of hospital design and work processes holds the potential to affect the efficiency and effectiveness of care delivery for the foreseeable future. Bold changes in the hospital work environment are imperative to ensure the sustainability and affordability of the hospital as part of the American health care delivery system.

Nurses are the linchpin of hospital care delivery. These frontline caregivers represent a critical and costly resource; maximizing the efficiency and effectiveness of nurses is essential to the integrity of hospital function and the promotion of safe patient care. A growing evidence base links more nursing time per patient-day with better patient outcomes.2–5 However, increased nurse workload and the growing nursing workforce shortage6 reduce the amount of nursing time available for patient care activities.

How medical-surgical nurses spend their time is a key driver of bold changes in the hospital work environment.7–9 Current re-
search suggests that two interrelated elements—nurse work process and the physical hospital environment—contribute to the efficiency and safety of patient care.10–12 An understanding of how nurses spend their time will target opportunities for nursing care effectiveness through improvements in management, workforce, work processes, and organizational culture.13

We undertook a time and motion study to provide an evidence-based understanding of how medical-surgical nurses spend their time and of the influence of unit architectural layout on nurses’ use of time and distance traveled. Documenting the drivers of inefficiency in nursing practice will allow for targeted changes to the work environment to positively influence patient safety and quality of care.

The primary objectives of the study were to identify how nurses spend their time during their shift and to pinpoint environmental variables in the acute-care nursing workplace that can be altered to positively affect the efficiency of nursing care and, ultimately, patient safety.

Specifically, the study aimed to determine:
- the amount of time nurses spend on specific activities: nursing practice, unit-related functions, nonclinical activities, and waste
- the distance traveled by the average nurse during a typical shift, and whether this movement is efficient
- the physiologic impact of the work environment on nurses.

This study was also designed to provide baseline data regarding documentation activities prior to the installation of electronic health record (EHR) technology in specific units. These findings are not included in this article because of complications in the analysis of the data collected.

**Methods**

The time and motion study was conducted at 36 hospital medical-surgical units within 17 health care systems and 15 states. Together, these geographically diverse health care systems operate a total of 274 hospitals with more than 63,000 beds. Each participating study health system and hospital’s institutional review board approved the study protocol.

**Study Units and Participants**

From a list of all eligible medical-surgical units at each of the participating hospitals, one unit per hospital was randomly selected for inclusion in the study. An eligible medical-surgical unit was defined as a unit in which patients who require less care than that which is available in intensive care units, step-down units, or specialty care units, and receive 24-hour inpatient general medical services, postsurgery services, or both general medical and postsurgery services. These units may include mixed patient populations with diverse diagnoses and of diverse age groups who require care appropriate to a medical-surgical unit.

Nurses at each participating unit meeting the eligibility criteria were invited to join the study; participa-

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**Table 1. Description of study protocols**

<table>
<thead>
<tr>
<th>Study protocol</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Baseline data for EHR implementation</td>
<td>How nurses spend their time</td>
<td>Nurse location and movement</td>
<td>Nurse physiologic response</td>
</tr>
<tr>
<td>Data collected</td>
<td>All documentation activities during shift</td>
<td>Random sampling of work activities</td>
<td>Distance traveled and location in nursing unit</td>
<td>Physiologic parameters, steps taken</td>
</tr>
<tr>
<td>Study period</td>
<td>All on-shift hours for seven days</td>
<td>All on-shift hours for seven days</td>
<td>All on-shift hours for seven days</td>
<td>23 hours/day for seven days</td>
</tr>
<tr>
<td>Device</td>
<td>PDA</td>
<td>PDA</td>
<td>RFID&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Armband&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Method</td>
<td>For each documentation activity: select category, note activity duration</td>
<td>When PDA vibrates, select: location, activity, cognitive category</td>
<td>Nurse location tracked continuously via RFID tags when on unit</td>
<td>Automatic recording of parameters throughout 23-hour period</td>
</tr>
<tr>
<td>Participation</td>
<td>Nurses randomized to protocol A or B</td>
<td>All nurses&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Voluntary</td>
<td></td>
</tr>
<tr>
<td>Participating nurses</td>
<td>385</td>
<td>382</td>
<td>750</td>
<td>288</td>
</tr>
<tr>
<td>Nurse shifts studied</td>
<td>1113</td>
<td>1083</td>
<td>1906</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<sup>a</sup>Radiance, Inc, Andover, MA.
<sup>b</sup>SenseWear Pro Armband (BodyMedia, Inc, Pittsburgh, PA).
<sup>c</sup>One study unit did not participate in protocol C.

EHR = electronic health record; PDA = personal digital assistant; RFID = radio frequency identification.
A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time?

When they completed the activity, nurses pressed “stop.” Protocol A sought to measure the amount of time spent on nursing work processes before the installation of EHRs. Pre-versus postinstallation results will be reported elsewhere.

Protocol B: How Nurses Spend Their Time

Nurses in research protocol B carried PDAs that vibrated at random times during their work shift to remind them to stop what they were doing and record the activity in which they were engaged. Each PDA was programmed to vibrate 25 times per 13-hour shift (in case of overtime), with a minimum interval of ten minutes between alarms. If the nurse did not respond immediately, the PDA continued to vibrate every 15 seconds until the nurse responded. When the PDA vibrated, the nurse was asked to select from categoric data sets describing where they were (patient room, nurse station, on unit, or off unit) and what they were doing (Table 2). For this report, the term patient room refers to any patient room that the nurse visited, not a single patient room.

The nurses’ activities were clustered into categories and subcategories of how much time nurses spend on activities considered to be nursing practice, nonclinical, unit-related, or waste. These categories and subcategories (Table 2) were selected to cluster sufficient increments of time to make strong comparisons and to identify important targets for change. The goals were to reveal drivers of inefficiency in how nurses spend their time and to identify opportunities to improve efficiency through changes to unit design and/or organization.

The subcategory of patient care activities does not represent a comprehensive accounting of all activities related to patient care. Other care-related subcategories, such as medication administration, care coordination, and documentation was voluntary. To be eligible, nurses were required to be licensed (RN, LPN, or LVN) and to provide direct nursing care for patients on the study unit. In-house pool nurses were eligible if they worked on the study unit for more than eight weeks. Ineligible nurses included: float and agency nurses; nurse preceptors and preceptors; and nursing supervisors, charge nurses, or other nurse specialists, unless they provided direct nursing care with the same acuity and patient load as other participants.

Study Protocols

The study consisted of four protocols: A, B, C, and D (Table 1). Nurses who consented to participate were randomized to either protocol A or protocol B. All nurses were asked to participate in protocol C, and any nurse who volunteered to do so took part in protocol D. For each protocol, study staff collected data for seven consecutive days, 24 hours a day, except for protocol D, for which data were collected for 23 hours a day.

Protocol A: Baseline Data for EHR Implementation

Nurses participating in protocol A were supplied with personal digital assistants (PDAs) to record all documentation-related activities during their shifts. With these PDAs, unit nurses documentation categories from the following options:

- Admission paperwork
- Assessment
- Transcribe orders
- Writing care plan
- Medications paperwork
- Teaching
- Discharge paperwork
- Other.

For each documentation activity, nurses selected “start” on their PDA, then the documentation category.

When they completed the activity, nurses pressed “stop.” Protocol A sought to measure the amount of time spent on nursing work processes before the installation of EHRs. Pre-versus postinstallation results will be reported elsewhere.

 Protocol B: How Nurses Spend Their Time

Nurses in research protocol B carried PDAs that vibrated at random times during their work shift to remind them to stop what they were doing and record the activity in which they were engaged. Each PDA was programmed to vibrate 25 times per 13-hour shift (in case of overtime), with a minimum interval of ten minutes between alarms. If the nurse did not respond immediately, the PDA continued to vibrate every 15 seconds until the nurse responded. When the PDA vibrated, the nurse was asked to select from categoric data sets describing where they were (patient room, nurse station, on unit, or off unit) and what they were doing (Table 2). For this report, the term patient room refers to any patient room that the nurse visited, not a single patient room.

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The subcategory of patient care activities does not represent a comprehensive accounting of all activities related to patient care. Other care-related subcategories, such as medication administration, care coordination, and documenta-

Table 2. Categories and subcategories of nursing time for protocol B

<table>
<thead>
<tr>
<th>Nursing activity category</th>
<th>Nursing activity subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste</td>
<td>Waiting</td>
</tr>
<tr>
<td></td>
<td>Looking/retrieving</td>
</tr>
<tr>
<td></td>
<td>Delivering</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit-related functions</td>
<td>Unit-related functions</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing practice</td>
<td>Patient care activities</td>
</tr>
<tr>
<td></td>
<td>Care coordination</td>
</tr>
<tr>
<td></td>
<td>Medication administration</td>
</tr>
<tr>
<td></td>
<td>Documentation</td>
</tr>
<tr>
<td></td>
<td>Assessment/reading vital signs</td>
</tr>
<tr>
<td>Nonclinical</td>
<td>Personal time</td>
</tr>
<tr>
<td></td>
<td>Patient/family care</td>
</tr>
<tr>
<td></td>
<td>Administration/teaching</td>
</tr>
</tbody>
</table>

1Unit-related functions included preparing equipment, counting narcotics, transporting patients between departments, using fax or copy machine, and reviewing or updating a status board.

2Patient care activities included providing care or treatment to the integumentary system; providing specific education about the patient’s condition and nursing needs; loss of bowel or bladder control in which the nurse cleans the patient, linens, or floor; participating in or dealing with a rapid-response team, code, or near code; participating in general discussion with the patient; conducting intervention activities such as intravenous site changes and urinary catheter insertion; preparing the patient for hospital admission or discharge; helping the patient with activities of daily living; providing specific education about the patient’s condition and nursing needs; assessing patient while off unit; conducting nursing or medical intervention while off unit.
tion were separated from patient care activities to help identify what activities consume nurses’ time. These categories, therefore, are intended to be utilitarian rather than absolute.

Protocol C: Nurse Location and Movement
To monitor nurse location and movement, nurses in research protocol C wore radiofrequency identification (RFID) tags (Radianse, Inc, Andover, MA) that continually monitored where they were, how far they traveled, and the duration of activity in any one spot. Signals from each RFID tag were transmitted to an indoor positioning system installed on each unit for the study week. The RFID tags measured the distance traveled in relation to the physical layout of the nursing unit. As nurses spent only 20 to 30 seconds in any one spot, each nurse was fitted with four tags to ensure that grouping signals would not be missed.

Protocol D: Nurse Physiologic Responses
To assess the physical impact of workload and stress on the nurses, volunteers from any study group had their physiologic response monitored by specialized armbands (SenseWear Pro Armband, BodyMedia, Inc, Pittsburgh, PA) to measure the physiologic metrics both on and off shift for 23 hours a day for a seven-day period (nurses removed armbands for one hour per day). The armbands simultaneously measured skin temperature, near body temperature, galvanic skin response, heat flux, and motion via a two-axis accelerometer. From these data, estimates were made for total energy expenditure (calories burned), distance traveled, speed, active energy expenditure, sleep, and categories of physical activity.

Site Implementation
Before study startup, the optimal placement of IPS receivers were mapped on computerized architectural drawings (CADs) of the study unit. Two days before the data-collection period, the temporary wireless access points were installed and tested to ensure proper functioning. At each study unit, the necessary hardware was installed, and staff and management members were oriented regarding the purpose of the study and the use of devices before data collection. The hospital study coordinator managed the data-collection process with the unit manager and nurse executive.

The study was conducted at each site during a period of seven consecutive days. Data for all units were collected between June 2005 and June 2006.

Unit-Assessment Data-Collection Tool
A standardized unit-assessment data-collection tool was completed by each study unit’s nursing manager to collect more than 200 hospital unit demographic, technologic, and architectural variables. These variables were used to interpret unit and nurse variation, as well as cluster relationships that correlated or explained the difference in efficiency and nursing time spent with patients.

Data Management and Statistical Analysis
The statistical and technical methods used in this study will be reported in detail in a separate publication. In brief, each hospital unit transmitted raw data to computer scientists at Purdue University who then stored the data in an Oracle database. Data was transferred from the Oracle database to an R

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Table 3. Nurses eligible, consenting, and completing study

<table>
<thead>
<tr>
<th>Participant status and reason codes</th>
<th>Subtotal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total nurses in study units</td>
<td>1420</td>
<td></td>
</tr>
<tr>
<td>Ineligible for study</td>
<td>339</td>
<td></td>
</tr>
<tr>
<td>Does not meet nurse definition</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>Inactive</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>New nurse in orientation</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Not scheduled during study</td>
<td>169</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Total eligible for study</td>
<td>1081</td>
<td></td>
</tr>
<tr>
<td>Did not consent</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>Felt that study entailed “Big Brother watching”</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Disliked consent process</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Just said no</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Too busy to “mess with”</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>“Too much equipment” used in study</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Would not participate in any study</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Consenting for study</td>
<td>826</td>
<td></td>
</tr>
<tr>
<td>Did not complete study</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>Did not start study</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Voluntarily dropped out during study</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Completed study</td>
<td>763</td>
<td></td>
</tr>
</tbody>
</table>
system for graphics database. A new framework was used for data display in which a “visualization database” exhibited all cleaned data as well as summary statistics. This deep visualization allowed for the development of valid statistical models and the performance of appropriate data analyses.

Cross-Validation Between Protocols

Data collected from the different protocols allowed for cross-validation of certain findings. Distance traveled on the unit, for example, was evaluated in both protocol C (through RFID tracking) and protocol D (through armband accelerometer). Nurse location could be validated between protocol B (PDA selection of location) and protocol C (RFID-determined location). Before the study was begun, location data for protocol C was validated by tracking “walks in the units.” RFID-tracked location was compared with audio recordings from unit walk-through.

Results

Profile of Participating Hospitals and Nurses

Of the participating medical-surgical units, 33 were in urban facilities (3 rural) and 17 were part of teaching/academic institutions. The average length of stay for the study units ranged from 2.62 to 8.67 days (average, 4.37 days). Unit sizes ranged from 11 to 20 beds to 81 to 90 beds (median, 31–40 beds).

A total of 1420 nurses were identified at the 36 study units. Of this total, 339 were deemed ineligible by study criteria; 826 of the eligible nurses consented to participate, and 763 completed the study (Table 3). No participants were removed from the study because of noncompliance. The majority of participants were RNs (783), and the remainder were LPN/LVN (43). Nurses’ educational background was as follows: 57%, AD or nursing diploma; 41%, BSN; 2%, MSN.

The study population of 767 nurses were randomized, 385 to protocol A and 382 to protocol B (Table 1). All nurses were included in protocol C, with the exception of nurses at one study unit, leaving a total of 750 participants. For protocol D, 288 nurses volunteered. In all, data were collected for 2201 nursing shifts (2065 RNs; 136 LVNs/LPNs) and 21,882 total hours (20,573 RNs; 1309 LVNs/LPNs). Average shift length was 9.94 hours.

Nurses randomized to protocol B responded on average 17 times per shift. Figure 1 illustrates the average time spent by nurses in each location category (patient room, on the unit, off the unit, nurse station); an additional 45 minutes per average 10-hour shift (7.5% of a ten-hour shift) were not accounted for by participants (no response, no location chosen, undefined, or pushed wrong response). Percentages reported below and in Figures 1 through 5 do not include undocumented time.

Figure 2 illustrates how nurses spent their time by activity category. More than three-quarters of nurses’ time was devoted to nursing practice (417 minutes, 77.7% reported time per shift). Activities considered to be waste consumed 36.3 minutes, or 6.6%, of reported time per 10-hour shift. Nurses’ time was further analyzed according to activity by location, and by subcategory. Figure 3 illustrates the amount of time per activity category in each of the four locations. Nursing practice accounted for the majority of time in all locations except off the unit. Waste and nonclinical activities accounted for larger proportions of time spent by nurses on the unit (excluding patient room and nurse station) or off the unit, compared to the patient room and nurse station. Time devoted to nonclinical activities was approximately equivalent for nurse station (20.6 minutes), on the unit (17.8 minutes), and off the unit (18.2 minutes); nonclinical activities accounted for only 11.3 minutes of time spent in the patient room.
Nursing Practice: Locations and Subcategories

Nursing practice time was concentrated in the patient room (155.7 minutes) and nurse station (180.6 minutes) (Figure 4A). Within nursing practice, the greatest proportion of time was devoted to documentation (147.5 minutes, 35.3%, Figure 4B). Care coordination—communication with team members or other departments—accounted for 86 minutes (20.6% of nursing practice). Patient care activities accounted for less than one-fifth of total nursing practice time (81 minutes, 19.3%).

The subcategories care coordination and documentation were further analyzed by dividing each according to nurses' location (Figure 5A/B). Both were performed predominantly at the nurse station (documentation: 119 minutes, 80.6% documentation time; care coordination: 59.4 minutes, 69.2% care coordination time). Only a minority of care coordination (2.4 minutes, 2.8%) and documentation (4.13 minutes, 2.8%) took place in the patient room.

Unit Architecture

Three different unit architectural types were included in the study: “racetrack,” “corridor,” and “radial.” Of 36 study units, 19 had a racetrack design; 12, corridor; and 5, radial. The effects of these three design types and design subtypes on nurses’ activities were evaluated. No consistent, statistically significant relationship was found between the various architectural types and nursing time spent with patients.

Distance Traveled

Individual nurses across all study units traveled between 1 and 5 miles per 10-hour daytime shift. During daytime shifts, average distance traveled ranged between 2.4 and 3.4 miles per 10 hours (median, 3.0 miles).

Nurses traveled less distance during nighttime shifts when most activities and patient tasks change (patients are less mobile, pain often increases). On night shifts, average distance traveled ranged between 1.3 and 3.3 miles per 10 hours. The median distance was 2.2 miles, a reduction of 0.8 miles per 10 hours from daytime shifts.

Nurses spent considerably less...
time moving when they were not at work. While they were off shift during the daytime, distance traveled varied from 1.2 miles to 3.5 miles. The median was 2.1 miles, or 0.9 miles fewer per 10 hours compared with daytime work shifts.

**Variation Between Shifts**

Distance traveled varied widely by shift. Distance per shift varied by a factor of four or more, even within the same unit (data not shown). Time spent on various activities (including documentation) also varied considerably between shifts. Of interest, the variability between individual nurses on the same unit was often greater than the variance across different hospital units.

**Physiologic Impact**

The normalized metabolic equivalents (nME), defined as energy expenditure during activity normalized to energy expenditure during sleeping time (i.e., nME = 1 during sleep), were calculated for nurses in protocol D. The median nME for nurses on daytime shifts was 1.71. Nurses working on night shifts had a reduced nME, with a median of 1.52, an 11% reduction. While they were off shift, nME dropped to a median of 1.5, a 12% reduction from the daytime shift.

**Discussion**

This study is the first hospital environmental study to quantify how nurses spend their time, in real-time and in real work contexts. The findings demonstrate that nurses spent more than three-quarters of their time on nursing practice-related activities—but less than one-fifth of all nursing practice time on activities defined as patient care activities. Three other activities accounted for the majority of nursing practice time: documentation, care coordination, and medication administration. Only 7.2% (31 minutes) of nursing practice time was dedicated to patient assessment and recording of vital signs.

Of all reported time, 6.6% (36.3 minutes) was categorized as waste. Activities within this category—many of which were “hunting and gathering” behaviors—are clearly targets for improving efficiency. The much larger proportions of time devoted to care coordination, medication administration, and, in particular, documentation may also represent opportunities for process improvement. Documentation accounted for the largest proportion of nursing time; in fact, this category by itself accounts for 27.5% of all reported time, more than unit-related functions, nonclinical activities, and waste combined.

Among locations, the nurse station featured prominently. Nurses spent the largest proportion of their time—38.6% (214.2 minutes)—at the nurse station, compared with less than one-third (171 minutes) in the patient room. It is also the primary location for activities related to documentation and care coordination. Whereas time spent in the patient room and at the nurse station was almost entirely devoted to nursing practice (Figure 3), nurses' time at other locations on the unit and off the unit was fragmented between nursing practice, nonclinical activities, unit-related functions, and waste.

A picture emerges of the professional nurse who is constantly moving from patient room to room, nurse station to supply closet and back to room, spending a minority of time on patient care activities and a greater amount of time on document...
tation, coordination of care, medication administration, and movement around the unit. The motion findings of the study support this picture. Nurses walked significant distances while at work and walked farther while on shift (median, 3.0 miles) than when not at work (median, 2.1 miles). In previous studies, walking has been identified as a major time consumer for nurses, and evidence suggests that time saved walking translates into more time spent on patient-care activities.1

Previous research has shown that a primary reason for nurse attrition is the workloads traditionally inherent in this profession.14 Our findings regarding the physical activity required in nursing—long distances traveled and increased metabolic expenditure—corroborate the physical and workload demands nurses endure on a regular basis.

**Documentation**

Documentation is an essential part of nursing practice and accounts for a major portion of the nurses’ time. The documentation process in many hospitals is also rife with inefficiencies. For example, nurses and other care providers often must transfer information between data collection systems, consuming nursing time and contributing to transcription errors. Documentation is often duplicated between departments and disciplines because of the lack of a single patient problem list for all providers. The result is fragmentation of care, duplication of data sets, and the inability to quantify the outcome of the care provided. Evolving regulatory and public policy requirements for documentation (such as “present on admission”) may exacerbate these problems.15

The efficiency of documentation is a multifactorial problem, and solutions remain varied and controversial. Health care systems will need robust processes driven by caregivers to improve efficiency and reduce time dedicated to documentation. There is hope that EHRs will improve efficiency, but whether they can has not yet been documented.

**Medication Administration**

Like documentation, medication administration is an essential component of nursing practice. Because nurses devote considerable time to this category of care, opportunities may exist to improve efficiency. Approximately two-thirds of all time spent on medication administration in this study was related to drug delivery to the patient (46.7 minutes). The other third (24.9 minutes) was spent preparing drugs for administration. Process improvements could reduce the time required for this step. Furthermore, medication administration has been identified by other researchers as a leading source of operational failures.10

Hospital medication processes may be affected by the fragmentation of the informatics infrastructure. In an ideal patient care nursing unit, medications would be administrated as part of a seamless closed-loop system that provides accurate and timely information about the patient, including patient identification, order verification, allergies, laboratory values, potential reactions, and preferences. Operational failures within this process demand the nurse’s attention and time and may be a source of additional distance traveled.

Proposed improvements to this process include advanced automated dispensing systems, the use of small medication cabinets within the patient room, and the use of case carts to provide most medications predicted on that basis of patient condition. Creating closed-loop medication administration systems will require an interdisciplinary effort, including supply chain, informatics, work process, and vendor platform integration.

**Care Coordination**

Care coordination (communication regarding the patient) accounts for approximately one-fifth of nursing practice time. The benefits of timely and efficient communication between team members have been documented by other investigators.16-19 However, inefficiencies in communication may consume nurses’ time and put patients at risk. Failure to rescue—death following the occurrence of an adverse event—is a nurse-sensitive outcome that has been correlated with nurse-patient ratios, communication, and patient surveillance, among other factors.7 Indeed, many failure-to-rescue situations can be traced back to communication delays or omissions.

The efficient flow of patient information and status updates could reduce wasted time and the potential for errors. Proposed technology solutions include wireless networks, handheld and ear devices for the delivery of patient information, and intelligent systems that automatically track the physical location of a medical provider.

Most care coordination time is spent at the nurse station. Indeed, the nurse station itself may represent an opportunity for design and process improvement. The location of terminals and/or wireless devices for data entry, for example, could reduce the need for and time spent at the nurse station. Such changes could reduce walking time between patient rooms and the nurse station, and increase the amount of time available in the patient room.
Nursing Unit Design

One of our study objectives was to describe the variation in distance traveled, time spent by category, and workload between units with different physical layouts. No statistically significant correlation was found between type of unit design and time spent with patients. In fact, there was more variation in miles traveled and patient time between nurses on the same unit than between units. One likely explanation for these findings is that nurses’ ability to organize their work and staffing assignments has greater impact on these measures than does physical space by itself. For example, a nurse with geographically contiguous patient assignments traveled less than a nurse with an assignment based on the level of acuity of illness in which patients were placed in noncontiguous rooms. This finding suggests that process and policy, as well as relatively minor physical changes within a unit (such as distribution points of supplies or medications), can have a major impact on nurse workload.

Nurses’ adaptability may allow them to compensate for limitations imposed by the physical design of the unit. This adaptation may mask potential effects of unit layout on distance traveled and time spent per activity. Additional statistical analyses of time and motion data are currently underway to detect interactions between unit architecture and nurse time and movement.

It may be that for unit layout to make a difference in nursing time spent on patient care activities, other contextual factors must also change. Such factors include the interoperability of technology, staff work assignments, and work processes. Previous research provides compelling evidence that poorly organized practice environments can negate the benefits of excellent staffing and positive patient outcomes.20,15 A holistic approach is needed whereby people, process, and technology come together harmoniously in a physical space to produce the maximum medical-surgical unit efficiency.

Study Limitations

The challenge study nurses faced in continuing their jobs without interference from the time and motion study (both with respect to patient needs and ensuring study validity) might have led to problems in the data collected. For example, some nurses in protocol A forgot to turn off their PDAs after completing their respective activity, leading to outlier times in the database. In protocol B, nurses occasionally selected no category or pressed incorrect buttons. These are limitations of the self-report methodology.

The study design required identification of all activities of a nursing shift and grouping these activities into cogent, useful, and appropriate categories. The rationale for these activities and groupings could be sensibly debated. The category of patient care activities, for example, does not include activities, such as medication administration, that have obvious and direct impact on patient safety and outcomes. The categories were selected with the intention of grouping activities that comprise sufficient nursing time to provide useful data while avoiding more vague terms such as direct and indirect care.

Conclusions

Nurses are the primary hospital caregivers, and the efficient use of their time and energy is critical to the future of American hospitals. Our study evaluated the time that nurses spent and the distance that they traveled across 36 geographically diverse medical-surgical units. The results demonstrate that nurses devote large proportions of their time to documentation, medication administration, and care coordination and somewhat less time to patient care activities. Nurses also travel significantly larger distances and exert more energy during daytime shifts than when away from work.

These findings illustrate the complex and demanding hospital work environment and suggest opportunities to improve the efficiency of nursing work. Changes to the process and technology of documentation, communication, and medication handling, as well as the physical design of units, could benefit nursing efficiency and the safe delivery of care.

Truly transforming the hospital–patient care environment to improve the delivery of safe, high-quality, patient-centered care would be a paradigm shift. The task now is to test solutions to create a more effective work environment that seamlessly supports clinicians in the direct care of patients.

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

Acknowledgments

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References
cal_env.pdf.

What You Can Do

Do not let what you cannot do interfere with what you can do.

― John Wooden, b 1910, UCLA Basketball Coach
soul of the healer

“Flowers and Space”

Oil on canvas
24” x 36”

By Kamran Nikravan, MD

Dr. Nikravan is a Urologist at the West Los Angeles Medical Center. He credits art with bringing balance to his life. Dr. Nikravan began his studies in art at the Brentwood Art Center and continues at the Kline Academy of Fine Art, both in Los Angeles, CA. Dr. Nikravan loves his wife’s flower arrangements and this one inspired him to paint. You may see more of his work at his Web site: www.nikravan.com.
Weight Loss and Psychologic Gain in Obese Women—Participants in a Supported Exercise Intervention

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Ann C Whitaker, RD, LD, CDE

Abstract

Background: Physical activity is a predictor of maintained weight loss; however, causal mechanisms are unclear. Behavioral theories suggest that associated psychologic changes may indirectly affect weight loss.

Objective: We sought to test the association of a behaviorally based exercise support protocol (The Coach Approach [CA]), with and without a group-based nutrition education program (Cultivating Health), with adherence to exercise and changes in physiologic and psychologic factors, and to assess theory-based paths to weight and body-fat changes.

Setting: The study took place in YMCA wellness centers.

Study subjects: Study participation was open to formerly sedentary obese women.

Design: Study participants were randomly assigned to the CA Only (CA; n = 81), The CA Plus Cultivating Health (CA/CH; n = 128), or the control (n = 64) group. We contrasted dropout and attendance rates and changes in self-efficacy (SE), physical self-concept (PSC), total mood disturbance (TMD), body areas satisfaction (BAS), and select physiologic factors during a six-month period. We also analyzed proposed paths to weight loss.

Results: The CA and CA/CH groups had significantly lower exercise dropout rates ($\chi^2 = 44.67, p < 0.001$) and higher attendance rates ($F = 10.02; p < 0.001$) than the control group did. Improvements in body fat, body mass index (BMI), and waist circumference were significant for only the CA and CA/CH groups. Significant improvements in TMD, PSC, and BAS scores were found for all groups, with effect sizes greater in the groups incorporating the CA protocol. Within the five paths assessed, entry of changes in TMD and BAS scores into multiple-regression equations, along with SE and PSC scores, increased the explained variance in exercise session attendance from 5% ($p = 0.01$) to 16% ($p < 0.001$). Exercise session attendance was significantly associated with changes in body fat ($r = -0.41; p < 0.001$) and BMI ($r = -0.46; p < 0.001$).

Conclusion: Counseling based on social cognitive and self-efficacy theory may increase exercise adherence and improve variables indirectly related to weight and body-fat reductions. Although decreases in body fat and BMI were obtained, they appeared less pronounced than psychologic improvements. Additional research on interrelations of physical activity, psychologic factors, and weight change is warranted for development of obesity treatments.

Introduction

Approximately 65% of American adults are either overweight (body mass index [BMI], 25.0–29.9 kg/m$^2$) or obese (BMI $\geq$ 30 kg/m$^2$), with more women (33.4%) being obese than men (27.5%). Obesity is a prominent modifiable risk factor for type 2 diabetes, heart disease, hypertension, and stroke. Although restriction of calorie intake and increase in energy expenditure will reduce weight, responses to diets and exercise programs have been problematic. Persistence of requisite behaviors has been the major problem. Definitive reviews have concluded that diets alone are ineffective for sustained weight control, as are methods based on education in favorable eating and physical activity behaviors.

The strongest predictor of sustained weight loss is regular physical activity, although causal mechanisms of this are undetermined and the dropout rate is typically 50% to 65% within the first three to six months. Although considered less important for weight loss than reduction in caloric intake, exercise may...
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have benefits not typically cited. It is possible that improvements in feelings of ability, or self-efficacy, often associated with success with an exercise program, will induce persistence with caloric reduction.

Consistent with social cognitive and self-efficacy theory, self-efficacy is thought to influence health behaviors through dimensions of task self-efficacy (ie, perceived physical capabilities) and self-regulatory efficacy (ie, perceived self-management competencies). Interventions based on self-efficacy theory use self-management and self-regulation to effectively deal with barriers to persistence, and they promote a sense of competence. Mood and body-image improvements, often associated with physical activity, may also be related to adherence to a program of weight management. Physical activity may serve as an indirect mitigator of low mood and dysfunctional eating. In extending self-efficacy theory, Baker and Brownell proposed a model that included relationships between physical activity program participation, changes in psychologic and self-efficacy factors, exercise frequency, and weight loss. They suggested that improved mood would be associated with increased exercise and with an improved psychologic climate where caloric reduction becomes easier. They stated that “… positive changes in body image, irrespective of numbers on the scale, may help prevent discouragement and resignation. …” Supporting this premise, improved self-perception and perceived physical attractiveness was found to be associated with an exercise program in females, even when measured physical changes were minimal. Addressing the possibility that positive perceptions emanating from physical activity participation may generalize to eating behaviors, Baker and Brownell stated that “… increases in exercise self-efficacy could influence eating self-efficacy and dietary compliance through a more general sense of weight-loss self-efficacy.”

Improved self-management related to exercise, leading to enhanced self-efficacy and better results with weight management, has been previously supported.

The Coach Approach (CA) is a structured exercise-support treatment based on principles of social cognitive and self-efficacy theory. It is administered through monthly meetings supported by a computer program. The CA has been associated with significantly improved adherence to newly initiated exercise through highlighting improvements in mood and incremental progress toward goals, pairing exercise regimens with reinforcing rather than punishing feelings, incorporating an array of self-management and self-regulatory skills, and facilitating social supports. Whether findings generalize to exclusively obese samples is, however, unknown. Also unknown are results of the CA when paired with comprehensive instruction in appropriate nutritional practices.

Thus, our investigation contrasted three distinct conditions—the CA alone, the CA plus nutrition information classes, and a control group—on measures of adherence to exercise and on physiologic, self-efficacy, body satisfaction, and mood changes. Also assessed were proposed paths based on both self-efficacy theory and Baker and Brownell’s model. Because community wellness centers often have the means to deliver standardized protocols to large numbers of individuals in need, thus possibly supporting traditional medical care, that venue was selected for study.

Specific hypotheses were as follows:

1. Groups incorporating the CA protocol would have significantly better exercise session attendance, lower dropout rates, and better improvements in body fat, waist circumference, resting heart rate, blood pressure, and BMI than a control group would.

2. The addition of a group nutritional treatment to the CA protocol would increase effects on the physiologic factors.

3. Improvements in mood, body satisfaction, and self-regulatory and task self-efficacy would be significantly greater for groups incorporating the CA protocol than for a control group.

4. Accounting for self-efficacy dimensions at baseline, and their changes during a six-month period, would significantly predict exercise session attendance in study treatment subjects. Also, accounting for changes in mood and body satisfaction would add to the explained variances in attendance.

5. Theoretically derived paths would indicate that the CA protocol was associated with significant improvements in the dimensions of self-efficacy, mood, and body satisfaction; these changes would be significantly associated with exercise session attendance; and attendance would be significantly negatively related to changes in body fat and BMI.

It was hoped that findings would suggest directions and priorities for future research—ultimately resulting in more effective and reliable behavioral weight-management interventions appropriate for large-scale dissemination.

**Methods**

**Study Subjects**

Women volunteered by responding to newspaper advertisements. Inclusion criteria were: 1) being
age 21 to 65 years, 2) being obese with a BMI of 30 to 45 kg/m², 3) having partaken in no regular exercise (≤ 1 session/week) within the previous year, and 4) reporting a goal of weight loss. Exclusion criteria were 1) having inadequate physical conditions for exercise, 2) being pregnant or planning to become pregnant soon, and 3) taking medications for weight loss. A written statement from a physician regarding adequate physical health to participate was required. Appropriate institutional review board approval and consent from all study subjects were received.

Study subjects were randomized into three groups. Each group was provided access to similar YMCA wellness centers. Space limitations of respective facilities yielded slightly different group sample sizes. The CA Only group (CA; n = 81) was assigned to the behaviorally based exercise counseling protocol. The CA Plus Cultivating Health group (CA/CH; n = 128) additionally incorporated group nutrition information sessions. The control group (n = 64) was provided only typical wellness center practices. No significant differences were found between groups on the following variables. Overall, the age range was 22 to 65 years (mean, 43.2; SD, 10.0). BMI was 30.0 to 44.9 kg/m² (mean, 43.6 kg/m²; SD, 4.1). The racial makeup was 44% African American, 50% White, and 6% other racial groups; 87% of participants were in the lower-middle to middle socioeconomic class.

Measures

Exercise Dropout and Attendance

Consistent with previous research,6,9 dropout was defined as a 30-day period of no exercise sessions recorded during the six-month study time frame. Exercise session attendance was the ratio of sessions attended divided by the “ideal” number of sessions or 72 (3 sessions assigned per week × 24 weeks), expressed as a percentage. Exercise sessions completed were recorded electronically through a system that was suggested as valid through strong significant correlations (r values, 0.42–0.55), with changes in measures of cardiorespiratory function (eg, aerobic capacity, blood pressure, resting heart rate).18

Self-Efficacy

Consistent with previous research,21 the two dimensions of self-efficacy—self-regulatory efficacy and task self-efficacy12,20—were separately measured. The Exercise Self-Efficacy Scale (SE)22 was used to measure exercise barriers self-efficacy, or confidence in using one’s psychologic resources to overcome barriers to completing exercise (ie, self-regulatory efficacy). SE required responses to five items that began with the stem “I am confident I can participate in regular exercise when:” (eg, “I feel I don’t have the time”) on a scale ranging from 1 (not at all) to 4 (very confident). Internal consistencies were 0.82 and 0.76, and test–retest reliability over a two-week period was 0.90.23

The Physical Self-Concept Scale (PSC) of the Tennessee Self-Concept Scale24 measured feelings of adequacy regarding the physical self (ie, task self-efficacy). PSC required responses to 14 items (eg, “I have a healthy body,” “I am neither too fat nor too thin”) on a scale ranging from 1 (always false) to 5 (always true). The internal consistency was 0.83, and test–retest reliability over a one- to two-week period was 0.79.25 Significant correlations with the Psychasthenia scale of the Minnesota Multiphasic Personality Inventory (MMPI), Body Shape Questionnaire, and Nash Body Image Scale suggested concurrent validity in women.24,25

Body Satisfaction

The Body Areas Satisfaction Scale (BAS) of the Multidimensional Body-Self Relations Questionnaire26 evaluated satisfaction with aspects of the body (eg, lower torso [buttocks, hips, thighs, legs], weight). BAS required responses to five items on a scale ranging from 1 (very dissatisfied) to 5 (very satisfied). The internal consistency for females was 0.73, and test–retest reliability was 0.74.26

Mood

Total mood disturbance (TMD) is an aggregate measure of negative mood derived from subscales of the Profile of Mood States—Short Form.27 Respondents rated feelings over the preceding week on 30 items on a scale ranging from 0 (not at all) to 4 (extremely). Internal consistencies for the Tension, Fatigue, Depression, Confusion, Anger, and Vigor subscales ranged from 0.84 to 0.95, and test–retest reliability at three weeks averaged 0.69.27 The factor structure demonstrated consistency, and concurrent validity was suggested through contrasts with measures such as the Beck Depression Inventory, Manifest Anxiety Scale, and MMPI.27,28

Physiologic Factors

A recently calibrated digital scale (Tanita Corporation, Arlington Heights, IL) and tape measure were used to measure waist circumference (cm) and BMI. Body-fat percentage was measured using Lange Skinfold Calipers (Beta Technology, Santa Cruz, CA) at three sites (abdomen, ilium, and triceps), applying the Jackson-Pollock equation. Resting heart rate was assessed after a minimum of five minutes of rest. An aneroid sphygmomanometer with attached stethoscope (MDI Instruments USA, Agoura Hills, CA) was used to
measure systolic and diastolic blood pressure (mmHg). Measurements were each taken at a similar time of day by the same technician.

Change scores for all measures were calculated by subtracting the baseline score from the score at week 24.

Procedure
Study subjects were provided access to YMCA wellness centers in the area of Atlanta, Georgia, that included a variety of cardiovascular exercise apparatus, group exercise classes, and areas for walking and running. All study subjects were assigned an initial meeting with a credentialed exercise leader who completed a one-day training session and a minimum of ten hours of supervised practice in their assigned treatment. Quality assurance of treatments was provided by a supervisor and study investigator. All institutional and governmental regulations concerning the ethical use of human volunteers were followed.

In the CA group, a series of six one-hour meetings with an exercise leader, spaced across six months, was provided. These one-on-one sessions included an orientation to available exercise apparatus and administration of the cognitive-behavioral protocol designed to support maintenance of exercise. Initially, a brief survey assessed propensity for early dropout on the basis of: 1) present ability to tolerate exercise-related discomfort, 2) existing social supports, and 3) self-management/self-regulatory abilities.28 A support computer program (FitLinxx, Norwalk, CT) adjusted subsequent treatment components on the basis of responses. The general format of each meeting was similar. Goal-setting followed suggestions by Locke and Latham.29 Long-term goals were set and reduced into specific short-term goals that were documented. Feedback methods were used that tracked process-related goal progress such as cardiovascular exercise time and changes in energy, fatigue, and stress over time.

Exercise plans accounted for individual preference, and modifications of intensities and durations were made to increase probabilities of maintaining exercise on the basis of responses on a 12-item acute feeling scale.29 A behavioral contract was incorporated to increase commitment. Appropriate group exercise classes were suggested to promote feelings of social cohesion—a correlate of adherence.30 Instruction in a different self-management/self-regulatory skill such as cognitive restructuring, stimulus control, or dissociation from discomfort was given each meeting. The Coach Approach protocol was intended to increase feelings of mastery, competence, and self-efficacy related to exercise—strong predictors of adherence.10,20

Nutrition and weight-loss information provided to the CA group was limited to brief review of a one-page summary of suggestions from the American College of Sports Medicine.31 Topics included: 1) understanding calories, carbohydrates, protein, and fats; 2) calculating caloric needs for weight loss; 3) using the food guide pyramid; 4) developing a plan for appropriate snacking; and 5) menu planning. Although the group was focused on weight loss, no specific caloric or fat restrictions were imposed.

In the control group, typical participant–professional contacts were incorporated that consisted of instruction on how to complete specific exercises, their associated benefits, exercises completed to date, and monthly appointments to adjust exercise regimens.32 Nutrition and weight-loss information provided was the same as for the CA group.

For each group, three exercise sessions per week were assigned, and contact with exercise leaders was similar. Cardiovascular exercise progressed to ≥30 minutes per session by the third month. All assessments were administered in a private area at baseline and at week 24.

Data Analysis
An intention-to-treat design was implemented where missing data associated with dropout were imputed using the “last observation carried forward” method.33 Other missing data were imputed using the expectation-maximization approach.34 This conservative analytic format protected against type I error due to overrepresentation of treatment “compliers” and retained the maximum experimental power possible given the goals of the investigation. Chi-square and one-way analysis of variance (ANOVA) were first used to contrast group differences in dropout and exercise session...
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attendance percentage, respectively. Analyses of both within- and between-group changes in SE, PSC, BAS, and TMD scores and physiologic factors were then conducted retaining actual baseline scores. Because direct calculation of effects for within-group changes was advantageous, separate within- and between-group analyses were chosen over mixed-model repeated-measures ANOVA. Effect sizes were reported for \( \chi^2 \) analysis using Cramer's V \[ V = \sqrt{\chi^2/N(k-1)} \], for the one-way ANOVAs using eta-squared \[ \eta^2 = t^2/t^2 + df \], and for the dependent \( t \)-tests using Cohen's d \[ d = \text{mean}_1 - \text{mean}_2/SD \].

Hypothetical paths derived from social cognitive and self-efficacy theory\(^1\)\(^2\)\(^1\)\(^2\)\(^3\)\(^2\) and from Baker and Brownell's model \(^1\) were next assessed by pooling findings from the two treatment groups (CA and CA/CH). Whether self-regulatory efficacy (ie, SE scores) and task self-efficacy (PSC scores) at baseline significantly predicted exercise session attendance and, following, body-fat and BMI reduction, was first tested using regression analysis. The theoretically derived paths of the intervention with changes in SE, PSC, BAS, and TMD; exercise session attendance; and finally, body-fat and BMI changes, were then assessed (see Figure 1 for details and graphic representations of the path analyses).

Statistical significance was set at \( \alpha = 0.05 \) (two-tailed) throughout. The approximately normal distributions of change scores (skewness and kurtosis < 2.0 SE) was appropriate for the analyses chosen. On the basis of the exploratory nature of the investigation and of previous suggestions,\(^3\) no adjustments were made for multiple \( t \)-tests. A power analysis suggested a sufficient sample size to detect a small-to-moderate effect \( (f^2 = 0.10) \) at the 0.05 alpha level.

**Results**

**Adherence to Exercise**

The number of dropouts significantly differed by group \( \chi^2 (df = 2; N = 273) = 44.67; p < 0.001; V = 0.29 \). Follow-up testing with Bonferroni correction indicated that the CA (38.27%), the CA/CH (28.12%), and the control (62.50%) groups significantly differed from one another. Exercise session attendance significantly differed by group \( F(2, 270) = 10.02; p < 0.001; \eta^2 = 0.07 \). Follow-up testing using the Tukey HSD method indicated that attendance in both the CA (mean, 43.16%; SD, 30.54) and the CA/CH (mean, 50.97%; SD, 30.03) groups was significantly greater than the control group (mean, 31.07%; SD, 25.04).

**Changes in Physiologic Factors**

For the CA group, significant within-group improvements were found for body-fat percentage, waist circumference, and BMI (Table 1).

**Table 1. Changes in physiologic factors from baseline to week 24**

<table>
<thead>
<tr>
<th>Physiologic factor</th>
<th>Baseline</th>
<th>Week 24</th>
<th>t</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>The Coach Approach only group (n = 81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Body-fat percentage</td>
<td>38.33</td>
<td>5.36</td>
<td>36.52</td>
<td>6.08</td>
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<tr>
<td>Waist circumference (cm)</td>
<td>109.37</td>
<td>21.18</td>
<td>107.32</td>
<td>21.26</td>
<td>-4.78</td>
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<td>Resting heart rate (beats/min)</td>
<td>81.89</td>
<td>14.42</td>
<td>81.04</td>
<td>14.48</td>
<td>-0.95</td>
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<tr>
<td>Blood pressure—systolic (mmHg)</td>
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<td>19.69</td>
<td>129.41</td>
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<td>Blood pressure—diastolic (mmHg)</td>
<td>84.21</td>
<td>9.63</td>
<td>83.57</td>
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<tr>
<td>Body mass index (kg/m²)</td>
<td>38.12</td>
<td>5.86</td>
<td>37.39</td>
<td>6.24</td>
<td>-4.00</td>
</tr>
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<td>The Coach Approach plus Cultivating Health group (n = 128)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body-fat percentage</td>
<td>37.42</td>
<td>4.32</td>
<td>34.67</td>
<td>4.98</td>
<td>-6.09</td>
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<td>Waist circumference (cm)</td>
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<td>104.48</td>
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<td>-6.84</td>
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<td>Resting heart rate (beats/min)</td>
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<tr>
<td>Control group (n = 64)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body-fat percentage</td>
<td>38.63</td>
<td>5.56</td>
<td>38.51</td>
<td>6.06</td>
<td>-0.13</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>110.44</td>
<td>14.22</td>
<td>109.41</td>
<td>13.85</td>
<td>-1.87</td>
</tr>
<tr>
<td>Resting heart rate (beats/min)</td>
<td>82.64</td>
<td>12.61</td>
<td>80.92</td>
<td>12.31</td>
<td>-1.20</td>
</tr>
<tr>
<td>Blood pressure, systolic (mmHg)</td>
<td>131.48</td>
<td>14.44</td>
<td>129.67</td>
<td>15.91</td>
<td>-1.25</td>
</tr>
<tr>
<td>Blood pressure, diastolic (mmHg)</td>
<td>81.52</td>
<td>8.46</td>
<td>83.63</td>
<td>12.19</td>
<td>1.64</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>35.81</td>
<td>5.24</td>
<td>35.66</td>
<td>5.15</td>
<td>-1.35</td>
</tr>
</tbody>
</table>
For the CA/CH group, the preceding factors, in addition to resting heart rate, systolic blood pressure, and diastolic blood pressure, demonstrated a significant within-group improvement. For the control group, no significant within-group change was found. For changes in each physiologic factor tested, greater effects were observed in the CA/CH group, followed by the CA group (Table 1).

No significant group difference (p values > 0.05) was found for any physiologic factor at baseline. Separate one-way ANOVAs were calculated to assess group differences in physiologic factors using within-group score changes. An overall significant difference was found for changes in waist circumference ($F(2, 270) = 7.69; p < 0.001; \eta^2 = 0.05$). Follow-up testing using the Tukey HSD method indicated a significantly greater reduction in the CA/CH group than in either the CA group or the control group.

An overall significant difference was also found for changes in BMI ($F(2, 270) = 3.32; p = 0.038; \eta^2 = 0.02$). Follow-up testing indicated a significantly greater reduction in the CA/CH group than the control group. Finally, an overall significant difference was found for changes in body-fat percentage ($F(2, 270) = 8.03; p < 0.001; \eta^2 = 0.06$). Follow-up testing indicated a significantly greater reduction in the CA and CA/CH groups than in the control group.

### Table 2. Changes in psychologic factors from baseline to week 24

<table>
<thead>
<tr>
<th>Psychologic factor</th>
<th>Baseline</th>
<th>Week 24</th>
<th>t</th>
<th>p</th>
<th>d</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td><strong>The Coach Approach only group (n = 81)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mood disturbance</td>
<td>11.90</td>
<td>13.64</td>
<td>6.66</td>
<td>11.02</td>
<td>-4.47</td>
</tr>
<tr>
<td>Tension</td>
<td>3.58</td>
<td>3.41</td>
<td>2.88</td>
<td>2.33</td>
<td>-2.26</td>
</tr>
<tr>
<td>Anger</td>
<td>4.20</td>
<td>3.20</td>
<td>3.10</td>
<td>2.36</td>
<td>-4.22</td>
</tr>
<tr>
<td>Fatigue</td>
<td>6.60</td>
<td>4.89</td>
<td>4.91</td>
<td>4.16</td>
<td>-4.42</td>
</tr>
<tr>
<td>Vigor</td>
<td>7.19</td>
<td>3.60</td>
<td>8.35</td>
<td>3.94</td>
<td>2.72</td>
</tr>
<tr>
<td>Confusion</td>
<td>2.19</td>
<td>2.43</td>
<td>1.80</td>
<td>1.96</td>
<td>-2.22</td>
</tr>
<tr>
<td>Depression</td>
<td>3.32</td>
<td>0.69</td>
<td>3.14</td>
<td>0.85</td>
<td>-2.29</td>
</tr>
<tr>
<td>Physical self-concept</td>
<td>42.48</td>
<td>5.98</td>
<td>45.06</td>
<td>6.67</td>
<td>4.84</td>
</tr>
<tr>
<td>Body areas satisfaction</td>
<td>10.12</td>
<td>2.43</td>
<td>11.15</td>
<td>2.71</td>
<td>5.30</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>16.84</td>
<td>3.82</td>
<td>17.26</td>
<td>4.55</td>
<td>1.01</td>
</tr>
<tr>
<td><strong>The Coach Approach plus Cultivating Health group (n = 128)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total mood disturbance</td>
<td>15.61</td>
<td>13.63</td>
<td>5.38</td>
<td>13.71</td>
<td>-6.38</td>
</tr>
<tr>
<td>Tension</td>
<td>4.34</td>
<td>3.21</td>
<td>3.07</td>
<td>2.67</td>
<td>-4.59</td>
</tr>
<tr>
<td>Anger</td>
<td>3.87</td>
<td>3.36</td>
<td>2.93</td>
<td>3.31</td>
<td>-2.43</td>
</tr>
<tr>
<td>Fatigue</td>
<td>7.48</td>
<td>4.22</td>
<td>4.77</td>
<td>4.27</td>
<td>-5.71</td>
</tr>
<tr>
<td>Vigor</td>
<td>5.64</td>
<td>3.50</td>
<td>8.95</td>
<td>4.42</td>
<td>7.50</td>
</tr>
<tr>
<td>Confusion</td>
<td>2.98</td>
<td>2.60</td>
<td>2.05</td>
<td>1.96</td>
<td>-3.80</td>
</tr>
<tr>
<td>Depression</td>
<td>2.53</td>
<td>1.44</td>
<td>1.51</td>
<td>1.00</td>
<td>-3.80</td>
</tr>
<tr>
<td>Physical self-concept</td>
<td>37.33</td>
<td>7.42</td>
<td>39.27</td>
<td>6.11</td>
<td>3.78</td>
</tr>
<tr>
<td>Body areas satisfaction</td>
<td>9.81</td>
<td>2.34</td>
<td>11.51</td>
<td>2.87</td>
<td>6.98</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>15.82</td>
<td>4.57</td>
<td>16.27</td>
<td>4.32</td>
<td>1.12</td>
</tr>
<tr>
<td><strong>Control group (n = 64)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mood disturbance</td>
<td>12.00</td>
<td>11.16</td>
<td>8.59</td>
<td>10.46</td>
<td>-3.14</td>
</tr>
<tr>
<td>Tension</td>
<td>4.06</td>
<td>3.14</td>
<td>3.16</td>
<td>2.27</td>
<td>-3.70</td>
</tr>
<tr>
<td>Anger</td>
<td>3.22</td>
<td>2.70</td>
<td>2.72</td>
<td>2.10</td>
<td>-1.85</td>
</tr>
<tr>
<td>Fatigue</td>
<td>6.44</td>
<td>3.80</td>
<td>6.16</td>
<td>4.16</td>
<td>-0.65</td>
</tr>
<tr>
<td>Vigor</td>
<td>7.69</td>
<td>3.87</td>
<td>8.66</td>
<td>3.70</td>
<td>2.60</td>
</tr>
<tr>
<td>Confusion</td>
<td>2.34</td>
<td>2.26</td>
<td>2.16</td>
<td>2.11</td>
<td>-1.52</td>
</tr>
<tr>
<td>Depression</td>
<td>3.63</td>
<td>0.93</td>
<td>3.06</td>
<td>1.01</td>
<td>-3.58</td>
</tr>
<tr>
<td>Physical self-concept</td>
<td>44.06</td>
<td>8.26</td>
<td>45.75</td>
<td>8.62</td>
<td>3.52</td>
</tr>
<tr>
<td>Body areas satisfaction</td>
<td>11.09</td>
<td>3.03</td>
<td>12.28</td>
<td>3.51</td>
<td>4.37</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>15.91</td>
<td>4.68</td>
<td>15.94</td>
<td>4.21</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Note: total mood disturbance = [Σ (tension, anger, fatigue, confusion, depression) – vigor].
Changes in Psychologic Factors

No significant group difference (p values > 0.05) was found on any psychologic factor at baseline. TMD scores were significantly reduced for each group (Table 2). Changes in Profile of Mood States subscales are also given. One-way ANOVA indicated an overall significant difference in changes in TMD, by group [F(2, 270) = 6.55; p < 0.001; η² = 0.05]. Follow-up testing indicated a significantly greater improvement in the CA/CH group than in either the CA or control groups. Each group demonstrated significant within-group improvements in PSC and BAS scores (Table 2). ANOVA indicated no significant differences by group [F(2, 270) = 2.28; p = 0.10; η² = 0.02 and F(2, 270) = 0.43; p = 0.65; η² = 0.003, respectively]. Within-group improvement in SE scores did not reach statistical significance for any group.

Relations of Cognitive Behavioral Treatment, Psychologic Factors, Exercise Attendance, and Changes in Body Composition

For the CA and CA/CH groups pooled (n = 209), significant improvements in PSC, BAS, and TMD scores were found, and changes in SE approached statistical significance (p values < 0.10). Findings from regression models, with simultaneous entry of the theory-based predictors of exercise session attendance (Table 3), were next entered into five proposed paths (for actual regression values and graphic representations of proposed paths, see Figure 1). The explained variance in exercise session attendance was significant in each regression model. Approximately the same portion of the variance was accounted for by entry of SE and PSC scores at baseline (7%; model 1) and by changes in scores on these measures from baseline to week 24 (5%; model 2). Inclusion of changes in BAS (model 3) and TMD (model 4) scores, individually, increased the explained variance in exercise session attendance to 12% and 13%, respectively. When changes in BAS and TMD scores were together simultaneously entered, creating a four-factor model (model 5), 16% of the overall variance in exercise session attendance was accounted for.

Standardized beta weights suggested significant unique contributions to the overall explained variance in exercise made by entry of change scores in BAS and TMD (Table 3), also supported through contrasts of adjusted R² values. Strong negative correlations were found between exercise session attendance and changes in body fat (r = –0.41; p < 0.001) and BMI (r = –0.46; p < 0.001). The total effect of The Coach Approach protocol on changes in body fat and BMI were significant in each model (p values ≤ 0.001).

Table 3. Results of simultaneous linear multiple-regression analyses for prediction of exercise session attendance

<table>
<thead>
<tr>
<th>Model variables</th>
<th>β</th>
<th>R</th>
<th>R²</th>
<th>R² adj</th>
<th>F</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Self-efficacy</td>
<td>0.13</td>
<td>0.27</td>
<td>0.07</td>
<td>0.06</td>
<td>6.74</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ self-efficacy</td>
<td>0.07</td>
<td>0.22</td>
<td>0.05</td>
<td>0.04</td>
<td>4.46</td>
<td>0.03</td>
</tr>
<tr>
<td>Δ physical self-concept</td>
<td>0.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.36</td>
</tr>
<tr>
<td>Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ self-efficacy</td>
<td>0.03</td>
<td>0.35</td>
<td>0.12</td>
<td>0.11</td>
<td>8.20</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Δ physical self-concept</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.65</td>
</tr>
<tr>
<td>Δ body areas satisfaction</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Model 4</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Δ self-efficacy</td>
<td>0.07</td>
<td>0.36</td>
<td>0.13</td>
<td>0.11</td>
<td>8.40</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Δ physical self-concept</td>
<td>0.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.04</td>
</tr>
<tr>
<td>Δ total mood disturbance</td>
<td>–0.29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Model 5</td>
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<td></td>
<td></td>
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<tr>
<td>Δ self-efficacy</td>
<td>0.05</td>
<td>0.40</td>
<td>0.16</td>
<td>0.14</td>
<td>8.37</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Δ physical self-concept</td>
<td>0.03</td>
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<td></td>
<td></td>
<td></td>
<td>0.53</td>
</tr>
<tr>
<td>Δ body areas satisfaction</td>
<td>0.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Δ total mood disturbance</td>
<td>–0.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
</tbody>
</table>

Note: the delta symbol (Δ) denotes change in score from baseline to week 24. adj = adjusted R² values
Figure 1. Path representations of relations of physical activity participation; self-efficacy, mood, and body satisfaction; exercise attendance, and changes in body fat and body mass index (BMI): models 1 through 5.

Values in bold type denote beta weights. All other values denote linear bivariate correlations. BAS = Body Areas Satisfaction scale of the Multidimensional Body-Self Relations Questionnaire; PSC = Physical Self-Concept scale of the Tennessee Self-Concept Scale; SE = Exercise Self-Efficacy scale; TMD = Total Mood Disturbance scale of the Profile of Mood States. *p < 0.10; †p < 0.001; ‡p < 0.01; ‡‡p < 0.05

For use in the path representations, changes in psychologic factors associated with the Coach Approach (CA) protocol, expressed as t values, were first converted \[ r = \sqrt{t^2 / (t^2 + df)} \]. Changes in SE and PSC scores alone, then additionally entering changes in BAS and TMD scores first alone, then together, were next incorporated into separate multiple-regression equations. Finally, linear bivariate correlations between exercise session attendance and changes in body fat and BMI were added to the path models. For effect decomposition, total effects of the CA protocol on changes in body fat and BMI were estimated by regressing each variable of the respective model separately on body fat and BMI change scores and omitting the intervening variable of exercise session attendance. The significance of the beta value for the exogenous variable was used as the test for significance of the total effect. Consistent with previous research and with suggestions for analysis of longitudinal data under the present conditions, use of study subjects’ changes in scores during the six months of the study, which retained actual baseline scores, was deemed preferable to statistically controlling for baseline differences. This method adequately accounted for changes under conditions consistent with the normal variations in baseline scores found in the present population.

The following references supported methodologies used for effect decomposition within the path analyses:


The following references supported the use of unadjusted change scores:

Weight Loss and Psychologic Gain in Obese Women—Participants in aSupported Exercise Intervention

Discussion
In the control group, exercise session attendance (mean, 31.1%) and dropout (mean, 62.5%) was similar to samples who were not exclusively obese.\textsuperscript{6,8,18} Possibly the group nutrition education component increased participants’ perceived value of exercise within the overall weight-loss process, resulting in the least dropout in the CA/CH group (mean, 28.1%). Moreover, when paired with the behavioral skills likely acquired through the CA protocol, subjects’ persistence may have further benefited. The CA and CA/CH groups did not, however, significantly differ in exercise session attendance rates.

Unlike the control group, both treatment groups had significant decreases in body fat, waist circumference, and BMI. The corresponding mean changes in weight of approximately−0.2 kg/week (range, −1.8 to 0.4 kg/week) was less than the maximum recommended\textsuperscript{3,28}; however, consideration should be given to the conservative intention-to-treat design used that retained data from even early treatment dropouts. Often analyses of weight-loss interventions include only individuals with high compliance. Although the larger effect sizes for reductions in body fat, waist circumference, and resting heart rate in the CA/CH group, relative to the CA group, may be attributable to dietary changes associated with the nutrition component, direct analyses of food intake was not made.

The significant changes in TMD found in each group are consistent with research suggesting that once a minimum exercise frequency and duration is met (eg, 15 minutes, two times per week), additional improvements in mood are unlikely;\textsuperscript{19} but inconsistent with a minority of studies suggesting a dose–response relationship.\textsuperscript{38} These findings of mood improvements associated with moderate exercise may be useful to physicians and other health care practitioners. The similar effect sizes, across groups, in PSC and BAS are reconciled by research suggesting that participation in an exercise program, rather than physical activity output itself, predicts changes in perceptions of the physical self.\textsuperscript{19} Little correspondence between perceived and actual physical changes was previously found in women initiating exercise.\textsuperscript{39,40} Increases in SE scores were not significant and may be dependent on self-management and self-regulatory abilities unlikely to improve spontaneously (without adherence to corresponding training). The intention-to-treat design may have substantially affected mean changes in SE through inclusion of many study subjects with minimal treatment exposure. Direct measurement to clarify use of self-management/self-regulatory skills is planned for future related research.

The five proposed paths from exercise program participation to weight changes indicated that changes in self-efficacy constructs may predict exercise session attendance better when body satisfaction and mood changes are also accounted for. Findings support reinforcement and social cognitive theory, which suggests that when meaningful changes in physiologic and psychologic factors are perceived along with sufficient abilities (ie, efficacy beliefs), associated behaviors will be maintained. It will be important to better evaluate the probable proactive relationship of diet and exercise behavior with changes in weight and body composition.

Replication and determination of the generalizability of the present findings to other samples are required. Extensions of this research should better control for possible effects associated with the increased professional attention of the group nutrition information sessions. Additionally, experimental designs that systematically track changes in weight over several years are required to assess sustained effects.

Our findings, however, strongly suggest that the relations of exercise, psychologic factors, and weight loss are important to consider for the development of both weight-management theory and treatment.\textsuperscript{3}

Disclosure Statement
The author(s) have no conflicts of interest to disclose.

Acknowledgments
This research was supported by a grant from Kaiser Permanente of Georgia to the YMCA of Metropolitan Atlanta.

Katherine O’Moore-Klopf of KOK Edit provided editorial assistance.

References
5. Prong NP, Wing RR. Physical activity and long-term maintenance
Weight Loss and Psychologic Gain in Obese Women—Participants in a Supported Exercise Intervention

“Monet Revisited”

photograph

By Ira Levy, MD

Dr Levy is a retired physician of the Southern California Permanente Medical Group. He is the former Director of Emergency Services and former Director of Pulmonary Services at the West Los Angeles Medical Center and Clinical Professor Emeritus of Medicine at the University of Southern California School of Medicine in Los Angeles, CA. This photograph was taken at the Self-Realization Fellowship Lake Shrine in Pacific Palisades, CA. Dr Levy says that he was struck by the similarity to the artwork of Claude Monet.
Where Do Teens Go to Get the 411 on Sexual Health? A Teen Intern in Clinical Research with Teens

Abstract

Research Setting: The research for the study reported here was conducted in conjunction with the Biomedical and Health Sciences Internship for High School Students at the University of California, San Francisco, Department of Pediatrics. The eight-week intensive summer program promotes interest in science, medicine, and health among young people by introducing students to the professional world of science, broadly defined. Interns are expected to assists in a specific research project that addresses a scientific question. They participate in a variety of lectures and are exposed to faculty members, medical students, and college graduates working as research assistants in a rich academic and clinical research setting. This study was conducted within Kaiser Permanente (KP) of Northern California as part of a larger study aimed at increasing Chlamydia screening among sexually active adolescents. It was approved by Committee on Human Research, the institutional review board (IRB) for the University of California, San Francisco and the IRB for KP Northern California.

Objective: There were two primary objectives of this study: first, we sought to identify where teenagers obtain information about sexual health; second, we examined whether aspects of a clinician’s communication style with a teen during a health care visit were associated with the teen choosing that clinician as a primary source of sexual health information (as compared with parents, peers, teachers, the news media, and other sources).

Results: Teens who perceived that their clinician communicated with respect and explained information in a way that they could understand were more likely to cite their clinician as a primary source of sexual health information (as compared with parents, peers, teachers, the news media, and other sources). Whether the clinician asked about sex during the health care visit was significantly associated with males selecting the clinician as a primary source of sexual health information. An important finding, at least for males, because teens do not always bring up the topic.

Background

Chlamydia trachomatis is the most common reportable bacterial sexually transmitted infection (STI) in the United States, with the highest rates among adolescents between the ages of 15 and 24 years. Most chlamydial infections are asymptomatic and, if untreated, can lead to pelvic inflammatory disease, ectopic pregnancy, and infertility. Interventions have successfully increased rates of screening and treatment of chlamydial infections. Despite recommendations to screen sexually active adolescents for Chlamydia at least annually, little progress is being made—the most recent data show that only 36% of adolescents between the ages of 16 and 20 years are screened. There is a wide variety of reasons for poor Chlamydia screening rates; of particular interest for the study reported were factors relating to the styles of clinicians’ communication with their adolescent patients. According to the National Longitudinal Study of Adolescent Health, few teens are aware of the risks of chlamydial infections. Teens with low perceived knowledge of STIs have been found to have significantly higher odds of engaging in risky sexual behaviors. Although not sufficient, knowledge is an essential component in prevention efforts and treatment of asymptomatic STIs—namely, Chlamydia. Therefore, it is important to understand who and what teens turn to for information about sexual health in addition, because clinicians can be an important source of accurate information, we also examined factors associated with teens’ ranking their clinician as a source of sexual health information. Prior research has demonstrated that teens are more likely to disclose sensitive health information (sexual history) to their clinician if the
clinician had previous conversations with them regarding sex or sexual health16 and if the clinician explains that the visit is confidential.17,18 Decades of research have also identified what clinician communication qualities are important to teens (eg, responsiveness, being a good listener, being caring, respectfulness).19–21 The current study took this work a step further by examining the association between important aspects of clinicians’ communication and with teens’ selection of their clinician as a primary source of sexual health information. In addition, we provide updated information on where adolescents go for sexual health information among teens who have access to health care.

**Methods**

Self-report surveys (Figure 1) were administrated to adolescents, age 14 to 18 years, after an urgent-care visit at one of the four participating Kaiser Permanente Northern California Pediatric Departments. The survey was anonymous, voluntary, and brief (one page). When a teen gave verbal consent, a research associate handed the teen the survey. The teen completed the survey in private (no one else was with the teen during survey completion), dropped it in a one-way collection box, and received a gift certificate redeemable at a local store as a thank-you for participation. The first part of the survey asked for basic demographics: age, sex, and race or ethnicity. It then asked a few questions about the encounter (eg: Did your clinician ask you about sex? Did anyone accompany you at the visit? Have you ever had sex?). It then asked teens to rank where they go to get information about sexual health (with 1 being the most frequent source, 2 being the second most frequent source, and so on). Teens were given a list of possible choices, and they could write in a source if it was not listed. If they ranked a given source of sexual health information as a 1, 2, or 3, that source was considered to be a primary source. Logistic regression examined associations of clinician communication variables with clinician as a source of sexual health information. Analyses were conducted separately for females and males and adjusted for age. Multivariate analyses were then conducted by fitting a model with variables having a p value < .1 from the logistic regression.

**Results**

A total of 365 teens (89% response rate) completed the survey; 58% were female. The mean age of respondents was 15.6 years. The sample was ethnically diverse, with 29% Caucasian, 27% Latino, 15% Asian, 14% multiethnic, 6% Pacific Islander, 5% African American, and 4% other. We found several gender differences regarding whom teens reported as their source of sexual health information (Table 1). Females (50%) tended to be more likely than males (38%) to seek sexual health information from mothers (p = 0.003), whereas males were more likely than females to get information from their fathers (31% vs 25%, respectively; p < 0.001). In addition, females were more likely than males to report their clinician as a primary source of sexual health information (38% vs 30% respectively; p = 0.049). Lastly, males (16%) were more likely than females (8%) to report not having any source of sexual health information. Logistic regression analysis showed that females who stated that their clinician “explained things in a way they could understand” and “provider asked about sex” were significantly associated with clinician as a primary source for sexual health information. For males, the association was significant for “doctor treated me with respect,” “asked about sex,” and “had time alone
with doctor.” However, in multivariate analyses, the only significant associations were age for females (odds ratio [OR], 1.25; 95% confidence interval [CI], 0.928–1.68; p < 0.01) and clinician asking about sex at the visit for males (OR, 3.24; 95% CI, 1.56–6.73; p < 0.01).

**Conclusion**

Though there are more than two decades of research using both qualitative and quantitative methods regarding clinician communication about sensitive health topics with teens, ours is the first study to examine teens’ assessment of key clinician communication variables with the teens’ rating the clinician as a source of sexual health information immediately after their encounter with the clinician. We found that teens who perceived that their clinician communicated with respect and explained information in ways that they could understand were more likely to cite their clinician as a source of sexual health information. Confidentiality has been found to be a key factor in teens’ decisions to seek needed health care for sensitive services. Similarly, we found that having time alone (confidentiality) with the clinician was also associated with teens’ selection of a clinician as a primary source of sexual health information. Surprisingly, not all of these factors remained significant in multivariate analyses. What did remain significant, at least for males selecting their physician as an information source, was whether the clinician asked about sex during the visit. Though adolescents often expect clinicians to discuss sensitive health issues and generally trust their advice, teens do not often initiate these conversations, so it is important for clinicians to do so.

In terms of who or what teens turn to for sexual health information, friends were the most frequently cited source of sexual health information for teens in our study, followed, in decreasing order, by mothers, teachers, physicians, the Internet, fathers, and other relatives, with notable sex differences. However, recent research is finding that whom teens turn to may vary by type of health problem. As has been found in prior research, teen females were more likely to talk to their mothers than males were, and males were more likely to talk with their fathers than females were. In addition, females were more likely than males to report their clinician as a source of sexual health information. This finding may be confounded with data that suggest that clinicians tend to ask females about sex more frequently than they ask males. An astounding finding was that although all of the teens in our study received health care, only 33% reported their clinician as a primary source of sexual health information and 11% reported having no source for such information (with males significantly more likely than females reporting no information source). It should be noted that our study did not control for potential confounding effects of clinician age, ethnicity, clinic setting, or type of visit (urgent versus well care)—all of which could influence clinician–teen interaction during visits. In addition, our findings may not be generalizable to teens outside of this pediatric setting and to those without any health care.

**Implications**

Clinicians can play an important role in delivering important and accurate information about STI prevention as well as to screen teens for asymptomatic chlamydial infections. Because STI risk assessment and screening are confidential health services, it is important for clinicians to routinely have time alone with teens to initiate and engage them in such confidential conversations. Doing so may increase the proportion of teens who turn to their clinician for important and accurate sexual health information.

Future research should examine how other aspects of clinician and parental communication can influence teens’ choices for seeking sexual health information. It is clear that there are sex differences in whom teens turn to for sexual health information; however, these differences must be further investigated, and particular attention must be given to making sensitive services equally attractive and effective for both females and males—preferably prior to their sexual debut, to deter or at least delay it, as well as to prevent STIs, HIV and AIDS, and pregnancy. Future interventions should be aimed at developing and evaluating both system-level interventions and clinician education programs for...
increasing physician comfort, cultural sensitivity, and skill when communicating with teens about sexual health. In addition, more work needs to be done to understand how to best partner with parents in this effort, because parents are an important source of sexual health information for many teens.

**From the mentor-author**

With a long-standing interest in mentoring adolescents, I welcomed the opportunity to mentor Yana and have been her mentor for three consecutive summers. Having a teen perspective on our research team gave us all a richer appreciation for integrating youth development into our research program. We plan to build on the formative work that Yana has done as we continue to administer these surveys and explore issues of how clinician communication influences not only whom teens turn to for sensitive health information but also how clinician communication influences their attitudes toward disclosing sensitive, personal health risk behaviors and their willingness to be screened for common asymptomatic sexually transmitted infections (eg, Chlamydia). Research shows that mentoring is most effective when part of a formal program (ie, one that has a screening process for mentors and participants, applies some type of matching criteria, and provides ongoing support for mentors and program participants). More information on the high school internship program at the University of California, San Francisco, is available at: www.pediatrics.medschool.ucsf.edu/youth/training/intern.aspx.

—Kathleen Tebb

**From the student-author**

The Biomedical and Health Sciences Internship for High School Students at the University of California, San Francisco did more than just expose me to science and medicine. It taught me more about myself than I have learned in all 17 years of my life. I discovered my strengths and interests, finding out more about my personality in addition to dealing with questions people had for me about what I want to be and why. Simply, it taught me to think about who I am. Most importantly, it taught me not to be scared and to never think, I can’t, without even trying or considering. Before I entered the program, being a physician was just something I said that I wanted to be but never thought that I was strong enough to become. I never thought I had the amount of skills needed or the type of knowledge to succeed, but now, I wonder why I thought that way. I figured out that if you really want to do something in life, nobody has the power to stop you. If I really want to become a physician, no amount of books or words on a page or people in a room can stop me from pushing myself forward.

—Yana Reznik

**Editor’s Note**

Kathleen Tebb, PhD, was the primary research mentor and coauthor of this article with Yana Reznik, a high school student at the time this research was done.

**Disclosure Statement**

The author(s) have no conflicts of interest to disclose.

**Acknowledgments**

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Katharine O’Moore-Klopf of KOK Edit provided editorial assistance.

**References**


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**Giving a Fish a Bath**

Telling a teenager the facts of life is like giving a fish a bath.

— *Arnold H Glasgow, Psychologist*
Integrating Herbs and Supplements in Managed Care: A Pharmacy Perspective

Abstract
Herbal and other dietary supplements are popular among patients. Whether and how to establish and manage an herbal formulary remains a challenge for conventional managed-care organizations. Pharmacists and clinicians depend on evidence-based guidelines to help determine which products (whether pharmaceutical or herbal) to make available to patients. Evidence from randomized controlled trials that supports the use of most herbal supplements is scarce, yet for some supplements, credible evidence supports the possibility of efficacy. Quality control remains a concern for the supplement industry and for patients and clinicians considering the use of supplements.

Clinicians may improve care by both disseminating educational materials and making available to patients popular quality-controlled herbal supplements deemed safe and effective. Kaiser Permanente Northwest (KPNW) has adopted a comprehensive and systematic approach to managing and stocking herbal supplements that can serve as a model for other conventional and managed care organizations. KPNW’s dedicated Natural Products Advisory Committee (NPAC) has made considerable progress toward developing a constructive response to KPNW patients’ herbal supplement use. Making supplements available at pharmacies can improve clinical outcomes, patient convenience, and quality control. NPAC currently limits its reviews to randomized, controlled trials and data from meta-analyses and systematic reviews for single-ingredient supplements. As interest in this area maintains steady growth, NPAC will continue to study how best to meet patients’ needs.

Background
Herbal and other dietary supplements are popular among patients. Whether and how to establish and manage an herbal formulary remains a challenge for conventional managed-care organizations. Pharmacists and clinicians justifiably desire to adhere to evidence-based guidelines in determining which products (whether pharmaceutical or herbal) to make available to patients. Evidence from randomized controlled trials that supports the use of most herbal supplements is scarce, yet there are some supplements for which there is credible evidence that supports the possibility of efficacy. In some instances such “proven” products are popular among patients and are recommended by many clinicians. Quality control remains a perplexing problem for the supplement industry, however, and patients can have a difficult time recognizing and identifying high-quality products.

The issue is further complicated by the fact that complementary and alternative medicine systems such as Ayurveda and Traditional Chinese Medicine indicate the prescription of multi-ingredient herbal...
mixture. Such mixtures may have a long history of use but are difficult for the health care industry to evaluate, comprehend, and standardize.

Given this complex array of issues, the prevailing confusion about herbal supplements within conventional health care comes as no surprise. Against such a backdrop, we may improve care both by disseminating educational materials and by making available to patients those popular, quality-controlled herbal supplements deemed safe and effective. Kaiser Permanente Northwest (KPNW) has adopted a comprehensive, systematic approach to managing and stocking herbal supplements that can serve as a model for other conventional and managed care organizations.

In 2000, the KPNW Regional Formulary and Therapeutics Committee (RFTC) established the dedicated Natural Products Advisory Committee (NPAC). NPAC, charged with the mission of providing “information and advice to the RFTC about natural products,” is an interdisciplinary committee of pharmacists, clinicians, and dietitians. NPAC evaluates which products to stock and leverages organizational systems, including the electronic medical record (EMR), as tools for educating clinicians and patients about herbal supplements.

Guidelines for Assessing Natural Products

NPAC developed a set of four criteria to provide a framework for determining which natural products to stock at KPNW over-the-counter pharmacies:

1. Is there sufficient evidence from randomized controlled trials to suggest efficacy?
2. Are there significant concerns regarding product safety and drug-herb interactions?
3. Is a high-quality product available?
4. Is there sufficient interest in the supplement among patients and/or clinicians?

The Role of Evidence-Based Medicine

Evidence-based medicine (EBM) has been defined as the “set of principles and methods intended to ensure that to the greatest extent possible, medical decisions, guidelines, and other types of policies are based on and consistent with good evidence of effectiveness and benefit.”5 As more and more natural products on the market make their way into conventional medicine, NPAC provides high-quality evidence reviews to guide clinicians, pharmacists, and patients in making informed decisions regarding whether to use these supplements.

Prior to reviewing a product, NPAC formulates a clinical question in collaboration with primary and/or specialty care clinicians, pharmacists, and our EBM team of specialists (MD methodologists and consultants). This step is critical. Many supplements are commonly used for a range of indications, but the clinical question(s) must be narrowly defined to make an evidence review feasible. The clinical question emphasizes outcomes and typically addresses potential benefits and harms of the intervention or supplement being investigated.

In carrying out a critical appraisal of the literature, NPAC follows quality parameters set forth by the EBM team. The methodology includes a thorough and systematic search of the literature using high-quality electronic databases, including natural-product databases, Cochrane, PubMed, and Ovid. Ideally, NPAC focuses on relevant systematic reviews and meta-analyses first.

Then, the EBM consultant and the methodologist identify, critically appraise, and score all other relevant experimental and epidemiologic studies assessing the efficacy of the supplement in question. From this rigorous process, NPAC creates an evidence synopsis to ensure that resulting recommendations are reliable and relevant. The EBM team brings clinical expertise and training in epidemiology to formulate recommendations that are based on the quality of the evidence. The evidence synopsis documents the search-and-appraisal process, including search terms and databases used, and all other Kaiser Permanente (KP) content informed by the synopsis. It also serves as the primary template for updating content on an annual basis and for necessary revisions when new and landmark studies are released.

Quality Control and Vendor Selection

When NPAC determines, on the basis of evidence, that a dietary supplement is effective and safe, NPAC looks for a quality product to make available for sale in KPNW pharmacies. Currently, there is no effective governmental oversight of herbal supplements or assurance of product integrity. Newly crafted rules could provide the Food and Drug Administration (FDA) with more rigorous oversight authority beginning as early as 2008. Ultimately, the supplement industry must do a better job of manufacturing and certifying dietary supplements that are consistently free of contamination and accurately labeled.

Supplement manufacturers in the US may participate in voluntary quality-certification programs, including the US Pharmacopoeia (USP) verification.6 USP verification ensures that supplements are
could improve the health of our patients. Whereas quality should definitely
1. The label accurately lists what is
verified products are not available, 
in the bottle—all the listed ingre-
NPAC requires that the vendor
dients are present in the declared
certify a certificate of analysis as
amount.
documentation of product con-
tent and purity. Currently, the
2. The supplement does not contain
content and purity. Currently, the
harshful levels of contaminants.
KPW National contracted National
3. The supplement will break down
Vitamin Company’s Nature’s Blend
and release ingredients in the
products line provides quality-controlled
body.
supplements for our pharmacies at
4. The supplement has been made
a competitive price.
under acceptable manufacturing
practices.
Unfortunately, USP verifica-
This article is an absolute must read for hospital pharmacies, administra-
tion of herbal supplements is not
tion of the herbal pharmacy marketplace.
 nationwide, leaving purchasers to
try to identify quality-controlled
makers and products. NPAC
 provides this important service for
KPW patients, who as individuals
may lack the time, resources, and
expertise to properly identify and
research the issues. When USP-

The Herbal Pharmacy Marketplace
Tieraona Low Dog, MD
This article is an absolute must read for hospital pharmacies, administra-
tors or clinicians looking to stock and sell dietary supplements, including
herbal products. There is little question that the marketplace for herbal
products continues to grow at a steady pace. Indeed, between 1990 and
1997, use increased by 380% in the US.1 In fact, when looking across all
complementary and alternative practices, the greatest relative increase
in the US between 1997 and 2002 was herbal medicine (12.1% vs. 18.6%,
respectively; representing 38 million adults).2 There are thousands of herbal
products being sold in the marketplace, including a considerable number
of dubious efficacy, uncertain safety, and/or questionable quality making it
almost impossible for the consumer to discern the good from the bad, the
effective from the ineffective, or the safe from the dangerous.
Results from scientific studies are lost in the storm of information available
on the Internet and in the mass media, where pseudoscientific and mislead-
ing promises are intermingled with factual and promising information that
could improve the health of our patients. Whereas quality should definitely
improve in the coming years due to the Food and Drug Administration’s
issuance and enforcement of the new good manufacturing practices for
dietary supplement manufacturers (cGMPs), there will continue to be
problems in the short term and challenges will remain for products being
imported from Asia and the Indian subcontinent. In a review of safety risks,
it was noted that “many of the cases where herbal products have been
associated with actual human poisoning were not in fact caused by herbs
alleged to be in the product, but resulted from substitution or contamina-
tion of the declared ingredient, intentionally or by accident, with a more
toxic botanical, a poisonous metal, or a potent nonherbal drug substance.”3
Adulteration with prescription medications remains a concern for a num-
er of traditional Chinese medicine products.4 There is no question that
high-quality products must be the first step in guiding patients’ decisions
regarding dietary supplement use.
It is unreasonable to assume that average consumers will be able to
easily identify a high-quality product that is evidence based for their specific
als to guide clinicians and patients in the context of evidence-based shared decision making.

Notable product rejections by the committee have included Airborne, Avlimil, kava, and ephedra. Airborne, promoted for prevention of respiratory illness, was identified as ineffective. Avlimil, purported to enhance “female libido,” has not been shown effective and has been cited as a possible cause of pancreatitis. Other products were rejected consistent with FDA bans against their use. Kava has been associated with liver injury. Ephedra, once a common ingredient in weight-loss formulas and energy supplements, was banned by the FDA as of April 12, 2004, because of its links with hypertension, myocardial infarction, seizures, stroke, and death.

Many KP regions other than KPNW maintain processes for evaluating and stocking herbal supplements. Comparison (Table 1) reveals substantial though not complete concordance among regional pharmacy experts.

**Documentation and Education**

**Integration with the EMR**

It is essential that clinicians can document in the medical record when patients are using herbal products and that there are tools to guide both the clinician and the patient to safe and effective care. The EMR used at KP is a flexible tool that can be modified to serve these needs. Because all clinicians share the same EMR, the detailed information about an individual’s supplement use is accessible whenever the patient may interact with the health system. The EMR also serves as an interactive tool in the examination room, allowing clinicians to display graphs of blood pressures and trends in laboratory results and to share clinical practice guidelines and reference materials from the KPNW Intranet. The EMR can also serve as a safety tool that allows automatic checking for interactions between drugs and natural products at the moment of order entry. The KP EMR did not come loaded with all of these tools built in; the clinicians of KP, with guidance from NPAC, have modified the system to make it work for their needs.

Three key features have been developed in the EMR regarding use of natural products: documentation, decision support, and patient safety.

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**References**

Documentation

For complete clinical understanding of an individual patient, it is essential to document what medications or natural products the patient is taking and why. In the KP EMR, clinicians can record a patient’s use of a particular supplement on the medication list by entering the supplement name as an order and then associating the order with a specific diagnosis. Alternatively, if the clinician enters Herbal in the orders field, a drop-down list of supplements will appear (Figure 1).

Decision Support

Once the clinician selects the relevant product, brief synopses regarding indications, dose, efficacy data, and side effects will pop up for the clinician to review (Figure 2). The program provides links to additional Web-based resources, including:

- Relevant KPNW clinical practice guidelines
- The NPAC-sponsored evidence synopsis
- Pertinent monographs from the Natural Medicines Comprehensive Database
- The NPAC-authored Dr Herbal clinician newsletter
- An NPAC-authored patient handout.

Patient Safety

Drug-herb interactions and herb-allergy alerts will appear as a pop-up to alert clinicians when entering certain supplements.

Patient Education and Marketing

KPNW pharmacies consistently stock only those supplement products approved through the processes outlined above. NPAC frequently selects products for review on the basis of clinician or pharmacist request, which in turn may be patient driven. The addition of a newly approved supplement to our shelves is not accompanied by any direct patient promotion or advertising. Table 2 details actual product sales for seven stocked natural products at KPNW pharmacies for the 12-month period July 2006 through June 2007, based on a service population of about 470,000 patients.

NPAC devotes considerable energy to developing patient-education handouts for selected herbal products, including those in KPNW pharmacies and other commonly used supplements. Patient-education handouts are primarily requested and printed at KP pharmacies but

Table 1. Supplements stocked across five Kaiser Permanente regions

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Indication</th>
<th>Northwest</th>
<th>Northern California</th>
<th>Colorado</th>
<th>Southern California</th>
<th>Hawaii</th>
</tr>
</thead>
<tbody>
<tr>
<td>St John’s wort</td>
<td>Depression</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Glucosamine (chondroitin)</td>
<td>Osteoarthritis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Gingko Biloba</td>
<td>Cognitive impairment</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Omega 3/fish oils</td>
<td>Lipids</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Melatonin</td>
<td>Jet lag</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Flaxseed</td>
<td>Lipids</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Saw palmetto</td>
<td>Prostatic hypertrophy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Echinacea</td>
<td>Upper respiratory infection</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Probiotics</td>
<td>Rotaviral diarrhea</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Garlic</td>
<td>Atherosclerosis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Coenzyme Q10</td>
<td>Parkinson disease</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Feverfew</td>
<td>Migraine</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ginger</td>
<td>Nausea</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Milk thistle</td>
<td>Liver dysfunction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

* indicates supplements that are stocked in this Region

Table 2. 12-month product sales at Kaiser Permanente Northwest pharmacies

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Dose (mg)</th>
<th>Form of supplement</th>
<th>Bottles sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omega-3</td>
<td>1000</td>
<td>#90</td>
<td>3729</td>
</tr>
<tr>
<td>Flaxseed</td>
<td>1000</td>
<td>#90</td>
<td>1480</td>
</tr>
<tr>
<td>Gingko biloba</td>
<td>40</td>
<td>Capsule #60</td>
<td>333</td>
</tr>
<tr>
<td>Glucosamine sulfate</td>
<td>500</td>
<td>Capsule #60</td>
<td>2392</td>
</tr>
<tr>
<td>Melatonin</td>
<td>3</td>
<td>Tablet #60</td>
<td>1955</td>
</tr>
<tr>
<td>Saw palmetto</td>
<td>160</td>
<td>Tablet #30</td>
<td>1078</td>
</tr>
<tr>
<td>St John’s wort</td>
<td>300 mg</td>
<td>Capsule #60</td>
<td>518</td>
</tr>
</tbody>
</table>
can also be printed on demand from examination-room computers and other designated patient-education environments. Being able to provide this resource at the point of care allows KP to provide patients with valuable information on dosing, side effects, drug-herb interactions, and cost. When necessary, NPAC will prepare handouts for supplements that raise significant patient safety concerns, such as kava and ephedra.

KPNW pharmacists provide patient education during face-to-face encounters regarding supplement use. The most common patient inquiries at the pharmacy relate to pricing and herb-drug interactions. Frequently, patients present to the pharmacy with a product purchased elsewhere and inquire whether they can take it concurrently with their prescribed medications. Pharmacists can screen for drug-herb interactions using the electronic dispensing system and can access a variety of additional online resources, including the Natural Medicines Comprehensive Database and Natural Standard.

**Conclusion**

NPAC has made considerable progress toward developing KPNW’s constructive response to our patients’ herbal supplement inquiries and use. It is sensible for a managed care organization such as KPNW to make quality supplements available at pharmacies, from the standpoint of clinical outcomes, patient convenience, and quality control. Currently NPAC generally limits its reviews to randomized controlled trials and data from meta-analyses and systematic reviews for single-ingredient supplements. We recognize, however, that the popularity of herbal therapies and alternative medicines extends to teas, spices, traditional multi-ingredient herbal mixtures, and other food products, especially among some ethnic populations. As interest in this area maintains steady growth, NPAC will continue to study how best to meet patients’ needs.

**Disclosure Statement**

The author(s) have no conflicts of interest to disclose.

**Acknowledgments**

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Alternative Medicine, National Institutes of Health.
Katharine O’Moore-Klopf of KOK Edit provided editorial assistance.

References

It Was Good

And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good.

— Genesis 1:12, The Bible, King James Version
CASE STUDY

Hyperthyroid-Induced Cardiomyopathy in an Adolescent

Peter N Mattar, MD, MPH
Eugene Y Hwang, MD

Introduction
Although there is ample evidence of hyperthyroidism associated with heart failure in adults, few reports exist in the medical literature regarding children who experience thyrotoxic cardiomyopathy. In this report we describe an adolescent patient who presented for urgent care with vague symptoms of palpitations, headaches, lower-extremity swelling, and dyspnea on exertion and was found to have congestive heart failure (CHF) secondary to hyperthyroidism.

Case Example
A previously healthy African-American girl, aged 11 years, presented for urgent care with a three-week history of exercise and heat intolerance, dyspnea on exertion, chest pain, and a four-day history of lower-extremity edema and headaches. In addition, she reported feeling fatigue and nervousness and having periods of insomnia. She also complained of intermittent feelings of racing heartbeat and palpitations during the preceding three weeks that sometimes lasted an entire day. She reported no history of fevers, sore throat, rash, weight loss, or diarrhea. The patient experienced menarche at age 11 years 6 months and had not had any subsequent menses. She had no history of syncope and reported being able to sleep flat on her back without problems. According to her mother, she had a long history of tachycardia. Her mother said that one year earlier while undergoing a routine physical examination, the girl had a heart rate of >130 beats/min. The patient's family history was negative for congenital heart disease, cardiomyopathy, or sudden unexplained death. The girl's maternal aunt had been found to have supraventricular tachycardia at age 38 years.

Initial vital signs included a heart rate of 130 beats/minute and respiratory rate of 22 breaths/minute. The patient was thin but not cachectic. Her skin was warm and moist, she was in no distress, and she had neither lymphadenopathy nor a neck mass. She did exhibit mild bilateral hand trembling, but she showed no evidence of hair loss. Her thyroid gland was enlarged, measuring 5 cm, and was soft and without nodules. A cardiac examination revealed a slightly hyperactive precordium, a gallop rhythm, and a 2/6 systolic murmur at the left lower sternal border and apex. The patient did not exhibit lid lag, periorbital edema, or pretibial myxedema. An electrocardiogram (Figure 1) showed sinus tachycardia, right atrial enlargement, and left ventricular hypertrophy. Chest radiographs revealed mild cardiomegaly with a normal pulmonary vascular pattern. The echocardiogram showed moderate mitral and tricuspid regurgitation with moderate left heart enlargement. The patient was admitted to the hospital and given 20 mg of furosemide intravenously twice a day and 2.5 mg of lisinopril every day for CHF.

The patient then had a significant decrease in her lower-extremity edema. An assessment of thyroid-stimulating hormone (TSH) level was ordered at the initial urgent care visit; she had a TSH level of <0.01 µU/mL. Her level of free thyroxine (T<sub>4</sub>) was 3.70 µ/dL. Because of her hyperthyroidism, the patient was instructed to begin taking 15 mg of methimazole per day and 50 mg of atenolol twice a day. The patient was discharged after three days of hospitalization.

At the two-month follow-up examination, she had decreased fatigue, insomnia, and palpitations. Her heart rate had decreased to 110 beats/min. After four months, the patient reported a 12-pound weight gain within the preceding three months, had complete resolution of fatigue and insomnia, and had a heart rate of 92 beats/min. She also reported no further dyspnea on exertion, shortness of breath, palpitations, or heat intolerance. A cardiac echocardiogram obtained five months after initial assessment showed decreased tricuspid regurgi-
Hyperthyroid-Induced Cardiomyopathy in an Adolescent

Case Study

Hyperthyroid-induction cardiomyopathy in an adolescent


New Lives—Latinos, Cancer, and Spirituality: An Ethnographic History

As part of a Principles in Clinical Medicine assignment, I was able to interview a Latino family. Luis and Isabel are a pleasant Hispanic couple who are open and accurate historians. They speak fragmented English, but seem to have excellent comprehension. We had little difficulty communicating, though they both prefer to speak in Spanish. They insist that their three children speak Spanish around the house; in fact, Luis says he pretends not to understand English when the children speak it around the house. Luis and Isabel both speak English when out in public to try to avoid the discrimination they both experienced when they first came to the US and could not speak English.

Household Composition

There are currently five people living in their house:
- Luis was born in Mexico City and lived there until 11 years ago when, at age 18, he “just decided” to come to the US. He is in the process of obtaining a green card. He stated that it was important because “unlike illegal immigrants, [he has] rights, and knows them so that [he doesn’t] believe or let threats, insults, and discrimination bother or scare him.”
- Isabel was born in Mexico and came to the US nine years ago with her first husband who was stationed in Mexico with the US military. After living in the US a couple years her husband began to act violently towards her and their daughter. With the help of friends she was able to escape and was introduced to Luis by another friend. She had obtained her green card when she moved to the US with her American husband. Pilar is Isabel’s daughter from her first marriage. She is 15, was born in Mexico and has lived in the US nine years. Because of her father’s American citizenship, she is a US citizen. She is in ninth grade, speaks English fluently, and attends the local high school.
- Linda is Luis and Isabel’s first child. She is seven and was born in the US. She is in first grade and speaks English fluently.
- Stephen is Luis and Isabel’s youngest child. He is five, was born in the US, and recently began kindergarten.

Material Possessions, Transport, and Family Support

Luis and Isabel rent an 850-square-foot three-bedroom apartment, which was very clean when I visited. They have a TV without cable, an old VCR player, a DVD player, and a ministereo. The apartment is sparsely furnished with basics, such as a dining room table and chairs, a couch, but no extra furnishings such as end tables, lamps, bookshelves, etc. They have two older cars, a 1992 Chrysler minivan, and a 1989 Pontiac Fiero. When talking about the cars, Isabel chimed in that “usually only one is working at a time, and Luis has to use it to get to work.” There was a clean birdcage in the corner of the dining room, which held three parakeets, their only pets. While talking about the birds, Luis recounted how two birds had escaped last week while the children were playing with them, so they had purchased replacements. I asked about family and Luis mentioned that he has many uncles, aunts, and cousins in the area, but is only in contact with his brother who lives nearby. Similarly, Isabel mentioned that she has no family here and actually wanted to go back to Mexico sometime in the future because she misses the support provided by her large family.

Housing Costs

The major expense for Luis and Isabel, aside from health care, is rent, which Luis pays. They moved into their apartment just one month ago because rent at their former residence had become too expensive. They are quite satisfied with their new home and happy to be settled down, although Luis mentioned that he hopes to be able to save so they can stop “just paying, paying, paying for rent,” and purchase a
small home to begin compiling assets. He said that it will probably be more than a year before they will be in a position to even consider purchasing a small home.

Family Work History and Income

Luis is employed by a company that makes custom acrylic plastics. Isabel works at the YMCA and uses her income to buy the food and for other expenses such as clothes for the children, etc. They are also struggling to pay past health care expenses and have been awarded some assistance/charity finance programs, but they still need to make monthly payments. Luis told us that he would rather spend time with his wife and children and have a little less money than his brother who works constantly and misses his family.

Medicines and Herbs in the Home

They have the usual over-the-counter medications such as ibuprofen and acetomenophin, which are stored in a secure cabinet in Luis and Isabel’s bedroom. They do not take any medications on a regular basis or use any supplements, such as herbs, etc.

Folk-Medicine Beliefs and Practices

When I asked about traditional Mexican medicine, we discovered that, for the most part, people in the cities in Mexico use Western medicine. Like here in the US, health care is dependent on the type of job and how much money you have. Good jobs in Mexico provide health insurance with no copays. In the case of emergencies, they contrasted the emergency room in Mexico with those in the US, saying that “[in Mexico] it doesn’t matter how severe your injury is, but rather how much money you can pay. The rich people with lots of money will get their small cut treated while a poor person with major bleeding or a heart attack waits to be treated—so I think it is a little better in America.” However, Isabel did mention that outside the urban areas, you could find traditional healers. She said many people use their traditional medications for common illnesses, such as colds, but turn to Western medicine when they have more serious problems. She mentioned that their primary traditional medications consisted of “ground-up leaves mixed with different pastes.” Luis said that he uses the traditional medication of virgin honey and lemon to cure any colds or mild illnesses he might have, and believed that they help him improve. They also mentioned that they are Christians and believe in miraculous healings.

Health Problems in the Family

Luis is the only one in the family with health insurance. His job provides Kaiser Permanente insurance, with which he is very satisfied; however, it is much too expensive for them to buy into the family plan through Luis’s work, which leaves everyone else uninsured. Fortunately, the children have been healthy. If any problem ever arises they go to the doctor at a free clinic that has Spanish-speaking employees or interpreters. Through the clinic they have received their vaccinations. Unlike Luis and the children, Isabel has had several major health problems.

When I asked Isabel about her health, she began by telling us how she has fought “pelvic” cancer. She said she felt a lump when she was sitting down three years ago, and went to a free clinic to have it checked out. They referred her to Oregon Health and Science University, where she was diagnosed with cancer. She underwent ten operations to remove the cancer, at a cost of $2000 per operation. I asked her Arthur Kleinman’s eight questions for eliciting the patient’s explanatory model of his/her illness about her cancer, which were a little difficult for her to understand, but she answered as best as possible. She mentioned that she felt funny after using a dirty toilet in the restroom at a gas station shortly before noticing the lump, and wondered if that might have had something to do with causing the cancer. She elaborated that she was “ numb to the world” for three weeks after getting the diagnosis. She was very worried about what would happen to her two-year-old son and four-year-old daughter if she wasn’t around. She was concerned that they would not have a good person to look out for them, especially with so little family in the area. Jokingly she added that, “I wasn’t worried about Luis—he’ll find another wife and be okay, but my children—I was very worried about them.” She realizes her disease will have a long course. She was happy with the care she received and said she was not interested in traditional medicine to treat her cancer. She hopes she’ll have enough time to raise her children until they can take care of themselves. Following the surgeries, which were “successful,” she went through a course of chemotherapy, during which she was diagnosed with diabetes.

Isabel began to lose some of her eyesight in one eye because of macular degeneration, which she attributed to the chemotherapy. She realizes that diabetes is a lifelong disease and prays that her diabetes will stay under control. She said every time it has been checked since she started praying, the glucose has been within the normal range; however, she does not check her sugar at home or on a regular basis. Surprisingly, she was not very worried about losing the vision because she could still be around to help her children even if she couldn’t see them. Because of the expense, she has not had an eye exam in two years.
The high cost of health care has limited her access and desire to pursue more than the most essential care. They applied for and received a discount on her cancer care, yet still have credit agencies billing them. She said, “I just ignore [the credit agencies] now because I have to get food for the family—I can’t pay the bill. We try to pay the $100/month payment plan, but it is still such a struggle, sometimes we just can’t make the payment.”

Following the story about her cancer, I asked if she’d had any other health problems, and with some hesitance, Isabel shared a fascinating story that took place seven years ago. She was three months pregnant with Linda and began to experience severe cramping in her lower abdomen. She went to the doctor, who diagnosed her with an ectopic pregnancy and insisted that they rush to the hospital for surgery. Instead Isabel and Luis went to their church and prayed. They went home afterwards and waited. Two days later they returned to the same doctor who was very angry that they hadn’t gone for surgery. He yelled at them and sternly remarked that she had made a serious mistake and endangered not only her life, but the fetus’s as well. Isabel was bothered and told him that she was not ready to give up her baby, and that it bothered her that he called her baby a fetus, yet he continued to call it a fetus. However, when he performed the ultrasound, the baby had moved from the fallopian tube into the uterus, much to the amazement and disbelief of the doctor. They attributed this miracle to their prayers, and since then, in addition to Western medicine, they have had a devout reliance on their Christian faith for their medical needs. Luis summed it up saying, “God is the best doctor. God helps a lot.”

**Health Hazards Around the House**

Isabel and Luis are very good at keeping medicines and other dangerous household items such as cleaning agents, etc., out of reach of their children. I did not observe any major health hazards around the house.

**Risk Factors for Inadequate Health Care**

The primary risk factor for Luis and Isabel’s family is lack of access to health care and health education. Their financial limitations have prevented them from using care and receiving optimal preventive care such as diabetes education, eye appointments, and dental care. Nonetheless, I was extremely impressed with the family’s outlook and approach to life given their difficult situation. At the end of the interview, Luis and Isabel told us a story about how many of their immigrant friends will not get any health care at all because of fear of being turned in to the Immigration and Naturalization Service (INS). They recounted how one friend in particular had avoided any prenatal care, and delivered her baby in her own living room with only her husband and daughters to help her because she was afraid of being turned in to INS. Thankfully Isabel and Luis have been able to access some care, but for them, and for many of their friends, their access to care is inadequate because of legal and financial limitations—an issue we as physicians and leaders in the medical community must address.

**Analysis and Personal Reflections**

**Health Systems**

Luis and Isabel were an extremely pleasant couple to visit. They welcomed me into their home, offered me juice, and openly answered my personal and probing questions. We laughed together and enjoyed a wonderful conversation—they are good people. If I had not asked the questions I did, I would never have understood the difficulties and intricacies of their situation. I would not have known how much Isabel cherishes each day she has with her children or each moment she watches them because she never knows when her cancer will return or her eyesight will fade. I would not have known how they moved to a smaller apartment in order to try to pay their medical bills.

Is this just the way life goes? Or are situations like Luis and Isabel’s the result of a flawed system? Clearly, life is not fair, but do we exacerbate the unfairness of our world by the system we use to deliver health care?

The numbers are gut-wrenching: 43 million uninsured people—good people, like Isabel and her children. We spend almost twice per capita what other modern nations do on health care—14% of our gross domestic product (GDP)!! Still, people are left without any insurance at all, forced to cover the rising costs of health care on their own. When bad things happen, like Isabel’s cancer, they are left with nothing.

Individual situations, like Isabel’s, highlight the growing need for change in our system. Yet how can we change? With 14% of GDP spent on health care, a lot of people are making a tremendous amount of money through this system and will exert a major effort to prevent losing that income. Thus, a strong force will be needed to make the necessary changes. We need a system that will provide preventive care for everyone, a system that strives to keep all people healthy and heals them when they become ill. A new model is needed and development of that model is going to require a close partnership between physicians and government. Yet delivering the necessary primary and preventive care to 43 million more people will require more providers than simply physicians.

In this new model of primary/preventive care, there will need to be an increased partnership between physicians and allied health members such as physician assistants and nurse practitioners. Because there are not enough practitioners to handle all the needed primary and preventive care, we must train preventive care educators, fol-
lowing the model of diabetes educators. Because it would be a one-payer system, the cost of training and providing this preventive care should easily be recovered through reductions in more expensive procedures. More importantly than just recovering costs, this would result in better health and better quality of life for everyone.

Government will need to play a significant role, as the spectrum of care available should be the same in any place in the nation and no private company or corporation could provide for everyone. Expansion/modification of Medicare/Medicaid that could be funded by a corporate tax (the money that companies are already paying for health insurance) and may be an interesting way to begin to approach this issue without having to create a whole new infrastructure. If such a system were in place, Isabel would not be in such a horrible plight financially and could also be receiving diabetes education and screening, which might have brought attention to her diabetes earlier and prevented her macular degeneration. Her children could be receiving well-child visits and health education so they could learn how to live healthier lives.

For this to take place within the existing infrastructure, a great philosophical shift from rationing patients to rationing services is required. It is fundamentally wrong for legislative budget committees to decide, “We don’t have enough money to cover Isabel and her children—she’s not poor enough, so they’ll just have to figure something else out.” Until this transition takes place in politicians as well as voters, it will be very difficult to make the necessary changes in the system.

Health Literacy

Health literacy is a major issue for Luis and Isabel, along with most people in our system who are not fluent in English. They seemed to understand basic concepts of experiences they had had such as what was cancer, how the surgeries had fixed it, why chemotherapy had been needed, and Isabel mentioned that they always get a medical interpreter if the clinician does not speak Spanish. However, it seemed they did not have a solid understanding of diabetes, a subtle, complex and chronic condition. They did not understand that the macular degeneration was caused by the diabetes and not her chemotherapy. Isabel was overweight and had significant abdominal fat, which, combined with the declining vision, indicated that she was at high risk for more complications from her diabetes. Furthermore, she did not monitor her glucose levels, so it is hard to judge whether or not the diabetes was actually under control, or whether she just happened to be at lower levels when she visited the physician. She was beginning to suffer the effects of diabetes because she did not understand how the disease worked, and how important treatment was, highlighting the lack of health literacy. A good system of preventive care, which could be provided by a national health system, could address these issues.

Occupational and Environmental Hazards

Compounding the difficulties of the situation faced by many low-income families without health insurance is that they are often forced to work in places where they are exposed to more health-compromising hazards. Luis is fortunate to have an employer who offers health insurance, but he is still exposed to hot plastics and any gases they may put off while forming the custom plastics. It would be important to be aware of this exposure if he began having any respiratory or dermatological symptoms. Although often disparaged as a nuisance, the role that Occupational Safety and Health Administration plays in protecting people from potentially dangerous environments is very important and is one example of how having a better system in place has prevented many injuries and hazardous exposures, saving lives and reducing the health care burden that would have been caused by workplace injuries and their consequences.

Spirituality in Medicine

It is crucial for physicians to remember the role that spirituality plays in our patients' lives. We are so focused on the important scientific details and evidence-based research, it is easy to overlook the impact a patient’s spirituality can have on their health condition. For Luis and Isabel, it played a central role in their approach to health care and medicine. As Luis said, “God is the best doctor.” As their physician, it would be important to be sensitive to their desire to incorporate prayer into their care. Actions such as calling on hospital clergy when Isabel was preparing for her surgery might help to foster a good relationship with them. Furthermore, when patients do things that seem unfathomable to us, such as not going for treatment when an ectopic pregnancy has ruptured, or is about to rupture, we need to be sensitive to their decisions and try to educate the patient in a calm and open manner. We also need to be open to the reality that “miracles” can and do occur in medicine.

My time with Luis and Isabel served to crystallize my understanding of several topics covered in the Principles of Clinical Medicine course. However, its greatest impact came in bringing the reality of the situation in medicine and the health care system in the US to the forefront of my thinking. Having established an understanding of the system throughout this class allowed me to see Luis and Isabel’s situation more clearly. Rather than simply viewing it as a difficult situation, I now see clearly how it is the product of a defunct health care system, which misses its goal in name as well as function. We need a health system accessible to everyone whose primary mission is to promote good health in addition to caring for the sick.

Disclosure Statement

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A patient presents to the Emergency Room with a two to three day history of right lower quadrant abdominal pain, worsening in intensity; low-grade fever; and tenderness to palpation over the right lower abdomen, slightly toward midline. Diagnostic images show:

Figure 1. Computed Tomography scan with oral and IV contrast demonstrates a large, distended tubular structure in the right lower abdomen consistent with an inflamed appendix.

Figure 2. (same patient) Computed Tomography scan identifies an appendicolith within the center of the enlarged appendix.

Given the clinical scenario, this provides radiographic proof of acute appendicitis.

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Dr Tripuraneni is a Child Psychiatrist and the Assistant Physician in Chief at the Fresno Medical Center in Fresno, CA. He recently converted from film photography to digital and took this photograph near a walking trail in Fresno at dusk. He was photographing the sunset when a fast biker came out of nowhere and crossed the bridge—he feels he was lucky to capture the biker’s image just as he was crossing the setting sun.
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Clinical Medicine

Background
Communication barriers often go undetected in health care settings and can have serious effects on the health and safety of patients. Limited literacy skills are one of the strongest predictors of poor health outcomes for patients.1,2 Studies have shown that when patients have low reading fluency, they know less about their chronic diseases, they are worse at managing their care,3 and they are less likely to take preventive measures for their health.4 However, patients do not need to have limited literacy skills to have low health literacy. The Institute of Medicine defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."5

Limited health literacy is a hidden epidemic. It can affect health status, health outcomes, health care use, and health costs.6 The entire health care system relies on the assumption that patients can understand complex written and spoken information. Patients are expected to navigate a complex medical system and then manage more and more of their often complex care at home. If they do not understand health information, they cannot take necessary actions for their health or make appropriate health decisions.

The 2003 National Assessment of Adult Literacy found that nearly half of the US population has inadequate literacy. These individuals cannot use instructions on a prescription drug label to determine what time to take that medication.7 Individuals classified as having low literacy skills cannot locate an intersection on a map or calculate the total cost of purchases on an order form. After years of education and training, physicians find themselves in the small minority of the population with high-level literacy skills. They may often unknowingly present health information at a literacy level higher than their patients can grasp. Additionally, medical training comes with its own vocabulary that can further encrypt health information presented to patients. For the health and safety of patients, the gap between the literacy of clinicians and that of their patients must be bridged to achieve effective communication and understanding. It is important to recognize that there are individuals with adequate literacy who still may have difficulty understanding written and spoken health care information because of the medical terminology and jargon that is used in the health care environment.

Individuals with limited health literacy are at risk for error and poor health outcomes. They have trouble understanding medication instructions, appointment reminder forms, informed consent, discharge instructions, and health education materials. This leads to lack of adherence to medication regimens; missed primary care appointments, laboratory tests, and referral appointments; and lack of proper health self-management. Such actions may appear to be noncompliance but may instead be the result of limited health literacy. Patients with limited health literacy often end up back in a physician’s office with more serious conditions or, worse, in the Emergency Department (ED). Low health literacy costs the US health care system up to $75 billion annually.8

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Corridor Consult
Do Patients Understand?

Suzanne Graham, RN, PhD
John Brookey, MD

Public health nurse: “Jill, I see you are taking birth control pills. Tell me how you are taking them.”

Jill: “Well, some days I take three; some days I don’t take any. On weekends I usually take more.”

Public health nurse: “How did your doctor tell you to take them?”

Jill: “He said these pills were to keep me from getting pregnant when I have sex, so I take them anytime I have sex.”

This story is true: Jill is a single woman, age 21 years, who works as a house cleaner. She reads at about the second-grade level.
Fortunately Jill was not pregnant. Had she become pregnant as a result of her misunderstanding of how to take the birth control pills, there would have been additional costs to the system as well as to Jill. Jill’s physician probably made the assumption that Jill understood all of the information provided. Taking the time to check the patient’s understanding during the office visit may save time in the long term by avoiding unnecessary hospitalizations, ED visits, phone calls, and additional health care appointments.

**How to Ensure that Patients Understand**

Most people with low literacy are very ashamed of it and therefore have become very good at hiding the problem. Many do not tell their bosses, coworkers, or even life partners. Patients with limited health literacy are well served by a psychologically safe environment so that they do not feel ashamed. To achieve this, clinicians can tell patients ahead of time what to bring to the appointment. They can be told that they are welcome to bring someone with them to the visit. Staff members who are responsible for checking patients in should be friendly and helpful. The length and number of forms patients are asked to fill out should be limited. Finally, confidential assistance in filling out forms should be offered.

Indications that patients have limited health literacy may include incompletely filled out forms; frequently missed appointments; poor compliance; inability to identify the name, purpose, or timing of a medication; and not asking any questions. A patient’s reaction to written materials can raise concern about literacy skills. A patient with low literacy might say, “I forgot my glasses at home,” and ask the physician to read the materials aloud. The patient might say that s/he will take the materials home to read or to show to a spouse or child. If patients exhibit these red flags, physicians should be aware that they may need greater assistance in understanding information related to their health.

For greater clarity and understanding, written materials should be created in a patient-friendly manner. This means using simple words, short sentences in bulleted format, and lots of white space. Medical jargon should be avoided and simple pictures should be used when helpful. Emphasis should be on what the patient should do; unnecessary information should be avoided.

Physicians must encourage open communication with patients. All patients—not just those with limited health literacy—can benefit from clear communication practices. When conveying information verbally, physicians and staff should communicate in key points, avoiding excessive information; most patients will not remember more than three messages. It is important to speak slowly and avoid medical jargon. Use analogies for common things—a patient might better understand joint problems if joints are compared with hinges. Reading handouts with the patient, highlighting and circling important parts, and encouraging the patient to ask questions are also helpful tools.

An important component of creating a psychologically safe environment is fostering an atmosphere in which questions are welcomed. A helpful communication tool for both physicians and patients is Ask Me 3. Created by the Partnership for Clear Health Communication (National Patient Safety Foundation, North Adams, MA), this tool specifies three essential questions to which patients should know the answer after every health care encounter: 1) What is my main problem? 2) What do I need to do? 3) Why is it important for me to do this? When clinicians use posters and brochures found on the Ask Me 3 Web site, patients are encouraged to ask these three questions and physicians are reminded to structure information conveyed to patients around these questions. Patients are empowered when they are invited to ask questions and encouraged that physicians want them to understand their own health care. Jill’s physician could have used the Ask Me 3 technique as follows:

1. Jill, you have told me that you are having sex but you don’t want to get pregnant.
2. To keep from getting pregnant, you must take one birth control pill every single day at the same time.
3. If you don’t take the pills this way, you may get pregnant.

Jill’s physician would then follow this with a teach-back. After clinicians have structured the information given to patients around Ask Me 3, one of the most effective ways that they can check for patient understanding is the teach-back method. When patients are asked the yes-or-no question “Do you understand?” they may be embarrassed to admit that they do not. Instead of doing this, clinicians can ask patients to put the information in their own words to make sure that they understand. Clinicians can do this by asking patients to tell them what they will tell their spouse or child about their condition or by asking patients to let them know what they heard so that the clinicians can make sure that they explained everything that the patients need to know. The teach-back incorporates recommended elements of

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**When patients are asked the yes-or-no question “Do you understand?” they may be embarrassed to admit that they do not. ... ask patients to put the information in their own words to make sure that they understand.**
adult learning—personalization, reinforcement, and multiple modalities. The National Quality Forum recommends teach-back as a top patient safety practice, and using it has been found to be associated with better health outcomes. Had Jill’s physician asked her to share her understanding of how to take the birth control pills, he would have realized that she had misunderstood. It is important that when checking patients’ understanding of instructions, clinicians do so in a manner that does not embarrass patients. For example, Jill’s physician could have said something like “Jill, you have told me that you don’t want to get pregnant, so I want to make sure that I explained things clearly. Let’s check how clear I was by having you tell me how you are going to take the pills.”

Conclusion
Limited health literacy can pose a risk to patient safety. Establishing awareness of the problem, committing to addressing the issue, and implementing communication changes in the health care environment can help ensure that patients understand their health issues and are competent in managing their care. Low health care literacy affects not only those with general low literacy but also individuals who may be extremely literate in their own areas of expertise but who have a problem understanding medical terminology. The most prudent approach is to always assume that your patient does not understand you or has a different perception of what you are saying. If Jill had been your patient, how would you have made sure that she understood how to take her birth control pills?

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References

Understanding
You never really understand a person until you consider things from his point of view.
— Harper Lee, b 1926, American Pulitzer Prize-winning novelist.
A Clinical Communication Strategy to Enhance Effectiveness and CAHPS Scores: The ALERT Model

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Abstract
The Consumer Assessment of Healthcare Providers and Systems (CAHPS) program is a national annual report that surveys patients and rates health plans on a variety of metrics, including claims processing, customer service, office staff helpfulness, and ability to get needed care. Although physicians may feel they have no immediate control over many aspects of this questionnaire, there is an important area of the survey where they do have direct control: “how well the doctor communicates.”

It is well established that effective physician–patient communication has beneficial effects not only on physician and patient satisfaction but also on adherence to medical advice, diagnostic accuracy, and malpractice risk. The creators of the CAHPS survey developed and incorporated four questions seeking to ascertain the patient’s impression of the physician’s communication skills. These questions assess how well the physician listened carefully to the patient, how often the physician explained things understandably, how often the physician showed respect for what the patient said, and how often the physician spent enough time with the patient.

Many excellent clinical communication models exist that touch on aspects of the CAHPS topics, but it behooves physicians to be mindful of the exact survey questions. The ALERT model of communication was developed to facilitate physicians’ recall of these measures. By incorporating key verbal and nonverbal communication skills, clinicians can address and improve their scores on this important area of the CAHPS survey.

Introduction
The Consumer Assessment of Healthcare Providers and Systems (CAHPS) program is an evolving and comprehensive family of standardized surveys that ask consumers and patients to report on and evaluate their experiences with health care. The CAHPS program is funded and administered by the US Agency for Healthcare Research and Quality. The survey covers topics of importance to consumers, including accessibility of medical services and physician and clinician communication skills. The CAHPS program seeks to assist organizations, purchasers, and consumers in assessing the patient-centeredness of care, comparing health plan performance, and ultimately improving the quality of care. Since 1999, the National Center for Quality Assurance has required CAHPS survey results from health plans (including Kaiser Permanente (KP)) seeking accreditation and submitting data as part of the Healthcare Effectiveness Data and Information Set.

Although the CAHPS Health Plan Survey (Versions 3.0 and 4.0) are extensive and cover many important areas pertaining to the delivery of care, individual physicians may feel that much of the survey content is out of their immediate influence. Fortunately, the portion of the survey covering physician–patient communication is clearly under the direct control of the clinician. As the CAHPS family of surveys has continued to evolve and expand (such as the development of HCAHPS for hospitalized patients as well as Adult, Child, Commercial, Medicaid, and Dialysis Center-specific surveys to name a few), the elements pertaining to physician communication have remained consistent. In addition, the CAHPS survey questions assessing effectiveness of clinical communication align well with other survey tools currently in use, including Art of Medicine, used by the Colorado Permanente Medical Group. If physicians are aware of the exact questions on the CAHPS questionnaire...
that focus on clinical communication, they will be better able to hone their skills to address these important metrics.

Here, we explore the four CAHPS questions in the “How Well the Doctor Communicates” section of the survey and highlight ways of improving these skills on the basis of existing research. The four CAHPS questions focus on the patient’s perception of how often the physician listened carefully to the patient, how often the physician explained things understandably, how often the physician showed respect for what the patient said, and how often the physician spent enough time with the patient. The ALERT model was developed to aid physicians and clinicians in recalling the CAHPS questions:

- Always
- Listen carefully
- Explain things understandably
- Respect what the patient says
- Manage Time perception

### Clinical Communication

It is well established that excellent physician–patient communication enhances a variety of important metrics, including improved physician and patient satisfaction,2 better patient compliance,1 reduction in medicolegal risk,1 and improved health outcomes.5 Medical schools and residency programs across the US are developing and employing innovative communication curricula for physicians in training.9 Banking on the assertion that good communication skills are “learnable, teachable, and improvable,” many practicing physicians participate in communication workshops to improve these important skills.8 Even the American Board of Medical Specialties is partnering with CAHPS to develop and incorporate clinical communication assessments into the physician Maintenance of Certification process.9 Fortunately, many excellent models exist to assist physicians in enhancing their clinical communication skills, including the “Four Habits”10; “Inviting, Listening, Summarizing”11; and others.12,13 There are also online resources available with skills training and research services, including those provided by the Institute for Healthcare Communication and the American Academy on Communication in Healthcare (www.healthcare-comm.org and http://aachonline.org, respectively). Thus, by using existing communication models and resources to better understand the CAHPS questions focusing on physician–patient communication and recalling the ALERT mnemonic, physicians can address and improve these skills.

### The ALERT Model

#### Always

Because we do not know which patients will receive CAHPS questionnaires, excellent clinical communication must be used consistently with all patients. The CAHPS report provides information as to whether the patient felt that the physician never, sometimes, usually, or always used the specific communication skill. Understandably, physicians often score higher when usually and always are combined in terms of grouping survey results, and the scores tend to drop when always is the lone standard. That is, we often use effective communication but do not always do so. It is our hope that clinicians will use these skills always and not only when convenient. Practice and awareness will facilitate consistency.

#### Listen Carefully

The art of listening is a critical piece of physician effectiveness. From auscultating a cardiac murmur to listening to a dictated radiology report to hearing the story of a patient’s illness, active listening is one of the key ways in which we take in clinical information. The CAHPS survey seeks to ascertain the patient’s perception of whether the physician listened carefully. How is it that we can take in verbal information used to make critical decisions yet give the impression that we are not actually listening? Physician and author Fred Platt, MD, has gone so far as to say that “inaccurate and ineffective listening leads to diagnostic and therapeutic disasters and convinces our patients that they are in the hands of incompetents.”14,15 Indeed, active listening is necessary and important across the entire spectrum of care, from the simplest office visit15 to the most complicated inpatient scenario.16

Effective listening requires awareness and participation on the part of the clinician. We must express to the patient that we are listening by being fully present. This can be demonstrated in the following ways:

- Maintaining eye contact while the patient is speaking
- Sitting down, leaning in, and keeping an open and receptive body posture
- Using reflective statements such as paraphrases and summaries (“What I hear you saying is that …,” “Let me make sure I understand …”)
- Avoiding interrupting the patient’s story—being quiet and paying attention
- Avoiding multitasking, such as shuffling papers or typing on the computer
- Avoiding unnecessary interruptions when possible (door knocks, pager, cell phone)
Physicians’ use of these simple concepts will allow patients to more fully tell the story of their illness and thus feel listened to, heard, and understood.

**Explain Understandably**

The initial part of a clinical interview typically centers on relationship-building and information-gathering; the latter part is steeped in information sharing. According to Frankel and Stein, investing in the end of the clinical encounter emphasizes delivering diagnostic information, providing a clear rationale, exploring potential barriers to adherence, and providing support. The CAHPS survey question is again asked from the patient’s perspective: “Did the doctor explain things understandably?” As clinicians, we may feel that we have explained things very clearly, yet from the patient’s view, this may not be the case. It is incumbent on physicians to ensure that patients can understand all diagnostic and therapeutic options as clearly as possible. A recent study of Permanente physicians from the Hawaii and Southern California Regions found that those with the highest patient satisfaction ratings offered more detailed and effective explanations to patients **using simple language** than did physicians with low ratings.

Many clinicians have had the uneasy feeling that what was just explained to a patient or family was not well understood. Reasons for poor comprehension may include fear, mistrust, dementia, hearing impairment, time factors, language barriers, health literacy issues, and overuse of medical jargon. It is estimated that more than 90 million Americans cannot adequately understand basic health information, and this obstacle affects people of all ethnic groups and income and education levels. Former US Surgeon General Richard Carmona has stated that clinicians must “communicate in plain simple terms and take the time to confirm comprehension.”

Patients perceive that their care is thorough and appropriate when they have received enough information to understand the problem and options relating to treatment. Effective explanations can be enhanced by doing the following:

- Explaining the rationale for tests, treatments, and consultations (“I’m ordering this blood work to see if we can find a reason for your fatigue.”)
- Using simple, easy-to-understand terminology whenever possible
- Speaking slowly, clearly, and at an appropriate volume
- Avoiding medical jargon and abbreviations
- Discussing treatment goals and outlining expected course of recovery
- Exploring barriers to compliance (eg, cost, travel, work schedules)
- Providing resources (handouts, diagrams, after-visit summaries)
- Checking for understanding, comprehension, and agreement
- Asking if there are additional questions or areas needing clarification.

A useful technique for assessing patient comprehension is the “teach back” method, in which patients are asked to restate the rationale and plans in their own words. This should be done in a supportive and nonthreatening manner so as to not embarrass the patient or family. The physician could say, for example, “Okay, Mr Jones, I know that when you get home, your family is going to want to know what we talked about today in terms of your knee pain. What are you going to tell them?”

**Respect What the Patient Says**

The CAHPS question asking how often the physician showed “respect for what you say” can be confusing to some clinicians and potentially offensive to others. Aren’t we the medical experts? Isn’t the patient in the office to hear what we have to say? Perhaps in a bygone medical era, physicians could give their point of view without considering the patient’s thoughts or wishes. However, we are now in an information era, in which many patients have very definite ideas about their care plan. With the emergence of the Internet, direct-to-consumer advertising, and a host of other readily available medical-information sources, patients are showing up on our doorsteps more informed (and occasionally misinformed) than ever. Many patients want to collaborate with the care team and be actively involved in decision making. It is incumbent on physicians to be accepting, even welcoming, of patients’ points of view pertaining to their care. The CAHPS question seeks to ascertain whether the physician respected what the patient had to say and thus the patient’s point of view. It is important to note that respect does not necessarily imply agreement; simply put, it means acknowledgment of what the patient has to say. Interestingly, a 2007 *Consumer Reports* survey of 39,090 patients found that of those who rated their physicians as “excellent,” 77% felt that their doctor treated them with respect.

How do physicians demonstrate respect for the patient’s point of view? In response to the *Consumer
A Clinical Communication Strategy to Enhance Effectiveness and CAHPS Scores: The ALERT Model

Reports survey findings, Caleb Alexander, MD, of the MacLean Center for Clinical Medical Ethics at the University of Chicago, stated that “physicians have to establish a climate of trust and safety where patients' concerns are heard in a nonjudgmental fashion” (emphasis added). Clinicians need to be sensitive to patients' frame of reference and be careful not to devalue their health beliefs. Patients respond best to physicians who are genuinely curious about them, and they shut down when they feel they are being viewed in an overly generalized, stereotypical way.

Although many variables can add to the complexity of the demonstration of respect (differences in age, culture, sex, education, experience, and personality, to name a few), in the simplest terms, to be respectful is to be humble. Respect is manifested by behaviors that reinforce a patient's dignity.

Demonstrating respect for what the patient has to say can be accomplished by using skills outlined in habit 2 (elicit the patient’s perspective) of the Four Habits model:

- Ask for the patient’s ideas about his or her illness (“What do you think might be causing this problem?” “What worries you the most about this?”)
- Elicit specific requests from the patient (“How might you and I work together to solve this problem?” “I see you’ve been downloading information from the Internet. Tell me what you’ve come up with so far, and I’ll share my thoughts with you.”)
- Explore the impact on the patient’s life (“How this is affecting your ability to get through your workday?”)

It is critical to the establishment of a trusting and therapeutic alliance that we discover patients' beliefs and theories about their illness. We must be willing to discuss and respect their beliefs even if we disagree with them.

Manage the Perception of Time

Perhaps one of the most pervasive complaints of both clinicians and patients is a lack of time. Feeling rushed or hurried is frustrating to all parties. Indeed, with an ever-increasing emphasis on value and efficiency in health care delivery, quality time between physician and patient is an increasingly valuable resource. The CAHPS survey asks, from the patient’s point of view, whether the physician spent enough time with him or her. One solution for this problem would be to add more time to all visits, but research suggests that simply increasing the length of each appointment may not necessarily improve the patient's perception of time spent. The aforementioned study involving KP patients and physicians found that patient satisfaction ratings were not significantly related to the length of the visit. The challenge is thus for the physician to manage the perception of time. This can be accomplished with careful attention to good clinical communication skills.

While studying patients’ “entitlement” to time with their physician, Pollock and Grime found that it is the perceived quality of time, rather than just quantity, that is critical to patients' experience of office visits. What improves the quality of the time spent? Research suggests that when patients have their emotional needs met—when they feel listened to and understood—regardless of the actual time spent with the physician, they are satisfied not only with the visit but also with the visit length. Furthermore, those satisfied with the quality of the visit are more likely to comply with medical advice. In short, physicians can create the sense of more time through the process of improved listening and understanding. Patients who are left feeling that a visit was too short may say more about the content of the visit than the time on the clock.

Clinicians concerned that slowing down, listening, and uncovering patients’ emotional needs might actually lengthen the visit and cause them to run late can take comfort in the findings of a study involving visits to primary care and surgical specialists. In these audiotaped encounters, physicians who responded empathetically to patients’ emotional needs had visits that averaged 2.5 minutes shorter than the visits of those who ignored the emotional needs. That is, careful listening and appropriate empathetic responses actually saved time for the physician and likely improved the perception of the quality of time for the patient.

To enhance the patient’s perception of time spent with the physician, try the following:

- Focus on demonstrating listening, empathy, concern, and understanding
- Sit down during the interview
- Maintain eye contact
- Avoid appearing rushed or hurried; don’t look at your watch or the clock
- Use open-ended questions to allow the patient time to speak
- Avoid rapid-fire and closed-ended questions
- Keep patients apprised of wait times and delays

Remember that although we may not be able to add minutes to the clock, we can affect the patient’s perception of time by improving the quality of the time.
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Conclusion
Clinician awareness of the CAHPS survey areas looking at communication in the examination room is an important step toward improving scores in this area. The metrics of listening carefully, explaining understandably, respecting what the patient says, and improving the patient’s perception of time can be easily remembered by recalling the ALERT mnemonic. Careful consideration and consistent use of the skills embedded in these areas should enhance patients’ perception of our clinical communication and lead to improved CAHPS scores. Most importantly, however, improved physician–patient communication leads to healthier patients, better medical outcomes, and happier physicians.

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References
“Absolutely amazing stuff. Social network maps like this provide a whole new view of the organization. How long will it take you to do this?” asked the Associate Medical Director.

“Excuse me?” I asked.

“Let’s do it. What’ll you need?”

I was confused. “You mean, collect this kind of data here to get a sense of what’s going on? Or everything, the whole process, of collecting formative data, assessing priorities among caregivers, getting feedback on prototype interventions and revising them, and then intervening and following up? Or just a proposal?”

“Not a proposal. We need to move the needle. This could save us millions.”

That’s when it hit me. I work in an organization where there is a will to change: improvement, innovation, Plan Do Study Act, with emphasis on the act. The question, then, is whether it is a learning organization—a sign of greatness—or just an innovative organization—a sign of being good at core objectives. Collectively, do we listen? Do we communicate across departments, facilities, and regions to transfer successful practices? Do we document experiences to pass on the knowledge gained for those who follow us? These simple questions reflect the pathways and qualities and persistence of innovation dissemination of mutual understanding and two-way communication, not just a one-way transmission of information. Dissemination occurs when the state of the art—what practitioners do—affects the state of the science—what researchers do, and vice versa. Organizational dissemination is fundamentally a learning process.

Getting From Good to Great

Innovative organizations can excel in their core mission. Large, complex organizations with solid consistent performance often have the resources to be innovative. But they often fail to capture what they already know, share it internally, support implementation, and thus capitalize by learning from within. It takes a learning organization to be great.

Too often, dissemination is a one-way transmission: create a Web site, award a local success, give a talk. These are passive approaches that rely on the assumption that evidence of effect is sufficient to propel innovations into broad use across organizations and among organizations. This faulty assumption is one of several common missteps in attempts to spread successful practices (see Sidebar: Top Ten Dissemination Mistakes in Organizational Change). Worthy innovations can take decades to spread whereas ineffective innovations diffuse rapidly and sustain. The knowledge that is most critical for reproducing effective results can be the most difficult to communicate. Technology is rarely an answer in and of itself to the challenges of organizational learning. Lastly, organizations can be remarkably adept at not learning from past mistakes.

Innovation, and even more so, dissemination, is naturally political. Innovation is political because an innovation supplants or supplements existing expectations and behaviors, and because personal and organizational identities are associated, sometimes strongly so, with innovations. The implementing team must trust the team that is the source of the innovation. How will our adoption of an innovation from afar reflect on us? Will we be seen as mere imitators? Is the source of the intervention someone or some unit we want to be seen as copying? Wouldn’t it reflect better on our unit if we created an intervention ourselves? Can ideas from afar really work in our clinic, with our staff, our physicians, and our patients?

The Innovative Organization

Having an innovation or practice that is worthy of replication and spread is the critical initial criterion for dissemination. Discovery,
originality of thought, creativity, and breakthrough insights do not just happen. Organizational conditions must be supportive of inventive activity. The psychologic conditions that lead to creative work, hard work paired with enthusiasm, are made possible by social conditions inside organizations that can affect the likelihood and quality of innovative work. Find a physician or nurse who is self-indulged in work and you have the basis for inventive activity.

Innovation needn’t always be thought of as a prelude to dissemination. Some innovations can be effective and efficient, yet are poor candidates for dissemination, suited to a few sites but not for most or even many. Successfully transferring an effective practice to just one site can be formidable enough. Moreover, the objectives of inventive activity may not extend beyond an initial site or a couple sites.

American universities bear certain similarities to integrated health care systems. Each employs highly skilled experts who have high degrees of autonomy in determining what they will do. Each type of organization is complex, with many units grouped by specialty. Hierarchy in both types of organization is rather flat with units only loosely coupled. Both physicians and faculty can be more normatively tied to their specialization and its professional societies than they are to their employer.

But because universities rarely call on the knowledge of their faculty to improve organizational quality, service, or efficiency, the individual innovativeness of their faculties does not cumulate into their organizations likewise being innovative.

Medical organizations, including multispecialty group practices, are similar to universities in structure, though not in function or culture. An HMO may look like a university on paper, but successful HMOs are more highly attuned and responsive to their market both in terms of consumers and competitors than are successful universities. For example, Kaiser Permanente is a very progressive organization, which is neither good nor bad; it is an accu-

<table>
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<tr>
<th>Top Ten Dissemination Mistakes in Organizational Change</th>
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<tr>
<td><strong>1. Assume that evidence matters in the decision making of potential adopters.</strong></td>
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<tr>
<td>Interventions of unknown effectiveness and of known ineffectiveness often spread while effective interventions do not. Evidence is most important to only a subset of early adopters and is most often used by them to reject interventions. <strong>Solution:</strong> Emphasize other variables in the communication of innovations such as compatibility, cost, and simplicity.</td>
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<td><strong>2. Substitute our perceptions for those of potential adopters.</strong></td>
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<tr>
<td>Inadequate and poorly performed formative evaluation is common as experts in the intervention topical domain engage in dissemination. <strong>Solution:</strong> Seek out and listen to representative potential adopters to learn wants, information sources, advice-seeking behaviors, and reactions to prototype interventions.</td>
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<td><strong>3. Use intervention creators as intervention communicators.</strong></td>
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<td>Although the creators of interventions are sometimes effective communicators, the opposite condition is much more common. <strong>Solution:</strong> Enable access to the experts, but rely on others who will elicit attention and information seeking by potential adopters.</td>
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<td><strong>4. Introduce interventions before they are ready.</strong></td>
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<td>Interventions are often shown as they are created and tested. Viewers often perceive uncertainty and complexity as a result. <strong>Solution:</strong> Publicize interventions only after clear results with messages that elicit positive reactions from potential adopters.</td>
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<td><strong>5. Assume that information will influence decision making.</strong></td>
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<td>Information is necessary and can be sufficient for adoption decisions about inconsequential innovations, but for consequential interventions that imply changes in organizational routines or individual behaviors, the first to adopt often do so for counter-normative reasons and their low social status can become associated with an intervention. <strong>Solution:</strong> Gather data about who among potential adopters is sought out for advice; intervene with them to propel dissemination.</td>
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<td><strong>6. Confuse authority with influence.</strong></td>
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<td>People in positions of authority may be regarded as influential, but often this is not the case. <strong>Solution:</strong> Gather data about who among potential adopters is sought out for advice; intervene with them to propel dissemination.</td>
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<td><strong>7. Allow the first to adopt (innovators) to self-select into dissemination efforts.</strong></td>
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<tr>
<td>The first to adopt often do so for counter-normative reasons and their low social status can become associated with an intervention. <strong>Solution:</strong> Learn the relational structure that ties together potential adopters so that influential members can be identified and recruited.</td>
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<td><strong>8. Fail to distinguish among change agents, authority figures, opinion leaders, and innovation champions.</strong></td>
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<td>It is unusual for the same persons to effectively play multiple roles in dissemination into and within communities and complex organizations. <strong>Solution:</strong> Use formative evaluation to determine the functions that different persons are able to fulfill.</td>
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<td><strong>9. Select demonstration sites on criteria of motivation and capacity.</strong></td>
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<td>Criteria of interest and ability make sense when effective implementation is the only objective. But spread relies on the perceptions by others of initial adopters. <strong>Solution:</strong> Consider which sites will positively influence other sites when selecting demonstration sites.</td>
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<td><strong>10. Advocate single interventions as the solution to a problem.</strong></td>
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<td>Potential adopters differ by clientele, setting, resources, etc, so one intervention is unlikely to fit all. <strong>Solution:</strong> Communicate a cluster of evidence-based practices so that potential adopters can get closer to a best fit of intervention to organization prior to adaptation.</td>
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rate description of a will within the organization to try new things.

Can an organization suffer from being progressive? Can the will to try new things, to celebrate new care models and new information systems and new commitments to customers and compliance and error reduction and responsiveness and coding protocols negatively affect an organization? Although many changes are desirable, not all will outperform existing organizational ways for getting work done.

An organization good at innovation needn’t share what works and why, but becoming great at organizational learning means precisely this.

On Becoming a Learning Organization

What would it take to prompt the internist or surgeon to look first within the organization for ways to improve? How can learning by sharing come to characterize who we are?

A disseminative organization must decrease the varied individual costs associated with implementation of a new practice or intervention, including research, evaluation, customization, and monitoring. Caregivers are already overburdened. The tacit ways that effective practices have been applied with success at an initial practice site must be made explicit. Each practice site is, in fact, unique and thus has the potential for creative adaptation and improvement over the initial demonstrated outcomes. The creation of generalizable dissemination tools and guides must be readily available so that the adopters and implementers see their value and can easily apply them. Learning by sharing is the means; uniformity and improved efficiency is the potential result.

Conclusion

The perspective to organizational change outlined here requires a high degree of certainty that an effective practice, based on demonstrated or potential robustness, will work in diverse settings. This perspective requires support for local units from leadership, local and national. Local implementers need to know the causal components responsible for desirable observed outcomes. They must see how similar groups or units have successfully adapted the practice. This approach requires trust that a set of new, proven practices warrants consideration; that clinicians are capable and well positioned to improve quality, service, and affordability. This balance of support and trust between central administration and local offices and clinics is the sweet spot of organizational change. It’s where change isn’t just for the sake of change, but rather for the improvement of the organization and the lives of our patients.

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References

Ms McMillen is an Editor and the Staff Writer of *The Permanente Journal*. Since being given her parents’ old Brownie camera as a child, photography has been a love and a passion. She recently had her first show of photographs of images from France. This image was taken at the Monterey Bay Aquarium in Monterey, CA. The jelly fish exhibits are always an attraction because of their grace, beauty, and visual lyricism.
Alcohol Abuse in the Workplace:
When You Smell It, Do You Ask?

Peter Washburn, MD

Introduction
What do you do when you smell alcohol on the breath of a coworker? For obvious—and not so obvious reasons—this question has greater significance for those in health care. The following are excerpts from my memoir of 12 years as a Navy physician. In the 70s and early 80s, I became interested in what is now called Addiction Medicine. This interest blossomed when I took a two-week course for health professionals on substance abuse at the Naval Hospital in Long Beach, CA under the leadership of Captain Joseph Pursch, MD, then Medical Director.

Fresh from this two-week course, I returned to the Naval Hospital where I was stationed, now an “expert” on the diagnosis and treatment of alcoholism. A few months after my return, I had the opportunity to put into practice something I had learned in Long Beach.

The Doctor
Before I arrived at this small hospital in the mid-1970s, I heard rumors that my new boss had a problem with alcohol, had been in treatment for alcoholism, or some variant of this theme. The details weren’t clear. If he were a recovering alcoholic, it would be very interesting, rewarding, even. But if the gossip was not accurate—for example, he should have gone to treatment but hadn’t—then things could be awkward. Nothing like having an active alcoholic boss to make life challenging. Since the information was so sketchy, I had to proceed as if I knew nothing of these rumors.

There was no hint that John, the Chief of Internal Medicine, had a special relationship with alcohol. I had only been at this hospital a couple months when I submitted a request to attend the substance abuse course in Long Beach. If John was in recovery, that request ought to have flushed out some comment from him. He tacitly approved it without comment. Perhaps the rumor was a little off: “Boss” is ambiguous. Perhaps the rumors were about the Commanding Officer of the hospital or the Chief of Medicine, not the Chief of Internal Medicine. I wasn’t about to investigate.

The Long Beach course and vague instruction from Dr Pursch to “keep an eye on your boss,” raised my awareness. Confidentiality prevented Dr Pursch from disclosing anything specific, but I was certain the rumors were about John; I wasn’t certain what role I should play.

I had noticed a faint wobble of the match when lighting the cigarillos he was fond of. It was not unusual for beads of perspiration to appear on his forehead during morning rounds. Too much coffee? Nervous because he was afraid we all were getting ahead of him in medical knowledge? Too hot and humid? Not in February.

As months went by, I became more involved in the alcohol unit. John said nothing about this, neither encouraging nor hindering me. He was the perfect boss: he left me alone.

Then, one morning as we were making rounds, I detected the smell of alcohol on John’s breath. It was faint but unmistakable. As we were going our separate ways, I asked one of my colleagues if he noticed anything, smelled anything. “That’s your baby,” he said, distancing himself and walking off.

John obviously wasn’t drunk; he wasn’t slurring his words. It would be so easy to overlook the odor of alcohol—that fruity-sour smell—on John’s breath, but that went against everything I had learned in Long Beach. This small detail could be the tip of the iceberg. Captain Pursch’s words kept coming back to me: “keep an eye on your boss.” Did he mean I should do something? I was due in the clinic in a few minutes and had little time to ponder. “Deal with it directly.” “Act as you would in any other medical situation,” my training nagged me. I found myself following John into his office, as if to ask him something. I closed the door behind me and sat down in front of his desk.

When I met him, John was a career Navy physician, older than I, a full Commander to my more junior Lieutenant Commander. He didn’t live up to the imposing figure I had imagined. The first time I saw John he was working in the Emergency Room (ER) and I

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had to precipitously revise my preconceptions. A good foot shorter than I and overweight, he had worn a set of tight, pink scrubs, which, with his dark brown hair, made him look like a bottle of Pepto-Bismol. Now, sitting behind his desk, our height differences were no longer evident; his uniform reminding me he was my boss. I leaned forward and said quietly, “John, I’m pretty sure I smell alcohol on your breath.”

He stared at me blankly, as if at a loss for words. I didn’t have a follow-up. A moment of silence. I groped forward. “And if I can smell it, so can the patients.”

That took it out of the realm of the personal. He couldn’t say, “Oh, Peter’s so hung up on this alcohol thing he sees alcoholics everywhere,” something I was afraid people sometimes thought.

He looked innocent. Wounded. A plaintive, “How could you?” was the message I was being sent. Doubt arose about what I had smelled. Had I been mistaken?

He gave a little cough, relaxed, and then smiled. He pointed to a bottle of cough syrup sitting on his desk. “Do you suppose that’s what you’re smelling? I’ve had a little cold …” He gave another cough.

I felt had. And simultaneously relieved. He has this alibi. I hadn’t been wrong, or, at least not completely wrong. Just off the mark.

I sat back, confused about where to go from here. Alcohol is a good cough suppressant and is almost always the main ingredient in cough syrups.

“Well, sir … Still, I don’t think it’s a good idea to be rounding on patients smelling of alcohol.”

He conceded with a lame, “I guess you have a point.” I left his office cowed.

Out in the hallway I still felt uncomfortable. Something said I wasn’t done. The new CO, the Captain, also an internist, was a likeable man although I had had almost no dealings with him up to this point. I felt he ought to know.

Without further thought, I went to his office and asked his secretary if the Captain had a free moment. Seconds later I was seated in front of John’s boss who welcomingly asked, “What’s up?”

I got right to the point. “I was with John just now and I can smell alcohol on his breath. He says it’s the cough syrup he’s taking but I think it isn’t a good idea for him

Substance Abuse in the Workplace Today

Kitty Evers, MD, MFA
Robert J Savery, MA, LMFT

In terms of substance abuse and addiction, although many things are still the same as they were 20-30 years ago, many are different. Rumors, denial, suspicions, embarrassment, and reluctance to report are all still inherent in substance abuse situations. However, far from being a two-week training period, today there is a field of medicine, Addiction Medicine, and a specialty, Addictionology, to guide peers; and there are legal mandates that, if they existed in the 70s and 80s, are certainly stronger and more substantial.

In the Northwest, the Northwest Permanente Physician Advocate Resource (PAR) was developed 16 years ago and any physician who has concerns about another can get assistance from PAR in negotiating the process of addressing substance abuse in another physician. This can even be done anonymously. The goal is to protect patients first and foremost but also to help the physician. PAR boasts a physician self-referral rate of 84% for all categories though self-referral for substance abuse is not as high.

Whereas the armed forces have their own rules and regulations regarding substance abuse, Washington and Oregon have definitive reporting laws, specific to each state but very similar in design. Licensees are mandated—and protected—by each state’s medical board to report a peer as being impaired: impairment may be caused by substance abuse or any number of other problems; eg, emotional, marital, stress, and disease. In Oregon and Washington, a substance abuse case is referred to the Oregon Health Professional Program (HPP) or the Washington Physician Health Program (WPHP), respectively, both of which have many resources to assist in investigating suspected substance abuse and a monitoring/contract system for those who seek treatment. The Washington program also provides similar services to those dealing with mental disorders resulting in impairment. Of great importance is that both provide confidentiality from public and Board of Medical Examiners purview.

As long as the physician is successfully active in the program she is protected from public disclosure including the National Data Bank. Nurses...
to be at work with alcohol on his breath . . ."

The Captain raised his right hand to stop me and said, “Thank you very much. I’ll take it from here,” and lowered his hand. He then nodded, indicating that I was dismissed.

On my way to the clinic I wondered if I had just made a mess of things in the front office. Who knew what the ramifications might be, for me, for John. I might never get approval to attend another alcohol conference. Not if I was going to be causing trouble like this.

The next day, work was awkward. John was his usual self, although I kept my distance. I had told my nose to take a vacation; I wasn’t interested any more if that smell was still there. Weeks went by. Nothing was said, by anybody. All that for nothing.

Then, suddenly, John wasn’t at work. He’d be out six weeks: the length of the Navy’s course of alcohol treatment at that time. Although everyone seemed to know why he was out, no one said anything about it. If he had been out because of a broken leg, there would have been bits of information floating around about how he was doing, how it happened, how to get in touch with him. But no one said a word. He was just gone. Despite the added workload on the rest of us, I was secretly elated. The right thing had happened. When John came back, he’d be in recovery and we could joke about the whole thing. Then again, he might want to take over the management of the alcohol unit; that’d be his thing. The corpsmen would be calling him up and not me.

Well, no danger of that happening. When John came back to work a couple months later nothing was different. He didn’t say anything about where he’d been, no one said anything, and life went on exactly as before.

A year later he retired. He had done his 20 years in the Navy, had gotten passed over for Captain, and decided to “take the money and run.” He continued to live in town but I never heard from him.

But I heard from his wife. Some months after his retirement she called to tell me John was drinking again. Was there anything I could do? I had never met her; never even talked to her. Over the phone she told me about his treatment programs. Indeed, his first treatment had been in Long Beach. The Captain had
... if ever one was stymied about what to do with an alcoholic, translate the situation into an analogous illness—diabetes—and then the solution... would appear automatically.

**The Nurse**

Several months later, it happened again. I was on duty in the ER on a Sunday afternoon. I had just finished with a patient when I noticed the commander chief nurse (CDR) standing in the hall hugging a clipboard, tension in her face. I could tell she wanted to talk to me privately. “One of the ICU nurses has alcohol on her breath,” she said quietly.

“Does she seem impaired? Slurring her words?”

“Oh, no. She seems fine. She just came on shift. But, I can smell it.”

John all over again. But this time it wasn’t just me faced with the dilemma of the colleague with “alcohol on breath.” I had the CDR to back me up. The colleague was a woman, and not my boss. I shouldn’t be intimidated. Still, it wasn’t going to be easy.

“Did you say anything to her?”

“No, I thought I’d talk to you first.”

“How about I come with you. You can introduce me.”

Several months later, it happened again. I was on duty in the ER on a Sunday afternoon. I had just finished with a patient when I noticed the commander chief nurse (CDR) standing in the hall hugging a clipboard, tension in her face. I could tell she wanted to talk to me privately. “One of the ICU nurses has alcohol on her breath,” she said quietly.

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“Did you say anything to her?”

“No, I thought I’d talk to you first.”

“How about I come with you. You can introduce me.”

In effect I wanted the CDR to be the one who thought something was amiss. I was just a consultant, winging it.

John retired the Navy and couldn’t make him do anything. She was already doing what she needed to: attending her support group. If he was ever willing to come to the ER, I could arrange it so that he’d be admitted, at least to detox him. But that call never came.

Months later I heard what happened in the end. One morning their 15-year-old daughter found him on the floor in the kitchen. Dead. The official cause of death after only a limited autopsy was listed as chronic alcoholism. Later the death certificate was amended to arteriosclerotic cardiovascular disease.

I attended his funeral. A military service: taps, colleagues from the hospital in uniform, the flag that had draped the coffin folded into a triangle, presented to his wife. Afterwards, his wife hugged me. There was no need for words. The real loss had occurred long ago.

Jane was beautiful, early 30s, single, and blonde. She was suitably surprised when the CDR and I intercepted her coming out of a patient cubicle.

“I wanted the doctor here to see you,” the CDR began. Okay, that would be my modus operandi. I recalled some alcoholism expert saying once in a lecture: if ever one was stymied about what to do with an alcoholic, translate the situation into an analogous illness—diabetes could often serve as a useful example—and then the solution about what to do would appear automatically. With that tip I proceeded as if the CDR was worried that Jane was sick, truly sick, and she wanted her to see the doctor.

“Are you okay?” I asked gently.

Jane looked up at me, alarmed, eyes wide in innocent transparency. “Why, sure. Why do you ask?”

By now the CDR had retreated out of hearing range, leaving the two of us standing in the hall.

“Well, the CDR here thought she smelled alcohol on your breath and wanted me to check it out.” By now I was close enough so that I too could detect that odor of alcohol. And indeed, she seemed just fine. Just a little rattled.

“Why … why … that can’t be. There must be some mistake. I haven’t had anything to drink. Gee, what d’ya think, I’d come to work after belting down a few?”

Behind the little joke she was all vulnerability and authenticity. This wasn’t going the way I expected. How could I do this to her, be so heartless. I persisted. This was probably not going the way she expected either: *this guy is impervious to my charms.*

Quietly, calmly, I said, “Well, why don’t we go down to the ER and get a blood alcohol. If it’s ok, well you … we can forget the whole thing.” I knew what I was saying was inane—at least the part about “forgetting the whole thing.” But the part about getting a blood alcohol felt right. If there was a question about whether a patient was jaundiced or not, one simply got a blood test and that would settle it.

“Oh, is this really necessary?” Jane protested guilelessly, backing away. The CDR was now conferring with another nurse at the desk, hopefully explaining that the Lieutenant and I were going to be off the ward a few minutes. I held firm. I hadn’t been wrong about John. And this time there were two of us who smelled something.

“Come, it will only take a minute.” Another lie. What was I doing? With these little lies—which seemed wholly appropriate to the situation—I was drawing on unfamiliar resources. I was making it up as I went along. I had never before had the occasion to need a
Alcohol Abuse in the Workplace: When You Smell It, Do You Ask?

Don’t they?

nurses,” she pleaded.

was the implication.

else I don’t know.”

would want to get rid of you. Unless, there’s something treatment again, that doesn’t necessarily mean the Navy and he’s still on duty. If you’re willing to go through physician I know who went through treatment twice I needed his example to reassure her. “There’s this couldn’t tell her anything that might identify him, but 15.5/15/08   11:38:55 AM

In the ER I took her into a treatment cubicle and behind the curtain of secrecy drew a red top tube of blood. I didn’t have her check into the ER; there was no paperwork. As far as the ER staff was concerned a doctor and nurse were conferring privately behind a curtain.

Once the blood was drawn I suggested she go back to work as if nothing had happened. I’d let her know what the result was.

An hour later we knew. Her blood alcohol reflected somewhat more than a couple drinks earlier that afternoon. I told the CDR to alert the ICU that they would have to cover for Jane; I had sent her home. It crossed my mind that maybe I should have put her in the hospital. She could have gone into withdrawal, maybe gotten suicidal. But I was concerned that I had hassled her enough for one day. I took a chance that these things wouldn’t happen.

They didn’t. She went off to another round of treatment, and weeks later she was back at work.

Although she didn’t exactly thank me, she acknowledged that making an issue of her drinking had been just what she needed. She and I became almost friends. Whenever we crossed paths in the hospital we stopped and chatted, discreetly of course, about how things were going. It felt good. I even asked if she wouldn’t like to come work at the alcohol unit. We were trying to get a full-time nurse and she’d be perfect.

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“Gee, I really think this is pointless,” she said but abruptly stopped resisting and accompanied me down the hall as if we were talking about some patient.

Halfway down the stairs she stopped and put her hand over her mouth. “Oh my God! I did have a drink. I was at a party this afternoon. I forgot.” Was it the privacy of the stairwell or the inevitability of the blood test that elicited this confession? She smiled as if all was forgiven. “We don’t have to go through with the blood test. I did have a drink, just before coming to work. I didn’t think it would matter.” She looked at me pleadingly.

“No. I think we should go through with it.”

She was rooted to the spot. She got more insistent,“All right, I had a couple. But you don’t need to get a test. I admit it.”

I started to falter. My inflated sense of confidence was deserting me. But I had gotten too far into this to back out now. The CDR was watching, figuratively, from the sidelines. I still would have to report back to her what I had decided to do with one of her staff. And the other nurses in the ICU knew something was up.

She must have sensed my wavering. “Look, you don’t know what this means to me. I can’t have this on my record.” She paused. She’d said too much.

“If you have a problem with alcohol, the Navy treats this as a medical issue. You don’t have to worry. Trust me.” There it was, another lie. Or at least, a promise I didn’t want to proceed in this direction. It would not be up to me what happened to her. Who knew what machinations went on in the upper echelons of the Nurse Corps. Doubt about the ramifications of what I was doing began to seep in.

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“Oh, I don’t know about that,” she laughed. “I don’t think I could take it. I’m doing fine just as I am.”

She continued to do well. And, for the four years remaining of my duty at that hospital, I had no further occasion to confront a coworker for having alcohol on his or her breath.

Today, after a 2-year fellowship in addiction medicine and 30 years of experience, I wouldn’t hesitate to address a health care professional with alcohol on their breath at work. But, wouldn’t you know; now that I’m ready, it just doesn’t happen. I haven’t smelled that telltale odor on a doctor or nurse in years. Times have changed. Or then again, maybe they duck into the nearest bathroom when they see me coming.

Editor’s note

With the exception of Dr Pursch, the names have been changed to protect identity.

blood test on a staff member while they were on duty. It wasn’t going to be anonymous; the ER staff was going to know something was going on. Maybe behind a curtain I could just draw her blood myself, take it over to the lab … I wasn’t sure what I was going to do.

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Rosie the Riveter’s Wartime Medical Records

Morris F Collen, MD
Bryan Culp
Tom Debley

Abstract

On October 24, 2000, the Rosie the Riveter World War II/Home Front National Historical Park was established in Richmond, CA to commemorate in a substantial way the wartime women workers in the shipyards. A review of the 1942-1945 published case reports from the medical records of women who worked in the Kaiser Shipyards in Richmond, found that the women who helped build ships for the war effort suffered many of the same medical problems as the men with whom they worked.

On December 7, 1941, the largest single military attack on American soil devastated the Pacific Fleet. Only one month later, Henry Kaiser’s Shipyards in Richmond, CA employed 30,000 men and women in perhaps the largest mixed-gender industrial workforce ever assembled. These men and women worked side-by-side in a variety of trades, using newly developed techniques and heavy machinery to rebuild and bolster the US Navy. These workers faced severe injury in an environment that aggravated any predisposition to respiratory illnesses; particularly for the men in this workforce, most of whom were not accepted into the armed forces because of age and/or compromised physical condition.

Garfield, who provided all the medical services, industrial and nonindustrial, to the Kaiser Shipyard workers, wrote that, from December 1941 to October 1943, 48,330 casualties, injuries, and deaths in the American armed services were reported. The National Safety Council of Chicago reported that during this same period there were more than seven million casualties among the workers in industry in the US. In a survey of the war production industries, Hanna found that shipbuilding had the highest rates of disabling injuries of all war production industries. Kosorris reported that in nearly every department studied women experienced relatively more disabling injuries than men. In welding and burning operations, the frequency rate of injuries in women was 64.6% compared with 41.3% for men. McElroy and McCormack noted that, in 1943, there were 31.2 disabling injuries for each one million employee hours worked in federal contract shipyards. Lane reported that for every 100 shipyard employees, there were 7.3 injuries in 1943, 5.5 in 1944, and 4.9 in 1945; and attributed the declining injury rate to the implementation of safety rules by the US Maritime Commission. A significant percentage of the male workforce were either over draft age or in poor health; the majority of younger men had been classified 4F (unfit for service) by their local draft boards. Smillie, an early Permanente physician, wrote that the first workers were recruited without regard to age, gender, or physical condition. They arrived in Richmond by trainload from different parts of the country and were quartered in quickly erected barracks; later, when families arrived, they lived in government-financed housing.

In the Richmond Kaiser Shipyards, pre-employment physical examinations were not allowed under the union contract. Had physical examinations been permitted, nearly all of these workers would have been employed because of the severe shortage of civilian manpower. Age limits were of no consideration for the duration of the war. Kuh, a physician working at the shipyards and trained in public health, introduced a selective placement process identified as Physical Demands and Capacities Analysis, wherein a set of physical and environmental factors served as the patterns to be used by a job analyst to describe the job requirements and to be used by a physician to evaluate each worker to facilitate the placement officer’s task of matching worker and job. Kuh reported that many women welders left the shipyards because they were physically unable to do the work. He described how one of the gynecologists working at the shipyards developed a physical training course to prepare women for the strenuous work: a scaffolding was erected outside of the welding school and women were taught to climb high ladders, to lift heavy loads, and to climb with loads.

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In 1943, three fifths of all women shipyard workers in the US were employed by Pacific coast private shipbuilders in the US. Eventually one-third of the 90,000 Richmond shipyard workforce were women; 60% of workers at another shipyard were women. In these shipyards, tons of steel were cut, shaped, welded, riveted, and swung into place by cranes on a daily basis. Women did the same work done by men and were exposed to the same occupational and environmental health hazards. Thus women suffered from some of the same medical problems. By the end of the war in 1945, the Richmond Kaiser Shipyards had built more than 1000 Liberty and Victory-class freighter and cargo ships. Steve Gifford (personal communication, 2004) wrote that building a Liberty ship required about 150,000 rivets. On June 8, 1943, a riveter named Rose “Rosie” Bonavita set a production record by driving 3345 rivets in one work shift while working on a bomber aircraft. For this astonishing feat she was dubbed “Rosie the Riveter” by the press and received a personal letter of commendation from President Franklin D Roosevelt. The extraordinary ability of some women who worked in the shipyards to become very efficient riveters had already been recognized when an image of Rosie the Riveter, painted by Norman Rockwell, appeared on the cover of the Saturday Evening Post magazine on May 29, 1943. She came to symbolize the women who worked in war industries at jobs that had not previously been expected of them (Steve Gifford, personal communication, 2007). To honor these Rosies in particular, a Congressional Act, signed by President William Clinton on October 24, 2000, established the Richmond Field Hospital. Under Dr Garfield’s leadership the enterprise grew to become the largest civilian medical care program on the Home Front. Of 2984 major surgical procedures performed during 1943, 5.4% were in the gynecology service. The first 100 appendectomies, in 90 men and 10 women, were performed with no mortality. Cecil Cutting, MD, (see “In Memoriam”) the first Chief-of-Staff, reported that in the first 18 months, Permanente general surgeons performed 1001 major operations (excluding orthopedics, gynecology, and urology), including 471 hernioplasties, 297 appendectomies (50 patients had ruptured appendices); all done without a single surgical fatality. By October 1944, 427 appendectomies had been performed, with 55 of these patients having perforated appendices, without any fatalities.

In Dr Garfield’s “Second Annual Report,” he wrote that in 1944 the number of employees in the shipyards had decreased to 68,000 because many employees felt that the war was coming to an end and they returned to their homes. Dr Garfield also reported that he had established the Permanente Foundation Health Plan in 1942, with its membership offered to the families of workers, and it had been subscribed to by 90% of the workers. During the year 1944, the number of patient visits to the First Aid Stations had decreased to 77,989; of which 5.1% of patients had been referred to the Richmond Field Hospital (now 100 beds) or to the Oakland Hospital (300 beds). There were a total of 10,337 patients discharged from both hospitals in 1944, including some family members of shipyard workers. A total of 705 women were discharged from the obstetrics service; and 2984 major surgical procedures performed during 1943, 5.4% were in the gynecology service. The first 100 appendectomies, in 90 men and 10 women, were performed with no mortality. Cecil Cutting, MD, (see “In Memoriam”) the first Chief-of-Staff, reported that in the first 18 months, Permanente general surgeons performed 1001 major operations (excluding orthopedics, gynecology, and urology), including 471 hernioplasties, 297 appendectomies (50 patients had ruptured appendices); all done without a single surgical fatality. By October 1944, 427 appendectomies had been performed, with 55 of these patients having perforated appendices, without any fatalities.

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In the “First Annual Report,” Dr Garfield wrote that, in 1943, the average number of patient visits-per-month to all three First Aid Stations was 97,473; and 5.8% of the patients had been referred to the Richmond Field Hospital for further treatment. Under Dr Garfield’s leadership the enterprise grew to become the largest civilian medical care program on the Home Front.
clear and she recovered without any complications. Weeks of treatment in the hospital her lungs became consolidated in the upper and lower lobes of the right lung. After two hospitalizations; two of whom were women: one, age 20 years, sustained fractures of the right second to seventh ribs. Her chest x-ray showed consolidations of the right upper lobe, and a puncture of the lower lobe of the left lung; she died six hours after admission to the hospital. The other, age 22 years, suffered a chest injury in an auto accident and sustained fractures of the right fourth to sixth ribs, complicated by a right pneumothorax. After treatment with sulfadiazine, the drug of choice at the time, her recovery was uneventful. Another woman, aged 31 years, sustained fractures in the midaxillary region of the left eighth and ninth ribs following a fall in her home. She developed a right lower-lobe pneumococcic pneumonia that responded well to treatment.

In 1943, four cases of acute fat embolism, an unusual complication of compound fractures, were reported. One woman, aged 21 years, was hospitalized with a diagnosis of acute fat embolism complicating the removal of bone fragments following a fracture of the tibia. Postoperatively she developed chills, fever, and pain in the chest. Her chest x-ray was normal, but her electrocardiogram showed typical changes of acute cor pulmonale, apparently caused by fat emboli to her lungs from the marrow of her fractured bone; her urine revealed the presence of fat. On the fourth day, the lipuria had cleared and all the acute symptoms had subsided.

Membership was then opened up to the community. By May 1949, the Health Plan had grown to about 70,000 members; in April 1950, it had about 110,000 members; and in 1952, 250,000 members. The now-named Kaiser Foundation Health Plan membership, as of February 2008, is 8,698,874 members nationwide, (Won S Ha, personal communication, 2008) fulfilling the vision of Dr Garfield and Henry Kaiser born in the Richmond shipyards during those war years.

The medical records of the shipyard workers during the war years (1941-1945) were the sources of articles published in the Permanente Foundation Medical Journal, from which the case reports and statistics included here were abstracted. These tell the medical story of the contribution to the war effort of the women shipyard workers who suffered from a variety of trauma, occupational diseases, and nonoccupational medical problems in service to their country.

**Trauma Cases**

From 1942 to 1944, 248,000 patients were seen in the Richmond and Oakland Permanente Hospitals. A total of 13,261 fractures were treated: most common were fractures of the hands, of the feet, and of the ribs. During an 18-month period, 52 shipyard workers with fractures of the mandible—12 of which occurred in women—were treated at the two hospitals. More than half of the mandibular fractures were multiple; 44 of the patients were satisfactorily treated by wiring; 8 required external skeletal fixation—1 was a woman who fell 60 feet from the top deck of a hull; she also suffered a skull fracture.

During this two-and-a-half-year period, 95 patients had nonpenetrating pulmonary injuries treated at the two hospitals; two of whom were women: one, age 20 years, was struck by a train and suffered compound fractures of both humeri, fractures of the left third and fourth ribs, and a puncture of the lower lobe of the left lung; she died six hours after admission to the hospital. The other, aged 22 years, suffered a chest injury in an auto accident and sustained fractures of the right second to seventh ribs. Her chest x-ray showed consolidations in the upper and lower lobes of the right lung. After two weeks of treatment in the hospital her lungs became clear and she recovered without any complications. An additional 56 patients with nonpenetrating chest injuries developed pneumonia following their injuries. They were treated in the hospital for post-traumatic pneumonia. One woman, aged 34 years, had been struck in the right side of her chest by a vehicle; she sustained fractures of the right fourth to sixth ribs, complicated by a right pneumothorax. After treatment with sulfadiazine, the drug of choice at the time, her recovery was uneventful. Another woman, aged 31 years, sustained fractures in the midaxillary region of the left eighth and ninth ribs following a fall in her home. She developed a right lower-lobe pneumococcic pneumonia that responded well to treatment.

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**Other Occupational Cases**

Like the men working in the shipyards, women suffered from a variety of occupational disorders. Stenosing tendovaginitis of the digital flexor tendons, commonly known as “trigger fingers,” tended to occur in the third and fourth digits of the major hand in newly trained welders. As a result of the trauma of maintaining prolonged flexion, mild aseptic inflammatory changes developed at the proximal end of the tendon sheath, which eventually became thickened and constricted. A nodule would develop proximal to this constriction when the finger was maintained in this flexed position; the passage of the nodule through this thickening was responsible for the finger “locking.” Thirty-eight patients with trigger fingers were seen; 24 were female welders. The majority were helped by splinting the proximal interphalangeal joint using short, padded, metal splints that relieved the locking of the finger while welding; only one patient required surgery to resect an elliptical area from the nodule.

Welders were exposed to the fumes of vaporized copper and zinc. Most cases of metal fume fever occurred among welders working on galvanized metals. Metal fume fever was rarely severe enough to warrant hospitalization; yet during a four-year period 13 patients were admitted to the hospital with symptoms of chills, fever, headache, cough, nausea and vomiting. Most welders developed symptoms of metal fume fever on Mondays and they lost less than three days from work. The treatment was entirely symptomatic.

From September 1942 to May 1944, 632 hernioplasty procedures were performed, with a complication rate of 2%. The patients included women who fell from heights. Two of the three cases with complications were caused by fat emboli. The third involved an intubation of the upper lobe by an indwelling chest tube following a right pneumothorax; the patient developed a pleural effusion that responded well to treatment in the hospital.
Rosie the Riveter's Wartime Medical Records

Nonoccupational Medical Problems

Women shipyard workers also suffered from common gynecologic conditions. A cancer detection clinic was set up by the gynecologists. From July 1943 to July 1944, 20 women were seen with malignancies: 14 with different stages of cancer of the cervix, 3 with adenocarcinoma of the fundus of the uterus, 2 with cancer of the ovary, and 1 with an epidermoid carcinoma of the vulva.15 Over a two-year period, cancer of the cervix was the diagnosis in 0.9% of all new patients admitted to the hospital gynecology service.15 Two women had radical mastectomies for breast cancer. Henley57 describes the case of a woman who received a blow to her left breast; after repeated self-examinations revealed that a small lump at the site had not disappeared, she came to the clinic where a biopsy revealed a carcinoma; a radical mastectomy was performed. One woman had an infiltrating epidermoid carcinoma of the posterior vaginal wall that required a one-stage, abdominopereineal resection.60 Two women with menstrual complaints were found on examination to have congenital transverse septa of the vagina, which were treated surgically.60 The incidence of venereal disease during the war period was particularly high. Thirteen percent of all new gynecologic patients were found to be infected with gonorrhea, so a shipyard-wide educational program was initiated.36

Twenty patients, five women, with duodenal ulcer all confirmed by upper-gastrointestinal roentgenograms, were treated.39 Twenty-eight patients, four women, were found by upper-gastrointestinal roentgenograms to have gastroesophageal hiatus hernias.39 Acute suppurative cholangitis was treated in three women workers who were admitted to the hospital with chills, fever, right-upper quadrant pain and tenderness, and a high white-cell blood count. All three were treated by surgical removal of the gall bladder; all recovered without any complications.38 Three patients were treated for complete esophageal obstruction by meat as a foreign body. Wiesenfeld42 describes the case of one of these patients, a woman, aged 23 years, who had swallowed lye as a child and had been treated in the past with a series of esophageal dilatations. While eating a steak, she began to complain of retrosternal pain and severe difficulty in swallowing, which progressed to complete aphagia. She was taken to surgery where, under local anesthesia, an esophagoscope was passed and the steak was removed using a grasping forceps.

Between March 1943 and January 1945, 20 adults, 4 women, were diagnosed with acute rheumatic fever. Their findings included a history of a sore throat from procedures were performed; 574 (92.1%) were for inguinal hernias; 57.8% were judged by the California State Industrial Accident Commission to have arisen out of, or been aggravated by, work in the shipyards. Hernioplasties were performed on 483 patients, including 13 women.26 Five hundred forty patients were treated by orthopedists for painful shoulders, 130 patients were treated for calcifications in the rotator cuff tendons; and one-half of all of these patients were women.29

Men and women suffered from the cold and dampness in the shipyards, located on the shores of the San Francisco Bay; respiratory illnesses, especially pneumonia, were very common. Of all 2176 patients with pneumonia treated in these shipyards during these war years; one-sixth were women. The fatality rate for women was one-half that of men—probably because the men were older or physically unfit.30 During the eight-month period between September 1942 and May 1943, 517 patients with pneumonia were treated at the Oakland Hospital. Two-thirds of these cases were caused by pneumococci; 28% had pneumonia involving more than one lobe. The gross mortality rate for the 517 patients was 8.1%. At this time, sulfadiazine was the treatment of choice for coccic pneumonia; 12% of patients treated with sulfadiazine developed some form of sulfadiazine toxicity. The most common was crystalluria, which developed in 7.7% of patients—occasionally an obstruction of the ureter by the crystals required a urologist to flush them out.27 Psychoses occurred in 0.8% of patients treated with sulfadiazine, and the mental symptoms cleared rapidly after discontinuing the drug.27 In a series of 748 consecutive patients with pneumococcal pneumonia treated with sulfadiazine, 20.9% were very severely ill and received adjuvant, type-specific, pneumococcus rabbit serum; with a mortality rate of 6.2%. During 1943, more than 23 million units of pneumococcus rabbit serum were dispensed from the hospital pharmacy.36 Between May 1, 1944 and February 1, 1945, 646 patients with pneumococcal pneumonia were admitted to the Permanente Hospital in Oakland; all were treated with sulfadiazine, which was supplemented with injections of penicillin as it became available; with a mortality rate of only 1.1%. When penicillin became more plentiful, patients with coccic pneumonia were treated with parenteral penicillin alone.35 In October 1945, 12 patients, 3 women, with moderately severe pneumococcal pneumonia were treated only with oral penicillin, 100,000 units every 2-3 hours. All responded promptly to this dosage schedule, with no toxic reactions or complications.34

Women shipyard workers also suffered from common gynecologic conditions. A cancer detection clinic was set up by the gynecologists. From July 1943 to July 1944, 20 women were seen with malignancies: 14 with different stages of cancer of the cervix, 3 with adenocarcinoma of the fundus of the uterus, 2 with cancer of the ovary, and 1 with an epidermoid carcinoma of the vulva.15 Over a two-year period, cancer of the cervix was the diagnosis in 0.9% of all new patients admitted to the hospital gynecology service.15 Two women had radical mastectomies for breast cancer. Henley57 describes the case of a woman who received a blow to her left breast; after repeated self-examinations revealed that a small lump at the site had not disappeared, she came to the clinic where a biopsy revealed a carcinoma; a radical mastectomy was performed. One woman had an infiltrating epidermoid carcinoma of the posterior vaginal wall that required a one-stage, abdominopereineal resection.60 Two women with menstrual complaints were found on examination to have congenital transverse septa of the vagina, which were treated surgically.60 The incidence of venereal disease during the war period was particularly high. Thirteen percent of all new gynecologic patients were found to be infected with gonorrhea, so a shipyard-wide educational program was initiated.36 Twenty patients, five women, with duodenal ulcer all confirmed by upper-gastrointestinal roentgenograms, were treated.39 Twenty-eight patients, four women, were found by upper-gastrointestinal roentgenograms to have gastroesophageal hiatus hernias.39 Acute suppurative cholangitis was treated in three women workers who were admitted to the hospital with chills, fever, right-upper quadrant pain and tenderness, and a high white-cell blood count. All three were treated by surgical removal of the gall bladder; all recovered without any complications.38 Three patients were treated for complete esophageal obstruction by meat as a foreign body. Wiesenfeld42 describes the case of one of these patients, a woman, aged 23 years, who had swallowed lye as a child and had been treated in the past with a series of esophageal dilatations. While eating a steak, she began to complain of retrosternal pain and severe difficulty in swallowing, which progressed to complete aphagia. She was taken to surgery where, under local anesthesia, an esophagoscope was passed and the steak was removed using a grasping forceps.

Between March 1943 and January 1945, 20 adults, 4 women, were diagnosed with acute rheumatic fever. Their findings included a history of a sore throat from
one to four weeks prior to the onset of symptoms, temperatures over 100 degrees (F), migratory polyarthritis, changing heart murmurs, and transient electrocardiogram abnormalities. All had an elevated sedimentation rate, and 19 had a leukocytosis.15

Summary
With the dedication by the US National Park Service of the Rosie the Riveter World War II/Home Front National Historical Park on the site of the former Richmond Kaiser Shipyards, it is timely to commemorate some of the extraordinary contributions by women doing wartime work during 1942-1945 and to appreciate the serious hazards to which they were exposed and the great variety of medical problems they suffered. Fortunately, published case reports from their wartime medical records are available through archived copies of the first Permanente Journal: the Permanente Foundation Medical Bulletin.

References
30. Collen MF. The Treatment of Pneumococcal Pneumonia in the
Rosie the Riveter’s Wartime Medical Records

In Memoriam
Cecil C Cutting, MD
October 31, 1910 – March 2, 2008

Cecil C Cutting, MD, a pioneer physician instrumental in establishing Kaiser Permanente and first and longest-serving Executive Director of The Permanente Medical Group (TPMG), died on March 2, 2008 at the age of 97 years. When Sidney Garfield, MD, and Henry Kaiser formed their alliance to provide prevention-oriented, prepaid health care for the workers at the Grand Coulee Dam in 1938, Dr Cutting was the first physician hired. The United States then formally entered World War II and the Kaiser Shipyards in Richmond, CA became the new home for Dr Cutting and of the innovative health care program. When the war ended in 1945, the program opened to the public. In 1948, Dr Cutting, with Dr Garfield and five other physicians, founded TPMG. Dr Cutting was selected Executive Director, a position he held for 20 years.

Dr Cutting graduated from Stanford University and received his MD from Stanford University Medical School. He completed his residency at Stanford Lane Hospital and San Francisco County Hospital in surgery and orthopedics. He served as Chief of Surgery and Chief of Staff at the Oakland and Richmond Medical Centers in California. In retirement, he was Medical Advisor to the Kaiser Foundation Research Institute. Dr Cutting is survived by his son Christopher, his daughter Sydney, named after Dr Garfield, and two grandsons.
Educational Theatre Program: Promoting Health

Nancy H Stevens, PhD
Stan Foote
Philip Wu, MD

Educational Theatre Program Mission:
“Through arts and education, engage and inspire individuals and communities to make healthy choices.”

You know many of your young patients and families are overweight. Yet, how effective are your 15-minute sessions with each family? How do you overcome the electronic buzz, the marketing messages, the cultural teases, and the whispers of your patients’ peers to get them to eat and live well?

Kaiser Permanente (KP) has found a unique, health promotion strategy that complements the clinical messaging targeted to young people: the Educational Theatre Program (ETP). This program engages children in interactive productions to help them think about the choices they make that affect their health.

During ETP performances, audiences watch schoolmates or professional actors act out scenes about tough topics many of these children face every day, including poor self-esteem, obesity, diabetes, sexually transmitted diseases, drug abuse, suicide, bullying, and others.

Sometimes, the actors stop the action and ask the audience how they would handle a situation. Hands shoot up. The children’s honest responses are astounding. (See sidebar: What They Say About ETP.)

Begun in 1985, the award-winning ETP uses theatre to address critical issues children and families face today. Each production shows rather than preaches, through kinesthetic, aural, peer-to-peer learning, and lively interactive “talkback” opportunities during or after some performances. Scripts are informed by medical, educational, and theatre professionals; community members; parents; and—most important—the children themselves. In addition, each production is intentionally and intensively based on The 40 Developmental Assets for Adolescents from the Search Institute (Minneapolis, MN), which focuses on “concrete, common sense, positive experiences and qualities essential to raising successful young people.”

In 2006, KP’s eight regions invested almost $10.3 million in more than 2500 performances at 1883 schools to reach 539,000 children and 70,000 adults, including parents, teachers, principals, school counselors, and nurses. Through extensive media coverage, ETP also impacts communities. It is one of the largest children’s educational theatre programs in the US.

The regional ETPs interact regularly, sharing research, scripts, set designs, talkback approaches, teacher study guides, and evaluation models. Each region creates or adapts scripts to address local health issues. Most regions operate in-house troupes. The Northwest region is unique in that it has partnered with a professional company, Oregon Children’s Theatre, to deliver engaging, professional-quality shows, from script development and casting through evaluation. Some regions, such as Colorado and Northern California, use theatre as the focal point of broader health-intervention campaigns, which include meal programs, parenting classes, etc.

Why has KP made such a large investment in theatre? According to Phil Wu, MD, a KP Pediatrician who serves on the Northwest Region’s ETP advisory team and co-

Under the astute guidance of the janitor, “Rudy,” the “What Would You Do?” cast is eager to make choices that lead to healthier and happier lives.

Nancy H Stevens, PhD, (left) is the Director of Community Benefits and Health for the Northwest Region of Kaiser Permanente in Portland, OR. E-mail: nancy.h.stevens@kp.org.
Stan Foote (center) is the Artistic Director of Oregon Children’s Theatre in Portland and the Educational Theatre Program collaboration with Kaiser Permanente. E-mail: stan@octc.org.
Philip Wu, MD, (right) is a Pediatrician at the Tualatin Medical Office in Tualatin, OR. E-mail: philip.p.wu@kp.org.
Educational Theatre Program: Promoting Health

What They Say About ETP

- “I learned that you shouldn’t tease people.” Elementary school student
- “If friends tell you to do something bad, maybe don’t be friends with them.” Elementary school student
- “It made me think about playing more sports and being active, because I’m lazy.” Middle school student
- “I think it was fun to show kids how to make good choices in a musical because talking to them would be boring.” Middle school student
- “Watching IF made me think about how I should talk to people about my problems and how I feel. And try to listen and help them with their problems and feelings.” Middle school student
- “This is probably the best assembly I’ve ever seen for elementary students.” Elementary school counselor
- “Live performance really drives these messages home.” Fifth-grade teacher
- “We get a lot of shows that try to teach our students about these issues. This was nicely nuanced, in a context the kids can understand.” Elementary school principal
- “This play may have had more of an impact on me than the kids.” Middle school mother
- “When I grew up, kids were experience-rich and information-poor. Today, kids are experience-poor and information-rich. They’re aware of these issues, but we’re afraid of them talking about them because we’re afraid of the conversation.” Middle school principal

authored this article, “We’ve discovered that we must supplement traditional clinical approaches with other health intervention tools. [Theatre] is an entirely different way for us to communicate with our community about what they can do to effect change. It’s motivational instead of prescriptive. The latter approach never worked, and certainly doesn’t now. You don’t change behavior by telling people they should do something.”

Can we say that ETP is achieving its mission of inspiring children to make informed decisions about their health? Judging by overwhelmingly positive pre- and post surveys and anecdotal responses from parents, teachers, students, and KP staff, the answer is a resounding “yes!” After seeing an ETP production, students have told us they’ve decided to be nicer to people who are “different,” or to help friends with eating disorders and depression. Some have written that they’ve decided not to commit suicide. One sixth-grader who starred in our original musical IF exclaimed, “I used to be a nobody. Now, I’m somebody. And now, I know I want to be an actor.” An eighth-grader at another school, who was undergoing chemotherapy for brain cancer, decided to try out for IF and drew in his “too-cool” friends to perform. Now, that’s a healthy leader!

As Dr. Wu says, “This isn’t one of those programs where you expect to have a dramatic shift in behavior. Instead, we have planted a seed in a part of the brain that, in children this age, still is dormant. To change behavior, it’s important to give children brief and powerful messages several times and consistently. By following up with other activities and linking with other organizations that have a similar goal and messages, we really do have an impact.”

The national ETP also has hired Russell Granet, founder of Arts Education Resource, a consulting firm specializing in arts assessment, to structure a formal evaluation process. (See sidebar: Assessing ETP’s Effectiveness.)

We’re learning every day about theatre’s efficacy as a health-promotion tool. This is experiential learning—kinetic, engaged and real. It’s a valuable investment in children’s lives … and we encourage communities and other health care organizations to consider adopting similar programs. For more information on programs in your area, visit our Web site: http://xnet.kp.org/etp/ or see the sidebar: ETP Regional Office and Contacts.
Assessing ETP’s Effectiveness

Is ETP achieving its mission? Are we helping children live healthier lives?
ETP leaders are gathering feedback and pre- and postproduction evaluations.

We’re also consulting with Russell Granet, founder of Arts Education Resource, a consulting firm specializing in arts assessment. We’re implementing his main message—“value what you assess and assess what you value” to help quantify the qualitative ETP experience. He advises us that, “We must be clear that statistics show that change is slow to happen. It’s unrealistic to assume that one 40-minute show will transform lives.” However, he adds that, “Educational theatre is engaging. If you tell me, I’ll forget; if you show me, I’ll remember; if you involve me, I’ll understand. The more we feel and do, the more we’ll retain, because educational theatre is in your body. It’s a multiple-intelligence approach, as posited by Howard Gardner, PhD, author of Frames of Mind.”

Glenna Kelly, Community Programs Manager for Colorado ETP, agrees with Granet. “In Colorado, our ETP Community Advisory Board tells us that theatre hits learning modalities (eg, repetition, rhythm, visualization and physical movement) that help plant the seeds Dr Wu talks about. In addition, focusing on what’s ‘right’ instead of what’s ‘wrong’ in young people can support positive, healthy development. Strength-based programming that develops critical thinking and social skills can provide young people with tools to help them avoid risk factors of all kinds. As the research done by the Search Institute on the ‘40 Developmental Assets’ indicates, the more strengths a young person has, the less likely they are to participate in risky behavior.”

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“The Futures Song” from IF shows kids they create the life they want—through decisions they make every day.
Abstracts of Articles Authored or Coauthored by Permanente Physicians, Nurses, and Investigators

From Northern California:
**Pregnancy plasma glucose levels exceeding the American Diabetes Association thresholds, but below the National Diabetes Data Group thresholds for gestational diabetes mellitus, are related to the risk of neonatal macrosomia, hyperglycaemia and hyperbilirubinaemia.**


**Aims/Hypothesis:** Gestational diabetes mellitus (GDM) is a risk factor for perinatal complications. In several countries, the criteria for the diagnosis of GDM have been in flux, the American Diabetes Association (ADA) thresholds recommended in 2000 being lower than those of the National Diabetes Data Group (NDDG) that have been in use since 1979. We sought to determine the extent to which infants of women meeting only the ADA criteria for GDM are at increased risk of neonatal complications.

**Materials and Methods:** In a multiethnic cohort of 45,245 women who did not meet the NDDG criteria and were not treated for GDM, we conducted nested case-control studies of three complications of GDM that occurred in their infants: macrosomia (birthweight >4500 g, n = 494); hyperglycaemia (plasma glucose <2.2 mmol/L, n = 488); and hyperbilirubinaemia (serum bilirubin ≥3.42 micromol/L (20 mg/dL), n = 578). We compared prenatal glucose levels of the mothers of these infants and their controls.

**Results:** Women with GDM by ADA criteria only (two or more glucose values exceeding the threshold) had an increased risk of having an infant with macrosomia (odds ratio [OR] = 3.49, 95% CI = 1.55-7.84), hyperglycaemia (OR = 2.61, 95% CI = 0.99-6.92) or hyperbilirubinaemia (OR = 2.22, 95% CI = 0.98-5.04). Glucose levels one hour after the 100-g glucose challenge that exceeded the ADA threshold were particularly strongly associated with each complication.

**Conclusions/Interpretation:** These results lend support to the ADA recommendations and highlight the importance of the one-hour glucose measurement in a diagnostic test for GDM. Reprinted with kind permission of Springer Science+Business Media.

From Northern California:
**Association of fewer hours of sleep at six months postpartum with substantial weight retention at one year postpartum.**


Shorter sleep duration is linked to obesity, coronary artery disease, and diabetes. Whether sleep deprivation during the postpartum period affects maternal postpartum weight retention remains unknown. This study examined the association of sleep at six months postpartum with substantial postpartum weight retention (SPPWR), defined as 5 kg or more above pregravid weight at one year postpartum. The authors selected 940 participants in Project Viva who enrolled during early pregnancy from 1999 to 2002. Logistic regression models estimated odds ratios of SPPWR for sleep categories, controlling for sociodemographic, prenatal, and behavioral attributes. Of the 940 women, 124 (13%) developed SPPWR. Sleep distributions were as follows: 114 (12%) women slept ≤5 hours/day, 280 (30%) slept 6 hours/day, 321 (34%) slept 7 hours/day, and 225 (24%) slept ≥8 hours/day. Adjusted odds ratios of SPPWR were 3.13 (95% confidence interval [CI]: 1.42, 6.94) for ≤5 hours/day, 0.99 (95% CI: 0.50, 1.97) for 6 hours/day, and 0.94 (95% CI: 0.50, 1.78) for ≥8 hours/day versus 7 hours/day (p = 0.012). The adjusted odds ratio for SPPWR of 2.05 (95% CI: 1.11, 3.78) was twofold greater (p = 0.02) for a decrease in versus no change in sleep at one year postpartum. Sleeping ≤5 hours/day at six months postpartum was strongly associated with retaining ≥5 kg at one year postpartum. Interventions to prevent postpartum obesity should consider strategies to attain optimal maternal sleep duration.

**Clinical Implication:** This is the first study to examine the association of sleep duration with the risk of substantial postpartum weight retention (11 lbs or more above pregravid weight). We followed 940 women from early pregnancy and asked about sleep duration at six months postpartum, and one year postpartum. Five or fewer hours of sleep was associated with a threefold risk of substantial weight retention at one year postpartum independent of other known predictors (i.e., pregravid obesity, gestational weight gain, age). Our findings suggest that six hours sleep or more per day during the first year after pregnancy may be as important as healthy eating habits and regular exercise in preventing weight retention. —EG

From the Northwest:
**Progression from newly acquired impaired fasting glucose to type 2 diabetes.**


**Objective:** We sought to estimate the rate of progression from newly acquired (incident) impaired fasting glucose (IFG) to diabetes under the old and new IFG criteria and to identify predictors of progression to diabetes.
ABSTRACTS

**Research Design And Methods:** We identified 5,452 members of a health maintenance organization with no prior history of diabetes, with at least two elevated fasting glucose tests (100-125 mg/dL) measured between 1 January 1994 and 31 December 2003, and with a normal fasting glucose test before the two elevated tests. All data were obtained from electronic records of routine clinical care. Subjects were followed until they developed diabetes, died, left the health plan, or until 31 December 2005.

**Results:** Overall, 8.1% of subjects whose initial abnormal fasting glucose was 100-109 mg/dL (added IFG subjects) and 24.3% of subjects whose initial abnormal fasting glucose was 110-125 mg/dL (original IFG subjects) developed diabetes (P < 0.0001). Added IFG subjects who progressed to diabetes did so within a mean of 41.4 months, a rate of 1.34% per year. Original IFG subjects converted at a rate of 5.56% per year after an average of 29.0 months. A steeper rate of increasing fasting glucose; higher BMI, blood pressure, and triglycerides; and lower HDL cholesterol predicted diabetes development.

**Conclusions:** To our knowledge, these are the first estimates of diabetes incidence from a clinical care setting when the date of IFG onset is approximately known under the new criterion for IFG. The older criterion was more predictive of diabetes development. Many newly identified IFG patients progress to diabetes in <3 years, which is the currently recommended screening interval.

**From Southern California:**

**Asthma costs and utilization in a managed care organization.**


**Background:** Medical costs and health care utilization associated with asthma and the variation by treatment are poorly understood.

**Objective:** To compare single controller inhaled corticosteroid (ICS) to other asthma drug regimens on medical costs and utilization.

**Methods:** Direct medical costs and utilization were captured from administrative electronic databases from continuously enrolled members with asthma age five years or older with drug coverage. Asthma patients were identified during 2002, categorized into 14 asthma drug groups on the basis of 2003 prescription records, and had total medical costs and utilization determined in 2004 adjusting for demographics, insurance types, asthma risk, comorbidity, and propensity scores.

**Results:** A total of 96,631 patients met the study eligibility criteria. Patients were (mean ± SD) age 38 ± 23 years and were 57% female, 14% Medicare, 4% Medicaid, and had a median family income (mean ± SD) of $64,967 ± $29,285. Total unadjusted direct medical costs/patient/year averaged $3745 ($3298 low asthma risk vs $6797 high asthma risk; p < .001). Adjusted total and asthma drug costs were significantly lower with single controller ICS compared with single controller leukotriene modifiers, long-acting beta-agonists, and theophylline and most combination controller regimens (p < .001 for all comparisons). In addition, single controller ICS compared with single controller leukotriene modifiers and combination controllers was associated with significantly lower asthma-related utilization.

**Conclusion:** Total direct costs and asthma-related utilizations are meaningfully less in the year after being dispensed single controller ICS compared with single controller leukotriene modifiers or most combination controllers.

**Clinical Implication:** On the basis of prior evidence of clinical efficacy and with new evidence provided by the present cost analysis study, inhaled corticosteroids are the preferred first line single controller agent for patients with persistent asthma. In addition, periodic evaluation of asthma patients on combination controllers should be done to determine if their clinical control merits tapering from combination controller therapy to single controller inhaled corticosteroid treatment. —RZ

**From Northern California:**

**Maternal caffeine consumption during pregnancy and the risk of miscarriage: a prospective cohort study.**


**Objective:** The objective of the study was to examine whether the risk of miscarriage is associated with caffeine consumption during pregnancy after controlling for pregnancy-related symptoms.

**Study Design:** This was a population-based prospective cohort study.

**Results:** An increasing dose of daily caffeine intake during pregnancy was associated with an increased risk of miscarriage, compared with no caffeine intake, with an adjusted hazard ratio (aHR) of 1.42 (95% confidence interval 0.93 to 2.15) for caffeine intake of less than 200 mg/day, and aHR of 2.23 (1.34 to 3.69) for intake of 200 or more mg/day, respectively. Nausea or vomiting during pregnancy did not materially affect this observed association, nor did the change in intake pattern of caffeine during pregnancy.

In addition, the magnitude of the association appeared to be stronger among women without a history of miscarriage (aHR 2.33, 1.48 to 3.67) than that among women with such a history (aHR 0.81, 0.34 to 1.94).

**Conclusion:** Our results demonstrated that high doses of caffeine intake during pregnancy increase the risk of miscarriage, independent of pregnancy-related symptoms.

**Clinical Implication:** For a woman who is pregnant or is attempting to become pregnant, clinicians should advise that she stop drinking regular coffee or large amounts of caffeinated soda. She should consider switching to decaffeinated coffee. If she really feels that she must drink regular coffee, she should limit consumption to less than one cup per day. —DL ✶
One of my favorite courses in college was “The American Historical Novel” and I have been hooked on the genre ever since. Paul Bernstein, MD, of the Head and Neck Surgery Department at the San Diego Medical Center has taken a stab at historical fiction with a subject near and dear to the heart of every Permanente physician: the life of Sidney Garfield, MD, and the founding of the Kaiser Permanente (KP) Medical Care Program. Written in the first person from Dr Garfield’s point of view, The Courage to Heal takes us from his days as a surgery resident through the signing of the Medical Service Agreement between the Kaiser Foundation Health Plan and Hospitals and the Permanente Medical Groups, which gives KP its current structure.

Dr Garfield is portrayed as an idealistic hero who toils selflessly in the interests of his patients and of his vision of affordable medical care. Henry Kaiser is painted as a visionary industrialist and as a controlling, top-down manager. The love interest is a beautiful, dedicated nurse with a secret. Dr Bernstein casts the medical establishment as compassionless adherents to the fee-for-service model. It is classic good versus evil: the KP physicians save lives; the fee-for-service physicians smoke and drink.

The interactions of the characters make for some juicy reading. The first-person voice is a little off-putting at first but it lends an interesting immediacy to the story. We get Dr Garfield’s thoughts and motivations, but none of those from the other characters, thus maintaining a sense of mystery.

There are a few rough spots. For example, from time to time, Dr Bernstein parenthetically cites actual historical sources for quotes. Whereas in a journal article or scholarly historical piece accurate citation is a must, in a novel, I found it distracting. I overlooked this because reading historical fiction is less about the facts than about the themes. The themes Dr Bernstein tackles here work just as well in 2007 as they did in 1937. Too many people still do not have access to good health care. Those who do have access pay too much for it. Quality is often suboptimal. The fee-for-service system puts perverse incentives in front of physicians to do more than is necessary. These challenges were true for Dr Garfield and they are true for us.

To be sure, Dr Bernstein leaves unexplored some important issues surrounding the founding of KP. For instance, whereas fee-for-service may give physicians an incentive to do too much, some argue that prepaid health care might give physicians an incentive to do too little. However, because the book comes from Dr Garfield’s first-person perspective, we can forgive that. Dr Garfield was a man of integrity, and the thought of scrimping on services never entered his mind.

In the end, I think I like historical fiction most because I find it poignant. It is not the characters or the narrator who are omniscient, but we the readers. We not only already know the end, but we also know what happened between the end and the present. In college, a classmate told me not to bother reading Thucydides’ History of the Peloponnesian War because Sparta wins. But knowing that makes all of the debate and missteps by the Athenian assembly that much more tragic. The tragedy is compounded by the fact that we, unlike Thucydides, also know that the loss of the Peloponnesian War meant the end of the golden age of Athens, and that it would be many centuries before there was another such center of democracy and learning.

While reading Dr Bernstein’s book, I was struck by that same poignancy. Courage to Heal ends on a note of triumph. Dr Garfield started with a small desert hospital, and, despite adversity, managed to cofound a thriving medical enterprise, yet, he would have a hard time recognizing the KP of today. We have HealthConnect, ICD-9 coding, Medicare at risk, E&M coding, and DHMO products; self-insurance products are just around the corner. We have come a long way from our roots as a prepaid health plan with an emphasis on preventive care. Maybe in the end, fee for service does win.

Overall, I found this to be an engaging read and I would recommend it to everyone in our Program. Perhaps if we have an understanding of our roots, our future path will be a little clearer.


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BOOK REVIEW

How Doctors Think
by Jerome Groopman, MD

In my 32 years of clinical practice I have seen an inexorable shift from listening to the patient and employing techniques of medical deduction to the often mindless use of imaging and laboratory tests, often supported by algorithms and flow charts. Much of this is the result of the litigious atmosphere of medicine in the US that casts a long shadow over human fallibility. Jerome Groopman, MD, cites diagnostic errors confirmed by autopsy results at close to 15%.

Patients’ unreasonable expectations are, in part, medicine’s fault. Major medical and scientific advances have raised expectations that must be moderated. In How Doctors Think, Dr Groopman adds the message that patients must be active participants in their own care.

Professor of Oncology and Immunology at Harvard Medical School, Dr Groopman is a nationally renowned physician and author of three other books and innumerable articles. He has further distinguished himself by his ability to distill multiple clinical episodes gathered over the years into absorbing, elegant narratives with many insights.

One such insight is the need for continued improvement toward an optimal physician-patient relationship. It has long been recognized that too often physicians communicate poorly or not at all. As a result, we are sometimes called arrogant or stand-offish. Recognition of such lack of communication skills has generated multiple remedial programs in all Kaiser Permanente regions, some of which have been described in The Permanente Journal. 1,2 Meaningful communication with patients has recently secured a position as one of the six competencies now required in US graduate medical education.

In story after story Dr Groopman explores both rational and irrational factors that bear on medical decision making; he explains in detail where and how misdiagnosis can occur. A snap judgment that leads to a right decision can just as easily lead to a wrong one. A prior experience can influence a current case. Rapport with a patient or lack thereof can affect a potential diagnosis.

In the hurly burly of everyday medicine, the Socratic principle of well thought-out diagnosis often gives way to what Dr Groopman and others have called “pattern recognition.” This quick gestalt is often subtly influenced by one of several premises: availability—the reach for the most plausible explanation; commission bias—the need to do something; confirmation bias—the selective use of information supporting what one expects to find; attribution errors—the use of stereotypes that then bias decision making; and diagnosis momentum—where a diagnosis is accepted as definitive despite contrary or incomplete data.

A quick read and easily digestible, replete with wonderful and multiple stories, this exposition of the art and science of medical decision making is geared to the lay consumer but is perhaps more valuable for physicians who interact with patients. I highly recommend the book.

References
2. Stein T. A decade of experience with a multiday residential communication skills intensive: has the outcome been worth the investment? Perm J 2007 Fall;11(4):3.

Simplicity
My aim is to put down on paper what I see and what I feel in the best and simplest way.
—Ernest Hemingway, 1898 – 1961, American author