

The Permanente Journal

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Birch Lake
photograph
By Shenshen Dou, MS

Nature not only nurtures us, it eases our pain and heals our soul. This is a work from the artist's "Man in Nature" photography

art serial. In this image a girl playfully walks along a flowered trail beside a lake. The blurry reflection of the birch trees in the lake helps to fashion an illusory feel.

Ms Dou worked as a molecular biologist and is an artist living in West Linn, OR. More of her work can be found in this and other issues of *The Permanente Journal* and on her Web site at www.shenshenstudio.com.

112 CME EVALUATION FORM



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Logistic regression models were used to study cancer mortality through 2012 in 273,843 persons (1117 South Asians: India, Pakistan, Bangladesh, or Sri Lanka) with baseline examination data from 1964-1985. Death was attributed to cancer in 28,031 persons (1555 Asians, including 32 South Asians). The all-Asian vs white adjusted odds ratio was 1.0, and the South Asian vs white odds ratio was 0.5. In separate regressions, South Asians were at lower risk than blacks, Chinese, Filipinos, Japanese, or other Asians. The South Asian-white disparity was concentrated in men.

9 Does a Relationship Exist Between Lower Body Power and Balance Scores Among Older Adults?

Andrew Shim, EdD; Brady Harr, MS; Mike Waller, PhD

Falls are the second-leading cause of unintentional injury and death worldwide. All participants (13) were assessed stability scores via computerized posturography to determine center of pressure and limits of stability (LoS) balance scores. Participants stood on a perturbed surface with their eyes open and closed. Muscle power output and LoS scores have moderate to strong correlations with balance scores in older adults.

13 Nerve Transfer Surgery for Penetrating Upper Extremity Injuries.

Efstathios Karamanos, MD; Ilya Rakitin, MD; Sophie Dream, MD; Amir Siddiqui, MD

The authors included cases (16 males, age 16-43 years) performed since 2006 to repair penetrating trauma of upper extremities within 3 months of injury with at least 3 years' of follow-up. Six patients underwent nerve transfer surgery because of elbow flexion; 5, finger extension; 3, finger flexion; and 2, wrist pronation. Nine patients had associated vascular injury, and 4 had fractures. All patients improved from 0 of 5 muscle strength preoperatively to a mean of 3.8 within 1 year after surgery, and in all cases strength was maintained.

ERRATUM

Rahman A, Perri A, Deegan A, Kuntz J, Cawthorpe D. On becoming trauma-informed: Role of the Adverse Childhood Experiences Study in tertiary child and adolescent mental health services and the association with standard measures of impairment and severity. *Perm J* 2018;22:17-054. DOI: <https://doi.org/10.7812/TPP/17-054>

In the above-listed article, transcription errors were made in Table 3. The corrected Table and corrections in the article to reflect the corrected Table information may be viewed on our Web site: www.thepermanentejournal.org/issues/2018/winter/6619-adverse-childhood-experiences-survey.html.

We apologize for this error.

17 Effects of Treatment-Associated Increases in Fruit and Vegetable Intake on the Consumption of Other Food Groups and Weight Through Self-Regulatory Processes.

James J Annesi, PhD, FAAHB, FTOS, FAPA

Women with obesity (N = 74, mean age = 47.7 years) participating in a yearlong behavioral weight-loss treatment plan were assessed regarding changes in consumption of various food groups, physical activity, and eating self-regulation. Fruits and vegetables (FV) intake change significantly predicted changes in weight and consumption of dairy and bread products and sweets. The only other notable relationships were among changes in sweets, bread, and dairy consumption over 24 months. During 6, 12, and 24 months, changes in self-regulation significantly mediated the FV intake-weight change relationship. A reciprocal relationship between changes in FV intake and self-regulation also was found.

21 Association of Psychiatric Diagnostic Conditions with Hospital Care Outcomes of Patients with Orthopedic Injuries

Steven Schwartz, MD; Shahrzad Bazargan-Hejazi, PhD; Deyu Pan, MS; David Ruiz, MD; Anahed Shirazi, MD; Eleby Washington, MD

From a retrospective analysis of patient discharge data from 507 California hospitals (2001 to 2010), the authors extracted psychiatric diagnoses, alcoholism, substance abuse, and sociodemographic characteristics. The entire injury admissions represented 1.9% of hospital admissions and were predominantly older than age 64 years, white, and women with conventional health care insurance. The most common comorbidity was psychiatric illness (24.7%). Injury admissions with a psychiatric diagnosis had higher odds of a hospital stay of 7 or more days, surgical treatment complications, and in-hospital death.

27 Barriers and Facilitators to the Deprescribing of Nonbenzodiazepine Sedative Medications Among Older Adults.

Jennifer Kuntz, PhD; Louis Kouch, PharmD; Daniel Christian, PharmD; Preston L Peterson, MD; Inga Gruss, PhD

From the perspectives of patients, the greatest challenges to deprescribing are factors related to their insomnia; health care system factors, including a desire for personalized approaches to care; and their own positive personal experiences with sedative medication use. From the clinician perspective, a lack of institutional structures and resources to support deprescribing, the attitudes and practices of previous clinicians, and patient-related factors such as dependence and a lack of alternatives to treat insomnia were the most important barriers to deprescribing.



Content available at:
www.thepermanentejournal.org

CME

Prevalence and Safety of Intravenous Immunoglobulin Administration During Maintenance Chemotherapy in Children with Acute Lymphoblastic Leukemia in First Complete Remission: A Health Maintenance Organization Perspective. Patrick Van Winkle, MD; Raoul Burchette, MA, MS; Raymond Kim, CCRP; Rukmani Raghunathan, MD; Naveen Qureshi, MD

Children with acute lymphoblastic leukemia (ALL) in first complete remission (CR1) experience hypogammaglobulinemia and are at risk of sepsis during maintenance chemotherapy. A multicenter, retrospective cohort study observed 118 consecutive children (9 months-19 years) with ALL in CR1 during maintenance chemotherapy from 2008 to 2014. Groups treated with or without intravenous immunoglobulin (IVIG) were compared using nonparametric statistics. Use of IVIG in children with hypogammaglobulinemia occurred in approximately 30% of patients and was well tolerated.

Association of Inflammatory Markers with Disease Progression in Patients with Metastatic Melanoma Treated with Immune Checkpoint Inhibitors. Minggui Pan, MD, PhD; Mubarka Alavi, MS; Lisa J Herrinton, PhD

This retrospective cohort study included 108 patients with malignant melanoma treated with an anti-PD-1 checkpoint inhibitor from August 2014 through December 2015. The median time from initiating therapy to the end of follow-up was 118 days. For patients with metastatic melanoma treated with nivolumab or pembrolizumab, higher neutrophil or platelet counts, or lower lymphocyte counts, are associated with higher risk of progression. The authors recommend more frequent assessment for progression and closer follow-up, especially for patients with substantial comorbidities or poor physical performance.

The Case for Including Adverse Childhood Experiences in Child Maltreatment Education: A Path Analysis. Michael Bachmann, PhD; Brittany A Bachmann, MA, MEd

Survey data examined the impact of child maltreatment education programs and knowledge about adverse childhood events (ACEs) on medical practitioners' reporting habits and ability to detect maltreatment. The mediating variable "knowledge about ACEs" had the strongest structural effect on the number of Child Protective Services (CPS) referrals, almost twice as high as the second strongest effect of formal education programs. These practitioners were significantly more likely to recognize and to report abuse to CPS.

33 Adverse Childhood Experiences among a Community of Resilient Centenarians and Seniors: Implications for a Chronic Disease Prevention Framework. Rhonda Spencer-Hwang, DrPH; Xochitl Torres, MPH; Johanny Valladares, MBA; Marco Pasco-Rubio, MPH; Molly Dougherty; Wonha Kim, MD

In a qualitative study, centenarians and seniors in the Loma Linda Blue Zone (1 of 5 worldwide longevity hotspots), childhood exposures and practices were assessed using focus groups and semistructured key informant interviews, and supplemented with lifestyle and resiliency factor questions. Participants (7 centenarians and 29 seniors) reported exposure to multiple adverse childhood experiences (ACEs) (domains: economic deprivation, family dysfunction, and community violence). Community members reported practicing resiliency factors, each with anti-inflammatory properties suggesting mitigation of ACE-related toxic stress.

43 Diagnostic Pathway of Oral Cavity Cancer in an Integrated Health Care System.

Kevin H Wang, MD; Brian H Song, MD; Jason E Gilde, MD; Jeanne A Darbinian, MPH; Miranda L Ritterman Weintraub, PhD, MPH; Tara J Wu, MD; Eleanor L Yang, MD; James W Salazar, MD; Deepak Gurushanthaiah, MD

In a retrospective study of 247 patients with oral cavity squamous cell carcinoma (2007-2010), 167 (68%) had early-stage (I/II) disease, 86 (35%) were referred by dentists, and 70 (28%) had a history of premalignancy. The median time from symptom onset to care sought from a primary care physician (patient interval), from primary care physician to otolaryngologist, and from otolaryngologist to diagnosis was 8.6, 1.0, 0.0 weeks, respectively. These intervals did not differ by demographic characteristics, clinical factors, or tumor stage. Closer surveillance may represent an opportunity for diagnosis at an earlier stage.

51 Naloxone Distribution and Training for Patients with High-Risk Opioid Use in a Veterans Affairs Community-Based Primary Care Clinic. Katie E Raffel, MD; Leila Y Beach, MD; John Lin, MD; Jacob E Berchuck, MD; Shelly Abram, LVN; Elizabeth Markle, PhD; Shalini Patel, MD

The quality improvement study was conducted at an outpatient clinic serving 1238 marginally housed veterans with high rates of comorbid substance use and mental health disorders identified using the Stratification Tool for Opioid Risk Management. None of 67 patients had been prescribed naloxone at baseline. At end-of-intervention (a one-on-one, 15-minute, hands-on naloxone training led primarily by licensed vocational nurses, 61 patients (69%) had been trained. This delivery model has the potential to provide access to naloxone to a population of patients with opioid use who may not be engaged in mental health or specialty care.

SPECIAL REPORTS

56 The Importance of Continual Learning in a Rapidly Changing Health Care Environment. Michael H Kanter, MD; Patrick T Courneya, MD

57 Abstracts from the Kaiser Permanente 2018 National Quality Conference

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77 Refractory Hypoxemia in a Patient with Submassive Pulmonary Embolism and an Intracardiac Shunt: A Case Report and Review of the Literature.

Jean Liew, MD; Janelle Stevens, DO; Christopher Slatore, MD, MS

The management of acute submassive pulmonary embolism is undertaken on an individualized basis because of the wide spectrum of clinical presentations. In this report the authors review the literature and discuss the evidence behind the management of cases of acute pulmonary embolism complicated by hypoxemia from a patent foramen ovale. In a case of acute pulmonary embolism complicated by refractory hypoxemia from an intracardiac shunt, adjunctive therapies in addition to anticoagulation and thrombolysis must be considered.

CASE REPORTS

84 Sinonasal Ewing Sarcoma: A Case Report and Literature Review. Jonathan K Lin, MD, MBA; Jonathan Liang, MD

Our literature review found more involvement of the maxillary and ethmoid sinuses compared with the nasal cavity, and that the role of radiation and surgical approach was varied. Ewing Sarcoma of the sinonasal tract is a rare entity with high mortality, but few standardized treatment protocols exist. Further study and evidence-based treatment protocols are needed. This article outlines the role of relevant imaging, a multidisciplinary team approach, and the optimal timing of surgery, chemotherapy, and radiation.

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CME credits are available online at www.tpcme.org. The mail-in CME form can be found on page 112.



CME

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87 ECG Diagnosis: Accelerated Idioventricular Rhythm. Thomas H Gildea, MD; Joel T Lewis, MD, PhD, FACEP, FAAEM

Accelerated idioventricular rhythm (AIVR) is a ventricular rhythm of three or more consecutive monomorphic beats, with gradual onset and gradual termination. AIVR is usually seen during acute myocardial infarction reperfusion (following thrombolytic therapy or percutaneous coronary intervention), and rarely manifests in patients with completely normal hearts or with structural heart disease.

COMMENTARY

90 Meditation and Mindfulness: A Call to Action in Elevating Primary Care.

Ami Kapadia, MD

Mindfulness meditation has vast physiologic benefits that can reduce physician burnout and improve physician well-being. Collective meditation and mindfulness practices with organized continuity among physician groups can synergistically elevate the practice of primary care by fostering creativity and innovation needed for sustainable solutions. A cohesive frontline physician voice rooted in higher purpose cultivated by meditation and mindfulness practices in a platform directly linked to quality improvement can lead to meaningful change in primary care for all.

NARRATIVE MEDICINE

83 Blue Eyes.

Patricia Lynes, RN

Unable to move his contractured body, he only communicated with his beautiful blue eyes. He would blink and squeeze your hand when you asked him if he wanted to go home. His doctors, therapists, and nurses had become his family.

89 Nebraska Farm Scenes.

Lisa Schuman, NP

It seemed as though her daughters, in suppressing their angst over the death and dying of their mother, overshadowed the real patient. The girls, in their 60s, insisted that pictures of their dead father surround the patient's head so that when she opened her eyes they would be all she would see. She wanted the pictures replaced with images of farmland and cattle.

93 A Patient-Centered Approach to a Rural General Practice in Distress and the Search for a Solution.

Venetia Young, MB, FRCOG, dipFT; Lewis Mehl-Madrona, MD, PhD; Barbara Mainguy, MA

A general practice in rural UK (Cumbria) was overwhelmed by staff burnout. The authors conducted an audit using the electronic health record for patients coming to the practice 5 or more times annually (2008-2012), and planned an intervention—genogram, psychoeducation, and up to six 30-minute sessions of solutions-focused psychotherapy, in which difficult interpersonal relationships were identified and efforts made to resolve 1 major problem related to those relationships. The frequency of visits for patients with mental health conditions (41.0% of all frequent attenders in the practice) dropped significantly, and this intervention had beneficial impact on practitioners and improvement in the morale of the staff.

100 Fishbowl.

Eileen Ogasawara-Chun, MD

I saw the head of the baby start to emerge, then I was guiding the baby out. "Hold tight. They're slippery little devils." I heard nothing then. No shouts of joy. No "It's a boy! No crying of relief. "Then I felt a nudge. It was the attending. He said, "You don't need to hold that tight; the kid's got to breathe."

101 Implementing a Narrative Medicine Curriculum During the Internship Year: An Internal Medicine Residency Program Experience.

Tiffany Wesley, MD; Diana Hamer, PhD; George Karam, MD

Narrative medicine develops professional and communication skills that align with Accreditation Council for Graduate Medical Education competencies. Six sessions, implemented throughout 1 academic year, expose first-year internal medicine residents (interns) to narrative medicine. In total 17 interns attended at least 1 narrative medicine session; each session averaged 5.4 attendees, and 13 eligible interns completed the survey with 3 predominant themes: Mindfulness, physician well-being, and professionalism. This intervention demonstrates the value of a narrative medicine curriculum during medical resident training.

105 Thoughts on Sexual Health.

Kelly Isbill, DO

As a practicing obstetrician-gynecologist for more than 18 years, I have realized the importance of sexual health as well as the embarrassing lack of training in this very important part of our patients' overall mental and physical health. If anyone should be expected to be not only comfortable but knowledgeable about sex, it should be us. Unfortunately, many of us had little or no education in sexual health during medical school or residency. I have been on a journey to educate myself so I might better help my patients.

110 A View from the Other Side of the Consultation Desk.

Sarah Nicole Dunkerley, BMBS, MA (Oxon), MRCS (Eng), PGCert (ME)

In this reflection on being both a physician and a patient, I consider the events that happened to me as a patient with cancer and how this will change my practice as a doctor in the future.



ADDITIONAL ONLINE

More content is available at: www.thepermanentejournal.org.

CASE REPORTS

Undifferentiated Pleomorphic Sarcoma after Pirfenidone Use: A Case Report.

Christine A Moore, DO; Aaysha Kapila, MD

Glioblastoma Multiforme in a Patient with Multiple Myeloma: A Case Report and Literature Review.

Christine A Moore, DO; Moayed Ibrahim, MD; Aaysha Kapila, MD; Kailash Bajaj, MD

NARRATIVE MEDICINE

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Lisa Hawthornthwaite; Taylor Roebottom; Lauren Lee, MA; Mim O'Dowda; Lorelei Lingard, PhD

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Maximilian Andreas Storz, MD

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Kathryn A Teng, MD, MBA, FACP

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The Rural Inpatient Mortality Study: Does Urban-Rural County Classification Predict Hospital Mortality in California?

Daniel T Linnen, PhD(c), MS, RN-BC; John Kornak, PhD; Caroline Stephens, PhD, MS, RN, GNP

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Low Cancer Risk of South Asians: A Brief Report

H Nicole Tran, MD, PhD; Natalia Udaltsova, PhD; Yan Li, MD, PhD; Arthur L Klatsky, MD

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<https://doi.org/10.7812/TPP/17-095>

ABSTRACT

Context: South Asians (ancestry in India, Pakistan, Bangladesh, or Sri Lanka) may have lower cancer risk than other racial-ethnic groups.

Objective: To supplement published cohort data suggesting low cancer risk in South Asians.

Design: Logistic regression models with 7 covariates to study cancer mortality through 2012 in 273,843 persons (1117 South Asians) with baseline examination data from 1964 to 1985.

Main Outcome Measure: Cancer mortality.

Results: Through 2012, death was attributed to cancer in 28,031 persons, of which 1555 were Asians, including 32 South Asians. The all-Asian vs white adjusted odds ratio was 1.0, and the South Asian vs white odds ratio was 0.5 ($p < 0.001$). In separate regressions, South Asians were at lower risk than blacks, Chinese, Filipinos, Japanese, or other Asians. The South Asian-white disparity was concentrated in men but was generally similar when strata of smoking, body mass index, baseline age, and date of death were compared.

Conclusion: These data support the observation that compared with whites and other Asian groups, South Asians, especially men, have a lower risk of cancer.

marital status, smoking, alcohol habit, and body mass index (BMI). Race/ethnicity was studied primarily with whites as the referent in 2 sets of models: 1) blacks, all Asians, and others (not white, black, or Asian) and 2) blacks, Chinese, Japanese, Filipinos, South Asians, other Asians, and others. Interethnic Asian comparisons were studied by models using Chinese, Filipinos, Japanese, or other Asians as referents.

We studied total cancer and specific cancer types in all persons, year-of-death endpoints, and stratified by sex, race/ethnicity, BMI, and smoking. We present odds ratios (ORs), 95% confidence intervals (CIs), and associated p values.

INTRODUCTION

Studies of racial-ethnic disparities in cancer risk lead to greater understanding of etiology and point out needs for targeted screening and education. Several reports suggest that South Asians, defined as persons with ancestry in India, Pakistan, Bangladesh, or Sri Lanka, may have lower cancer risk than other racial-ethnic groups.¹⁻⁶ Our recent incidence study in 124,193 persons confirmed this and suggested that South Asians may have lower cancer risk than any other US racial-ethnic group.⁷ Hoping to cast more light on this, we expanded our study cohort to 273,843 persons and report here an analysis of 28,913 deaths attributed to cancer.

METHODS

Subjects and Data

The institutional review board of Kaiser Permanente approved the study protocols. Subjects were 273,843 persons with available detailed racial classification who underwent health examinations offered by a comprehensive Northern California Health Plan. Taken as a voluntary health

appraisal, the examination included health measurements and queries about sociodemographic status, habits, and medical history.⁸ As previously described,⁹ detailed racial classification was available for 2 time intervals: 1964 to 1973 and 1978 to 1985. For persons with multiple examinations, baseline data from the first examination were used.

Mortality Ascertainment

We followed subjects through December 2012 using an automated matching system¹⁰ that ascertained deaths in California. Presumption of complete follow-up yielded a calculated 8,215,000 person-years of follow-up, but estimates¹¹ suggest a sensitivity of 89% for the method used. The match found 28,913 deaths attributed to cancer. We accepted primary International Classification of Diseases, Ninth Revision death certificate codes, converting from Eighth Revision codes when necessary. Tables 1 a and b present race/ethnicity distributions.

We used logistic regression with 8 covariates, including sex, race, education,

RESULTS

Tables 1 a and b show that deaths resulting from cancer made up approximately 25% of all deaths and occurred at a slightly younger age than the average age for all deaths. Ethnic differences in mean age of any death and cancer death seemed to parallel the differences in mean baseline age, with South Asians the youngest (32.2 years at baseline) and whites the oldest (38.2 years at baseline). The unadjusted differences in cancer deaths per 1000 subjects, from 29.1 in South Asians to 107.6 in whites, are noteworthy.

In adjusted models, compared with whites, Asians as a composite had similar cancer mortality risk (Table 2). In models including both sexes with whites as the referent, Chinese had slightly higher risk, Japanese and other Asians had similar risk, Filipinos had slightly lower risk, and South Asians had substantially lower risk (OR = 0.5, CI = 0.3-0.7, $p < 0.001$). For the South Asians vs whites comparison, the OR in men was 0.4 (CI = 0.2-0.6, $p < 0.001$) and in women was 0.8 (CI = 0.5-1.3, $p = 0.4$). Disparities in risk were also present

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Table 1a. Racial-ethnic distribution of study population and cancer deaths^a

Group	Total in cohort (column %)	Mean base age, years	Cancer deaths (column %)	Cancer deaths per 1000	Cancer deaths as percentage of total deaths	Mean age at any death, years	Mean age at cancer death, years
Total	273,843 (100)	38.2	28,013 (100.0)	102.3	27.1	74.4	71.0
Men	123,361 (45.1)	39.1	14,360 (51.3)	116.4	26.8	76.4	70.7
Women	150,482 (54.9)	37.4	13,653 (48.7)	88.8	27.4	72.6	71.4
White	188,929 (69.0)	39.5	20,328 (72.6)	107.6	26.5	75.8	72.0
Men	87,378 (31.9)	40.1	10,357 (37.0)	119.0	26.2	78.0	71.9
Women	101,551 (37.0)	39.0	9971 (35.6)	97.8	26.85	73.7	72.0
Black	50,573 (18.5)	35.1	5169 (18.5)	102.7	28.9	69.6	68.1
Men	20,462 (7.5)	36.9	2665 (9.5)	130.3	29.3	70.9	66.9
Women	30,111 (11.0)	33.8	2504 (8.9)	83.2	28.5	68.3	69.3
Asians	20,685 (7.6)	35.7	1555 (5.6)	75.1	31.1	73.2	69.5
Men	9462 (3.5)	37.2	838 (3.0)	88.6	30.6	73.2	68.5
Women	11,223 (4.1)	34.4	737 (2.6)	85.7	34.8	73.1	70.3
Other/miscellaneous ^b	13,656 (5.0)	37.2	961 (3.4)	70.4	27.3	70.9	69.3
Men	6059 (2.2)	36.7	500 (1.8)	83.2	25.6	73.8	68.6
Women	7597 (2.8)	37.8	461 (1.6)	60.7	29.4	68.6	70.0

^a Some column percentages do not total to 100 because of rounding.

^b Not white, black, or Asian.

Table 1b. Asian subgroup distribution of study population and cancer deaths^a

Subgroup	Total in cohort (column %)	Mean base age, years	Cancer deaths (column %)	Cancer deaths per 1000	Cancer deaths as percentage of total deaths	Mean age at any death, years	Mean age at cancer death, years
Chinese	9519 (3.5)	35.7	810 (2.9)	85.1	32.7	73.6	69.7
Men	4553 (1.7)	37.1	458 (1.6)	100.7	31.3	74.2	69.1
Women	4966 (1.8)	34.4	352 (1.3)	70.8	34.85	73.2	70.1
Filipino	5898 (2.1)	36.7	369 (1.3)	62.5	27.2	73.1	69.3
Men	2469 (0.9)	39.1	191(0.7)	77.3	24.5	71.4	66.6
Women	3339 (1.2)	35.0	178 (0.6)	53.3	30.9	74.4	71.7
Japanese	2999 (1.1)	36.0	280 (1.0)	93.6	34.3	75.1	71.5
Men	1214 (0.4)	37.2	133 (0.5)	104.0	32.2	75.4	71.0
Women	1785(0.7)	35.2	147 (0.5)	82.1	36.5	74.9	72.1
South Asian	1117 (0.4)	32.2	32 (0.1)	29.1	25.4	66.0	63.5
Men	668 (0.2)	33.6	18 (0.1)	26.9	19.8	67.0	62.8
Women	449 (0.2)	30.2	14 (0.1)	32.1	40.0	65.7	64.0
Other Asian ^b	1242 (0.5)	33.4	64 (0.2)	51.6	28.8	66.1	61.8
Men	558 (0.2)	34.3	38 (0.1)	67.9	28.8	67.4	60.7
Women	684 (0.3)	32.7	26 (0.19)	38.2	28.9	65.1	62.5

^a Some column percentages do not total to 100 because of rounding.

^b Largely Korean or Vietnamese.

between Asian ethnic groups (Table 2). Compared with Chinese, Japanese subjects had similar risk, whereas Filipinos, South Asians, and other Asians had lower risk. Compared with Filipinos, Japanese subjects had higher risk and South Asians had lower risk. Compared with Japanese subjects, Filipinos and South Asians had lower risk. Compared

with other Asians, only South Asians had lower risk.

The lower risk of South Asians was generally consistent in models stratified by smoking, baseline age, and BMI, and in year-of-death endpoints (Table 3). A model that omitted the 378 deaths attributed to skin cancer showed a similar low risk for South Asians (Table 3).

Table 4 presents ORs of South Asians to whites and to Chinese (the largest Asian group) for risk of death attributed to the 10 most common cancer types in the analysis. These types constituted 77.7% of all cancer deaths (81.3% among South Asians). With small numbers of South Asian cases and wide CIs, few ORs showed p values less than 0.05, but

Table 2. Adjusted odds ratios of death caused by any cancer, odds ratio (95% confidence interval)^a

Ethnicity	All	Men	Women
Among entire study population vs white as referent			
Asian	1.0 (1.0-1.1) [p = 0.5]	1.0 (0.9-1.1) [p = 0.9]	1.0 (0.9-1.1) [p = 0.5]
Chinese	1.1 (1.1-1.2) [p = 0.002]	1.2 (1.0-1.3) [p = 0.02]	1.1 (1.0-1.3) [p = 0.06]
Japanese	1.1 (1.0-1.3) [p = 0.2]	1.1 (0.9-1.4) [p = 0.2]	1.1 (0.9-1.3) [p = 0.4]
Filipino	0.9 (0.8-1.0) [p = 0.02]	0.8 (0.6-0.9) [p = 0.004]	0.9 (0.8-1.1) [p = 0.4]
South Asian	0.5 (0.3-0.7) [p < 0.001]	0.4 (0.2-0.6) [p < 0.001]	0.8 (0.5-1.3) [p = 0.4]
Other Asian	0.8 (0.6-1.1) [p = 0.2]	0.9 (0.6-1.3) [p = 0.5]	0.8 (0.5-1.1) [p = 0.2]
Among entire study population vs black as referent			
South Asian	0.3 (0.2-0.5) [p < 0.001]	0.2 (0.1-0.4) [p < 0.001]	0.6 (0.3-1.0) [p = 0.002]
Among Asians vs Chinese as referent			
Japanese	1.0 (0.9-1.3) [p = 0.99]	1.0 (0.8-1.3) [p = 0.9]	1.0 (0.8-1.2) [p = 0.96]
Filipino	0.7 (0.6-0.8) [p < 0.001]	0.6 (0.5-0.8) [p < 0.001]	0.8 (0.6-0.9) [p = 0.008]
South Asian	0.4 (0.3-0.6) [p < 0.001]	0.3 (0.2-0.5) [p < 0.001]	0.6 (0.4-1.1) [p = 0.1]
Other Asian	0.7 (0.5-0.9) [p = 0.01]	0.8 (0.6-1.2) [p = 0.2]	0.6 (0.4-1.0) [p = 0.04]
Among Asians vs Filipino as referent			
Japanese	1.4 (1.0-1.7) [p < 0.001]	1.6 (1.2-2.0) [p < 0.001]	1.3 (1.0-1.7) [p = 0.04]
South Asian	0.6 (0.4-0.9) [p = 0.005]	0.5 (0.3-1.0) [p = 0.01]	0.8 (0.5-1.5) [p = 0.6]
Other Asian	1.0 (0.8-1.4) [p = 0.9]	1.3 (0.5-1.1) [p = 0.4]	0.8 (0.5-1.3) [p = 0.5]
Among Asians vs Japanese as referent			
South Asian	0.4 (0.3-0.6) [p < 0.001]	0.3 (0.2-0.5) [p < 0.001]	0.6 (0.4-1.1) [p = 0.1]
Other Asian	0.7 (0.5-1.0) [p = 0.02]	0.7 (0.5-1.1) [p = 0.02]	0.6 (0.4-1.0) [p = 0.1]
Among Asians vs other Asian as referent			
South Asian	0.6 (0.4-0.9) [p = 0.002]	0.4 (0.2-0.8) [p = 0.005]	1.0 (0.5-2.0) [p = 1.0]

^a Cohort has 273,843 persons with 28,013 cancer deaths through 2012. Odds ratios (95% confidence intervals in parentheses) are from logistic models with age, sex, race, smoking, alcohol, body mass index, education, and marital status.

Table 3. Adjusted odds ratios of South Asians vs whites in selected groups^a

Group	Number of subjects with cancer	OR (95% CI) vs whites ^b	p value
Never smoked	7464	0.6 (0.3-0.9)	0.01
Ex-smokers	4335	0.1 (0.02-0.9)	0.03
Smoke < 1 pack/d	5549	0.6 (0.3-1.4)	0.2
Smoke ≥ 1 pack/d	7972	0.6 (0.2-2.0)	0.4
Baseline age < 40 y	7909	0.7 (0.4-1.0)	0.1
Baseline age 40-49 y	8282	0.1 (0.2-0.7)	0.005
Baseline age 50-59 y	7350	0.2 (0.1-0.9)	0.03
Baseline age ≥ 60 y	4472	0.2 (0.02-1.9)	0.2
Died in 1964-1979	3795	0.3 (0.1-2.4)	0.5
Died in 1980-1989	6429	0.4 (0.3-1.4)	0.3
Died in 1990-1999	8220	0.4 (0.2-0.9)	0.02
Died in 2000-2012	9569	0.5 (0.3-0.8)	0.005
BMI < 25 kg/m ²	13,909	0.5 (0.3-0.8)	0.005
BMI 25-29 kg/m ²	9563	0.4 (0.2-0.8)	0.02
BMI ≥ 30 kg/m ²	2744	0.8 (0.2-3.8)	0.8
Nonskin cancer ^c	27,635	0.5 (0.4-0.7)	< 0.001

^a Cohort has 273,843 persons with 28,013 cancer deaths through 2012; because of missing values, sums of cancer subjects in smoking and BMI strata are less than 100%.

^b OR (95% CI) are from logistic models with age, sex, race, smoking, alcohol, BMI, education, and marital status.

^c Endpoint is all cancer except 378 cases attributed to skin cancer.

BMI = body mass index; CI = confidence interval; OR = odds ratio.

9 of the 10 South Asian-white or South Asian-Chinese comparisons in men had either an OR below 1.0 or no South Asian cases. Among women, 8 of the 10 cancer types had no cases or an OR below 1.0 for either set of comparisons.

DISCUSSION

Our finding of reduced cancer risk in South Asians aligns with sparse previous reports.¹⁻⁶ In a study of cancer incidence among Asian Indians or South Asians in India, Singapore, the UK and the US, the lowest total cancer incidence rates were observed in India and the highest in US whites.⁶ Cancer incidence rates among Indians residing outside India were intermediate, leading to the conclusion that overseas South Asians appeared to adopt the cancer patterns of their host country. In another analysis, Mangtani et al² compared ethnic South Asian immigrants in England and Wales with non-South Asian first-generation immigrants; all-cancer rates in ethnic South Asians were half those in other immigrant groups. A longer-term study of cancer incidence in South Asian migrants to England from 1986 to 2004 showed that overall, age-adjusted cancer incidence in South Asians was half that in non-South Asians but rose over time.⁴ The authors concluded that “although still lower than in non-South Asians, cancer incidence is rising in South Asians, supporting the concept of transition in cancer incidence among South Asians living in England.” In a later study, Maringe et al³ reported that although the survival advantage of South Asians tended to narrow for some cancer types over time, it remained present for colorectal, liver, and lung cancers in men. Comparing Asian Indians/Pakistanis with white Americans, Goggins and Wong¹ reported low cancer incidence and generally above-average survival in South Asians; standardized incidence ratios in men and women were 0.46 (95% CI = 0.44-0.48), and 0.55 (95% CI = 0.53-0.58), respectively. In a report based on racial-ethnic classification from the US 2000 census, Miller et al⁵ showed in 7 Asian ethnic groups that cancer incidence and mortality rates were lowest among Asian Indian/Pakistani and Guamanian men and women.

Our 2016 report of cancer incidence in Asian Americans in California showed that adjusted ORs among South Asians vs whites for any cancer were 0.5 (CI = 0.4-0.7, p = 0.002) in men and 0.6 (CI = 0.3-0.9, p = 0.02) in women.⁷ That analysis confirmed the established higher Asian/White risk of stomach, liver, and cervical cancer and lung adenocarcinoma.⁷ However, South Asians had no significantly increased risk for these cancer types in either the incidence data⁷ or the present mortality study. South Asians had slightly increased risk of incident upper airway and digestive tract cancers in men and ovarian cancer in women,⁷ but mortality data in Table 4 do not show these associations. In both reports, most Asian groups, including South Asians, had lower risk of melanoma, bladder cancer, and malignant glioma (data not shown). In both analyses, the numbers of South Asian cases were insufficient for stable risk estimates for individual cancer types.

The lower total cancer risk among South Asians (Table 2) included contributions from several common specific cancer types (Table 4). Consistency in strata (Table 3) added to the validity of

the finding. Although South Asians in this study population had a relatively low prevalence of smoking,¹² their lowered cancer risk compared with whites in never smokers was similar to that in other smoking subgroups. The persistence of South Asians' lower cancer risk in the later years of follow-up (Table 3) as well as the prior reports across different geographic regions support the validity of our findings.

Hypothetical explanations for low cancer risk in South Asians are all speculative, but an interplay of genetic and environmental factors seems likely. There are reports of distributions favorable to South Asians of genetic mutations associated with decreased risk of certain cancers. Examples are lower prevalence of *BRCA2* than *BRCA1* mutations in several Indian studies¹³ for breast cancer and polymorphism at *GSTM1* and *GSTP1* gene loci for prostate cancer.¹⁴ South Asians appear to have a high prevalence of polymorphisms in DNA repair systems XRCC1 and XPD, which aid in DNA repair and reduce cancer susceptibility.¹⁵ Speculation

... overseas South Asians appeared to adopt the cancer patterns of their host country.

about environmental contributors include low tobacco and alcohol use,¹² plus favorable dietary practices, such as vegetarianism and use of turmeric (curcumin), other spices, and food additives.¹⁶ A relatively high use of screening behaviors and access to care have also been cited.^{3,6} In our study population, South Asians

were a highly educated and scientifically sophisticated group, making adherence to healthy lifestyle practices a plausible factor in their reduced cancer risk.

In addition to small numbers of cancers in South Asians, limitations of our analyses include an absence of data about diet and other potential lifestyle factors, and use of only baseline measurements. Strengths include the size of the total study cohort, the long follow-up, and control for several potential confounders. Our findings do not point to any specific recommendations for public health measures, but we hope that our report will stimulate research that may lead to interventions that might reduce cancer incidence.

Table 4. Adjusted risk of death from the most common cancer types among South Asians^a

Cancer type	Number of cancers, all/SA	SA vs whites, OR (95% CI)			SA vs Chinese, OR (95% CI)		
		Both sexes	Men	Women	All	Men	Women
Lung	6375/2	0.2 (0.1-0.9) [p = 0.03]	No SA cases	0.8 (0.1-5.9) [p = 0.7]	0.1 (0.03-0.5) [p = 0.003]	No SA cases	0.4 (0.1-1.8) [p = 0.3]
Colorectal	2903/1	0.2 (0.02-1.0) [p = 0.7]	No SA cases	0.5 (0.1-3.7) [p = 0.2]	0.5 (0.01-0.8) [p = 0.02]	No SA cases	0.5 (0.1-2.7) [p = 0.5]
Breast	2447/3	—	—	0.6 (0.2-1.9) [p = 0.4]	—	—	0.5 (0.02-1.7) [p = 0.3]
Hematologic ^b	2786/7	0.7 (0.4-1.6) [p = 0.4]	1.0 (0.5-2.2) [p = 0.9]	No cases	0.9 (0.4-2.0) [p = 0.8]	1.1 (0.4-1.6) [p = 0.8]	No cases
Prostate	2057/3	—	0.5 (0.2-1.5) [p = 0.2]	Not applicable	—	0.8 (0.2-1.8) [p = 0.7]	Not applicable
Pancreas	1895/3	0.4 (0.1-1.6) [p = 0.2]	0.3 (0.04-1.8) [p = 0.2]	0.8 (0.1-5.9) [p = 0.8]	0.4 (0.1-1.6) [p = 0.2]	0.4 (0.04-2.8) [p = 0.3]	0.5 (0.1-3.8) [p = 0.5]
Upper airway, digestive ^c	1026/2	0.5 (0.1-3.7) [p = 0.5]	0.6 (0.1-4.0) [p = 0.6]	No SA cases	0.4 (0.1-3.1) [p = 0.4]	0.4 (0.1-3.3) [p = 0.4]	No SA cases
Stomach	910/0	No SA cases	No SA cases	No SA cases	No SA cases	No SA cases	No SA cases
Ovary	790/3	—	Not applicable	1.8 (0.6-5.6) [p = 0.3]	—	Not applicable	2.4 (0.7-8.6) [p = 0.2]
Liver	671/2	1.0 (0.2-4.0) [p = 0.99]	0.6 (0.1-4.1) [p = 0.6]	3.5 (0.5-25.9) [p = 0.3]	0.2 (0.05-0.8) [p = 0.2]	0.1 (0.01-0.8) [p = 0.2]	1.6 (0.2-13.4) [p = 0.6]

^a Logistic models include sex, age, race, education, ethnicity, alcohol, smoking, and marital status.

^b Includes non-Hodgkin lymphoma, multiple myeloma, myelogenous leukemia, lymphocytic leukemia, Hodgkin lymphoma (n = 73), and 235 other and unspecified leukemia.

^c Upper airway, digestive: Codes 140-150 except 142, 147, and 161.

CI = confidence interval; SA = South Asians.

CONCLUSION

In concert with previous studies, the present report strengthens the validity of the observation that compared with whites and other Asian groups, South Asians, especially South Asian men, have an unexplained lower risk of cancer. ❖

Disclosure Statement

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

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Enthusiasm

Enthusiasm is the motive force of progress. No really great deed was ever done in arts or arms, in literature or science, that has not the product of enthusiasm May we feel it; may we realize it; may we be animated by this immortal principle; may we be driven by this divine fire!

— John Chalmers Da Costa, 1863-1933, American surgeon, speaker, and author

Does a Relationship Exist Between Lower Body Power and Balance Scores Among Older Adults?

Andrew Shim, EdD; Brady Harr, MS; Mike Waller, PhD

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ABSTRACT

Context: Falls are the second-leading cause of unintentional injury and death worldwide.

Objective: To determine if a relationship exists between lower body power scores and center of pressure (CoP) and limits of stability (LoS) scores.

Methods: A one-shot case study design (n = 13) was selected for the investigation. All participants were assessed stability scores via computerized posturography to determine CoP and LoS balance scores. Participants stood on a perturbed surface with their eyes open and closed. An experimental stair ramp with a switch mat timing device was used to determine lower body power scores in watts.

Results: There was a strong correlation ($r = 0.725$, $p = 0.005$) between the posterior (LoS) plane and relative peak power. An intraclass R revealed a strong correlation among the three trials ($R = 0.831$) performed on the stair ramp.

Conclusion: Muscle power output and LoS scores have moderate to strong correlations with balance scores in older adults.

BACKGROUND AND OBJECTIVES

The US senior population is expected to double by 2050, as life expectancy improves with advances in medical care and pharmacology.¹ Along with extended longevity, however, functional issues can negatively influence quality of life for elderly people.

Falls are the leading cause of fatal and nonfatal injuries for older Americans.² One group of investigators discovered that medical costs associated with fatal and nonfatal falls totaled \$19.2 billion in 2006, with injuries ranging from hip fractures to traumatic brain injuries.² Research now considers factors that may diminish a person's ability to perform activities of daily living (ADLs). ADLs are daily tasks a person must be able to perform such as locomotion and feeding. Multiple and complex variables are involved with predicting the circumstances under which older adults may fall, which increases the difficulty associated with developing a care plan.

Research demonstrates that balance and strength are important for fall prevention, but few studies have focused on the importance of muscle power output.³ Power is defined as the measurement of force times distance over time compared with strength, which is a concept of maximal force production.⁴ Leg power is a stronger predictor in self-reported ADL

functionality in older women in relation to other measurements such as peak oxygen consumption, leg strength, chest press strength, and upper back power.⁵ Similar results were noted in a study performed on nonagenarian adults that identified muscle power output as a factor in gait variability.⁶ Investigators in a 2002 study noted that women with a history of falls were 24% less powerful than their peers who had not sustained falls.⁷ Initial studies focusing on generational differences among men revealed an 8.3% decrease in maximal anaerobic power per decade.⁸ A reduction in muscle power wattage in comparison to strength has been identified in people ages 65 to 89 years.⁹ Evidence suggests that muscle power output may influence fall likelihood and should be considered in addition to strength training.^{5,10} The ability to predict muscle power output should help to forecast functional decline in ADLs and loss of independence in elderly patients.¹⁰

Although muscle power output is an important factor in fall prevention, testing this variable in older adults has presented challenges. Many testing options, including the five-times-sit-to-stand test, stair walk tests, stand-up-and-go tests, and vertical jumping are available to assess muscle power output.¹¹ However, available tests may be dangerous, expensive, or inapplicable for the elderly population. One of the most effective tests for muscle power assessment is the Margaria-Kalamen test,¹² which was designed for athletic people who can escalate 12 steps with the highest possible velocity. Although the Margaria-Kalamen test can reliably assess leg muscle power output, performing the required task is risky for older participants. Signorile et al¹³ created a valid alternative for older people that used a ramp rather than a staircase, and this test allowed for improved safety and reliability when working with elderly patients. Shim and Drum⁴ made further changes to the ramp to simulate real-life stairs by adding steps, side rails, and a back rail on the top platform. Researchers noted that the modified lower body power output test with the stair ramp was a valid and reliable replacement for the Margaria-Kalamen test.⁴

Clinicians can use other assessment methods to evaluate fall risks in older people. Center of Pressure (CoP) testing, which involves body pressure via the soles of the feet concentrated in one location, is becoming popular with older adults. A potential benefit associated with multifactorial CoP testing is the ability to observe numerous variables to elucidate the relationship between muscle power and CoP measurements.

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There is a void in the literature regarding the relationship between lower body muscle power output and balance.

The purpose of this study was to observe if a relationship exists between lower leg muscle power output and CoP and Limits of Stability (LoS) measurements through use of a computerized posturography plate.

DESIGN AND METHODS

Qualified volunteers ($n = 13$) who were readily available from an independent senior citizen center in Sioux City, IA, were selected for this study. Participants were age 60 years and older. All participants lived independently, completed a general health questionnaire, provided informed consent, did not have vertigo or other diagnoses that could interfere with balance, and did not take medication that can cause dizziness. Those who had medical contraindications or missed their appointment times were excluded from the study. The project was approved by Briar Cliff University's institutional review board (Sioux City, IA) before the participants were recruited.

Muscle power output and balance testing took place at the senior center on the same day. The experimental stair ramp was placed on level, nonslip flooring. Before the testing, participants performed a specific neuromuscular warm-up by practicing on the ramp for several minutes. After the warm-up was complete, each participant was given directions to line up 3 meters away from the power ramp. Each participant ascended the ramp as quickly as possible. Lafayette Instruments (Lafayette, IN) switch mats were interfaced to an official timing device that was accurate to 0.001 second. Each switch mat was placed at the first and third ramp steps to start and stop the timing device once foot pressure was detected. Times were recorded to the nearest 0.01 second. Coaching was initiated to remind participants to step on each sensor to ensure accuracy. Each participant completed the test 3 times; a 2- to 3-minute rest period was provided between each trial to restore adenosine triphosphate and allow full recovery. Participants were not allowed to use handrails to help them ascend the ramp.

After lower leg muscle power output was completed, the balance tests were conducted in a private room. A computerized posturography plate (BalanceCheck System, Bertec Inc, Columbus, OH) was used to determine balance scores, which also calculated body mass index. Stability can be assessed by measuring changes in CoP scores on a force plate or posturography plate. Each participant was given five tests: Static stability with eyes open, static stability with eyes closed, perturbed stability with eyes open, perturbed stability with eyes closed, and LoS in four different planes. LoS is the distance to which a person can lean without losing balance. People with decreased levels of LoS are at higher risk for falls attributed to lack of cognitive readiness to make adjustments to their base of support. Participants were asked to stand on the plate for ten seconds for each test while the computer measured postural sway. They were coached to relax while standing on the plate and minimize unnecessary movements, including gestures, turning, or talking.

Participants stood on a foam labile pad with their eyes open during perturbed stability testing. They were coached

to stand as still as possible and reduce unnecessary gestures, talking, or turning. After the eyes-open test, each participant performed the same protocol on the perturbed surface with their eyes closed.

The LoS test performed with the BalanceCheck was next. Participants remained on the perturbed surface with their feet centered in the middle of the force plate. The researcher reminded participants to reduce all unnecessary gestures, talking, and turning. Once testing began, the participant was asked to lean as far forward, backward, left, and right as possible with their eyes fully open without losing balance to measure maximal range in the frontal and sagittal planes. Data were collected and evaluated with SPSS Version 22 (IBM Corp, Armonk, NY). A Pearson product moment correlation was used to view the relationship between lower body muscle power output from the ramp and CoP and LoS scores. An intraclass correlation was used to measure reliability of measurements from the power ramp.

RESULTS

LoS testing revealed a strong correlation ($r = 0.725$, $p = 0.005$) between posterior plane scores and relative peak power as shown in Figure 1. LoS posterior scores also moderately correlated ($r = 0.680$, $p = 0.011$) with relative average power (Figure 2). LoS anterior scores correlated with both LoS left ($r = 0.746$, $p = 0.003$) and LoS right ($r = 0.759$, $p = 0.003$) scores as shown in Figures 3 and 4, respectively. No significant correlations were found between power output measurements and CoP. An intraclass correlation between trials ran on the power ramp revealed a strong correlation ($r = 0.831$).

DISCUSSION

In 2012, investigators demonstrated that lower body muscle power output is a proximal determinant of falls and functional limitations in adults age 60 years and older.¹⁴ The World Health Organization defined a fall as "inadvertently coming to rest on the ground, floor or other lower level, excluding intentional change in position to rest in furniture, wall or other subjects."¹⁵ The ability to predict falls and improve functionality in this growing population will help to sustain quality of life and improve the economic impact associated with care of this population. Between 2012 and 2050, the US population of those age 65 years and older is projected to increase from 43.1 million to 83.7 million.¹ On the basis of the number of people living beyond age 65, and without any positive interventions in place, longevity itself will place a large burden on tax dollars and medical care if injury rates attributable to falls continue on the current trajectory.

About one-third of adults age 65 years and older will sustain a fall within a single year.¹⁶ Among these falls, 800,000 will result in hospitalization with an injury.¹⁷ Falls are likely to result in fractures or other injuries for older adults.¹⁷ Accounting for inflation, fatal and nonfatal fall-associated medical costs are projected to reach \$637.5 million and \$31.3 billion, respectively, in 2015.¹⁸ When researching primary care in the UK, investigators noted in a longitudinal cohort study that death risk at 1 year and 3 years was increased for recurrent elderly people who fall.¹⁶ Among people ages 75 and older, people who fall are 4 to 5 times more

Does a Relationship Exist Between Lower Body Power and Balance Scores Among Older Adults?

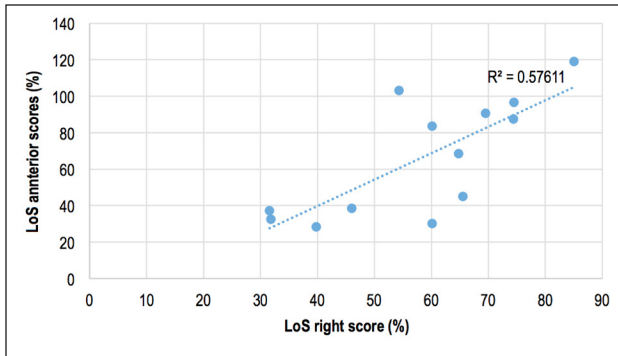


Figure 1. Correlation between relative peak power and LoS posterior scores. LoS = limits of stability

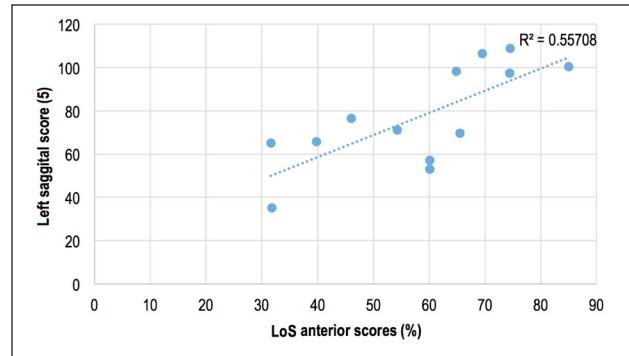


Figure 2. Correlation between relative average power and LoS posterior scores. LoS = limits of stability

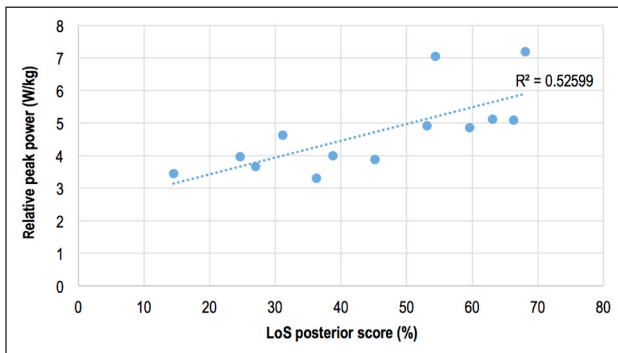


Figure 3. Correlation between LoS anterior scores and LoS left scores. LoS = limits of stability

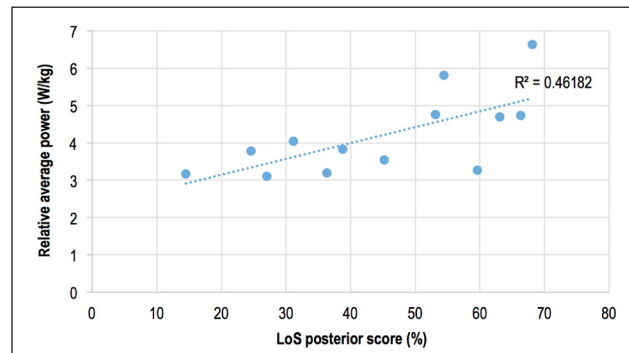


Figure 4. Correlation between LoS anterior scores and LoS right scores. LoS = limits of stability.

likely to be placed in a long-term care facility for the rest of their lives than those who do not.¹⁶

Much current and past research has examined the effects of strength on fall prevention. In 2005, Hess and Woollacott³ reviewed the effects of high-intensity strength training on functional measures of balance. Their study revealed that high-intensity strength training can effectively strengthen lower extremity muscles in balance-impaired older adults, resulting in major improvements in stability and functional movement. Pretest-posttest results from this study showed significant changes in quadriceps, hamstring, tibialis anterior, and gastrocnemius strength ($p \leq 0.001$). The only correlation between functional balance scores and strength was between gastrocnemius one-repetition-maximum strength change and Berg Balance Scale scores ($r = -0.683$). Chandak et al,¹⁹ who studied correlations between isometric muscle strength and balance performance in elderly women, assessed isometric strength of hip flexors, extensors, abductors, and adductors. Knee flexors and extensors and ankle plantar and dorsiflexors were tested as well. Participants' knee extensor findings correlated more strongly with balance than other measured musculatures. This study demonstrated that participants with good knee extensor strength had higher stability scores. These findings explain the authors' focus beyond lower body strength. On the basis of our results, the primary investigators would have concluded similar results as seen in

Hess and Woollacott's³ and Chandak et al's¹⁹ studies if the measured variables were replicated. In 2012, investigators observed strength measurements using the chair-stand test and stability index measurements.²⁰ This study showed a negative moderate correlation between strength and stability index scores ($r = -0.576$, $p < 0.01$). On the basis of past research, this study's investigators had expected to find a negative relationship between CoP scores and lower body wattage.²⁰ However, our significant results do not reveal a negative correlation attributable to variables such as LoS scores, which improved in the posterior plane as power output increased in all participants.

Intraclass correlation testing demonstrated that the stair ramp power test is a reliable assessment of lower power in older adults ($r = 0.831$). Shim and Drum⁴ produced similar results when using the ramp with younger adults ($r = 0.995$). Their study also revealed that the ramp test was an adequate replacement for the Margaria-Kalamen test ($r = 0.861$). Signorile et al¹³ developed the ramp by decreasing the angle to a ratio of 1:12 rise/run to increase accessibility for more elderly people and simulate standard access ramps. In 1989, investigators contended that the ramp method removed the skill component of stair running, further increasing muscle power output observed in testing.²¹ This viewpoint may help to ease the fears of elderly patients who participate in power assessments. Safety rails and steps were added by Shim and Drum⁴ and were very useful when testing older adults.

Muscle power output and [Limits of Stability] scores moderately to strongly correlate with balance scores in older adults.

Of 13 participants, only two required rails on the top platform to help them reduce speed upon completion, and only one participant needed support while ascending the ramp.⁴ This trial was meaningful because it gave clinicians the opportunity to assist participants and show them the safety features of the ramp. When working with the elderly population, use of top rails to assist with speed reduction is rarely seen, however.

When observing correlations between LoS scores and lower body muscle power ramp outputs, our results reveal strong to moderate correlations between LoS posterior and relative peak power and relative average power. A high correlation between these variables may be attributable to testing of posterior chain muscles with the stair ramp test, which also could be involved with balance. Relative peak power and relative average scores produced much higher correlations ($r = 0.725$ and $r = 0.680$, respectively), indicating that power may be a better predictor than strength toward improving balance than seen in previous studies.^{19,20} Power scores with LoS posterior scores produced higher correlations than previous studies.^{19,20,22} LoS anterior scores correlated highly with both LoS right ($r = 0.759$, $p = 0.003$) and LoS left ($r = 0.746$, $p = 0.003$) scores. Although investigators did not look at posture as a factor in this study, posture shifts in the anterior plane may be responsible for this correlation. Rolled shoulders, a flexed thoracic spine, and a forward head more anteriorly may have contributed to the higher correlations of movement in the left and right plane movements. Study limitations included the time of day the assessments were held; study sample size; and competing activities that were not originally scheduled at the senior center on the testing day, which reduced our sample size.

CONCLUSION

Muscle power output and LoS scores moderately to strongly correlate with balance scores in older adults. Further studies involving these variables such as receiver operating characteristic analysis for specificity and sensitivity should be considered for power ramp use to determine the ability to detect fall risk. Specific power training for older adults also should be studied. Our near-future goal is to use muscle power ramp test findings to identify at-risk adults and lower their likelihood for falls. ❖

Disclosure Statement

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

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How to Cite this Article

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Nerve Transfer Surgery for Penetrating Upper Extremity Injuries

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ABSTRACT

Context: Nerve transfer surgery is an option for repair of penetrating injuries of the upper extremity. In the right setting, it has advantages over tendon transfers and nerve grafting.

Objective: To review our experience since 2006 of nerve transfer surgery in the upper extremities.

Design: We included cases performed to repair penetrating trauma within three months of injury with at least three years' follow-up.

Main Outcome Measures: Preoperative and postoperative muscle strength of the affected extremity.

Results: All 16 patients were males aged 16 to 43 years. Six patients underwent nerve transfer surgery because of elbow flexion; 5, finger extension; 3, finger flexion; and 2, wrist pronation. Nine patients (56%) had associated vascular injury, and 4 (25%) had fractures. Average follow-up was 6 years. No perioperative complications occurred. Patients had a mean of 3.7 operations after the initial trauma. All patients received physical therapy. All patients improved from 0 of 5 muscle strength preoperatively to a mean of 3.8 (range = 2/5 to 5/5) within 1 year after surgery. In all cases, strength was maintained, and 8 (50%) had continued improvement after Year 1. Ten (63%) returned to their previous employment level. Mean Disabilities of the Arm, Shoulder and Hand score improved from 68 to 83 postoperatively.

Conclusion: Nerve transfer is a safe, effective technique for correcting penetrating trauma-related nerve injury. In appropriate patients it offers advantages over other techniques. Outcomes can be maintained long term, and many patients can return to their previous level of function.

INTRODUCTION

In traumatic peripheral nerve injury of the upper extremity, clinical outcomes with typical techniques, including tendon transfer and nerve grafting, are inconsistent and prone to suboptimal outcomes.^{1,2} Zone of injury, concomitant injuries, donor site morbidity, and need for staged procedures can all affect the outcome. Major drawbacks of the current treatment strategies can include delayed reinnervation for high injuries requiring nerve grafts, donor morbidity for tendon transfers and autologous nerve grafts, and prolonged reliance on trained therapists for good outcomes.

Nerve transfer surgery involves taking nerve branches from a neighboring nerve and redirecting them to the distal end of the injured nerve. Functioning branches close to the recipient non-functioning nerve are ideal donors as long as the donor nerve function is redundant or less critical. The body then regenerates

axons along the new path, and the motor cortex subsequently rewires itself to relearn muscle functions. This technique provides a nearby source of nerve for faster recovery because the healing and regeneration is occurring closer to the target site along the course of the recipient nerve.

Nerve transfer surgery has the potential to address many of the weaknesses of other surgical options. This study outlines our experience and results with nerve transfer surgery for repair of upper extremity penetrating nerve injuries.

METHODS

After institutional review board approval, a retrospective review was performed of all patients admitted to a Level I urban trauma center with penetrating injury to the upper extremities from January 2004 to December 2011 undergoing nerve transfer for repair of nerve injury. Inclusion criteria included penetrating injury to the upper extremities with subsequent sensorimotor deficit secondary to nerve injury, operative intervention within three months of initial presentation, and follow-up of at least three years after the initial operation.

Abstracted patient variables included age, sex, indication for surgery, the presence of associated vascular or osseous injury, follow-up duration, number of operations, and any perioperative complications. Primary outcome included preoperative and postoperative muscle strength of the extremity using the Oxford Scale.³ Secondary outcomes included the Disabilities of the Arm, Shoulder and Hand (DASH) score and surgical complications. The DASH score is an outcome measure that is scored in 2 components: The disability/symptom section (scored 1-5) and the optional high performance Sport/Music or Work section (scored 1-5).^{4,5}

RESULTS

During the study period, 16 patients underwent nerve transfer for repair of penetrating upper extremity injury. The patients identified were all males, with a mean age of 27 years (range = 16-43 years). Of the 16 cases of nerve transfer, 6 were caused by loss of elbow flexion, 5 were for loss of finger extension, 3 were caused by loss of finger flexion, and the remaining 2 for loss of wrist pronation. Associated vascular injury was encountered in 9 patients, and 4 patients had an associated osseous injury (Table 1). The mean follow-up was 6 years, and the median number of surgeries required was 4 (range = 2-5). No perioperative complications were encountered.

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Muscle strength of the affected extremity was checked preoperatively. All patients had 0 of 5 strength for the function in question, with 0 indicating no contraction and 5 indicating movement against gravity with full resistance (normal power). Muscle strength was reassessed at 6 weeks, 3 months, 6 months, and then annually. The median postoperative muscle strength at 1 year after surgery was 4/5, with a range of 2/5 to 5/5 ($p < 0.05$). All patients were followed for at least 3 years. Fifty percent of patients (8/16) maintained the same level of strength at 3 years that they had at the 1-year mark. The other 50% experienced improvement of their strength level from Year 1 to Year 3. No patient had deterioration in strength level after the first year (Table 2), and 10 of the 16 patients were able to return to their previous level of employment. When the DASH score was calculated for each patient preoperatively and postoperatively, a significant increase postoperatively was noted (score of 68 preoperatively vs 83 postoperatively, $p < 0.05$ respectively, Table 2).

Table 3 depicts the type of operation performed for every patient depending on his functional loss. The Modified British Medical Research Council Classification for muscle strength was documented preoperatively as well as at 3 years postoperatively.

DISCUSSION

In terms of traumatic sequelae of a penetrating injury to the extremities, nerve injury is of particular importance. Unlike with many other injuries, timely, good surgical technique is not the only predictor of outcome. Direct nerve repair of a proximal nerve injury can take months or years to produce good results. The disability can become permanent. Surgeons have developed ancillary procedures designed to correct the deficit by using other functioning neuromuscular or neurosensory units. The growing list of techniques includes nerve grafting (via autologous grafts, allogeneic grafts, or synthetic conduits), tendon transfer, nerve transfer, joint fusion, and adaptive splinting. Nerve transfer is a newer concept that involves redirecting a nerve segment from a neighboring noncritical or redundant branching nerve to the distal edge of the injured nerve (Figure 1).

Nerve grafting is employed to bridge gaps when primary repair of a transected nerve cannot be performed without tension or scarring. Even with excellent technique, the nerve regeneration length is unchanged and the biology of nerve regeneration (1 mm/d) remains the rate-limiting step.⁶ The number of axons that make it to the end organ is always reduced.⁷ Grafting also means 2 coaptations and successful healing at both sites. The outcome is a decrease in the quantity and eventual quality of the neuromotor unit by the time the regeneration is complete. During nerve grafting, the entire donor nerve domain, usually sensory, is lost. Nerve conduits and allografts decrease donor site impact but have not been shown to improve the clinical outcomes over nerve grafting.⁸⁻¹⁰

Many surgeons treating patients with nerve injuries prefer tendon transfers. For adept surgeons, the results are predictable. In most cases, tendon transfers are irreversible. They require the sacrifice of a neuromuscular unit; alteration of biomechanics, which can result in secondary trauma remote from the original injury; and the need for therapy and retraining.^{11,12} Because of the

Table 1. Demographic and clinical characteristics (N = 16)

Characteristic	Number
Sex, male	16
Age range, y	16-43
Indication for surgery	
Elbow flexion	6
Finger extension	5
Finger flexion	3
Wrist pronation	2
Associated vascular injury	9
Associated fracture	4
Mean follow-up, y	6
No. of operations, mean (range)	3.6 (2-5)
Perioperative complications	0

Table 2. Outcomes of nerve transfer surgery

Outcome	Number
Muscle strength of affected muscle group ^a	
Preoperatively	0/5
Postoperatively, mean (range)	3.8/5 (2/5-5/5)
Strength level change more than 1 y after follow-up	
Stable	8/16
Improvement	8/16
Deterioration	0/16
Return to previous level of employment	10/16
Mean DASH score	
Preoperatively	68
Postoperatively	83

^a Using the Oxford Shoulder Score.
DASH = Disabilities of the Arm, Shoulder and Hand.

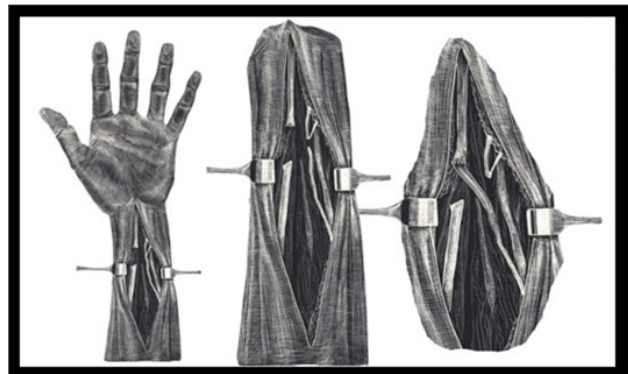


Figure 1. Surgical technique for nerve transfer (Illustration by Kelly Rosso, MD). Ulnar nerve to anterior interosseous nerve branch of median nerve in an end-to-end fashion.

rerouting required for tendon transfer, there is almost universally a drop-off in strength and mobility after transfer.¹²

Nerve transfer may be superior to nerve grafting because the surgical field during transfer is generally away from the site of injury, using healthy, recognizable tissues, instead of crushed or

scarred tissue found at the site of injury. Despite recent improvements and use of grafts, nerve grafting continues to have a poor prognosis.¹³ It is for this reason that the focus of nerve repair has shifted toward the technique of nerve transfer. Results of the present study show that nerve transfer can achieve higher functional results and more predictable outcomes over those typically obtained with nerve grafting.

Compared with tendon transfer, nerve transfer has been shown to have several advantages. Nerve transfers are performed outside the zone of the original injury using healthy, recognizable tissues, instead of crushed or scarred nerve tissue. Nerve transfer allows reinnervation of native muscle and preservation of the natural anatomy. This is beneficial, because it does not alter the biomechanics, which can decrease range of motion, restrict muscle or tendon gliding, or cause secondary trauma such as adhesions or tendon rupture. Additionally, tendon transfer may require extensive dissection, and precluding this dissection with nerve transfer may lead to less donor site morbidity. Nerve transfers occur closer to the motor endplate, resulting in shorter interval to reanimation and less loss of functional motor units.¹⁴ In theory, this can improve detailed nerve function, including fine and gross motor function, as well as sensation. Details of current practices in nerve transfer for sensation are outlined in an article by Boyd et al.¹⁵

Nerve transfers do have some disadvantages. The clinical results of a nerve transfer, unlike tendon transfer, do take months to materialize. Tendon transfers allow one to see the results of the surgery within weeks. Nerve transfer is a technically demanding surgery. Poor outcomes may not manifest for a while and may delay any discussion and plan for further surgery and intervention. Patient morbidity and expenses are extended. There is a risk with nerve surgery of unintended damage to the donor nerve.

Although it was not seen in our study, donor nerve injury can be irreversible. There are also technical limitations to nerve transfer surgery. For now, safe and effective surgery should be guided by tenets outlined elsewhere.¹⁶

Nerve transfer has not yet become the standard treatment of penetrating injuries to the upper extremities. Initially nerve transfer was used for repair of severe brachial plexus injuries; now indications have expanded to include distal nerve deficits of the upper extremity as well. More evidence on nerve transfer is needed to develop a treatment algorithm.

Outcomes for reconstruction after peripheral nerve injuries are difficult to interpret for several reasons, including lack of standardization, varying degrees of injury per patient, and lack of consensus on surgical approach. However, there is increasing interest in nerve transfer to treat injuries. Because nerve transfer is relatively new, many series have a limited number of patients, but more results continue to be published. The present study uses a large cohort and reports favorable outcomes, with more than 50% of the patients returning to their previous level of employment. Furthermore, nerve transfer in our study was shown not to be associated with any morbidity, making it a safe choice when penetrating upper extremity injuries are encountered. A very important point of this study is the fact that even after 1 year of follow-up, some patients continued to improve. Follow-up of at least 3 years was required to see this improvement. Our numbers, however, are not large enough to make any conclusions regarding predictors of late improvement. Also notable is that 63% of patients returned to work. Delayed completion of reconstruction is a strong predictor of not returning to work. Nerve transfers in this cohort were timely and appropriate so patients were able to remain motivated. The improvement in DASH score is also a strong predictor of patient-based outcome.

Table 3. Patients' operation and outcomes

Patient	Loss of function	Operation	Pre-MBMR Classification	Post-MBMR Classification (at 3 y)
1	Elbow flexion	Ulnar nerve to musculocutaneous nerve (Oberlin)	M1	M4
2	Elbow flexion	Ulnar nerve to musculocutaneous nerve (Oberlin)	M1	M4
3	Elbow flexion	Ulnar nerve to musculocutaneous nerve (Oberlin)	M2	M5
4	Elbow flexion	Ulnar nerve to musculocutaneous nerve (Oberlin)	M1	M4
5	Elbow flexion	Oberlin plus median nerve to brachialis branch of musculocutaneous nerve	M1	M4
6	Elbow flexion	Ulnar nerve to musculocutaneous nerve (Oberlin)	M2	M5
7	Finger extension	FDS branch of median nerve to PIN	M1	M4
8	Finger extension	FDS branch of median nerve to PIN	M0	M4
9	Finger extension	FDS branch of median nerve to PIN	M1	M5
10	Finger extension	FDS branch of median nerve to PIN	M1	M5
11	Finger extension	FDS branch of median nerve to PIN	M1	M4
12	Finger flexion	AIN to motor branch of thenar muscles	M2	M4
13	Finger flexion	AIN to motor branch of thenar muscles	M2	M4
14	Finger flexion	Motor branch of ECRB to AIN	M1	M4
15	Wrist pronation	Motor branch of ECRB to AIN	M1	M3
16	Wrist pronation	Motor branch of ECRB to AIN	M1	M4

AIN = anterior interosseous nerve; ECRB = extensor carpi radialis brevis; FDS = flexor digitorum superficialis; MBMR = Modified British Medical Research Council; Oberlin = Oberlin procedure; PIN = posterior interosseous nerve.

Limitations of this study include its retrospective nature. We also excluded six patients who did not complete at least three years' follow-up.

CONCLUSION

Nerve transfer has the potential to address many of the limitations associated with other treatment options used for high penetrating trauma of the upper extremity. In our study, we present 16 cases that further demonstrate that nerve transfers can be done in a systematic manner to obtain consistently strong functional outcomes. Furthermore, we show that clinical improvement continues in some patients for up to 3 years. ❖

Disclosure Statement

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

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All Nerves

In all nerves there are both faculties, by which I mean the faculty of perception and the faculty of motion.

— Galen of Pergamon, 130 AD-210 AD, prominent Greek physician, surgeon, and philosopher in the Roman Empire

Effects of Treatment-Associated Increases in Fruit and Vegetable Intake on the Consumption of Other Food Groups and Weight Through Self-Regulatory Processes

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ABSTRACT

Context: Increased intake of fruits and vegetables (FV) may be useful for weight loss.

Objective: This study was designed to evaluate the effects of changes in FV intake on the overall diet and to determine if self-regulation affects the association between changes in FV intake and weight.

Methods: Women with obesity (N = 74, mean age = 47.7 years) participating in a year-long behavioral weight-loss treatment were assessed regarding changes in consumption of various food groups, physical activity, and eating self-regulation over 6, 12, and 24 months.

Results: FV intake change significantly predicted changes in weight and consumption of dairy and bread products and sweets. The only other notable relationships were among changes in sweets, bread, and dairy consumption over 24 months. Over 6, 12, and 24 months, changes in self-regulation significantly mediated the FV intake-weight change relationship. The overall mediation models were significant (R^2 values = 0.19, 0.13, and 0.32, respectively). A reciprocal relationship between changes in FV intake and self-regulation also was found. Significant increases in physical activity outputs did not influence weight changes.

Conclusion: Findings supported a relationship between FV intake and weight loss occurring through self-regulatory skills. Associations between FV intake and reduced consumption of other food groups provided data useful for improving the architecture of behavioral weight-loss treatments and the foci of medical practitioners' helping methods.

INTRODUCTION

Obesity is a medical condition with considerable effects on health risks and quality of life. Although the popular focus on targeting proportions of diet macronutrients (ie, proteins, fats, and carbohydrates) for weight loss has proved ineffective,¹ fruit and vegetable (FV) intake has been associated with weight loss.^{2,3} Although FV intake can influence consumption of other food groups,¹ this has been an understudied area. Targeting as few behavioral changes as possible may serve as a therapeutic advantage when designing weight-loss treatments.⁴

Because it takes considerable self-control to eat more healthy food and less unhealthy food such as sweets, self-regulation instruction has become a focus of behavioral weight-loss treatments that is based on accepted behavior-change theories such

as social cognitive theory.^{5,6} It is possible that the increased use of self-regulation methods (eg, goal setting/progress tracking, restructuring unproductive self-talk, environmental [stimulus] control) mediates the FV-weight loss relationship and, further, has a symbiotic, mutually reinforcing relationship with FV intake.

Women with obesity who participated in a community-based behavioral weight-loss program were assessed over 6, 12, and 24 months. It was expected that increased FV intake would be significantly associated with reduced weight and reduced consumption of other food groups. Investigators also predicted that the relationship between increased FV intake and reduced weight would be significantly mediated by treatment-associated changes in dietary self-regulation, and that relationships between changes in FV intake and self-regulation would be reciprocal.

METHODS

Participants

Participant (N = 74) data were derived from a longitudinal test of treatment-associated changes in emotional eating.⁷ The volunteers were required to be at least age 21 years with a body mass index (BMI) of 30 kg/m² to 40 kg/m² and not be participating in a weight-loss program or taking a psychotropic medication. Women with physical contraindications to participation (such as pregnancy) also were excluded. The mean age was 47.7 years (standard deviation [SD] = 8.0), and the mean BMI was 34.9 kg/m² (SD = 3.2). The racial/ethnic makeup was approximately two-thirds white and one-third African American; several participants represented other racial categories. Nearly all were from households in the middle family income range of \$50,000 to \$100,000 yearly. University institutional review board approval and written informed consent were obtained.

Measures

Eating Behaviors

Daily servings of vegetables (eg, 118 mL [4 ounces] of peas); fruits (eg, 118 mL [4 ounces] of an orange); dairy products (eg, 236 mL [8 ounces] of yogurt); meats, beans, nuts, and other proteins (eg, 59 mL [2 ounces] of boneless chicken); bread products (eg, 59 mL [2 small slices] of whole-grain bread); and sweets (eg, 118 mL of a small brownie) as indicated by US Department of Agriculture sources⁸ were summed using a brief survey. FV intake was then aggregated. Response scores demonstrated significant correspondences (β values = 0.45-0.83, all p values < 0.001) with

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the scores of more comprehensive and extensively validated food frequency recalls, and test-retest reliabilities over 3 weeks ranged between 0.77 and 0.83.^{9,10}

Eating Self-Regulation

To assess the use of self-regulation skills related to eating, responses to 10 items (1 = never to 5 = often) such as “I say positive things to myself about eating well” and “I keep a record of my eating” were summed.¹¹ The internal consistency was Cronbach $\alpha = 0.81$, and test-retest reliability over 2 weeks was 0.74.¹¹ For the data within this study, Cronbach $\alpha = 0.80$.

Physical Activity

The number of physical activity sessions per week of at least 15 minutes’ duration was recalled using the Leisure-Time Physical Activity Questionnaire (Section 1).¹² Activity types corresponded to metabolic equivalents (MET) equating O₂/kg/hour ranging from 3 MET (eg, easy walking) to 9 MET (running) and were summed.¹² Previous research^{13,14} found significant relationships (β values = 0.38-0.57, all p values < 0.001) between the Leisure-Time Physical Activity Questionnaire and accelerometer, weight change, and maximal oxygen uptake results. Test-retest reliability over 2 weeks was 0.74.¹⁴

Weight

Body weight was measured using a recently calibrated digital scale. The mean of two consecutive measurements was recorded (in kg) after removal of heavy outer clothing.

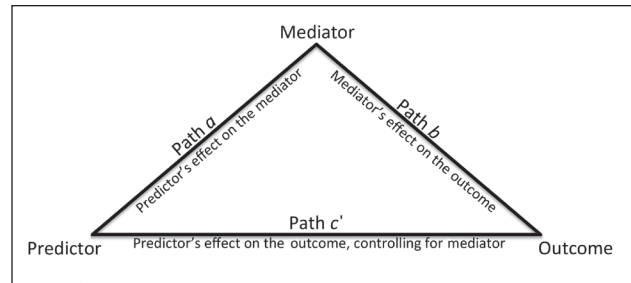


Figure 1. Mediation analyses diagram.

Procedure

The treatment consisted of components of physical activity support and eating-behavior change based on tenets of social cognitive theory,⁵ especially the emphasis on use of self-regulatory skills to effectively deal with lifestyle barriers.⁶ The treatment was administered by trained wellness staff members at a community wellness center.

The Coach Approach protocol¹⁵ supported physical activity via six 45-minute 1-on-1 meetings. Assimilation of self-regulation methods such as goal setting, thought-stopping/cognitive restructuring, relapse prevention, dissociation, and stimulus control was the central focus. After 10 weeks of physical activity support alone, instruction in food logging was added, and group

Category	Baseline, mean (SD)	Assessment month, mean (SD)	Δ Baseline-assessment month, mean (SD)	Category intercorrelations					
				1	2	3	4	5	6
Assessment month 6									
1. Fruit/vegetable intake/d	3.73 (1.53)	5.65 (1.93)	1.92 ^a (1.79)		-0.11	0.22	-0.26 ^b	-0.28 ^b	-0.28 ^b
2. Dairy product intake/d	1.69 (1.02)	1.69 (0.93)	0.00 (1.09)			0.31 ^c	0.22	0.21	0.06
3. Meat/protein intake/d	2.93 (0.98)	2.86 (1.16)	-0.33 (0.520)				0.00	-0.12	-0.13
4. Bread product intake/d	3.05 (1.50)	2.12 (1.17)	-0.93 ^a (1.50)					0.52 ^c	0.18
5. Sweets intake/d	1.86 (1.14)	1.01 (1.03)	-0.86 ^a (1.20)						0.17
6. Weight (kg)	94.77 (12.19)	88.77 (12.26)	-6.00 ^a (4.87)						
Assessment month 12									
1. Fruit/vegetable intake/d	3.73 (1.53)	5.59 (2.01)	1.86 ^a (1.880)		-0.38 ^c	0.17	-0.39 ^c	-0.27 ^b	-0.30 ^c
2. Dairy product intake/d	1.69 (1.02)	1.65 (1.02)	-0.04 (1.10)			0.01	0.27 ^b	0.21	0.17
3. Meat/protein intake/d	2.93 (0.98)	2.74 (0.93)	-0.18 (1.05)				0.08	0.01	-0.01
4. Bread product intake/d	3.05 (1.50)	2.01 (1.06)	-1.04 ^a (1.53)					0.33 ^c	0.13
5. Sweets intake/d	1.86 (1.14)	0.92 (0.78)	-0.94 ^a (1.36)						0.09
6. Weight (kg)	94.77 (12.19)	89.30 (12.79)	-5.48 ^a (5.97)						
Assessment month 24									
1. Fruit/vegetable intake/d	3.73 (1.53)	5.87 (2.07)	2.14 ^a (2.08)		-0.31 ^c	0.14	-0.34 ^c	-0.24 ^b	-0.51 ^c
2. Dairy product intake/d	1.69 (1.02)	1.64 (0.98)	-0.05 (1.20)			0.03	0.23	0.27 ^b	0.22
3. Meat/protein intake/d	2.93 (0.98)	2.83 (0.99)	-0.09 (1.21)				0.12	-0.08	0.04
4. Bread product intake/d	3.05 (1.50)	2.04 (1.35)	-1.01 ^a (1.95)					0.34 ^c	0.04
5. Sweets intake/d	1.86 (1.14)	1.09 (1.05)	-0.78 ^a (1.51)						0.15
6. Weight (kg)	94.77 (12.19)	89.35 (12.6)	-5.43 ^a (6.41)						

^a p < 0.001.
^b p < 0.05.
^c p < 0.01.
 SD = standard deviation.

nutrition sessions were held every 2 weeks using the Weight Loss For Life protocol.¹⁶ Sessions adapted self-regulatory skills learned in the context of supporting physical activity to control eating. For example, restructuring unproductive statements that could lead to missing a planned evening physical activity session would be adapted to address self-talk about circumventing dietary goals for the day. Along with self-regulation and maintaining regular physical activity, increasing FV consumption was a major emphasis of the 56-week treatment. Fidelity checks on approximately 15% of treatment sessions indicated few protocol deviations that were easily remedied.

Data Analyses

Because there was no systematic bias detected within the 8% of missing cases, the intention-to-treat approach incorporated the expectation-maximization algorithm¹⁷ for imputation. For the primary analyses, a moderate effect of $f^2 = 0.15$ at the conservative statistical power level of 0.90 ($\alpha < 0.05$) necessitated a minimum sample size of 71.¹⁸ SPSS Statistics version 22.0 (IBM, Armonk, NY) was used for the statistical analyses.

Linear bivariate relationships first were calculated across changes in daily consumption of food groups and weight, separately from baseline to months 6, 12, and 24, at which statistical significance was set at $\alpha < 0.05$ (2-tailed). Considering previous research and suggestions¹⁹ and an absence of floor and ceiling effects, change (gain) scores were unadjusted for their baseline value. Mediation of the relationship of changes in FV intake and weight by change in self-regulation for eating over 6, 12, and 24 months was computed next using a bootstrapping method with 20,000 resamples.²⁰ Because directionality within the incorporated relationships was already established, 1-tailed analyses ($\alpha < 0.05$) were used to evaluate statistical significance. R^2 was calculated to determine significance of the overall models, and path a (predictor→mediator), path b (mediator→outcome), and path c' (predictor→outcome, controlling for the mediator) were also calculated as β values (Figure 1). Mediation significance

was established when the bias-corrected and accelerated 95% confidence intervals did not include 0. Change in physical activity was tested for its significance as a covariate.

On the basis of previous suggestions,²¹ the presence of a reciprocal (bidirectional) relationship between changes in FV intake and self-regulation also was tested by reversing the position of the predictor and mediator variables in paired equations. If significant mediation was found in both equations, then a reciprocal relationship had been detected.

RESULTS

Score Changes

Physical activity significantly increased (all p values < 0.001) from a baseline mean of 6.50 (SD = 7.89) to a mean of 35.16 (SD = 19.69) at month 6, a mean of 29.59 (SD = 16.63) at month 12, and a mean of 30.06 (SD = 17.41) at month 24. Self-regulation for eating at baseline (mean = 22.09, SD = 5.85) demonstrated a significant increase to month 6 (mean_{change} = 9.79, SD = 7.13, $p < 0.001$), month 12 (mean_{change} = 6.25, SD = 9.12, $p < 0.001$), and month 24 (mean_{change} = 8.03, SD = 8.49, $p < 0.001$). Table 1 details all other score changes.

Bivariate Relationships

FV intake changes from baseline to months 6, 12, and 24 served as significant predictors of changes in weight and bread and sweets consumption over 12 and 24 months and dairy consumption at 24 months (Table 1).

Mediation Analyses

When eating self-regulation was entered as a mediator of the relationships of change in FV intake and weight over 6, 12, and 24 months, change in physical activity did not demonstrate a significant effect on the prediction of weight change ($\beta = -0.02$, SE = 0.03; $\beta = -0.04$, SE = 0.04; and $\beta = -0.07$, SE = 0.04, respectively). As a result, this variable was removed from further analyses. The overall mediation models were each significant

Predictor	Mediator	Outcome	Path a		Path b		Path c'		Indirect effect through the mediator	
			β (SE)	p value	β (SE)	p value	β (SE)	p value	β (SE)	95% CI
Changes from baseline to month 6										
Fruit/vegetable intake	Self-regulation	Weight	1.26 (0.45)	0.003	-0.24 (0.08)	0.001	-0.45 (0.31)	0.073	-0.31 (0.20)	-0.695, -0.052
Self-regulation for eating	Fruit/vegetable intake	Weight	0.08 (0.03)	0.003	-0.45 (0.31)	0.073	-0.24 (0.08)	0.001	-0.04 (0.03)	-0.116, -0.002
Changes from baseline to month 12										
Fruit/vegetable intake	Self-regulation	Weight	1.57 (0.44)	< 0.001	-0.18 (0.09)	0.031	-0.67 (0.38)	0.042	-0.28 (0.21)	-0.753, -0.033
Self-regulation for eating	Fruit/vegetable intake	Weight	0.10 (0.03)	< 0.001	-0.67 (0.38)	0.042	-0.18 (0.09)	0.031	-0.07 (0.04)	-0.136, -0.015
Changes from baseline to month 24										
Fruit/vegetable intake	Self-regulation	Weight	1.75 (0.41)	< 0.001	-0.22 (0.09)	0.008	-1.19 (0.34)	< 0.001	-0.38 (0.18)	-0.792, -0.153
Self-regulation for eating	Fruit/vegetable intake	Weight	0.12 (0.03)	< 0.001	-1.19 (0.34)	< 0.001	-0.22 (0.09)	0.008	-0.14 (0.06)	-0.262, -0.055

^a Analyses were based on a 1-tailed bootstrapping method to assess mediation that incorporated 20,000 resamples of the data (path a [predictor→mediator], path b [mediator→outcome], and path c' [predictor→outcome, controlling for the mediator]).²⁰ CI = confidence interval; SE = standard error.

($R^2 = 0.19$, $p = 0.001$; $R^2 = 0.13$, $p = 0.006$; and $R^2 = 0.32$, $p < 0.001$). Change in self-regulation demonstrated significant mediation in each of the 3 equations (Table 2).

Reciprocal Relationship Analyses

In models in which the predictor and mediator variables were reversed, there were significant mediations (Table 2). This indicated reciprocal, bidirectional relationships between changes in self-regulation and FV intake.

DISCUSSION

Findings supported relationships between both short- and long-term increases in FV intake and reduced weight loss and reductions in consumption of other food groups. This finding is consistent with previous suggestions that increased FV intake will reduce consumption of other food types and overall energy intake.²² However, additional analyses within the present research suggest that the significant relationship between increased FV consumption and weight loss was achieved through (ie, significantly mediated by) increased self-regulation. Increasing positive (targeted) behaviors associated with eating more FV likely required participants to use more of their self-regulatory skills. As these skills were bolstered and used more effectively, improved eating behaviors emerged. Duplicating this scenario could advance the mutually reinforcing relationship that was documented through the reciprocal interaction between increases in FV intake and self-regulation. Both theory and systematic reviews strongly suggest the importance of self-regulation as a key mediator of weight-loss treatment effects.^{6,23,24}

Although this study was limited by a single-group design with a volunteer sample that may have been especially motivated, it provides new analyses and a basis for further research into the dynamics of treatment-associated changes in diet, self-regulation, and weight loss. Extensions of this research should strengthen measurement instrumentation by incorporating validated food recall surveys that differentiate within food groups (eg, starchy vs nonstarchy vegetables) and accelerometers that can more objectively measure physical activity outputs. After implementing these measures and completing replications involving more ethnicities and sample types, a continued focus on FV intake and self-regulatory skills development can help increase the effectiveness of behavioral weight-loss programs that primarily are unreliable beyond the very short term.²⁵ Ultimately, medical professionals' support of patients' weight-management efforts will be enhanced. ❖

Disclosure Statement

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

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Association of Psychiatric Diagnostic Conditions with Hospital Care Outcomes of Patients with Orthopedic Injuries

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ABSTRACT

Context: Psychiatric comorbidity is common in orthopedic injury, but the effects on hospital care outcomes have been identified only generally.

Objective: To quantify psychiatric comorbidity and its outcome effects in a large, multicenter population of inpatients with orthopedic injuries.

Design: Retrospective analysis of patient discharge data from 507 California hospitals from 2001 to 2010. Study sample included orthopedic diagnoses using International Classification of Diseases codes for major pelvic and lower extremity injuries in patients older than age 17 years. From the injury data, we extracted psychiatric diagnoses, alcoholism, substance abuse, and sociodemographic characteristics.

Main Outcome Measures: Length of stay, surgical complications, and inpatient deaths.

Results: The entire injury admissions represented about 1.9% of all hospital admissions and were predominantly older than age 64 years, white, and women with conventional health care insurance. The most common comorbidity in the patients with injury was psychiatric illness (24.7%). The most common psychiatric diagnoses in orthopedic injury admissions were dementia (14.3%) and depression (6.9%) without association. Compared with the injury admissions with no psychiatric diagnosis, admissions with psychiatric diagnosis had higher odds of a hospital stay of 7 or more days, surgical treatment complications, and in-hospital death.

Conclusion: Psychiatric comorbidity adversely affects several hospital outcomes in patients with orthopedic injuries: Length of stay, surgical complications, and inpatient mortality. In low-income populations, the adverse psychiatric effects are incrementally worse. The adverse effects of psychiatric comorbidity, particularly dementia and depression, on hospital outcomes should stimulate improved psychiatric care of many patients at risk of poor clinical outcomes.

INTRODUCTION

Orthopedic injuries frequently require acute hospitalization for urgent care. Many patients are admitted with clinically significant comorbidities, which affect outcomes of hospital care.¹ Psychiatric comorbidity is a frequent confounding factor in effective care.¹⁻¹⁰ Some investigators have found adverse effects on orthopedic outcomes owing to concurrent psychiatric diagnoses.^{1,2,5,11,12} Also, other studies have shown ethnic, racial, and socioeconomic disparities in care of orthopedic conditions.¹³⁻¹⁷ However, multicenter studies have not yet

validated and explained some outcome observations in these injured patients. Also, several specific psychiatric diagnoses have not yet been correlated with outcomes of acute orthopedic hospital care.

The purpose of this study is to report characteristics of hospitalized orthopedic injury/fracture patients in California, and to investigate the association of psychiatric diagnoses with length of hospital stay (LOS), surgical treatment complications and in-hospital mortality in a large population of hospitalized patients with orthopedic injuries.

METHODS

A cross-sectional analysis was conducted of patient discharge data from 507 California hospitals in a database maintained by the Office of Statewide Health Planning and Development. The database includes patient diagnoses, types of procedures, hospital characteristics, patient demographics, LOS, complications, comorbidity, costs, route of discharge, and self-reported race/ethnicity. For the present study, we used discharge data between 2001 and 2010. We included orthopedic diagnoses, using the International Classification of Disease, Ninth Edition (ICD-9) codes for major pelvic and lower extremity injuries that required hospital care in patients older than age 17 years. From the injury data we also extracted psychiatric diagnoses, alcoholism, and substance abuse, as well as age (< 65 years as the reference vs ≥ 65 years), sex, race/ethnicity (white vs black/African American, Hispanic, and Asian/other), insurance (private/Medicare vs Medi-Cal/other), number of comorbidities, LOS (< 7 days vs ≥ 7 days), complications (yes vs no), and in-hospital death (yes vs no).

All analyses were obtained and analyzed using analytics software (Statistical Analysis Software [SAS] Version 9.3, SAS Institute, Cary, NC). We used frequency (count and percentage) to depict the overall characteristics of the sample for the categorical variables (age, sex, race/ethnicity, insurance status, LOS, and comorbidity). We conducted bivariate analysis using the χ^2 test to determine the statistical difference in the outcome variables (LOS, surgical complications, and

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inpatient deaths) by the main independent variable (psychiatric diagnoses), alcohol abuse, and substance abuse, and the other independent variables (age, sex, race/ethnicity, insurance status, and number of comorbidities). In addition, we performed multiple logistic regressions to test the independent association between study predictor variables and the outcomes variables while controlling for the other variables in the model (ie, age, sex, race/ethnicity, insurance status, and number of comorbidities). Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) are presented, and statistical significance was considered at p value ≤ 0.05 .

RESULTS

The entire injury admission population was about 1.9% of all hospital admissions (Figure 1). Table 1 presents the demographic characteristics of the hospital admissions with orthopedic injuries. These patients were predominantly older than age 64 years, white women with a conventional health care insurance profile. These characteristics were similar to the characteristics of general admissions except that injury admissions were predominantly older (data not shown).

As indicated in Table 2, overall, the most common comorbidity in the patients with orthopedic injury was a psychiatric illness (24.7%). The specific psychiatric diagnoses in the general admissions and injury admissions with psychiatric diagnoses are shown in Table 2. The most common psychiatric diagnoses in injury admissions were dementias (14.3%) followed by depression (6.9%). Besides psychiatric diagnoses, diabetes mellitus was equally the most frequent comorbidity in both the general admissions and orthopedic injury admissions (data not shown). A small percentage of the injury admissions with psychiatric diagnoses had a diagnosis of alcoholism (2.0%) or substance abuse (0.9%).

The correlations between psychiatric diagnosis and other study variables in the injury population and hospital outcomes are shown in Table 3. Psychiatric illness was correlated with prolonged hospital stay of the patients with injury, surgical treatment complications, and in-hospital death ($p < 0.001$).

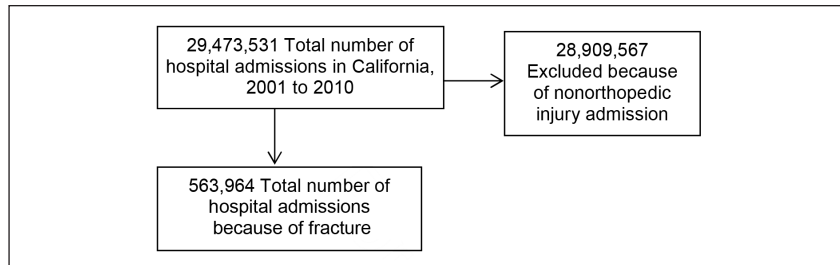


Figure 1. Flow diagram of selected cases.

Table 1. Characteristics of hospitalized patients with orthopedic injury by psychiatric diagnosis (study sample)

Characteristic ^a	Total injury admissions (N = 563,964), no. (%)	Psychiatric diagnosis (n = 139,450), no. (%)	No psychiatric diagnosis (n = 424,514), no. (%)	p value
Substance abuse				
Yes	3117 (0.6)	1195 (0.9)	1922 (0.5)	< 0.001
No	560,847 (99.4)	138,255 (99.1)	422,592 (99.5)	
Alcoholism				
Yes	18,011 (3.2)	2769 (2.0)	15,242 (3.6)	< 0.001
No	545,953 (96.8)	136,681 (98.0)	409,272 (96.4)	
Age, years				
< 65	211,526 (37.5)	25,170 (18.1)	186,356 (43.9)	< 0.001
≥ 65	352,438 (62.5)	114,280 (81.9)	238,158 (56.1)	
Sex				
Male	179,050 (36.7)	32,538 (25.8)	146,512 (40.5)	< 0.001
Female	308,648 (63.3)	93,462 (74.2)	215,186 (59.5)	
Race/ethnicity				
White	332,433 (78.0)	98,426 (85.4)	234,007 (75.2)	< 0.001
Black	17,445 (4.1)	3567 (3.1)	13,878 (4.5)	
Hispanic	55,621 (13.0)	8580 (7.4)	47,041 (15.1)	
Asian/other	20,984 (4.9)	4676 (4.1)	16,308 (5.2)	
Insurance				
Private/Medicare	452,004 (80.2)	126,801 (90.9)	325,203 (76.6)	< 0.001
Medi-Cal/other	111,881 (19.8)	12,632 (9.1)	99,249 (23.4)	
No. of comorbidities				
0	331,144 (58.7)	66,780 (47.9)	264,364 (62.3)	< 0.001
1	142,377 (25.3)	42,831 (30.7)	99,546 (23.4)	
2	59,734 (10.6)	19,768 (14.2)	39,966 (9.4)	
3	22,179 (3.9)	7330 (5.2)	14,849 (3.5)	
≥ 4	8530 (1.5)	2741 (2.0)	5789 (1.4)	
Length of hospital stay				
< 7 days	402,022 (71.3)	92,739 (66.5)	309,283 (72.9)	< 0.001
≥ 7 days	161,942 (28.7)	46,711 (33.5)	115,231 (27.1)	
Complications				
Yes	58,338 (10.3)	17,809 (12.8)	40,529 (9.6)	< 0.001
No	505,626 (89.7)	121,641 (87.2)	383,985 (90.4)	
In-hospital death				
Yes	13,093 (2.3)	4100 (2.9)	8993 (2.1)	< 0.001
No	550,871 (97.7)	135,350 (97.1)	415,521 (97.9)	

^a Demographic variables, such as age, sex, race/ethnicity were masked by The California Office of Statewide Health Planning and Development (OSHPD), therefore, some columns may not add up to total N.

Table 2. Psychiatric diagnoses in general admissions and fracture admissions^a

Psychiatric diagnosis	General admissions (n = 29,473,531), no. (%)	p value
Anxiety	1,280,222 (4.3)	< 0.001
Dementia	1,602,866 (5.4)	< 0.001
Depression	1,571,119 (5.3)	< 0.001
Episodic mood	1,286,681 (4.4)	< 0.001
Schizophrenia	769,528 (2.6)	< 0.001
Alcoholism	615,214 (2.1)	< 0.001
Substance abuse	446,406 (1.5)	< 0.001

^a Some admitted patients had multiple psychiatric diagnoses. For example, for all orthopedic injury admissions with a psychiatric diagnosis, 2.0% had a diagnosis of alcoholism and 0.9% had a diagnosis of substance abuse.

Table 4 presents the independent predictors of LOS, surgical treatment complications, and inhospital death of hospitalized patients with orthopedic injury. Compared with the injury admissions with no psychiatric diagnosis, admissions with psychiatric diagnosis had higher odds of 7 or more days of hospital stay (OR = 1.27; CI = 1.25-1.29), higher odds of having surgical treatment complications (OR = 1.18; CI = 1.15-1.20), and higher odds of inhospital death (OR = 1.15; CI = 1.10-1.20). These results were statistically significant.

Of the other variables in Table 4, injury admissions with substance abuse, alcoholism, age 65 years or older, and comorbid conditions as well as those from an ethnic minority group had higher odds of staying in the hospital 7 or more days

compared with their counterparts without these characteristics. On the other hand, female sex and having private/Medicare insurance lowered the odds of a lengthy hospital stay compared with their reference groups.

With respect to surgical treatment complications, injury admissions with substance abuse, alcoholism, and comorbid conditions had higher odds of complications, whereas age 65 years or older, female sex, belonging to an ethnic minority group, and having private/Medicare insurance lowered the chance of treatment complications for these groups compared with their reference groups. As for inhospital deaths, alcoholism, age 65 years or older, and comorbid conditions increased the odds of mortality, whereas substance abuse, female sex, belonging

Table 3. Associations of psychiatric diagnoses and other study variables with length of hospital stay, surgical treatment complications, and inhospital death in hospitalized patients with orthopedic injury, number (percentage)

Variable	Length of hospital stay			Surgical treatment complications			Inhospital death		
	< 7 Days	≥ 7 Days	p value	Yes	No	p value	Yes	No	p value
Psychiatric diagnosis									
Yes	92,739 (23.1)	46,711 (28.8)	< 0.001	17,809 (30.5)	121,641 (24.1)	< 0.001	4100 (31.3)	135,350 (24.6)	< 0.001
No	309,283 (76.9)	115,231 (71.2)		40,529 (69.5)	383,985 (75.9)		8993 (68.7)	415,521 (75.4)	
Substance abuse									
Yes	1659 (0.4)	1458 (0.9)	< 0.001	542 (0.9)	2575 (0.5)	< 0.001	38 (0.3)	3079 (0.6)	< 0.001
No	400,363 (99.6)	160,484 (99.1)		57,796 (99.1)	503,051 (99.5)		13,055 (99.7)	547,792 (99.4)	
Alcoholism									
Yes	11,969 (3.0)	6042 (3.7)	< 0.001	2005 (3.4)	16,006 (3.2)	0.004	272 (2.1)	17,739 (3.2)	< 0.001
No	390,053 (97.0)	155,900 (96.3)		56,333 (96.6)	489,620 (96.8)		12,821 (97.9)	533,132 (96.8)	
Age, years									
< 65	157,588 (39.2)	53,938 (33.3)	< 0.001	17,179 (29.5)	194,347 (38.4)	< 0.001	2321 (17.7)	209,205 (38.0)	< 0.001
≥ 65	244,434 (60.8)	108,004 (66.7)		41,159 (70.5)	311,279 (61.6)		10,772 (82.3)	341,666 (62.0)	
Sex									
Male	124,056 (35.5)	54,994 (39.8)	< 0.001	20,815 (41.2)	158,235 (36.2)	< 0.001	4978 (44.1)	174,072 (36.5)	< 0.001
Female	225,329 (64.5)	83,319 (60.2)		29,743 (58.8)	278,905 (63.8)		6317 (55.9)	302,331 (63.5)	
Race/ethnicity									
White	240,792 (78.9)	91,641 (75.6)	< 0.001	35,709 (79.6)	296,724 (77.8)	< 0.001	8194 (83.2)	324,239 (77.8)	< 0.001
Black	11,539 (3.8)	5906 (4.9)		1766 (3.9)	15,679 (4.1)		282 (2.9)	17,163 (4.1)	
Hispanic	38,961 (12.8)	16,660 (13.7)		5142 (11.5)	50,479 (13.2)		930 (9.4)	54,691 (13.1)	
Asian/other	13,932 (4.5)	7052 (5.8)		2244 (5.0)	18,740 (4.9)		449 (4.5)	20,535 (4.9)	
Insurance									
Private/Medicare	328,265 (81.2)	125,739 (77.7)	< 0.001	48,424 (83.0)	403,580 (79.8)	< 0.001	11,231 (85.8)	440,773 (80.0)	< 0.001
Medi-Cal/other	75,697 (18.8)	36,184 (22.3)		9908 (17.0)	101,973 (20.2)		1856 (14.2)	110,025 (20.0)	
No. of comorbidities									
0	260,688 (64.8)	70,456 (43.5)	< 0.001	9398 (16.1)	321,746 (63.6)	< 0.001	1929 (14.7)	329,215 (59.7)	< 0.001
1	94,527 (23.5)	47,850 (29.6)		20,663 (35.4)	121,714 (24.1)		3758 (28.7)	138,619 (25.2)	
2	33,421 (8.3)	26,313 (16.2)		14,740 (25.3)	44,994 (8.9)		3588 (27.4)	56,146 (10.2)	
3	10,290 (2.6)	11,889 (7.3)		8664 (14.9)	13,515 (2.7)		2440 (18.6)	19,739 (3.6)	
≥ 4	3096 (0.8)	5434 (3.4)		4873 (8.3)	3657 (0.7)		1378 (10.5)	7152 (1.3)	

to an ethnic minority group, and having private/Medicare insurance lowered the chance of in-hospital death for these groups compared with their reference groups.

Table 5 displays the separate analysis for each psychiatric diagnosis and their association with LOS, surgical treatment complications, and in-hospital deaths. The largest percentage of prolonged hospital stays and surgical treatment complications belonged to patients with schizophrenia (45.2% and 14.7%, respectively), and the largest percentage of in-hospital deaths belonged to the dementia group (3.9%) followed by the depression group (2.2%).

DISCUSSION

These data are consistent with recent study findings regarding the psychiatric effects on acute hospital care of patients with orthopedic injury.^{2,6} However, this study extends the understanding of psychiatric effects to a much larger group of patients because it includes all orthopedic injury admissions across a large spectrum

of hospitals and localities across the entire state of California. The data show that there is an important burden of psychiatric illness in hospitalized patients with orthopedic injuries and that psychiatric comorbidity is correlated with higher prevalence of surgical complications, longer hospital LOS, and higher in-hospital mortality. Among the psychiatric comorbidities, dementia and depression each accounted for a greater percentage of prolonged hospital stays, surgical complications, and in-hospital deaths compared with other psychiatric diagnoses.

Focused rehabilitation is the pertinent clinical implication growing from these observations. However, this term is complex, multifactorial, and not fully defined and is beyond the scope of this study, needing to be addressed in future studies.

In addition, our further look at the data showed adverse correlations between hospital care of patients with orthopedic injuries with psychiatric illness and their category of health insurance. This finding agrees with recent information in the care of patients

with hip fracture in which low-income status was independently correlated with adverse care parameters.¹⁶ In the current study, low-income patients with psychiatric illness remain in acute hospital care twice as long as the conventionally insured patients (data not shown). Patients in lower socioeconomic groups experience more surgical complications when they have a psychiatric illness, and they also have longer LOS than in the general patient population. Poor hospital surgical outcomes not only affect patient well-being but also increase the cost of care.¹⁸ Surgical complications and prolonged LOS have both been reported to increase the cost of medical care.¹⁹⁻²²

There are many reports of the adverse outcomes in orthopedic inpatients owing to psychiatric comorbidities.^{1,6-11} There are also reports of improved outcomes from systematic, multidisciplinary care of orthopedic inpatients.^{18,23} There appears to be an unexplained failure of improved medical management of these patients with respect to psychiatric comorbidities.

Table 4. Independent predictors of length of hospital stay, surgical treatment complications, and in-hospital death in hospitalized patients with orthopedic injury

Variable	Length of hospital stay ≥ 7 days		Surgical treatment complications		In-hospital death	
	Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value
Psychiatric diagnosis						
Yes	1.27 (1.25-1.29)	< 0.001	1.18 (1.15-1.20)	< 0.001	1.15 (1.10-1.20)	< 0.001
No	Reference		Reference		Reference	
Substance abuse						
Yes	2.00 (1.83-2.17)	< 0.001	1.79 (1.59-2.01)	< 0.001	0.61 (0.42-0.90)	0.0127
No	Reference		Reference		Reference	
Alcoholism						
Yes	1.33 (1.28-1.39)	< 0.001	1.44 (1.35-1.54)	< 0.001	1.04 (0.89-1.22)	0.5976
No	Reference		Reference		Reference	
Age, years						
< 65	Reference	< 0.001	Reference	< 0.001	Reference	< 0.001
≥ 65	1.26 (1.24-1.29)		0.82 (0.79-0.84)		2.09 (1.94-2.24)	
Sex						
Male	Reference	< 0.001	Reference	< 0.001	Reference	< 0.001
Female	0.83 (0.82-0.84)		0.84 (0.82-0.86)		0.68 (0.65-0.71)	
Race/ethnicity						
White	Reference		Reference		Reference	
Black	1.31 (1.26-1.35)	< 0.001	0.89 (0.84-0.94)	< 0.001	0.74 (0.66-0.84)	< 0.001
Hispanic	1.06 (1.04-1.08)	< 0.001	0.79 (0.76-0.82)	< 0.001	0.72 (0.66-0.77)	< 0.001
Asian/other	1.26 (1.23-1.30)	< 0.001	0.91 (0.86-0.95)	< 0.001	0.77 (0.69-0.85)	< 0.001
Insurance						
Private/Medicare	0.59 (0.58-0.61)	< 0.001	0.81 (0.78-0.84)	< 0.001	0.65 (0.60-0.70)	< 0.001
Medi-Cal/other	Reference		Reference		Reference	
No. of comorbidities	1.64 (1.63-1.65)	< 0.001	2.60 (2.58-2.63)	< 0.001	2.16 (2.13-2.20)	< 0.001

CI = confidence interval.

Table 5. Associations of different psychiatric diagnoses with length of hospital stay, surgical treatment complications, and inhospital death in hospitalized orthopedic injury patients

Diagnosis	Length of hospital stay			Surgical treatment complications			Inhospital death		
	< 7	≥ 7	p value	Yes	No	p value	Yes	No	p value
Psychiatric diagnosis, no. (%)									
Yes	92,739 (66.5)	46,711 (33.5)	< 0.001	17,809 (12.8)	121,641 (87.2)	< 0.001	4100 (2.9)	135,350 (97.1)	< 0.001
No	309,283 (72.9)	115,231 (27.1)		40,529 (9.5)	383,985 (90.5)		8993 (2.1)	415,521 (97.9)	
Anxiety, no. (%)									
Yes	15,588 (66.4)	7882 (33.6)	< 0.001	3059 (13.0)	20,411 (87.0)	< 0.001	424 (1.8)	23,046 (98.2)	< 0.001
No	386,434 (71.5)	154,060 (28.5)		55,279 (10.2)	485,215 (89.8)		12,669 (2.3)	527,825 (95.8)	
Dementias, no. (%)									
Yes	54,260 (67.4)	26,249 (32.6)	< 0.001	10,264 (12.8)	70,245 (87.2)	< 0.001	3142 (3.9)	77,367 (96.1)	< 0.001
No	347,762 (71.9)	135,693 (28.1)		48,074 (9.9)	435,381 (90.1)		9951 (2.1)	473,504 (97.9)	
Depression, no. (%)									
Yes	25,910 (67.0)	12,747 (33.0)	< 0.001	4757 (12.3)	33,900 (87.7)	< 0.001	831 (2.2)	37,826 (97.8)	0.020
No	376,112 (71.6)	149,195 (28.4)		53,581 (10.2)	471,726 (89.8)		12,262 (2.3)	513,045 (97.7)	
Episodic mood, no. (%)									
Yes	6854 (60.6)	4448 (39.4)	< 0.001	1641 (14.5)	9661 (85.5)	< 0.001	171 (1.5)	11,131 (98.5)	< 0.001
No	395,168 (71.5)	157,494 (28.5)		56,697 (10.3)	495,965 (89.7)		12,922 (2.3)	539,740 (97.7)	
Schizophrenia, no. (%)									
Yes	3149 (54.8)	2594 (45.2)	< 0.001	846 (14.7)	4897 (85.3)	< 0.001	101 (1.8)	5642 (98.2)	0.004
No	398,873 (71.5)	159,348 (28.5)		57,492 (10.3)	500,729 (89.7)		12,992 (2.3)	545,229 (97.7)	

Our study has some limitations. The methods in this study depended on the accuracy of diagnostic coding of the patient data used. Therefore, conclusions may be inaccurate and/or misleading if the data were found to be corrupted in the original collection process.^{24,25} This criticism is somewhat mitigated by the large number of heterogeneous sources of data and the large numbers of patients studied. In addition, the data that were reviewed did not state the criteria that were used to establish the various psychiatric diagnoses. This possible variation in diagnostic criteria from case to case could have either increased or decreased the prevalence of the psychiatric diagnoses. Finally, the data reflected the probability that some patients suffered from multiple diagnoses in either injury diagnoses or psychiatric diagnoses or both. This clinical situation explained differences in some of the total population numbers but did not affect the overall conclusions.

CONCLUSION

Psychiatric illness is common in hospitalized patients with orthopedic injury (24.7%), particularly in elderly, white women. Psychiatric comorbidity, particularly dementia and depression, adversely affects hospital outcomes in LOS, surgical

complications in patients with fracture, and inpatient mortality in these patients with orthopedic injuries. In low-income populations, the adverse psychiatric effects are incrementally worse for LOS, surgical complications, and inpatient mortality. Future studies may show that improved psychiatric care of these patients may improve hospital outcomes, especially in low-income populations. ❖

Disclosure Statement

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

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Crushing the Soul

In depression ... faith in deliverance, in ultimate restoration, is absent. The pain is unrelenting, and what makes the condition intolerable is the foreknowledge that no remedy will come—not in a day, an hour, or a minute ... It is hopelessness even more than pain that crushes the soul.

— William Styron, 1925-2006, American novelist and essayist

ORIGINAL RESEARCH & CONTRIBUTIONS

Barriers and Facilitators to the Deprescribing of Nonbenzodiazepine Sedative Medications Among Older Adults

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<https://doi.org/10.7812/TPP/17-157>**ABSTRACT**

Introduction: Nonbenzodiazepine sedative-hypnotic medications, or “Z-drugs,” are commonly used to treat insomnia among older adults (≥ 65 years), despite a lack of evidence of long-term effectiveness and evidence linking long-term use with poor outcomes.

Objective: To understand patient and clinician barriers and facilitators to deprescribing, or discontinuation, of Z-drugs.

Methods: We conducted a qualitative interview study among older adults who received a deprescribing intervention and among their clinicians at Kaiser Permanente Northwest. Semistructured interviews explored perceived barriers and facilitators to successful deprescribing of Z-drugs. Interviews were audiorecorded with participant permission. Content was analyzed using QSR NVivo 10 software.

Results: From the perspectives of patients, the greatest challenges to deprescribing are factors related to their insomnia, including the need for effective treatment of their insomnia; health care system factors, including a desire for personalized approaches to care; and their own positive personal experiences with sedative medication use. From the clinician perspective, a lack of institutional structures and resources to support deprescribing, the attitudes and practices of previous clinicians, and patient-related factors such as dependence and a lack of alternatives to treat insomnia were the most important barriers to deprescribing.

Conclusions: Health care systems must provide individualized care that supports patient goals for restful sleep and quality of life while also providing evidence-based care that takes patient safety into account. To accomplish this, systems must support patients and clinicians and provide a multidisciplinary approach that addresses insomnia treatment, provides patient education about sedative medication use, and supports the discontinuation process.

INTRODUCTION

Nonbenzodiazepine sedative-hypnotic medications, or “Z-drugs,” are routinely prescribed to adults age 65 years and older for the treatment of insomnia.¹⁻⁴ However, there is a lack of evidence that these medications—which include eszopiclone, zaleplon, and zolpidem—improve sleep over the long term, and research findings link long-term use among older adults with falls, daytime sedation, cognitive impairment, decreased quality of life, dependence and abuse, and hospitalization.⁵⁻⁸ In recognition of these risks, the American Geriatrics Society discourages

the use of nonbenzodiazepine sedative-hypnotics among older adults.⁵ Despite this, older adults continue to receive Z-drugs for months, years, or even decades.

Deprescribing is a research area focused on the process of discontinuation of drugs when existing or potential harms outweigh existing or potential benefits for an individual.⁹ Although the considerable evidence of the adverse effects of Z-drugs among older patients supports the need for deprescribing, few studies have studied interventions to stop their use.¹⁰ One approach with great potential is direct-to-patient education that provides information about the risks of medication use and empowers patients to start discussions with their clinician about deprescribing.¹¹⁻¹³ In parallel with the implementation of a direct-to-patient educational intervention, we conducted a qualitative study to examine older adults’ and primary care clinicians’ knowledge and attitudes regarding nonbenzodiazepine medication use and to identify barriers and facilitators to deprescribing.

METHODS**Study Setting and Design**

We conducted our qualitative interview study from February 2017 to April 2017 among older adults who had received an intervention to encourage deprescribing of their Z-drug and among their primary care clinicians at Kaiser Permanente Northwest (KPNW), an integrated health care delivery system in Oregon and Washington. Patients were eligible for the intervention if they were age 64 years or older and received multiple dispensings of Z-drugs in the previous year. Z-drugs include eszopiclone, zaleplon, and zolpidem. Patients were randomly assigned to either usual care (an intervention that provided mailed educational materials) or an intervention that included both mailed educational materials and pharmacist consultation. The mailed educational materials described the risks and benefits related to Z-drug use, provided information about nonpharmacologic alternatives to these therapies (eg, sleep hygiene techniques), outlined how a patient might taper the medication, and provided guidance for how a patient can pursue discontinuation of this medication. Collectively, the educational mailing sought to engage patients in shared decision making and to encourage patients to initiate a conversation with a pharmacist or their clinician around discontinuation of their nonbenzodiazepine medication. The pharmacist consultation

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reinforced the messaging of the mailed educational materials and provided additional information about the risks related to nonbenzodiazepine use and suggested approaches to taper that use. (Intervention educational materials are available on request.)

Participant Identification and Recruitment

We identified potential interview participants from a list of intervention recipients. We mailed invitations to randomly selected patients and followed these with phone calls. We identified primary care clinicians who had prescribed Z-drugs for patients who received an intervention and invited them to participate via an initial recruitment e-mail and one follow-up e-mail if necessary. We enrolled patients for a 45-minute to 60-minute telephone interview and clinicians for a 25-minute to 35-minute telephone interview. Patients received a \$20 gift card for participation; clinicians were not compensated.

Data Collection and Analysis

We created a patient interview guide exploring past and current use of nonbenzodiazepines, prior education about sedative use, educational needs, and reactions to the intervention materials (Sidebar: Patient Interview Guide, available at: www.thepermanentjournal.org/files/2018/17-157-Sidebars.pdf). We created a primary care clinician interview guide exploring approaches to providing care to older adults with insomnia, sedative medication prescribing practices, reaction to the intervention materials, and factors that hinder or support deprescribing of sedatives (Sidebar: Primary Care Physician Interview Guide, available at: www.thepermanentjournal.org/files/2018/17-157-Sidebars.pdf). Interviews were conducted by a single interviewer (see Sidebar: Interviewer Adherence with COREQ Standards available at www.thepermanentjournal.org/files/2018/17-157-Sidebars.pdf for interviewer adherence with Consolidated Criteria for Reporting Qualitative Research [COREQ] standards) and were

recorded with participant permission. This study was approved by the KPNW institutional review board.

We used NVivo Version 10 software (QSR International, Doncaster, Victoria, Australia) for data analysis. We conducted a conventional content analysis for patient and clinician interviews separately.¹⁴ We coded all interview responses on the basis of the interview guide content and, after coding all interviews, further examined and classified the data for each code into overarching categories.

RESULTS

We recruited 25 patients. We were unable to reach 10 of those patients, 5 refused participation, and 10 consented to an interview (1 man, 9 women). One patient initiated a taper of the Z-drug dosage and 1 patient stopped the medication after receiving the educational materials. Two patients considered but did not initiate tapering after their conversation with the intervention pharmacist. Six patients did not indicate their intent after the intervention.

We sent 36 e-mails and enrolled 6 primary care clinicians (3 women, 3 men). One additional clinician was referred for participation by another clinician; none of her patients received the intervention.

Patient Perspective

We assigned patient responses to 1 of 9 initial codes that included approaches to insomnia, beliefs and attitudes about deprescribing, and barriers and facilitators to deprescribing. From these coded data, we identified 3 overarching categories that patients considered crucial in understanding their sedative medication use and the barriers and facilitators of discontinuation of that use: 1) factors related to insomnia and its treatment, 2) health care delivery system-related factors, and 3) patient experiences with sedative medications and potential concerns. See Table 1 for patient comments.

Overarching theme	Quotations
Insomnia-related factors	"I'd rather not take it; I'd rather not take any medications. But you know, I'm approaching [age] 68, and I have a variety of medical conditions where it makes sense to take medications."
	"Who came up with information I received in the mail, you know, take a half, don't take one. ... Because if this truly works, then give me proof. ... I'm skeptical because there hasn't really been a study done on people who have taken [zolpidem] for a long time that I'm aware of. No information has come to my door. I am open-minded and if somebody can prove to me that it [tapering] really works, but if it doesn't work for me I want to be able to go back on [zolpidem] so I can sleep."
Structural and health care delivery system-related factors	"Dr X is extremely helpful in the sense that he says he trusts me to know my body, and I can take them as long as I feel the need for it."
	"I have ordered it, and the doctors have prescribed it. I don't think there have been many conversations with the pharmacist about side effects. ... It has never been proactively communicated before; nobody has ever said you have to stop taking this."
Patient experiences and concerns	"To be honest with you, I never had a lot of the symptoms that they are talking about [in the brochure]. I felt better in the morning, not groggy. I never fell asleep during the day, I did when I couldn't sleep. I never fell, I am 67, obviously in my mind, I think we have all of those. I felt like I never had any of these effects that they are talking about. ... The [symptom] I was looking at that would not want me to take it more than anything is the involuntary urine loss. ... I was always really careful about it; I never wanted to become dependent on it. I was very mindful. If I had taken it 3 times and I couldn't sleep on the weekend, I didn't take it."
	"I haven't had any falls. The only time I have had a fall from medication was when I tried to take trazodone and that made me so dizzy that I felt frightened to take it. ... I never felt that way with [zolpidem]. As far as I have felt confused or fuzzy, it is very hard for me to tease out whether I feel confused or fuzzy from medication or from stress or from my age or whatever is on my mind. Sometimes I take [zolpidem] and I wake up and I feel well rested, and it is a wonderful feeling, and other times I wake up feeling groggy or feeling like I'm in a cloud. But that's also true when I don't take it or when I haven't taken it for a while."

Factors Related to Insomnia and Its Treatment

Patients expressed that insomnia is a long-term diagnosis that takes many different forms but requires ongoing intervention. Patients emphasized that restful sleep is a key component for a high quality of life and their sedative medication has helped to achieve that. Patients felt that potentially initiating a tapering process presented them with the dilemma of finding an alternative safe treatment to maintain that quality of life. Related to this, a crucial obstacle was the perceived lack of alternatives and the fear that they may experience a compromised quality of life when sleepless nights return. One patient noted:

I had extreme insomnia, and even cutting down from 10 mg to 5 mg has definitely made my sleep much harder and it takes much longer for me to go to sleep. ... I'm worried that if I cut down even slowly that I'll have a lot of trouble. I'm 77 years old, and my quality of life will change for the worse if the insomnia comes back.

Patients did, however, believe that education about possible, safer alternatives could serve as an important motivator for people to initiate tapering. As one patient noted:

I was very willing to try a different sleep aid for this lifestyle I keep, and so I am open to better understand what other options I have to keep the same regimen I have.

One patient who had successfully stopped taking her sedative medication was willing to experience insomnia again because her lifestyle had changed, and she did not need as much restful sleep anymore. This patient noted:

The main reason I took it was because I was working. ... [A]fter I retired, if I only get one hour of sleep, the next day, I can handle it. I have not felt the need. Yes, sometimes I have insomnia, but it is not critical, as I don't have to go to work.

Factors Related to the Health Care Delivery System

Patients expressed their wish to be treated as an individual, rather than merely a member of a particular age group. One patient noted:

Maybe it isn't a great idea for people over 65 to be taking any kind of sleep medication, but maybe it isn't such a bad idea when you balance it against fatigue. ... The notion that everybody should or nobody should is maybe not the most individualized approach to medicine or health.

Patients expressed frustration with cookie-cutter approaches to deprescribing nonbenzodiazepines. Many patients did not identify with the patient stories, generalized descriptions of insomnia, or alternative strategies to treat insomnia (eg, sleep hygiene) included in the educational materials. As noted by one patient, "The brochure didn't target me at all. There are many different kinds of insomnia. ... I mean, people who don't really have insomnia think there is only one kind."

Patients pointed out that many primary care clinicians didn't emphasize deprescribing during regular encounters. In one patient's experience:

My provider hasn't really brought it up [tapering]. A few years ago, I brought it up, and she referred me to an online program. Then, I was referred to a sleep specialist who put me on a different medication.

Patient Experiences with Sedative Medications and Potential Concerns

Patients' overall experiences of taking their nonbenzodiazepine were very positive, and very few reported any side effects. One patient said, "[Zolpidem] works, and that's what I want to stay on. There [are] no side effects."

Considering their overall high satisfaction with their sedative medication, patients expressed mixed reactions about how side effects would affect their continued use of their nonbenzodiazepine.

Table 2. Primary care clinician perspectives on barriers to and facilitators for deprescribing of nonbenzodiazepines

Overarching theme	Quotations
Institutional structures	<p>"If I decide to taper ... anybody [off] any medication, I find the follow-up very complicated and cumbersome and a pain in the butt for the [practitioner] because we are the ones that need to be calling the patient every week or couple of weeks. It is time-consuming. I have managed to wean 2 patients off medications, but I don't want to do it anymore because of the follow-up that it requires. If I could assure that somebody else would do the follow-up—who asks, how are you doing? How are you dealing with this dose? Do you need to get back to the previous dose?—That would make it easier. ... If we have full schedules and only 20 minutes and people have 8 or 9 different problems, and sedative medications is one of them, it is usually not my top priority. I know that I'm creating a nightmare with follow-up."</p> <p>"We do not have enough time for us to follow[-up] these people. We don't even have time to see our regular patients, and, for older patients, a barrier is that we don't have much support."</p>
Patient characteristics and attitudes	<p>"For the people who have been using [zolpidem] and who are in this elderly age group, they tried everything else. If they wake up in the morning and they feel groggy and can't focus, they don't want to take that medication. ... But people who do tolerate it have no complaints at all and feel well and don't have any issues they are concerned about. They feel great, they feel refreshed, they are up in the morning and do whatever it is they do. Once they find the medication that works, they are very happy and very irritated by any attempts not to prescribe this medication any longer."</p> <p>"It can be a tough sell to get patients off of these meds. They are used to them, they have a pattern, they know how they feel when they are using them and they are afraid of quitting them and not being able to sleep or some other adverse effects. So I try to frame it for them again in terms of safety, and you know elderly people, their sleep patterns are very different than young people. ... Having these kind of meds on board can be quite dangerous. I try to frame it for them in this way to help them understand that I want them to be safe."</p>
Clinician characteristics and attitudes	<p>"The problem with this medication is that this medication was given like candy. The older doctors gave it like candy. These patients have already been on these medications when we were probably in junior high. Right now we just step into their lives, we try to take them off and imagine they have been on it for a long time, it was the norm before. ... I strongly feel that I inherited a problem that was created in the past."</p>

Some patients reported that side effects would play a crucial role in their desire to discontinue use of the medication. As one patient noted:

Perhaps when I retire, and it is not so important that I go back to sleep, maybe I would consider it then. But right now it seems to serve a purpose. ... If I had any inclinations to experience side effects, then I would stop it.

However, others believed that experiencing side effects would not be sufficient cause for them to taper the use of these medications. In general, patients felt that they were critical consumers who weighed the pros and cons of continuing to take nonbenzodiazepines.

Primary Care Clinician Perspective

We allocated clinician interview responses to 1 of 12 codes, including prescribing practices, insomnia treatment, management of sedative medication use, and barriers and facilitators to deprescribing. We then classified feedback into 3 overarching categories that summarize the challenges primary care clinicians experience in managing and deprescribing sedative medication use among older adults: 1) institutional structures, 2) patient characteristics and attitudes, and 3) clinician characteristics and attitudes. See Table 2 for clinician comments.

Institutional Structures

Primary care clinicians perceived a lack of institutional support and resources as a crucial obstacle to deprescribing. They believed that tapering dosages and deprescribing medications is a time-intensive process, both in terms of initiating the tapering process and overseeing it:

The only thing I really strongly recommend is that we have good support. We can start the taper off, but if I could send the patient information to a certain pool and tell them that they have to monitor a patient for four weeks to see how she is doing.

Clinicians also noted the need for additional support to initiate and oversee that process. One clinician noted:

We do not have enough time for us to follow [-up with] these people. We don't even have time to see our regular patients and, for older patients, a barrier is that we don't have much support.

Clinicians also pointed out a lack of clinical staff and infrastructure to address insomnia-related concerns, with one primary care clinician noting:

[W]e need more resources to help people with insomnia. ... We don't really have a clinic where we can send patients. If we had additional resources to help out with insomnia, as there are for pain, that would be great.

Primary care clinicians suggested a need for the health care system to prioritize deprescribing, present tapering as an activity prioritized by the system rather than only a single clinician, and to create incentives that would encourage the clinician to deprescribe. One primary care clinician noted that initiating the tapering process is counter to values—such as patient satisfaction—that the health care organization currently emphasizes:

There is a lot of emphasis on patient satisfaction, which is a double-edged sword. Sometimes we don't practice good medicine because good medicine often means not to make our patients happy.

Patients want immediate gratification. It is threatening for us. I'm judged by how fast a patient gets to see me. Nobody cares how many patients I have tapered off medication.

Finally, primary care clinicians also commented that nonbenzodiazepines pose a unique challenge because they are not considered as high a deprescribing priority as are medications such as opioids and benzodiazepines.

Characteristics and Attitudes of Patients

Clinicians emphasized that patients have come to physically, emotionally, and psychologically depend on nonbenzodiazepines; thus, they are very reluctant to give them up. One primary care clinician noted, “The big challenge is that many patients have been on this [regimen] for a long time. ... The psychological and physiological dependence is difficult.”

Primary care clinicians felt that there are few effective alternatives they can offer to patients if they were to pursue deprescribing of nonbenzodiazepines. One clinician noted,

There are not really many good alternative medications to help with sleep or anxiety. Even if I taper one medication, they usually want something else. They say, ‘Well, I can't sleep without it, so what are you going to give me instead?’ Often they are not receptive to behavioral techniques to try and help.

Primary care clinicians find it challenging to convincingly communicate concerns about potential side effects and patient safety, because patients often started taking nonbenzodiazepines after negative experiences with other medications. Few long-term users experience side effects and don't identify with the safety concerns. Clinicians also mentioned that deprescribing runs counter to a culture in health care that makes pills readily available rather than making other treatments available. One noted:

The majority just want a pill; it's the American way. We don't really want to work for it. It is going to take more than a pamphlet. ... We need to teach people about these medications.

Clinician Characteristics and Attitudes

Many primary care clinicians perceived that deprescribing has only recently become a priority and that generous prescribing in the past has now created an undue burden on current clinicians as they try to proactively address nonbenzodiazepine use among elderly patients. One clinician noted:

The problem is, quite frankly, that we don't start [prescribing] the medication. Most people come in on them. They were given them by their psychiatrist ten years ago and were continued on these medicines, and we are just left with a panel that has a high prevalence [of use] through nothing that I did. Now I'm supposed to be [the] one to stop it.

Thus, deprescribing requires clinicians to be proactive and to offer a reasonable alternative:

I try to be proactive with the 60 to 64[-year-old] group. I don't like to just tell them that they can't take it anymore, but I tell them we need to find something safer for you to use, because this isn't safe for you. I try to frame it for patients in this way because the safety of the patient is paramount, and I'm not just taking their meds away.

Some primary care clinicians are defeated by this burden and simply choose to maintain existing prescriptions, because the challenge of deprescribing seems too daunting. This shift in emphasis for clinicians causes frustration and inactivity, for example:

For patients who have continued prescriptions, most of which have never been started by me, I typically just continue those. Here is the thing: We have infinite resources to prescribe pills. We have very finite and limited resources to actually educate and inform patients about the things they need to know to wean themselves off these medicines. The limiting factor is not only what patients are willing to do but also the resources that we can provide them to help out.

DISCUSSION

Our study provides insights into challenges faced by older adults and primary care clinicians when confronted with deprescribing Z-drugs. We identified insomnia-specific, institutional, and patient and clinician factors that, if addressed, could lead to reductions in potentially inappropriate use of nonbenzodiazepine medications.

Primary care clinicians emphasized that the time required for appropriate discussion with the patient and for ongoing monitoring limits their ability to deprescribe medications. To address this, clinicians suggested a multidisciplinary approach, including support from health care professionals that can help treat patients' insomnia, counsel patients who are taking nonbenzodiazepines, and explain the process of tapering medication use. They also emphasized the need for the health care system to prioritize deprescribing, which included creating a culture that supports primary care clinicians in their efforts to deprescribe and recognizing or incentivizing those efforts. Primary care clinicians also expressed that the current need to deprescribe is related to the prescribing practices of past health care providers and a historical lack of emphasis on conservative use of nonbenzodiazepines. Finally, primary care clinicians believe that they have few alternatives to offer patients who have often used nonbenzodiazepines for a long time; thus, they remain likely to continue to prescribe nonbenzodiazepines. Collectively, these perceptions suggest the need for proactive education that encourages more conservative prescribing of nonbenzodiazepines early on and greater health care system support for deprescribing.

Patients also cited health care system barriers to deprescribing; however, they primarily emphasized the need for support systems that address insomnia. When deprescribing was the emphasis, patients pointed out a lack of clinician prioritization of deprescribing. They also felt that evidence about the safety of Z-drug use among older adults did not apply to them. A shift in emphasis from deprescribing to harm reduction, as one patient suggested, may provide a compromise between evidence-based medicine and patient safety quality measures while also providing care that addresses patient-centered goals such as restful sleep and quality of life.

Primary care clinicians emphasized duration of sedative medication use and difficulties associated with physical and emotional dependency as barriers to deprescribing. In contrast, patients did not note concerns about dependency. Rather, patients reported that they had used their nonbenzodiazepine for extended periods without experiencing side effects. Some patients said they would not be interested in taking the medication if they were experiencing side effects; however, many patients commented

that the threat of side effects did not outweigh the positive aspects of nonbenzodiazepine use or the potential for decreases in restful sleep or quality of life if they should discontinue use. Patients, but not clinicians, expressed concern about the need to balance deprescribing with long-term treatment of their insomnia. In our interviews, patients emphasized that their quality of life is at stake. In response, health care systems will need plans for medication discontinuation that educate the patient about alternative approaches to insomnia and ways to cope with withdrawal reactions and the transition from Z-drug use to these alternative insomnia treatments.

Patients also expressed their frustration with a perceived lack of safe alternatives. Although nonpharmacologic, behavioral treatments exist, clinicians also perceived that they had few alternatives to offer. In practice, a solution may be a focus on improving clinician education about safe and effective alternatives and institutional preparedness to provide nonpharmacologic treatment to patients with insomnia, while also communicating the lack of evidence of benefit and increasing evidence of harm associated with nonbenzodiazepine use among older adults. Collectively, this shift in focus would address patient needs, decrease dependence on medications, and lessen the burden on primary care clinicians.

A strength of our study, in contrast to other studies that focused on other medications or specific populations,¹⁵⁻¹⁷ is that we conducted it among a general population of older adults and their clinicians, within the context of a deprescribing intervention of Z-drugs. Our results reveal perspectives relevant to the development of interventions that specifically address Z-drug use and insomnia.

There are also limitations to our study. First, our small sample size may limit the generalizability of our results. Generalizability may also be affected if our recruitment resulted in greater participation among patients who have specific concerns about nonbenzodiazepine use or clinicians who struggle more with medication use among older adults. In addition, most of our patient participants were female; thus, generalizability may be affected if there are sex-specific differences in perspectives on nonbenzodiazepine use and deprescribing. However, given the consistency of our feedback, we believe that we ascertained common perspectives that consider patient concerns and clinician and health care system barriers. Our consistent use of an interview guide and the use of a formal content analysis help lessen these limitations.¹⁸ Second, our study was conducted in an integrated health care system, so institutional factors may differ from other settings.

CONCLUSION

Our study found that both patients and primary care clinicians recognize the need for health care systems to prioritize effective insomnia treatment, provide education about nonbenzodiazepine use, and offer support for the discontinuation of nonbenzodiazepines when necessary. Collectively, to encourage deprescribing and improve Z-drug use among older adults, patients require individualized care and clinicians require multidisciplinary support. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose. The sponsor of this study, Kaiser Permanente Northwest Center for Health Research, had no role in the design, methods, subject recruitment, data collection, analysis, or preparation of the manuscript.

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Natural Graces

That we are not much sicker and much madder than we are is due exclusively to that most blessed and blessing of all natural graces, sleep.

— Aldous Huxley, 1894-1963, British writer, novelist, and philosopher

Adverse Childhood Experiences among a Community of Resilient Centenarians and Seniors: Implications for a Chronic Disease Prevention Framework

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ABSTRACT

Context: Research has linked adverse childhood experiences (ACEs) with chronic disease in adults and diminished life span. Adverse biological embedding of ACEs potentially occurs through inflammatory mechanisms; inflammatory marker alterations are identified as candidate biomarkers for mediating health consequences. Lifestyle practices of residents of California’s Loma Linda Blue Zone, one of five worldwide longevity hotspots, may provide insight into inflammation remediation and chronic disease prevention. Little research has been done on centenarians’ early-life experiences or on ACEs in a longevity community.

Objective: To interview centenarians and seniors in this region regarding their childhood experiences to inform chronic disease prevention frameworks.

Design: Qualitative study of Loma Linda Blue Zone community members. Childhood exposures and practices were assessed using focus groups and semistructured key informant interviews, with open-ended questions on general hardships and ACEs and supplemented with lifestyle and resiliency factor questions. Data were audiorecorded and transcribed. Integrative grounded theory methods guided coding and theming.

Main Outcome Measures: Exposure to ACEs and practice of resiliency factors.

Results: Participants (7 centenarians and 29 seniors) reported exposure to multiple ACEs (domains: Economic deprivation, family dysfunction, and community violence). Community members reported practicing resiliency factors, each with anti-inflammatory properties suggesting mitigation of ACE-related toxic stress.

Conclusion: This is one of the first studies of its kind to identify a community of resilient members despite their tremendous burden of ACEs. Embedding the identified resiliency factors into chronic disease prevention frameworks has potential for mitigating systemic inflammation, alleviating chronic disease burden, and promoting a culture of health.

associated with toxic chronic stress, such as those associated with ACEs, may be through inflammatory mechanisms; a growing body of research supports this theory.¹⁰⁻¹² Furthermore, the inflammatory processes may commence in early-life as studies have revealed the ACE-associated increase in systemic inflammatory markers (C-reactive protein [CRP], fibrinogen, and proinflammatory cytokines) and biological changes already evident in childhood.^{11,13} Alterations in inflammatory markers are now identified as candidate biomarkers for mediating the health consequences associated with childhood adversities and subsequently improving healthy longevity.¹¹

Insight to reduce the growing prevalence of chronic diseases may be found in key communities around the world where individuals have exhibited increased resilience and longevity. As researchers have identified the link between ACEs and health in adulthood, assessing hotspots with increased healthy longevity makes logical sense.³ Resilient centenarian and senior members of longevity hotspot communities may have experiences in childhood but are able to mitigate ACE-related biological changes. Around the world, five communities—Sardinia, Italy; Nicoya, Costa Rica; Okinawa, Japan; Icaria, Greece; and Loma Linda, CA, US—have been identified as “Blue Zones,” or longevity hotspots where members tend to live healthier and longer.¹⁴⁻²⁰

The only Blue Zone identified in North America, and therefore having important

INTRODUCTION

Chronic diseases are a major contributor to morbidity, mortality, and decreased quality of life and have become a national public health crisis.^{1,2} A growing body of scientific evidence has linked environmental exposures and stressors in early life with the development of adult chronic diseases, ultimately decreasing life span.^{3,4} Since the landmark Adverse Childhood Experiences (ACEs) Study, researchers have associated early-life adverse stress inflicted by extreme poverty, parental

mental illness or incarceration, abuse, community violence, and other adverse experiences to later manifestations of diabetes, mental illness, cancer, chronic pulmonary disease, cardiovascular disease, obesity, and premature mortality.⁵⁻⁸ Left unabated, frequent or extreme activation of the body’s stress response system can become toxic, and in the absence of protective mechanisms, lasting adverse biological changes can occur.⁹

Researchers postulate that the embedding of adverse biological changes

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implications for health throughout the US, is composed of Seventh-day Adventists, a religious group known for its healthy lifestyle. Adventists tend to consume a greater vegetarian diet and refrain from using tobacco, alcohol, and illegal substances. Through one of the largest lifestyle cohort studies, the Adventist Health Study, researchers at Loma Linda University found lifestyle habits linked with an overall improvement in life expectancy that is significantly greater than that for the general US population as well as a reduction in chronic health conditions, especially those associated with states of chronic inflammation such as diabetes, obesity, metabolic syndrome, high blood pressure, and cardiovascular disease.^{19,21-25} The increased healthy longevity of this population may have major implications for health promotion, especially with disease prevention founded in early childhood.

Currently, limited research has been conducted assessing childhood experiences and exposures among centenarians, and to our knowledge, no such research has been conducted assessing ACEs or the potential for mitigating ACE-related adverse changes.^{26,27} With a history of significant longevity, the Loma Linda Blue Zone (LLBZ) community may provide a unique perspective for chronic disease prevention. Thus, the purpose of this research study was to obtain in-depth information from LLBZ centenarians and seniors about their childhood experiences and exposures and to provide insight for chronic disease prevention framework.

METHODS

We conducted a qualitative study using grounded theory methods from November 2015 through January 2017 and included 25 key informant interviews (KIs), 2 focus groups, and analysis of a centenarian’s published memoir to gain insight into the childhood experiences of LLBZ members.²⁸ The study was approved by Loma Linda University’s institutional review board.

Participant Recruitment and Inclusion Criteria

Eligible participants were approached at various areas around the city, including

community fairs, faith-based events, a local gym, and senior living facilities. Interested participants were later contacted by telephone to arrange an interview and to provide consent for participation. Participants were included in the study if they currently reside in the City of Loma Linda and were affiliated with the Seventh-day Adventist community.

Key Informant Interviews and Focus Groups

KIs of 7 centenarians and 18 seniors, with a high participation rate (100% centenarians and 98% seniors), were conducted using a semistructured guide with open-ended questions on adversity and hardship as well as positive experiences or resiliency factors (RFs) in their childhood. General ACE thematic areas were similar in nature to thematic areas of the ACE International Questionnaire (ACE-IQ).²⁹ *Resiliency factors* are defined as factors that support adapting well in the face of adversity, stress, trauma, and so forth, and research studies have tended to focus on the psychosocial constructs, such as caring and supportive relationships.³⁰

In addition to the psychosocial aspects, we assessed healthy lifestyle practices (ie, diet, rest, time outdoors) as RFs. Interviews were conducted by trained bilingual (English and Spanish) facilitators and lasted between 30 and 50 minutes. Findings from KIs informed development of the validation focus group guide. Confirmatory focus groups (n = 2) were conducted among seniors (n = 11) by trained bilingual facilitators, which took place on the Loma Linda University campus and lasted between 60 and 90 minutes. Focus groups and the KI interviewees were mutually exclusive groups, and all were audiorecorded and transcribed verbatim. Excerpts from one centenarian’s published memoir were collected and included in the data for coding and analysis.³¹ Sample size was determined using thematic saturation.

Qualitative Analysis

Once transcribed, textual data were analyzed using the constant comparative method to develop a grounded theory model for our study. To ensure

Table 1. Demographic characteristics of Loma Linda Blue Zone study participants

Characteristic	Total (N = 36), no. (%)	Centenarians (n = 7), no. (%)	Seniors (n = 29), no. (%)
Age category, years			
65-69	6 (7)	—	6 (21)
70-79	11 (31)	—	11 (38)
80-89	5 (14)	—	5 (17)
90-99	7 (19)	—	7 (24)
≥ 100	7 (19)	7 (100)	—
Sex			
Men	11 (31)	2 (29)	9 (31)
Women	25 (69)	5 (71)	20 (69)
Race/ethnicity			
African American	2 (5)	0 (0)	2 (7)
Asian	6 (17)	1 (14)	5 (17)
White	22 (61)	4 (57)	18 (62)
Hispanic-Latino	6 (17)	2 (29)	4 (14)
Country of origin			
US	23 (63)	2 (29)	21 (72)
Canada	3 (8)	2 (29)	1 (3)
Argentina	2 (6)	1 (14)	1 (3)
Colombia	1 (3)	1 (14)	0 (0)
China	2 (6)	1 (14)	1 (3)
Malaysia	3 (8)	0 (0)	3 (10)
Lebanon	1 (3)	0 (0)	1 (3)
Germany	1 (3)	0 (0)	1 (3)

systematic data analysis, an iterative process of individual-level review and group-level review and interpretation was implemented with a multidisciplinary team. After team consensus on the final codes, coding continued with transcriptions and the centenarian's memoir until thematic saturation was reached. Themes were further refined by multiple readings of the transcripts and memoir, and consensus was reached on the final themes through group discussion of the data. After analysis, participants were invited to a presentation on the study findings and subsequently approved our themes and model.

Adverse Childhood Experiences and Resiliency Factors Score

Participants were defined as exposed to an ACE or an RF if they reported an adverse or resiliency experience that occurred in the first 17 years of life. A total ACE and RF score was calculated by summing the number of categories with an ACE or resiliency-promoting factor to which a participant was exposed. The number of ACEs ranged from 0 (no exposure) to 11 (all categories exposed); RFs ranged from 0 (no exposure) to 8 (all categories exposed). Descriptive statistics (eg, percentages) were used to describe study participants as well as ACEs and RFs.

RESULTS

Centenarian and Senior Characteristics

In total, 36 participants (7 centenarians and 29 seniors) provided data on ACEs and RFs. Ages ranged between 65 and 102 years; most were women, US born, and white (Table 1). However, although more centenarians were white (57%), just 29% were born in the US. All the centenarians had lived in Loma Linda for 50 years or longer, except for one who had lived 5 years in the community. Centenarians lived by themselves (14%), with family members (57%), or at independent living facilities (29%). Additionally, all centenarians appeared in good

Table 2. Adverse childhood experiences (ACEs) among Loma Linda Blue Zone study participants

ACE domain	ACE subdomain	Participant quotes	Total (N = 36), no. (%)	Centenarians (n = 7), no. (%)	Seniors (n = 29), no. (%)
Economic hardship	Food deprivation	"We had some hard times to the point where we were barely surviving, and I know what it is to eat oatmeal 3 times a day."	16 (44)	7 (100)	9 (31)
	Low household income	"So, we were a family of 6 children, and farming was not a very good income. I grew up under very limited circumstances. My folks didn't have money to pay for me [my upkeep]."	19 (53)	7 (100)	12 (41)
Family dysfunction	Loss of parent	"My parents died, so I was with my grandmother on the streets and not knowing anything. Grandmother raised me for a few years, and then she died. After that it was horrible because nobody [would] take care of me."	7 (19)	4 (57)	3 (10)
	Loss of sibling	"Well, my brother one day he felt really, really bad, and the doctor came to our house, and [my brother] had meningitis; he died on Christmas Day. I had a sister, Helen, and she died; it was [due to] kidney failure."	2 (6)	0 (0)	2 (7)
	Family separation	"And he—father—was drafted at 51 by the German military, and that was in '44. He was placed in a camp when the war ended, a [prisoner-of-war] camp in Belgium."	16 (44)	5 (71)	11 (38)
	Parental addiction	"My mother was a smoker and she was a gambler too. So much debt and owing people money that my dad had to go to extra work to take care of the children and pay the debts off."	3 (8)	0 (0)	3 (10)
	Parental mental illness	"My mom, I am sure she had a nervous breakdown. I was in the first grade, so I was 6 years old at the time. I had just gone 2 months in, and she took me out of school to be with her because she was so lonely."	2 (6)	1 (14)	1 (3)
	Parental physical abuse	"When I grew up, I was down, you see because I came from very poor family and I was very poor in school. No achievement. I used to be beaten up and never wanted to open my mouth. If I have something [to eat], I am afraid to eat it because I should leave it alone or else ..."	2 (6)	1 (14)	1 (3)
	Parental mental abuse	"Her centenarian mother remarried when she was very young, and her stepfather was very abusive ... physically and mentally. He was just not very good to them, and that is just how it was."	5 (14)	3 (43)	2 (7)
Community violence	Witness to violence	"He—teacher—hit a girl with a stick so hard that he broke her fingers. The parents just said if they don't want to learn, beat them; it was very bad. We had to go through everything [they witnessed and experienced physical and mental abuse]."	5 (14)	3 (43)	2 (7)
	Refugee status	"We were refugees when I was 4. We had to flee and move around in China because of the invasion by Japan. During childhood we were quite poor."	1 (3)	0 (0)	1 (3)

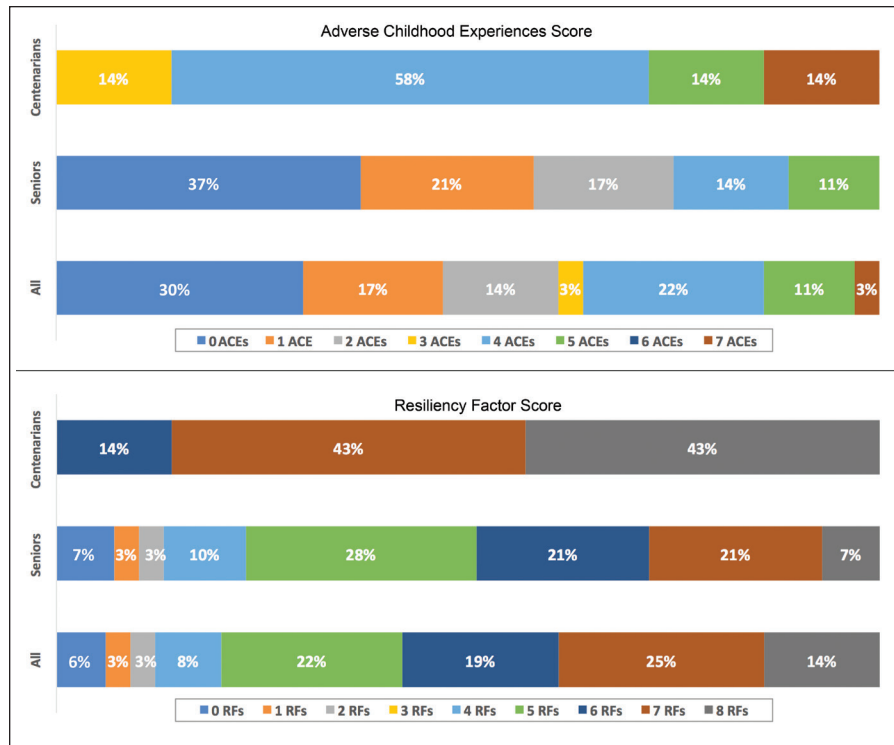


Figure 1. Percentage of Adverse Childhood Experiences (ACEs) and Resiliency Factors (RFs) for Loma Linda Blue Zone (LLBZ) study participants.

overall health without report of chronic illness and reported regular involvement in social activities. Sixty-two percent of the senior participants were white, and most (72%) were born in the US. A high percentage were well on their way to becoming centenarians themselves. Similar to centenarians, seniors were active and independent.

Qualitative Themes

Adverse Childhood Exposures

Through qualitative analysis of the transcriptions, 3 domains (economic hardships, family dysfunction, and community violence) and 11 subdomains of adversity emerged (Table 2 and Figure 1). The economic hardships subdomains included food deprivation and low household income. The family dysfunction subdomains included loss of parent, loss of sibling, family separation, parental addiction, parental mental illness, parental physical abuse, and parental mental abuse. Last, the community violence subdomains included refugee status and witnessing violence.

Among all study participants, the most reported adversities included low household income (53%), food deprivation (44%), and family separation (44%). Nearly all participants experienced profound economic disadvantage that hindered food security, access to education, and health care, and increased their odds of losing family members. Most participants (70%) had an ACE score of at least 1, and 36% had an ACE score of 4 or greater. Among centenarians, 86% reported an ACE score of 4 or more. All centenarians reported low household income and food deprivation; their families were subsistence farmers with extremely limited resources. The second most reported ACE included family separation (71%), followed by loss of a parent (57%) caused by death or abandonment. A total of 43% reported parental mental abuse and felt their parents lacked love, support, parenting, and guidance. Similarly, 43% reported witnessing violence in their communities in the form of exposure to beatings and war activities. Most seniors (63%) had at least 1 ACE, and 25%

reported 4 or more. Seniors reported having grown up in various socioeconomic backgrounds and parental education levels, and experiencing low household income (41%), family separation (38%), and food deprivation (31%) mainly during War World II, other regional wars, and the Great Depression in the US.

Resiliency Factors

During analysis of the RFs, 8 themes emerged of childhood practices that were sustained across centenarians' and seniors' life spans (Table 3 and Figure 1). The themes included kinetic life, spiritual practices, a helping hand, family and friends' camaraderie, nature engagement, resting reset, simple foods, and hopeful intrinsic drive. Nearly all study participants (88%) scored 4 or more RFs, and 39% had 7 or more. The most reported resiliency practice among all participants was family and friends' camaraderie (83%). Participants noted strong and long-lasting social bonds with family members (mainly siblings) and friends, and reported that these relationships offered emotional support and understanding in times of adversity. The second most commonly cited practice was kinetic lifestyle (80%); participants described an outdoor lifestyle immersed in physical activity from dawn to dusk. Centenarians and seniors from farming families raised livestock, gardened, baked, and cared for younger siblings for the most part of the day. Additionally, centenarians reported daily walks (2-3 hours) to school, a nearby town, a neighbor's house, and church. Seniors raised in urban settings also walked daily to school, experienced long hours of outdoor play, and weekly nature hikes with their family and friends. Spiritual practices (78%) were also very common; most participants described involvement in family worship activities and community participation through regular church/temple attendance and involvement in church ministries. Participants expressed diverse faith traditions during their early years of life. Consumption of simple foods was noted in 75% of participants, with home-grown foods, including abundance of vegetables and fruits, and limited meat. Their diets were modest, affordable, and mainly prepared at home. Regarding nature engagement

for study participants (75%), especially those from rural villages or farming backgrounds, “nature” was a way to earn a living: Working the soil to grow food and raising cattle to sustain their families but also as an outlet for enjoyment. For seniors from urban communities, nature was explored and enjoyed with family and friends, a time for fun, exercise, and relaxation. Participants described routine sleeping habits, with at least 8 hours of sleep each day (resting reset, 69%). They commonly held the belief that their actions would result in positive outcomes

in their life (hopeful intrinsic drive, 53%), and they regularly helped others with work (helping hand, 36%).

By study group, all centenarians were exposed to 6 or more RFs, and 58% of seniors noted exposure to 6 or more RFs. Like centenarians, seniors’ exposure to family and friends’ camaraderie (79%) was the highest, followed by kinetic life (76%), spiritual practices (76%), nature engagement (69%), and simple foods (69%). Last, participants reported overlap on RF exposure and practice as they engaged in various factors concurrently. For example,

although they indicated time in nature, they also cited participation in physical activity and friends’ camaraderie.

DISCUSSION

Our study findings not only support the identification of resilient individuals but also, to our knowledge, are the first to identify a community of resilient members despite their tremendous burden of ACEs. The RFs practiced in childhood remained present across their life spans and addressed multiple health domains (ie, mental, physical, spiritual, social).

Table 3. Resiliency factors practiced by Loma Linda Blue Zone study participants

Resiliency factor	Description	Participant quotes	Total (N = 36), no. (%)	Centenarians (n = 7), no. (%)	Seniors (n = 29), no. (%)
Kinetic life	A lifestyle immersed in activities that require physical movement from early in the morning to evening	<i>“I will give you a day in my life as a boy. I had to get up in the morning and go find the cows, and our place will be half a mile or so in dimension, so the cows will be away some place in the bush. Then you have to milk the cows and separate the milk, then eat breakfast, and then go to school. Now, going to school consisted of walking 2 miles ... so, you’d be up in the morning at 5:30 or 4.”</i>	29 (80)	7 (100)	22 (76)
Spiritual practices	Familial faith-based values, traditions, and practices instilled since childhood	<i>“I will never forget, she—mother—made me kneel down by the bed before we sleep, so she taught me a prayer, and I repeated that prayer for many, many years. And up to now I still kneel beside my bed before I go to sleep. And she brought us to church and made sure that we read the Bible stories.”</i>	28 (78)	6 (86)	22 (76)
Helping hand	Charitable acts and altruism practiced in early life	<i>“Our grandfather bought a house in town, next to the church. The teachers used to live in that house as well as children; we [centenarian and siblings] cooked and cleaned so that those kids will have a good place to stay.”</i>	13 (36)	4 (57)	9 (31)
Family and friends’ camaraderie	Network of meaningful and lasting relations that provide support and value	<i>“... we still remember each other from when we went to elementary school; in fact, some of my classmates are still my friends. I saw 3 of them this morning.”</i>	30 (83)	7 (100)	23 (79)
Nature engagement	Extensive exposure to natural and outdoor environments	<i>“We spent lots of time in nature, and we would go pick huckleberries up in the mountains and swim in the lake. Even when we were working, we would pick apples from apple orchards and run and play and do things like that.”</i>	27 (75)	7 (100)	20 (69)
Resting reset	Weekly day of rest away from routine activities to rejuvenate physically and mentally with family and friends; and regular sleep patterns of at least 8 hours of rest at routine times	<i>“Sabbath afternoon we looked forward to. My brothers went horseback riding. I did too, and it was just the time to be outside if we possibly could be. We went to a mountain about a half an hour from us, and we picnicked ... there was always a place to go outside, be together, and picnic and that sort of thing.”</i>	25 (69)	7 (100)	18 (62)
Simple foods	A homegrown and home-cooked diet high in vegetables and fruits with none or limited meat intake	<i>“We lived on a farm, and my mother baked great! She baked fresh bread, and we had lots of vegetables because my mother had a garden. We had fresh stuff all the time. She canned food in jars so in the winter time we had these things ... no artificial anything; everything was good, simple food.”</i>	27 (75)	7 (100)	20 (69)
Hopeful intrinsic drive	Positive thoughts that one’s actions will improve outcomes in life/experiences	<i>“A person has to bear in mind that you can’t allow circumstances to shape what your ultimate goal is. ... [I’d] been out of school about 1 year or 2, no money, nothing, and I was just walking alone one day, and I just got to thinking about the fact that I really wanted to be a doctor. I [didn’t] have any means, but I really wanted to be a doctor, and so I made up my mind to do so.”</i>	19 (53)	7 (100)	12 (41)

Their lifestyle was simple; they tended to live a more kinetic life, heavily engaged in nature and with many RFs practiced in tandem. Although the study participants endured tremendous childhood hardships with numerous ACEs, they were remarkably resilient, especially the centenarians. Evidence shows that ACEs are a major contributor to morbidity and mortality in adults with dose-response relationships between the number of ACEs and chronic diseases.^{5,32} With the strong relationship between ACEs, toxic stress, and adverse health outcomes, the question arises as

to how the LLBZ community members, especially the centenarians, are able to achieve such resilient longevity despite enduring tremendous childhood adversity.

Anti-inflammatory Properties

One important concept to consider regarding the longevity and resilience of the LLBZ is that each RF (kinetic life, spiritual practices, helping hand, family and friends' camaraderie, nature engagement, resting reset, simple foods, and hopeful intrinsic drive) practiced by LLBZ centenarians and seniors has been found in independent

studies to have anti-inflammatory properties (Table 4).³³⁻⁵⁴ Overall, the LLBZ community members lived a highly physically active life, and numerous independent studies have shown that this type of activity is significantly linked to a reduction in systemic inflammatory markers.⁴²⁻⁴⁴ In general, it is well known that increased systemic inflammation is a risk factor for increase in chronic diseases and reduction in life span.⁵⁵⁻⁵⁸ The practice of these health principles since early childhood may have afforded the centenarians and seniors enhanced ability to counter the effects of

Table 4. Loma Linda Blue Zone resiliency factors and independent study results identifying association with reduction in inflammatory markers

Resiliency factor	Author, year	Inflammatory markers	Independent study findings
Family and friends' camaraderie	Turner-Cobb et al, ³³ 2000	Cortisol	Quality in social relationships associated with significantly lower cortisol levels
	Costanzo et al, ³⁴ 2005	IL-6	Social support significantly associated with lower levels of IL-6
	Yang et al, ³⁵ 2005	IL-6, fibrinogen, CRP, ICAM-1, E-selectin	High family social strain associated with significant increase in IL-6 and fibrinogen and with overall inflammation burden (index variable created from all 5 markers)
	Kiecolt-Glaser et al, ³⁶ 2005	IL-6 and TNF-α	Hostile marital interactions associated with stronger acute increase in proinflammatory markers (IL-6 and TNF-α)
Helping hand	Schreier et al, ³⁷ 2013	IL-6	Volunteer time associated with significant decrease of IL-6, cholesterol, and BMI measurements
	Fuligni et al, ³⁸ 2007	IL-6 and CRP	Greater sense of fulfillment in helping others associated with significantly lower IL-6 and CRP levels
Hopeful intrinsic drive	Puig-Perez et al, ^{39,40} 2017, 2015	Cortisol	Optimism related to significantly lower daily cortisol levels and faster cortisol recovery after stressful experiences
	Roy et al, ⁴¹ 2010	IL-6 and CRP	Optimism significantly linked with lower IL-6; pessimism significantly related to higher IL-6 and CRP levels
Kinetic life	Hopps et al, ⁴² 2011	CRP, IL-6, IL-1β, and TNF-α	Physical activity associated with significant decrease in CRP, IL-6, IL-1β, and TNF-α levels
	Autenrieth et al, ⁴³ 2009	CRP and IL-6	Physical work and transportation (cycling/walking) to work associated with lower levels of CRP and IL-6
	Reuben et al, ⁴⁴ 2003	CRP	House/yard work associated with significantly lower risk of elevated CRP levels
Nature engagement	Li, ⁴⁵ 2010	Cortisol	Forest outing trips associated with significant decrease in salivary cortisol levels
	Roe et al, ⁴⁶ 2013	Cortisol	Higher green space in urban city spaces associated with significant decreased stress and cortisol levels
	Guillot et al, ⁴⁷ 2010	CRP	Vitamin D (major source is sunlight exposure) associated with significant decrease in CRP levels
Resting reset	Okun et al, ⁴⁸ 2011	IL-6 and TNF-α	Routine sleep practices associated with significantly lower plasma levels of proinflammatory markers
	Lin et al, ⁴⁹ 2012	IL-6	Leisure mental activities, including reading, attending lectures, and playing cards, were associated with significantly lower levels of IL-6
Simple foods	Nettleton et al, ⁵⁰ 2006	CRP, IL-6	Whole grains, fruits, nuts, and green leafy vegetables inversely associated with significantly lower CRP, IL-6, and homocysteine levels
	Hodgson et al, ⁵¹ 2007	CRP	Unprocessed lean meat intake associated with significantly lower trends of CRP concentrations
	Ciardi et al, ⁵² 2012	IL-6	Food supplements, preservatives, and colorants associated with significantly increased levels of IL-6 and decreased levels of leptin
Spiritual practices	Holt-Lunstad et al, ⁵³ 2011	CRP	High levels of spiritual wellness associated with significantly lower CRP levels
	Ferraro and Kim, ⁵⁴ 2014	CRP	Religious service attendance associated with significantly lower CRP levels

BMI = body mass index; CRP = C-reactive protein; ICAM-1 = intercellular adhesion molecule-1; IL = interleukin; TNF = tumor necrosis factor.

toxic stress and inflammation. Furthermore, the possibility exists that the RFs may interact synergistically, where the full impact is greater than the sum of individual components. Our study findings identify a theory that the anti-inflammatory practices that began in early childhood potentially mitigated the negative biological impact of toxic stress and childhood adversities and potentially enable the LLBZ community members, especially the centenarians, to live a significantly longer life span with less chronic disease.

Biological Mechanism

The mechanism behind childhood stress and health status later in life has not been fully elucidated. However, there may be an overlap between the mechanisms for longevity and that of the ACE-related biological embedding of toxic stress. With the knowledge that chronic disease in adults and shortening of life may have roots stemming from childhood exposures, an understanding of the biological mechanisms for longevity is important and has implications for early childhood health promotion. One of the longevity theories is that of “inflamm-aging” in which low-grade, chronic systemic inflammation increases over time because of the natural aging process and increases the risk of developing chronic disease.⁵⁹ Interleukin-6, tumor necrosis factor- α , and CRP have been identified as a few of the major potential inflammatory markers involved in the “inflamm-aging” process. It has been hypothesized that individuals living exceptionally long, healthy lives, such as the LLBZ centenarians, are better able to cope with stress and the inflammatory load and are subsequently able to slow or mitigate the “inflamm-aging” process. Further supporting this theory, a large body of published studies have identified a wide range of adult chronic diseases (ie, diabetes, cardiovascular disease, cancer) associated with states of chronic inflammation and life shortening.⁶⁰⁻⁶² On the resiliency side, a recent study of psychosocial-related RFs (ie, attending social engagements) found an association with a reduction in inflammatory markers in adults who had experienced multiple ACEs.⁶³ More research is needed to better understand how the RFs may work together to promote resilience.

Genetic Diversity and Low-Income Implications

There are a couple of additional points for consideration in supporting the strength of lifestyle influencing resilience and longevity. There has been a large amount of research focused on genes (eg, *FOXO3*) and their identified association with enhanced longevity.^{64,65} However, one point to consider is that differing from the other Blue Zones throughout the world, the LLBZ is a genetically diverse group, especially among centenarians because they come from countries around the globe. What they had in common was healthy lifestyle practices, which potentially gives insight into the strength of their lifestyle practices influencing resilience and longevity in this community. The second point to consider is that the LLBZ centenarians and seniors reported disadvantaged backgrounds with fewer resources. In general, household income has been found linked to poorer health

the health of all Americans, is to attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.⁷⁰ The RFs identified in our study, which have individually been supported by independent research studies, can help to enhance current existing chronic disease prevention frameworks to promote a culture of health.

Key stakeholders can significantly influence exposure to the RFs within the chronic disease framework. Health professionals, a critical key stakeholder, can bring awareness for factors and work to promote practicing of factors through conversation. Start the conversation on RFs with children and their families, even if only one or two sentences. Another key stakeholder critical in supporting a shift toward a culture of health is medical facilities/hospitals and their administrators because they could promote RFs in their facility, encouraging wide-ranging exposure to the RFs. Additionally, this stake-

The [Loma Linda Blue Zone] findings and evidence from Nicoya and Okinawa Blue Zone communities provide additional support for the strength of lifestyle factors influencing resiliency and longevity.

outcomes and premature death, and childhood poverty predictive of age-related disease risks, such as elevated inflammation levels and the clustering of metabolic risk factors in adulthood.⁶⁶⁻⁶⁸ Interestingly, the Nicoya, Costa Rica, and Okinawa, Japan, Blue Zone communities are also composed of some of the lowest income households compared with their surrounding regions yet have been recognized as experiencing some of the best survival rates in their respective countries.^{16,69} The LLBZ findings and evidence from Nicoya and Okinawa Blue Zone communities provide additional support for the strength of lifestyle factors influencing resiliency and longevity.

Informing Chronic Disease Prevention Framework

The findings from our research study have potential implications for informing chronic disease prevention frameworks and improving the health of our nation. One of the main goals of Healthy People 2020, an initiative striving to improve

holder group could develop innovative collaborations with community organizations (ie, museums, libraries, faith-based agencies, health departments) to promote community awareness and recognition for the RFs. There is a critical need for delivering health messages not only in the health sector but also across the nonhealth sectors. A fourth key stakeholder group, which is important in promoting a culture of health, is elected government officials and politicians. Given the latest knowledge on the critical importance of early child exposures and subsequent chronic disease development, government officials and politicians in charge of spending allocation should critically rethink current funding priorities. This change will ensure significant and increased level of funding targeting programs for early childhood, especially those with health components. In supporting innovative collaborations, greater investments are needed for health promotion and disease prevention research and programs for young children. A fifth

key stakeholder group, educational institutions and systems, could also facilitate promoting a culture of health via embedding of the RFs with their school systems and providing an environment that is supportive. Last, policy personnel is a potential key stakeholder group that could drive forward change by embedding RFs in their policy development initiatives.

Limitations

Our study has some limitations that merit discussion. One potential limitation is the limited generalizability of this study because it included only centenarians and seniors currently living in the LLBZ. However, the LLBZ centenarian and seniors included a wide age range, greatly differing ethnic background, and differing countries of origin. Similarly, there may be limited generalizability using the ACEs experienced because communities in the US may differ by the type of ACE exposures. Another potential limitation may be with the participants' ability to recall early-life experiences, with most participants likely underreporting resiliency practices and adverse exposures, especially for the oldest members. However, most of the centenarians and older seniors had family members present at the interview corroborating the information provided. Additionally, because this was a qualitative study in nature, further quantitative research studies are warranted to confirm and expand on our findings.

CONCLUSION

The LLBZ is a community known to have enhanced longevity and fewer chronic diseases. Our findings support that the optimal health of these community members may potentially be guided by resiliency-promoting factors, each with anti-inflammatory properties, which are established in childhood and maintained across the life span. Early-life interventions targeting lifestyle behaviors are emerging as a promising area of focus for reducing the epidemic of chronic disease. The identification of the childhood RFs among this community has characterized potential foundational cornerstones on which to build a framework for promoting a culture of health for the US. Future research studies are warranted assessing health intervention

approaches as informed by these RFs. In addition, research studies of childhood experiences (positive and negative) among other worldwide longevity regions and among centenarians are warranted and hold promise for addressing global pediatric toxic stress. With emphasis on early-life health promotion, we can alleviate the burden of chronic disease and enable a collaborative movement toward a more resilient country of wellness and longevity. ❖

Disclosure Statement

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

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California Flower Bloom
photograph

Jorge Ramirez, MD

This image was taken during sunset at Crystal Cove State Park in Laguna Beach, CA, in early spring after years of severe drought.

Dr Ramirez is a Family Physician and Chief of the Department of Family Medicine at the Downey Medical Center in CA. More of his photographs can be seen in previous issues of *The Permanente Journal* and at www.picturesandhealth.com.

ORIGINAL RESEARCH & CONTRIBUTIONS

Diagnostic Pathway of Oral Cavity Cancer in an Integrated Health Care System

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ABSTRACT

Context: Survival for patients with oral cavity squamous cell carcinoma (OCSCC) has remained relatively stagnant despite advances in treatment. Few studies have examined why advanced-stage disease is diagnosed in 40% of patients with OCSCC nationally.

Objective: To characterize the diagnostic pathway of OCSCC in an integrated health care system.

Design: Retrospective study of patients with OCSCC (2007-2010).

Main Outcome Measures: Referral patterns and demographic, clinical, and tumor characteristics associated with time to diagnosis (diagnostic interval).

Results: Of 247 patients, 167 (68%) had early-stage (I/II) disease, 86 (35%) were referred by dentists, and 70 (28%) had a history of premalignancy. The median time (interquartile range) from symptom onset to care sought from a primary care physician (patient interval), from primary care physician to otolaryngologist, and from otolaryngologist to diagnosis was 8.6 (4.0-25.8), 1.0 (0.6-3.1), 0.0 (0.0-3.0) weeks, respectively. These intervals did not differ by demographic characteristics, clinical factors, or tumor stage. Prolonged diagnostic intervals were observed among patients with premalignant lesions.

Conclusion: The patient interval was the largest component of the total diagnostic interval. The subsequent professional workup proceeded relatively efficiently. Prolonged diagnostic interval in patients with premalignant lesions may reflect the natural history of malignant transformation rather than a delay in diagnosis. However, nearly one-fourth of these cases were diagnosed at an advanced stage; closer surveillance may represent an opportunity for diagnosis at an earlier stage. Surveillance for premalignant lesions and facilitating referrals from dentists may expedite the diagnosis and treatment of OCSCC. Further investigation is warranted.

which detecting more disease at an earlier stage could result in improved survival and reduced morbidity. Few studies have examined the diagnostic pathway of oral cavity cancer and assessed whether delays commonly occur in the US population. In a large population cohort of patients with OCSCC, this study aims to 1) measure the patient and professional time intervals to diagnosis (diagnostic intervals) and the factors associated with these intervals, 2) identify risk factors associated with late-stage disease presentation, and 3) examine the referral patterns of patients with oral cavity cancer to an otolaryngologist.

METHODS

A retrospective cohort study was conducted in Kaiser Permanente Northern California (KPNC), a large integrated health care system. The cohort was composed of unique cases of oral cavity tumors diagnosed from January 1, 2007, through December 31, 2010. These cases were identified from a source population obtained from the KPNC Cancer Registry by the International Classification of Diseases for Oncology, Third Edition (ICD-O-3) site and histology codes. The KPNC Cancer Registry is a database containing all verified in situ and invasive cancers from KPNC medical facilities reported to the California Cancer Registry and the Survival, Epidemiology, and End-Results (SEER) program of the National Cancer Institute.

A total of 462 cases of oral cavity cancers were identified in the KPNC Cancer Registry. Fifty-one cases did not meet the following inclusion criteria: Age at diagnosis of 18 years or older, tumor

INTRODUCTION

Survival for squamous cell carcinoma of the oral cavity has not improved greatly since the 1980s, despite tremendous research efforts and advancements in technology.¹ One reason for this may be the stable rate of diagnosis at advanced-stage disease.¹ Unlike other, more common cancers, which have benefited from cancer screening and earlier detection, efforts toward improving earlier diagnosis of oral cavity squamous cell carcinoma (OCSCC) have been relatively limited.

Proper examination of most of the upper aerodigestive tract requires flexible

endoscopic equipment, which is rarely available outside the otolaryngologist's office. However, the oral cavity allows for relatively easy visualization without special instrumentation. Despite this accessibility, 40% of oral cavity cancers are still diagnosed with regionally metastatic disease and 6% with distant metastatic disease.¹ Not only does late-stage disease portend a poorer survival compared with early-stage disease, treatment of late-stage disease entails much more extensive treatment and results in a poorer quality of life.²⁻⁶

Opportunities to reduce diagnostic delays in oral cavity cancer may exist for

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histology of squamous cell carcinoma, and ICD-O-3 site code specific for the oral cavity. A systematic chart review was then conducted to exclude cases caused by a second primary tumor, tumor recurrence, or misdiagnosed subsite, or if the documentation was deemed inadequate to determine patient and professional diagnostic intervals ($n = 105$). A final series of criteria was applied to the unique 306 OCSCC cases, allowing for the further exclusion of patients whose tumor was identified as a carcinoma in situ, who saw an oral surgeon or non-KPNC otolaryngologist/head and neck surgeon before the KPNC primary care physician (PCP) or otolaryngologist, who were not treated, or who were missing data on patient diagnostic interval. The final sample consisted of 247 cases (Figure 1).

Demographic and lifestyle data were obtained from the KPNC Cancer Registry and the electronic medical record, including sex, age at tumor diagnosis, race/ethnicity, tobacco use history, and alcohol intake history. Clinical history data included tumor subsite, dental referral status, primary presenting symptom, presence of premalignant lesions, neck dissection status, treatment received, and final disease state.

Additional temporal data were collected on the time between a patient's first symptoms and the date when the patient presented to the PCP (patient interval), the time from the initial PCP visit until the date of pathologic diagnosis (professional interval), the combined total diagnostic time from patient symptoms to the date of pathologic diagnosis (diagnostic interval), and the total time from first symptom to time of treatment (total interval). Definitions used for patient and professional diagnostic intervals were consistent with those used in prior studies.^{4,7-10} When this information was not available in the PCP's documentation, the patient diagnostic interval was extrapolated from the otolaryngologist's notation.

Tumor Stages I, II, III, and IV were derived from the tumor, node, metastasis (TNM) classification system, according to the American Joint Committee on Cancer (AJCC),¹¹ and ascertained from the KPNC Cancer Registry using the North American Association of Central Cancer Registries' nationally standardized software

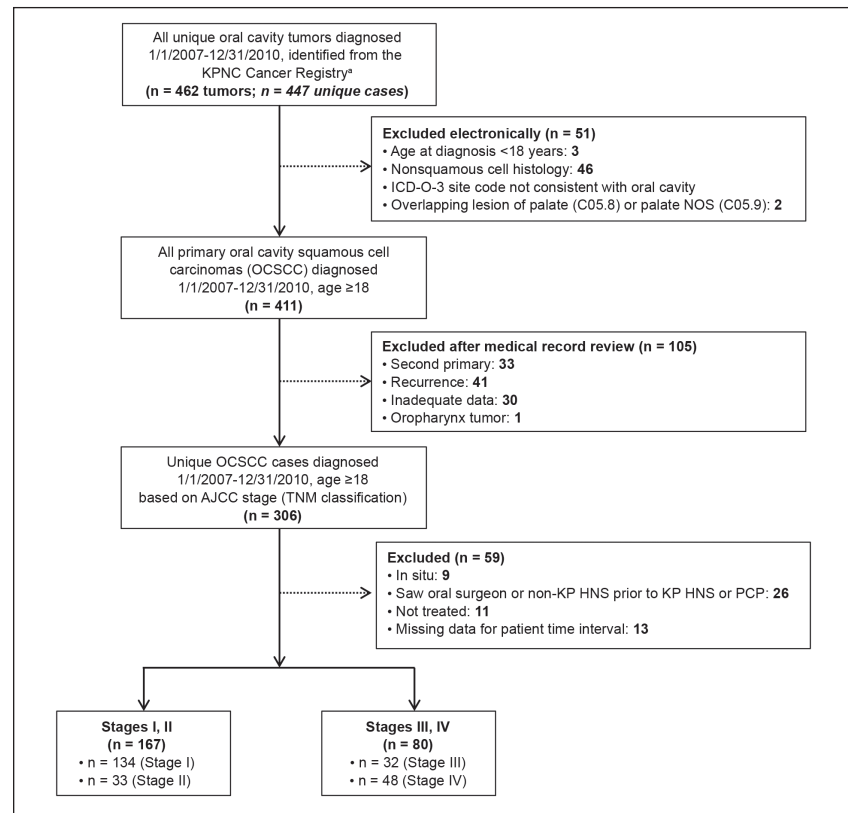


Figure 1. Cohort assembly of oral cavity squamous cell carcinomas diagnosed, 2007 to 2010.

* Initially identified by SEER sites (recode values): 20020 = tongue; 20040 = floor of mouth; 20050 = gum/other mouth. AJCC = American Joint Committee on Cancer; ICD-O-3 = International Classification of Diseases for Oncology, Third Edition; KP HNS = Kaiser Permanente head and neck surgeon; KPNC = Kaiser Permanente Northern California; NOS = not otherwise specified; PCP = primary care physician; SEER = Survival, Epidemiology, and End-Results Program; TNM = tumor, node, metastasis.

algorithm and verified using chart review. If TNM staging was not available in the KPNC Cancer Registry, a chart review was conducted to assign the clinical stage.

Descriptive statistics were generated for the 247 OCSCC cases, to examine frequency distributions of demographic (sex, age, race/ethnicity), lifestyle (tobacco and alcohol intake history), and clinical characteristics (tumor stage, tumor subsite, referred by dentist, primary presenting symptoms, presence of premalignant lesions, neck dissection status, treatment received, and final disease state). Descriptive statistics also were generated to examine measures of dispersion for the different intervals (patient, professional, treatment, diagnostic, and total). Bivariate analyses were used to assess variations in early stage (Stages I and II)

vs late tumor stage (Stages III and IV) and intervals according to demographic, lifestyle, and clinical characteristics. Chi-square tests were used to compare categorical variables. *T*-tests and non-parametric tests (Wilcoxon rank sum or Kruskal-Wallis) were used to compare continuous variables. All analyses were conducted using statistical software (SAS 9.3, SAS Institute Inc, Cary, NC). The Kaiser Foundation Research Institute's institutional review board approved this study with a waiver of consent.

RESULTS

Demographic, lifestyle, and clinical characteristics of the 247 unique OCSCC cases are presented overall and according to tumor stage (Tables 1 and 2). Two-thirds (67.7%, $n = 167$) of the cases had

early-stage disease, including 54.3% with Stage I (n = 134) and 13.4% with Stage II (n = 33). One third (32.4%) had late-stage disease, including 13.0% with Stage III (n = 32) and 19.4% with Stage IV (n = 48). Approximately half of the cases were men (53.4%), and more than half (56.6%) were older than age 60 years. The mean age was 64.2 years (standard deviation = 14.3 years) at tumor diagnosis, with a range from age 20 years to older than age 90 years. The cohort was composed predominantly of white patients (77.3%), followed by Asian/Pacific Islanders (12.6%). Most cases had a history of tobacco use (17.8% were current users, and 43.7% were former users) and of alcohol consumption (45.3% were current drinkers, and 10.5% were former drinkers). None of the demographic or lifestyle characteristics were associated with tumor stage.

Regarding clinical characteristics, the most common oral cavity tumor subsites were the tongue (61.9%) and floor of

mouth (16.2%). The most common primary presenting symptoms were tongue pain and lesions (61.1%) and floor-of-mouth lesions in the nontongue category (12.2%). More than one-third (35%) of cases involved a referral by a dentist. History of a premalignant lesion was reported for 70 cases (28.3%), and of these, 17 (24.3%) presented with late-stage disease at the time of diagnosis. Leukoplakia and dysplasia were the most common types of lesions (60% and 16%, respectively). Approximately half (51.3%) of patients with late-stage tumor died during follow-up, compared with 28.1% of those with early-stage tumor ($p < 0.0001$).

Among the 247 OSCCC cases, 213 had complete data for the number of weeks from their initial PCP visit until the first otolaryngologist visit (presumably after referral). All other intervals include all 247 cases. Between the onset of symptoms and the initial visit to the PCP, 119 cases (48%) had a delay of more than 3 months

(12 weeks). Patients experienced symptoms for a median of 8.6 weeks (range = 0-520 weeks; interquartile range (IQR) = 4.0-25.8) before presenting to the PCP (Table 3). This initial period, before the patient engaged with the medical system, contributed the most time on the pathway to treatment.

Between the first clinician visit to the PCP (or directly to the otolaryngologist for the 34 patients who “bypassed” the PCP) and the date of pathologic (tumor) diagnosis, 65 patients (26%) had a delay of more than 2 months (8 weeks). The median elapsed time between the initial presentation to a PCP and the tumor diagnosis, the professional diagnostic interval (Table 3), was only 2 weeks (IQR = 0.6-8.6), with the median time from the PCP to the otolaryngologist occurring within 1 week (IQR = 0.6-3.1), and the median time from the otolaryngologist visit to the tumor diagnosis occurring on the same day (0 weeks, IQR = 0-3.0; data not shown). The median time from when the tumor diagnosis took place to the time of initial treatment was 3.9 weeks (IQR = 2.6-5.9), contributing to a total interval from symptom onset to treatment of 21.1 weeks (IQR = 11.0-54.0), as shown in Table 3.

There were no significant differences in the underlying distributions of the various intervals, according to demographic and lifestyle characteristics or tumor stage (Table 3). However, differences were seen among patients who were initially referred by a dentist, compared with those who were not referred by a dentist, for the diagnostic interval (median = 25.8 weeks, IQR = 11.7-52.9 weeks; vs 13.9 weeks, IQR = 5.3-39.1 weeks; $p = 0.02$) and for total interval (median = 29.4 weeks, IQR = 15.7-56.0 weeks; vs 17.8 weeks, IQR = 10.0-45.2 weeks; $p = 0.03$). Patients with premalignant lesions, compared with those without, had a longer professional interval (median = 7.9 weeks, IQR = 1.0-53.0; vs 1.4 weeks, IQR = 0.3-4.6; $p < 0.0001$) and diagnostic interval (median = 43.2 weeks, IQR = 12.6-113.2 weeks; vs 13.8 weeks, IQR = 5.3-32.6; $p < 0.0001$). Patients with premalignant lesions also had a longer total interval (median = 46.2 weeks, IQR = 16.8-120.3 weeks; vs 18.0 weeks, IQR = 10.0-39.7 weeks; $p < 0.0001$).

Table 1. Demographic characteristics of 247 oral cavity squamous cell carcinoma cases

Characteristic	Total (n = 247), no. (%)	Tumor stages ^a I, II (n = 167), no. (%)	Tumor stages ^a III, IV (n = 80), no. (%)	p value
Sex				0.6328
Men	132 (53.4)	91 (54.5)	41 (51.3)	
Women	115 (46.6)	76 (45.5)	39 (48.8)	
Age at tumor diagnosis, years				0.8458
< 50	38 (15.4)	27 (16.2)	11 (13.8)	
50-69	112 (45.3)	74 (44.3)	38 (47.5)	
≥ 70	97 (39.3)	66 (39.5)	31 (38.8)	
Mean age at tumor diagnosis, years (SD)	64.2 (14.3)	64.4 (14.6)	63.8 (13.7)	0.7868
Race/ethnicity				0.1143
White	191 (77.3)	134 (80.2)	57 (71.3)	
Nonwhite ^b	56 (22.7)	33 (19.8)	23 (28.8)	
Tobacco use history				0.3930
Never	95 (38.5)	67 (40.1)	28 (35.0)	
Former ^c	108 (43.7)	74 (44.3)	34 (42.5)	
Current ^d	44 (17.8)	26 (15.6)	18 (22.5)	
Alcohol intake history				0.5846
None (abstainer)	78 (31.6)	51 (30.5)	27 (33.8)	
Former	26 (10.5)	15 (9.0)	11 (13.8)	
Current	112 (45.3)	79 (47.3)	33 (41.3)	
Unknown	31 (12.6)	22 (13.2)	9 (11.3)	

^a Tumor stage based on the American Joint Committee on Cancer's Tumor, Nodes, Metastases (AJCC/TNM) classification.

^b Includes African American (n = 6), Asian/Pacific Islander (n = 31), Hispanic (n = 18), and other race/ethnicity (n = 1).

^c Includes cigarettes (n = 99), cigars (n = 5), and chewing tobacco (n = 4).

^d Includes cigarettes (n = 41), cigars (n = 2), and pipe (n = 1).

SD = standard deviation.

DISCUSSION

Our study, conducted in a diverse integrated health care delivery system, is one of the first from the medical literature to investigate diagnostic pathways in oral cavity cancer within a US population. The time between the patient's initial symptoms and the first encounter with the PCP accounted for most of the delay in diagnosis and ultimately treatment. A statistically significant portion (28%) of patients had a previous diagnosis of a premalignant condition, and 35% were referred by a dentist. These findings support further investigation into avenues to reduce diagnostic delay, including surveillance of patients with premalignant

lesions and streamlining of the dentist-otolaryngologist specialist referral process.

The patient interval was found to be the largest component of the total diagnostic interval, a finding consistent with similar studies.^{7,12,13} We found no significant variations in the underlying distributions of patient intervals by early and late-stage disease; patients presenting at all stages waited a median of 8.6 weeks before initially seeing their PCP. This lack of relationship between diagnostic delays and stage of disease at initial presentation has been observed not only in studies of head and neck cancers¹⁴ but also in studies of other cancer subsites, including

colorectal, lung, endometrial, and cervical cancers.¹⁵⁻¹⁸ In fact, for some cancers such as medulloblastoma, it has been found that shorter intervals from patient onset of symptoms to clinical presentation are correlated with a decreased survival.¹⁵ Some cancer investigators have proposed that tumor growth rate, rather than patient diagnostic interval, is the preeminent factor that affects the stage of presentation. It is hypothesized that tumor growth rate has a greater influence on stage of presentation rather than the period of symptoms.^{15,18} Fast-growing cancers might present with short symptom intervals and late-stage disease, whereas slow-growing cancers might present with mild symptoms that the patient disregards for some time, but the cancer remains early stage when diagnosed. Late-stage tumors are theorized to express more overt symptoms including pain and bleeding, are more conspicuous on clinical examination, and are less likely to be misdiagnosed, which may paradoxically shorten diagnostic intervals for late-stage disease.¹⁶ In the oral cavity, this confounding factor may explain why we failed to find a temporal relationship between diagnostic intervals and stage of disease. However, earlier diagnosis allows treatment initiation of fewer cancer cells, increasing treatment success.

After patients with OCSCC presented to the PCP, their subsequent management was performed efficiently. The median time from PCP to otolaryngologist and from otolaryngologist to diagnosis was 1 week (IQR = 0.6-3.1 weeks) and 0 weeks (IQR = 0-3.0 weeks), respectively. This diagnostic efficiency may reflect the advantages of an integrated health care system, where the PCPs can call specialists during the initial patient visit and arrange for same-day appointments when clinically indicated. The median time from diagnosis to treatment was 3.9 weeks, which is similar to data from the National Cancer Database.¹⁹ That national study of more than 50,000 patients with head and neck cancer found that a treatment delay of 2 weeks was associated with worse survival.¹⁹ Although the study did not report information pertaining to the diagnostic intervals, one can infer that decreasing diagnostic delays may confer survival benefit as well.

Characteristic	Total (n = 247), no. (%)	Tumor stages ^a I, II (n = 167), no. (%)	Tumor stages ^a III, IV (n = 80), no. (%)	p value
Tumor subsite (ICD-O-3 coding system)				
Cheek, other mouth	24 (9.7)	14 (8.4)	10 (12.5)	0.7719
Floor of mouth	40 (16.2)	26 (15.6)	14 (17.5)	
Gum	22 (8.9)	14 (8.4)	8 (10.0)	
Hard palate	8 (3.2)	6 (3.6)	2 (2.5)	
Tongue	153 (61.9)	107 (64.1)	46 (57.5)	
Was referred by dentist				
No	161 (65.2)	104 (62.3)	57 (71.3)	0.1659
Yes	86 (34.8)	63 (37.7)	23 (28.8)	
Site of primary presenting symptom				
Nontongue ^b	76 (30.8)	56 (33.5)	20 (25.0)	0.0077
Tongue	151 (61.1)	103 (61.7)	48 (60.0)	
Neck	10 (4.1)	2 (1.2)	8 (10.0)	
Other ^c	10 (4.1)	6 (3.6)	4 (5.0)	
Had premalignant lesion				
No	177 (71.7)	114 (68.3)	63 (78.8)	0.0870
Yes	70 (28.3)	53 (31.7)	17 (21.3)	
Underwent neck dissection				
No	115 (46.6)	98 (58.7)	17 (21.3)	< 0.0001
Yes	132 (53.4)	69 (41.3)	63 (78.8)	
Treatment received				
Surgery	229 (92.7)	162 (97.0)	67 (83.8)	0.0002
Chemotherapy	65 (26.3)	23 (13.8)	42 (52.5)	< 0.0001
Radiation therapy	110 (44.5)	47 (28.1)	63 (78.8)	< 0.0001
Final disease state				
Alive without disease	146 (59.1)	114 (68.3)	32 (40.0)	0.0001
Alive with disease	13 (5.3)	6 (3.6)	7 (8.8)	
Died	88 (35.6)	47 (28.1)	41 (51.3)	

^a Tumor stage based on the American Joint Committee on Cancer's Tumor, Nodes, Metastases (AJCC/TNM) classification.

^b Includes cheek lesion (n = 10), floor-of-mouth lesion (n = 30), gum lesion (n = 26), and palate lesion (n = 10).

^c Includes dysphagia (n = 1), jaw pain (n = 6), otalgia (n = 2), and unknown primary presenting symptom (n = 1).

ICD-O-3 = International Classification of Diseases for Oncology, Third Edition.

Seventy patients (28.3%) were given a diagnosis of a premalignant lesion before the OSCCC diagnosis. The premalignant diagnoses include leukoplakia (diagnosed clinically), dysplasia (diagnosed with biopsy), and lichen planus. The professional interval was longer for these patients;

however, this may reflect the natural history of malignant transformation rather than a delay in diagnosis. Nearly one-fourth (24.3%) of these patients with known premalignant lesions received a subsequent diagnosis of late-stage disease. The treatment and surveillance of premalignant lesions

was not captured in our data collection; however, anecdotally, management seemed to be performed in variable fashion. Patients with known premalignant lesions may represent an opportunity for improvement through prevention or closer surveillance and detection of disease at an earlier stage.

Table 3. Patient, professional, diagnostic, and total time intervals^a in weeks for OSCCC cases, median (interquartile range)

Characteristic	Patient interval	p value ^b	Professional interval ^c	p value ^b	Diagnostic interval	p value ^b	Total interval	p value ^b
Overall	8.6 (4.0-25.8)	—	2.0 (0.6-8.6)	—	16.6 (6.0-52.0)	—	21.1 (11.0-54.0)	—
Demographic/lifestyle								
Sex		0.57		0.49		0.76		0.98
Men	8.6 (3.0-25.8)		2.2 (0.6-6.6)		15.3 (6.2-52.3)		20.4 (11.6-55.6)	
Women	12.0 (4.3-25.8)		2.0 (0.6-12.0)		17.5 (6.0-49.6)		23.2 (10.3-53.2)	
Age at tumor diagnosis, years		0.24		0.51		0.20		0.36
< 50	15.1 (4.3-52.0)		2.1 (0.7-4.9)		28.5 (7.3-55.0)		35.0 (11.7-59.6)	
50-69	8.6 (4.3-18.5)		2.3 (0.7-8.4)		17.1 (6.5-42.4)		22.5 (11.5-45.1)	
≥ 70	8.6 (3.5-25.8)		2.0 (0.3-10.0)		14.5 (4.9-42.4)		18.3 (10.7-47.3)	
Race/ethnicity		0.20		0.59		0.16		0.18
White	12.9 (4.3-25.8)		2.1 (0.6-9.9)		17.9 (6.3-52.6)		23.6 (11.5-55.6)	
Nonwhite	7.6 (3.0-15.0)		2.0 (0.6-4.8)		11.9 (5.5-39.4)		16.0 (10.4-42.9)	
Clinical								
Tumor stage (AJCC/TNM classification)		0.47		0.16		0.48		0.79
Stages I/II	8.6 (4.0-25.8)		2.4 (0.7-11.1)		17.2 (6.3-52.9)		21.1 (11.0-55.7)	
Stages III/IV	12.3 (4.3-25.8)		1.7 (0.4-5.7)		14.6 (5.4-38.7)		21.2 (10.9-43.4)	
Tumor subsite (ICD-O-3 coding system)		0.60		0.73		0.43		0.29
Cheek, other mouth	12.9 (4.5-25.8)		0.9 (0.2-20.2)		28.5 (10.3-48.9)		35.0 (18.2-52.6)	
Floor of mouth	12.9 (4.3-25.8)		2.0 (0.8-6.3)		16.1 (5.6-57.9)		20.8 (11.2-59.9)	
Gum	10.1 (3.5-17)		2.4 (0.3-8.4)		14.4 (8.7-27.8)		17.9 (14.9-30.2)	
Hard palate	3.7 (2.5-24.5)		1.1 (0.7-2.3)		7.1 (4.1-27.1)		10.6 (6.7-30)	
Tongue	8.6 (4.0-25.8)		2.7 (0.6-10.7)		16.8 (6.3-52.9)		22.4 (10.7-55.6)	
Was referred by dentist		0.16		0.47		0.02		0.03
Yes	12.9 (4.3-25.8)		2.4 (0.3-12)		25.8 (11.7-52.9)		29.4 (15.7-56.0)	
No	8.6 (3.5-25.8)		2.0 (0.6-8.1)		13.9 (5.3-39.1)		17.8 (10.0-45.2)	
Site of primary presenting symptoms		0.001		0.12		0.001		0.02
Nontongue	12.9 (4.3-25.8)		1.4 (0.3-7.5)		17.4 (7.9-44.5)		23.4 (12.1-48.3)	
Tongue	8.6 (4.3-30.1)		3.0 (0.6-11.6)		18.1 (6.9-54.7)		24.6 (11.5-57.6)	
Neck	2.0 (1.0-3.0)		2.1 (1.4-2.7)		4.1 (3.7-5.9)		10.7 (10.0-14.9)	
Other	3.0 (0.5-8.6)		0.6 (0.3-1)		8.4 (3.0-31.1)		12.2 (5.9-33.4)	
Had premalignant lesion		0.34		< 0.0001		< 0.0001		< 0.0001
Yes	12.9 (4.0-52.0)		7.9 (1.0-53.0)		43.2 (12.6-113.2)		46.2 (16.8-120.3)	
No	8.6 (4.3-24.0)		1.4 (0.3-4.6)		13.8 (5.3-32.6)		18.0 (10.0-39.7)	

^a Patient interval is the time from the patient's first symptoms to presentation to their primary care physician (PCP). Professional interval is the time from the initial PCP visit until the patient was seen by a head and neck surgeon (HNS) specialist and the time from the initial HNS visit until the tumor diagnosis. Diagnostic interval is the combined time of the patient and professional intervals. Total interval is the combined time of the patient and professional intervals and the time from the tumor diagnosis until the first tumor-directed treatment (median = 3.9 weeks, interquartile range = 2.5-5.9 weeks).

^b From Wilcoxon rank sum test or Kruskal-Wallis nonparametric test.

^c There are missing data on the number of weeks from the initial PCP visit until the first HNS visit (presumably after referral) for 34 patients. These individuals apparently were seen by the HNS first.

AJCC/TNM = American Joint Committee on Cancer's Tumor, Nodes, Metastases; ICD-0-3 = International Classification of Diseases for Oncology, Third Edition; OSCCC = oral cavity squamous cell carcinoma.

Dentists played a key role in our case population, referring more than one-third of the patients (35%) for evaluation, although this referral process is often not coordinated directly in our Health Plan. Inferring from the PCP records, it appears that dentists most often encouraged patients with suspicious oral lesions to see their PCP, and rarely was direct communication between the PCP and the dentist documented in the health record. Furthermore, timing of the dental visit was generally not recorded, and therefore the time between the dental visit and first PCP visit is unknown and may represent a substantial professional delay. Also, among the 121 cases (of the 306 retained after completion of medical record review; Figure 1) referred by dentists, 18% were referred to oral surgeons for biopsy when oral cavity cancer was suspected. In our health care environment, although oral surgeons sometimes perform biopsies, they rarely treat oral cavity cancers.

... coordinated directly in our Health Plan. Inferring from the [Primary Care Physicians (PCP)] records, it appears that dentists most often encouraged patients with suspicious oral lesions to see their PCP, and rarely was direct communication between the PCP and the dentist documented in the health record.

These referrals, therefore, created an unnecessary additional step in the diagnostic pathway, allowing more opportunities for delayed patient presentation.

The American Dental Association recommends that patients receive routine oral examinations at least once a year.²⁰ Although the US Preventive Services Task Force states that there is insufficient evidence to recommend oral cavity cancer screening,²¹ opportunistic screening examinations by dental professionals exhibit promise as an avenue to improve identification of disease and shorten the interval between symptoms of disease and initial visit with a PCP. Although the American Dental Association does not recommend any formal OCSCC screening, it does recommend that dentists and dental hygienists “remain alert for signs of potentially malignant lesions or early-stage cancers in all patients while performing routine visual

and tactile examinations, particularly for patients who use tobacco or who are heavy consumers of alcohol.”²² Two studies from the UK demonstrated that dental professionals had diagnostic sensitivities of 71% and 74%, respectively, in identifying oral cavity premalignant and malignant lesions.^{23,24} Surveys demonstrate that dentists are more knowledgeable concerning symptoms and signs of oral cavity cancer compared with PCPs²⁵ and play a vital role in the detection of OCSCC. With 62% of American adults actually seeing their dentist every year,²⁶ encouraging these preventive dental visits, especially for patients at high risk of OCSCC, may help in the earlier detection of suspicious lesions. Partnering with our dental colleagues and enabling them to directly refer patients to an otolaryngologist specialist may reduce diagnostic delay.

Several limitations should be noted in the interpretation of our findings. First,

because of the retrospective nature of our study, there may be patient recall bias in the reporting of the duration and quality of their symptoms. Patient intervals were, at times, documented with vague language, when symptom duration was recorded with nebulous language such as “a few” or “a couple.” This was best mitigated by assigning standard numerical values to each term, which were kept consistent throughout the study. Furthermore, data for patient risk factors regarding tobacco and alcohol use were not consistently documented, hence precluding meaningful analysis of these factors.

The strengths of this study include that it is one of the first to comprehensively assess the diagnostic pathways for oral cavity cancer within a large US community-based integrated health care delivery system serving a diverse patient population. Study of diagnostic delay is difficult in other American

practice settings and from other data sources. At many academic centers, a large proportion of their cases are diagnosed elsewhere, and therefore the data regarding their diagnostic pathway may not be readily available. National databases such as SEER and the National Cancer Database do not collect data before the date of diagnosis. The integration of our system allows for coordination of services between the PCPs and the otolaryngologists. Use of KPNC’s integrated electronic medical record with linkage to electronic databases and disease registries allowed for accurate capture of demographic and professional diagnostic intervals, which were further validated by chart review.

CONCLUSION

The patient diagnostic time interval has shown to be the largest component of the total diagnostic interval. Once patients presented to the physician, the diagnostic pathway proceeded relatively efficiently. Patients with premalignant lesions should be regularly monitored to increase the likelihood of diagnosis at early stages of disease as well as early treatment of the tumor after pathologically confirmed diagnosis. Collaborating with dentists and streamlining the referral process to otolaryngologists may be an avenue to screen patients for malignancy that merits further investigation. ❖

Disclosure Statement

The authors have no conflicts of interest to disclose.

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So Great an Evil

Cancers of the tongue and mouth begin with a small hard lump,
and sometimes with a little sore; both of which are attending with pricking pains,
and they spread in the same manner with cancerous sores in other parts.
This is so great an evil, that the slightest suspicion of it occasions very great uneasiness.

— William Heberden, MD, 1710-1801, English physician



Poppies
photograph

Abdalla Mallouk, MD

This image of a poppy bloom was taken in Southern CA in 2017, after a very rainy season.

Dr Mallouk is an Internist and Nephrologist for the Southern California Permanente Medical Group. He very much enjoys exploring and photographing the great outdoors. More of his photographs can be seen in previous issues of *The Permanente Journal*.

Naloxone Distribution and Training for Patients with High-Risk Opioid Use in a Veterans Affairs Community-Based Primary Care Clinic

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ABSTRACT

Context: Naloxone distribution has historically been implemented in a community-based, expanded public health model; however, there is now a need to further explore primary care clinic-based naloxone delivery to effectively address the nationwide opioid epidemic.

Objective: To create a general medicine infrastructure to identify patients with high-risk opioid use and provide 25% of this population with naloxone autoinjector prescription and training within a 6-month period.

Design: The quality improvement study was conducted at an outpatient clinic serving 1238 marginally housed veterans with high rates of comorbid substance use and mental health disorders. Patients at high risk of opioid-related adverse events were identified using the Stratification Tool for Opioid Risk Management and were contacted to participate in a one-on-one, 15-minute, hands-on naloxone training led by nursing staff.

Main Outcome Measures: The number of patients identified at high risk and rates of naloxone training/distribution.

Results: There were 67 patients identified as having high-risk opioid use. None of these patients had been prescribed naloxone at baseline. At the end of the intervention, 61 patients (91%) had been trained in the use of naloxone. Naloxone was primarily distributed by licensed vocational nurses (42/61, 69%).

Conclusion: This study demonstrates the feasibility of high-risk patient identification and of a primary care-based and nursing-championed naloxone distribution model. This delivery model has the potential to provide access to naloxone to a population of patients with opioid use who may not be engaged in mental health or specialty care.

With the input of key clinic stakeholders, a multidisciplinary team composed of internal medicine residents, a psychology trainee, registered nurses (RNs), and licensed vocational nurses (LVNs) set the goal of increasing both the distribution of naloxone autoinjectors and training in their appropriate use to our high-risk veteran population. The primary aim of the project was to develop the infrastructure to provide naloxone kits and training to 25% of patients at high-risk of opioid-related adverse events within 6 months. The objective was selected with consideration of attainability given the finite period of the resident quality improvement program.

METHODS

Setting

The study was conducted at an outpatient clinic engaging marginally housed veterans (defined as those who are without housing or are living in transitional living programs or in single-room occupancy units) who have high rates of comorbid substance use and mental health disorders. The clinic provides comprehensive services, including medical, mental health, social work, and substance use treatment, as well as housing referrals for veterans. The medical staff includes five primary care practitioners (PCPs), six internal medicine residents, three RNs, and three LVNs.

Planning the Intervention

The planning phase of this work began in October 2015. At that time, no patients with high-risk opioid use had been prescribed naloxone. This quality intervention

INTRODUCTION

Deaths caused by opioid overdose—both heroin and prescription opioids—have tripled in the US since 2010, and opioid use has now formally been recognized as a national epidemic.^{1,2} Veterans have high rates of pain and mental health disorders, such as posttraumatic stress disorder, as well as concomitant benzodiazepine and opioid use, placing them at particularly high risk of opioid-related accidents and overdose.^{3,4} As such, veterans are estimated to die of opioid overdose at twice the national average rate.⁵

Naloxone is an opioid antagonist previously used primarily in hospital settings to reverse fatal respiratory depression

owing to opiate overdose. The escalation of opioid overdoses has led community organizations to distribute naloxone widely among individuals with high-risk use.⁶⁻⁸ In 2014, the Department of Veterans Affairs (VA) implemented the Opioid Overdose Education and Naloxone Distribution (OEND) program, which aims to provide veterans with naloxone and trains them to administer it properly. Despite the implementation of this program, no formal workflow procedures existed in our VA Community-Based Outpatient Clinic for the distribution of naloxone kits, and no kits had been distributed to high-risk patients in our clinic before October 2015.

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was deemed exempt from the need for institutional review board approval.

The implementation phase took place from November 2015 to March 2016. There were three key elements of the planned intervention. The first was the identification of patients with high-risk opiate use. This identification was completed using a national VA dashboard known as the Stratification Tool for Opioid Risk Management (STORM) in which real-time, patient-specific data regarding comorbidities, mental health, substance use, and opioid/sedating medication use are utilized to determine three-year risk of opioid-related adverse outcomes.⁹

The second phase of this intervention was the education of clinic staff (LVNs, RNs, and physicians) about counseling patients on naloxone use. This was initially done through 30- to 60-minute, in-person training sessions led by a medical center pharmacist dedicated to the OEND project.^{10,11} There were no formal posttraining assessments performed to evaluate competency; some nursing staff did elect to be directly observed by a physician during their first patient counseling experience. Reinforcement education was done through online educational videos.

The final element of this intervention was the distribution of naloxone to patients. In this phase, high-risk patients were contacted using a tiered and multifaceted approach. A champion LVN attempted contact with identified patients first by telephone and then by letter, inviting them to the clinic for safety education regarding their opioid medication or opioid recreational use. For patients unable to be engaged by these methods, in-person contact was attempted while the patient was at the clinic for either medical or psychosocial services. To identify when these patients would be physically present in the clinic, a portion of the medical team “huddle” each morning was dedicated to reviewing the clinic schedule for high-risk patients.

The patient training consisted of 15-minute verbal discussion of signs of opioid overdose, administration of naloxone, and the importance of contacting emergency services.¹⁰ If additional training was needed, patients were referred to a training video.¹⁰ Primary supports

for patients were also invited to attend; however, given the social isolation of this patient population, it was rare for an individual other than the patient to participate.

The initial Plan-Do-Study-Act (PDSA) cycle included the quantitative (time/session, use of media) and qualitative (subjective assessment of educator comfort, patient receptiveness) evaluation of several patient education encounters. From this study, we found it easier to engage patients in the conversation about naloxone if we normalized the use of naloxone as a medication (ie, comparison to epinephrine injection [EpiPen]) and emphasized its role in aiding other social contacts such friends or family members who use opioids (ie, service to others). This content was then added to the outline of the naloxone training discussions. To aid our LVN staff in providing comprehensive education, we developed an automated clinic note template, which was completed by the trainer during the session.

To minimize prescriber/physician effort, the staff member providing the training was able to order the naloxone kit under the supervising prescriber’s name, thereby allowing the provision of the naloxone autoinjector to the patient at the time of training.

Method of Evaluation

We tabulated the number of patients identified via the STORM tool as high-risk users at baseline and subsequently tracked the number of patients prescribed naloxone on a monthly basis. These data were provided to frontline staff as well as the ambulatory clinic leadership in the form of e-mail and in verbal huddle communication. We additionally tracked the type of provider (eg, physician, RN, LVN) who distributed each naloxone kit. Finally, we documented the patients who were not prescribed naloxone as well as the underlying reason (eg, failure to contact, patient refusal of naloxone).

RESULTS

There were 67 patients identified as having high-risk opioid use, and none of these patients had been prescribed naloxone at the beginning of the intervention (0%). At the end of the intervention period, 61 patients (91%) had been provided with and trained in the use of naloxone (Figure 1). The naloxone was primarily distributed to patients by LVNs (42/61, 69%), with the remainder distributed by RNs (16/61, 26%) and physicians (3/61, 5%).

Of the 6 patients (9%) who were not prescribed naloxone, 3 patients declined the medication/training for undisclosed reasons, 2 patients were no longer receiving their care at our clinic, and 1 could not be contacted by telephone or letter and had not yet returned to the clinic.

DISCUSSION

Naloxone training and distribution has historically been implemented in a community-based expanded public health model, in which naloxone is distributed to those who use opioids as well as to potential bystanders (defined as those who may be present for an overdose event but not personally experiencing such).^{12,13} Although this model has shown efficacy, the reach and impact of naloxone training and distribution could be extended

This study demonstrated the feasibility of using electronic medical record tools to identify and prioritize patients at high risk of adverse events related to opioid use. ... also ... a patient identification and naloxone training process need not be championed by a physician ...

substantially by involving primary care clinics and clinicians. This general practice model of distribution is uncommon and little explored because of, in part, the inherent challenges of conducting naloxone training and distribution in the primary care setting. Barriers that have been cited include lack of practitioner time, lack of practitioner knowledge, lack of generalist ownership (ie, belief that specialists should manage substance-use disorder), and stigma surrounding opioid use.^{14,15}

We describe an innovative, primary care-based quality improvement initiative that increased naloxone distribution and training to a veteran population at high

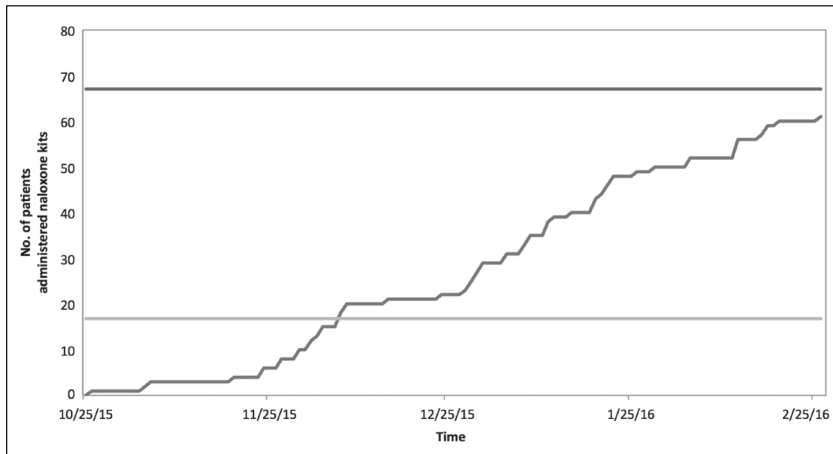


Figure 1. Naloxone distribution over time. Demonstrates the number of patients who received naloxone training and prescription during the course of the intervention (November 2015-March 2016). There were 67 patients identified at high risk (upper black line). The goal was to administer naloxone to at least 25% of these patients ($n = 17$), as demonstrated by the lower gray line. This goal was achieved in November 2015, and 61 patients (91%) were prescribed naloxone at the end of the intervention in March 2016.

risk of opioid-related adverse events. There were several unique features of this intervention that addressed previously cited barriers and contributed to its success. The first of these barriers was practitioner time, which was addressed both in the patient identification and patient training process. This study demonstrated the feasibility of using electronic medical record tools to identify and prioritize patients at high risk of adverse events related to opioid use. We also demonstrated that a patient identification and naloxone training process need not be championed by a physician but, rather, could be effectively implemented by nursing or pharmacy members of clinic teams after appropriate training. A previous qualitative study of general practitioners demonstrated a significant portion that preferred a model of naloxone delivery that engages nonphysician members of the multidisciplinary team, as our study did.¹⁴

This intervention also addressed the perceived barrier of practitioner knowledge. Our clinical team endorsed comfort with naloxone training, as measured by binary assessment of willingness to provide naloxone counseling, after a single 30-minute, pharmacist-led session with supplemental online educational videos. Given the brevity of this clinician training, it is feasible to implement during routine all-clinic team meetings and does not require additional time away from clinic.

Finally, although there are substance use treatment services accessible at our Community-Based Outpatient Clinic, there was no involvement by mental health or substance use specialists. This demonstrates the feasibility of primary care-based programming and addresses the historical lack of generalist ownership.

Sustainability

The Centers for Disease Control and Prevention now recommends that naloxone be prescribed to patients with a history of substance-use disorder, prior overdose, high-dose opioid prescriptions, and/or concurrent benzodiazepine prescription.¹⁶ To adhere to this recommendation, clinics must develop a process for prescribing naloxone to patients.

Although the workflow we have described was effective in providing naloxone training to existing patients with opioid use, separate and sustainable processes were concurrently developed for patients who are newly prescribed opioids. To ensure the sustainability of naloxone prescribing, our VA medical center now embeds naloxone orders within opioid medication electronic order sets. Practitioners are also prompted to prescribe naloxone and provide counseling when initiating opiate therapy of any kind and for any duration. This model is supported by a recent nonrandomized intervention

in safety-net primary care clinics demonstrating its feasibility and association with a 63% reduction in opioid-related Emergency Department visits at 1 year.¹⁷

Limitations

Our project demonstrates the ability to engage patients in naloxone training but studied only the process measure of naloxone kit distribution. Although we may extrapolate the benefit of this medication from other literature, outcome measures such as patient knowledge and skills with naloxone administration and the number of opioid-related adverse events, Emergency Department visits, and deaths among those administered a naloxone kit were not measured. The generalizability of our findings may also be limited because of our clinic's concentration on marginally housed veterans with high rates of comorbid substance use and mental health disorders and who have a close connection with their primary care home given the comprehensive services provided. Additionally, the STORM tool used to identify high-risk patients requires an electronic medical record and is validated for veterans but not for other patients.

CONCLUSION

It is feasible to distribute to and to educate high-risk patients on naloxone use in primary care clinics to reduce opioid-related adverse events. When clinical pharmacists and nurses deliver patient naloxone counseling, it requires minimal physician time. Ultimately, this type of delivery model can increase the number of patients receiving naloxone who are not engaged in mental health or other specialty care. ♦

Disclosure Statement

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

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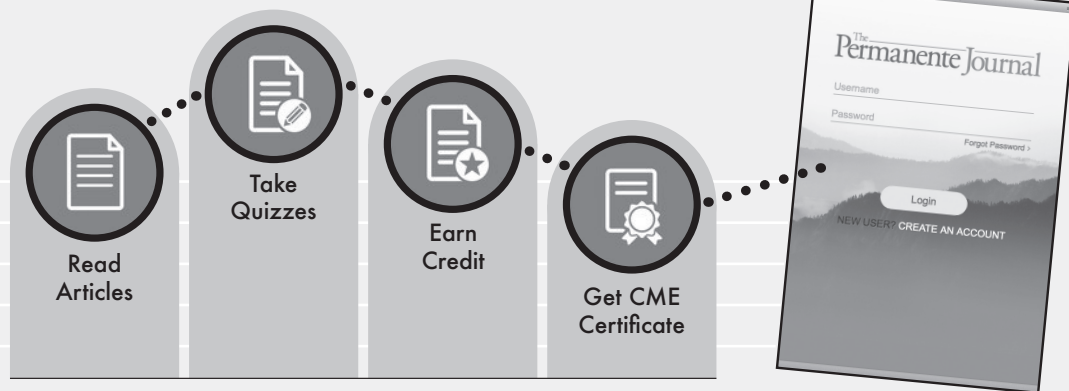
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Dance in the Clouds
photograph

Shenshen Dou, MS

From the artist: "On an early spring evening, in a typical thermal inverse weather pattern in Portland, OR, the fog is rising, the sun is setting, and the sky is turning a pinkish hue. I set my camera on a tripod to try to shoot the snowy mountain beyond the tree line, when suddenly a flock of birds appeared and gave this tranquil scene a poetic mood."

Ms Dou worked as a molecular biologist and is an artist living in West Linn, OR. More of her artwork can be seen on the cover of this issue and in other issues of *The Permanente Journal*, and on her Web site at www.shenshenstudio.com.

The Importance of Continual Learning in a Rapidly Changing Health Care Environment

Michael H Kanter, MD; Patrick T Courneya, MD

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Changes in health care are rapid with increasing participation from nontraditional companies in technology, pharmacy, and others.¹ Most recently, Chase, Berkshire Hathaway, and Amazon announced a joint health care initiative and the formation of an independent company to focus on technology solutions for simplified, high quality, and affordable health care.² The announcement sent immediate ripples throughout the health care industry and beyond even though it included no material plans or concrete details.

With the increase of available technology, the promise of new and nontraditional means to access care, and the general trend toward consumerism in health care,³ patients and purchasers are demanding more value—including higher-quality services, improved access, and lower costs. Moreover, as health care becomes more global through the advent of cloud computing and mass customization, there is growing demand for health equity and the mitigation of health disparities. Kaiser Permanente (KP) is already making great strides in this area and were recently recognized by the Center for Medicare and Medicaid Services as the first recipient of their new Health Equity Award.⁴

New technology is rapidly being applied to health care, leading to great advancements in how we treat and prevent illness. Although this innovation has led to mostly favorable results, some significant problems have surfaced, such as alleged fraud,⁵ that require vigilance on the part of health care organizations. These lessons are not new. Looking back on examples like the harm arising from relaxed use of opioids and the dramatic change in prescribing that came as we learned about risks of postmenopausal estrogen use, we learn repeatedly the importance of sound evidence and continuous vigilance as new evidence comes to us through research. There is also increasing recognition that one of the most common causes of harm are diagnostic errors, which may affect more than 12 million patients per year.⁶ Improvement efforts are challenging because of difficulties in measuring the problem and the gap in time that often occurs between the initial error and its detection. However, KP has closed many of the systemic gaps that contribute to diagnostic errors through our SureNet programs.^{7,8}

There is also great demand to begin measuring outcomes that matter to patients and that go beyond process measures and a limited set of intermediate outcomes measures. Although the work is still in its infancy, KP is leading the way in this area with demonstrated reductions in cardiovascular morbidity and mortality.⁹

Because KP has created effective solutions to many national challenges that affect the health care industry at large, we feel it is important to publish the results of our learning and improvement

efforts in hopes of supporting health care improvement outside of our system. For the 15th year, KP is convening its National Quality Conference and will again publish the abstracts of presentations at the meeting to help spread new quality initiatives throughout the nation. The abstracts cover each of the National Academy of Medicine's 6 aims or dimensions of quality (safe, timely, efficient, effective, equitable, and person-centered),¹⁰ which also form the framework for KP's National Clinical Quality Strategy. We recognize that there are many health care quality conferences of high value offered by organizations such as the Institute for Healthcare Improvement, the National Patient Safety Foundation, and others. However, we believe that large health care organizations can and should participate in creating quality forums where practices are not only shared but also published.¹¹ ❖

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Abstracts from the Kaiser Permanente 2018 National Quality Conference

BEHAVIORAL HEALTH AND WELL-BEING

From Northwest, Southern California, Program Offices

1. X Project: Getting Grounded—How Project Chamai Is Poised to Serve Emotional Wellness Needs of Kaiser Permanente Members

Trina Histon, PhD; W Scott Heisler, RN, MBA; Herbert Ozer, LCSW; Paul Castaldo, LCSW

DOI: <https://doi.org/10.7812/TPP/18-071-01>

Background: Project Chamai was launched in 2016 to apply the Xcelerating Learning and Spread (XLS) framework to develop new options for members that are convenient, timely, and affordable. Working in partnership with Kaiser Permanente (KP) Northwest and Southern California and our members, a minimally viable package to support member needs has been developed and is being tested in operations on kp.org. This includes 1) a landing page with emotional wellness content that can be personalized by the member; 2) workflows to enable therapists who work all along the care path to refer to these tools; 3) tools in an online personalized action plan (oPAP) that supports a member's episode care; 4) small-scale user testing of 3 to 5 online mobile applications to support emotional health.

Methods: At KP it is estimated that 25% of people in Specialty Behavioral Health have a Patient Health Questionnaire-9 (PHQ-9) score of 10 or less. Project Chamai is primarily for members who are experiencing subclinical symptoms of depression or anxiety that may include but are not limited to sleeplessness, emotional distress, difficulty engaging in social activities, feeling overwhelmed, and difficulty in coping with life transitions. Project Chamai can also be leveraged for members who are in ongoing therapy and Depression Care Management, because cognitive behavioral therapy (CBT) and other evidence-based tools can act as an adjunct to care.

Results: Key insights from the "Understand" phase have been used to inform design principles that in turn led to the development of low- to medium-fidelity prototypes of solutions (new landing page on kp.org, ability to personalize content, tool curation, access to premium applications (CBT, etc) to support members' emotional needs. Action plans for therapists are also being developed for use in oPAP as part of workflow optimization for mental health and wellness needs. Metrics that matter are part of the human-centered design process and include PHQ-9, and regional tools like Tridium (Polaris Health Directions, Wayne, PA) and a collaborative outcomes resource network (ACORN, Salt Lake City, UT) to track clinical outcomes in addition to preference and Web-based metrics to track user experience. Results from the small-scale user testing of mobile applications and online programs will also be shared.

Discussion: XLS provides a robust framework to show a cohesive process to chart the progress of national projects accountability for outcomes at each stage. Using human-centered design ensures that KP is truly delivering person-centered care by working with providers and members to build the solution.

From Southern California, Washington

2. Depression Care Management—An Evidence-Based, Collaborative Care Approach to Treating Depression in a Primary Care Setting

Alisa Aunskul, MSHCM; Daniel Hackett, MD; Karen Coleman, PhD; Mark Dreskin, MD

DOI: <https://doi.org/10.7812/TPP/18-071-02>

Background: Depression affects more than 16 million American adults each year, leading to disrupted interpersonal relationships, substance abuse, substantial losses in productivity, and a 50% to 100% increase in total health care costs. However, as

few as 25% of people with depression receive effective treatment. Most depression is detected in primary care, yet rates of appropriate treatment for patients with a diagnosis remain low. Depression Care Management (DCM) consists of a dedicated team that specializes in the treatment of depression in a primary care setting.

Methods: *Population:* Adult members age 18 years and older with a depression diagnosis (Major Depression Diagnosis or dysthymia), Patient Health Questionnaire-9 (PHQ-9) score 5-19, with or without a medication. Patients with a PHQ-9 score > 20 can be seen by DCM if a specialist believes s/he can treat the patient safely and effectively. *Intervention:* Behavioral activation, mindfulness, problem-solving treatment, cognitive behavioral therapy, medication treatment, adherence, and management. *Outcome measures:* Remission and improvement rates for patients enrolled and in treatment with DCM for a minimum of 3 months with an enrollment PHQ-9 score > 10. Rates are based on changes in PHQ-9 scores.

Results: 1) Increased PHQ-9 rates in Primary Care; 2) increased referral rates to Depression Care Management; 3) treatment outcome targets exceeded: 59% improvement in symptoms (goal 50%) and 44% remission of symptoms (goal 25%).

Discussion: 1) DCM to identify expansion plans for the upcoming year. Plans range from expansion to specialty departments (Obstetrics, Oncology) to further involvement and integration with existing population care management programs such as diabetes; 2) auto-referral pilot to assist with streamlining the process of patients being referred to DCM; 3) develop directional strategy for outreach and monitor penetration rates of DCM program to determine if the right people are getting the right treatment; 4) provide Depression Emmi (Wolters-Kluwer, Chicago, IL) for newly diagnosed patients on online personal action plan; 5) booster sessions and trainings for grief, subsyndromal situational depression, substance use/misuse; 6) Southern California Region participation in Project Chamai.

From Colorado, Georgia, Mid-Atlantic States, Northern California, Northwest, Southern California, Program Offices

3. Moving Upstream: Three Regions' Approaches for Addressing Social Determinants and Needs to Improve Health Outcomes

Nicole Friedman, MS; Irene Alvarez-Zamzow, MPH; Adam Sharp, MD, MS; Ranu Pandey, MHA

DOI: <https://doi.org/10.7812/TPP/18-071-03>

Background: Social and economic circumstances are known to have a powerful impact on health outcomes and health care use. Addressing these circumstances is crucial for improving health equity and fulfilling the Triple Aim. There is growing recognition of the importance of health care organizations assessing and addressing these issues in collaboration with community organizations. The 2014 Institute of Medicine report recommended inclusion of social and behavioral domains in electronic health records, and several Kaiser Permanente (KP) programs wanted to incorporate social needs assessment (SNA) into their health assessments and protocols.

Methods: *Population:* SNA programs servicing 3 target populations: KP Southern California (KPSC) Health Leads (HL) predicted high users (top 1%); KP Northern California (KPNC) Medicaid Managed Care (MMC) members; KP Northwest (KPNW) navigator program handling

referrals from across the care continuum. *Intervention:* Social needs screening by various modes (phone, in-person, kp.org) using a validated SNA questionnaire. Members with identified needs referred or connected with appropriate KP or community resources. *Outcome measures:* Phase 1: Number of members screened; social needs prevalence; count and percentage of members identifying one or more needs. For KPSC HL pilot, utilization and costs for intervention and comparison groups. Phase 2: successful referrals, health outcomes, and utilization impact.

Results: KPNW Navigator Program: 10,000 patients screened. More than 42,000 social v-codes in the medical record and more than 12,000 community resource referrals. Additionally, 20% of these referrals were either fully or partially satisfied. KPSC HL pilot (case control): High prevalence of social needs for top 1%; large voltage drops in communication from screen to connection; telephone intervention appears similar, may be more efficient; no overall short-term impact on costs and/or utilization except for very-low-income members (Medicaid, Dual Eligibles). KPNC MMC program: KP SNA tool (YCLS or Your Current Life Situation) integrated into onboarding assessment tool which will be used for all KPNC MMC members in 2018.

Discussion: KP has made great progress in member SNA. The Care Management Institute, with regional partners, developed an SNA questionnaire and item bank that all programs are being encouraged to use to enable cross-program comparisons and pooling of SNA data. SNA tools are integrated into KP HealthConnect. Most KP Regions have or are planning targeted SNA programs, and the Care Management Institute is facilitating sharing of learnings and best practices across programs/Regions. Questions remain about highest priority populations for SNA, staffing requirements, assessment/referral protocols, documentation and tracking of referrals, how to address needs (eg, referral vs active linkage), and how to identify and work with community resources.

From Southern California

4. The Community Action Poverty Simulation: A Powerful, Interactive Experience, Moving People to Make a Difference

Anna Khachikyan

DOI: <https://doi.org/10.7812/TPP/18-071-04>

Background: The Community Action Poverty Simulation promotes greater understanding of poverty in breaking down stereotypes and allowing participants to experience poverty and to step into the real-life situations of others. During the simulation, participants role-play the lives of low-income families, from single parents trying to care for their children to senior citizens trying to maintain their self-sufficiency on Social Security. The simulation opens your eyes to poverty and barriers to health care access.

Methods: According to the US Census, 14.3% of all Californians are at poverty level, which is a household income of \$63,783.

Results: One out of every 4 children in California lives below the federal poverty line. Child poverty rates among Latinos and African Americans are much higher (Latino: 30% poverty rate; African American: 31% poverty rate) than for whites (10% poverty rate) and Asians (12% poverty rate). More than 90% of children living in poverty have been born in the US. Children from lower socioeconomic backgrounds have poorer health outcomes.

Discussion: The Community Action Poverty Simulation is a powerful, interactive experience designed to help participants understand what a typical low-income family goes through in just trying to survive from month to month. A goal is to sensitize participants to the realities faced by low-income people and how those social and cultural contexts impact health care. A deeper understanding of barriers to health care access, the underlying causes of those barriers, as well as the impact of those barriers on people living in poverty and their experience of care, would help physicians and health care workers overcome these challenges and provide socially responsive care. Most importantly, it moves people to make a difference.

CARE MANAGEMENT

From Southern California

5. The E-SCOPE Initiative: A Strategic Approach to Identify and Accelerate Implementation of Evidence-Based Best Practices

Joel Whittaker, MPH; Joanne Schottinger, MD; Michael H Kanter, MD; Marguerite Koster, LMFT, MA

DOI: <https://doi.org/10.7812/TPP/18-071-05>

Background: Proposed changes in front-line care often originate with clinician suggestions, but evaluating their merit is time-consuming and expensive. Focused evidence reviews may yield inconclusive findings that do not allow clear-cut decisions, and pilot studies are vulnerable to poor design and less-than-rigorous evaluation. Duplicating clinical trials is costly and inconsistent with our affordability mission. E-SCOPE offers an accelerated, more effective way to break the logjam of identifying and implementing evidence-based practices in the clinical care setting.

Methods: *Problem:* More than 36,000 clinical trials are published yearly, many demonstrating effectiveness of clinical interventions to improve the health of Kaiser Permanente (KP) members. *Intervention:* Combining proactive identification of high-quality evidence with stakeholder engagement, implementation support, and monitoring to accelerate delivery of evidence-based best practices. *Comparison:* Care improvement initiatives driven by expensive, time-consuming evaluation of anecdotal suggestions; focused evidence reviews with inconclusive results and no clear-cut decisions; poorly designed and evaluated pilot studies; duplicating costly clinical trials inconsistent with the KP affordability mission. *Outcome:* Timely, effective, and efficient identification and implementation of evidence-based best practices.

Results: Between 2014 and 2017, the E-SCOPE Initiative proactively identified and accelerated the launch of 17 evidence-based best practices to improve the effectiveness, safety, timeliness, and/or efficiency of care. The date from study publication to date of deployment for all E-SCOPE interventions ranged from 4 to 36 months, a reduction from the 17-year average implementation time documented in published literature (<http://bit.ly/1voeaac>).

Discussion: The E-SCOPE process can successfully identify and implement beneficial evidence-based practices; minimize reliance on costly, time-consuming, and less-than-rigorous pilot studies; and reduce the time gap between publication and delivery of important patient care interventions supported by high-quality published

evidence. The Southern California region is developing knowledge management resources to share the identified evidence-based best practices and implementation strategies with other KP regions, and will seek feedback from workshop attendees on how best to provide E-SCOPE resources to meet existing clinical priorities, delivery system structures, and resources in other regions.

From Southern California

6. Continuing Care Quality Management: Right Care, Right Time, Right Place Applied to Skilled Nursing Facility Care

Peter Khang, MD; Jennifer Cortez; Christine Jordan; Artem Aghourian

DOI: <https://doi.org/10.7812/TPP/18-071-06>

Background: The postacute care marketplace is segmented with high degrees of variability among skilled nursing facility (SNF) leadership, care quality, and outcomes. Appropriate and adequate governance of the care provided and oversight of our members in SNF ensure the care they receive is consistent with what they received in the hospital.

Methods: *Population:* Improving the quality outcomes and utilization of skilled nursing care for members (most often age 65 years and older). *Intervention:* Implement the Continuing Care Quality Management (CCQM) model. *Comparison:* Compare results with historical outcomes and utilization. *Outcome Measures:* SNF patient day rate (PDR), SNF discharge rate, length of stay, and readmissions.

Results: The primary metric for success has been the SNF PDR—measuring the number of skilled days per 1000 members. Between 2015 and 2017, we saw the SNF PDR drop by nearly 33%. SNF PDR is the product of volume of SNF admissions and the length of stay. We have seen our SNF admission volumes decrease as CCQM emphasizes appropriateness of SNF placement, and CCQM-Inpatient Quality Management (IQM) teams work together to send patients home with adequate resources. The average length of stay remained constant, and the SNF Healthcare Effectiveness Data and Information Set (HEDIS) 30-day readmission observed/expected ratio has been relatively stable, despite a 12% increase in the expected rate since 2016.

Discussion: The CCQM model translates Care Without Delay (CWD) to the continuum. It enhances the quality, timeliness and appropriateness of care for members, working relationships (internal and external), and business outcomes. Successful implementation of the model requires engagement of local and regional executive leadership, with a strong oversight component. Interdependent collaboration between IQM/CWD and CCQM is critical to making significant progress, as introducing the model will be the start of a culture change for both hospitalists and SNF specialists.

From Colorado, Hawaii, Northern California, Northwest, Southern California

7. Changing Regional Surgical Practice to Improve Quality and Efficiency of Care

Charles Meltzer, MD

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Background: Customary referral patterns did not distinguish between higher- and lower-volume surgeons. In 2008-2013, 63% of

patients underwent thyroid procedures by low-volume (< 10 cases per year) surgeons, who had significantly higher rates of complications and 30-day readmissions—and who performed many fewer surgeries on an outpatient basis than higher-volume surgeons: 3% vs. 13% for total thyroidectomies and 29% vs. 46% for hemithyroidectomies. When appropriate, outpatient surgery is both more efficient and preferred by many patients.

Methods: *Population:* Patients with thyroid nodules or primary hyperparathyroidism being considered for surgery. *Intervention:* A multidisciplinary group (Head and Neck Surgery, General Surgery, Endocrinology, Medical Imaging, and Pathology) developed workflows identifying patient management steps, responsible providers, and key metrics. Group members became specialty champions. Published analyses of Kaiser Permanente data demonstrated the need for change. Lower volume surgeons could opt out of performing procedures or increase case volumes. A patient education pamphlet was created to support outpatient procedures. Surgeon-level quarterly reports track metrics. *Comparison:* 2008-2013. *Outcome measures:* Proportions of low-volume surgeons performing thyroid/parathyroid surgery and outpatient procedures and complication rates.

Results: In 2014-2017, the proportion of low-volume surgeons (< 10 cases/y) performing thyroid surgery decreased from 56% to 34%, the proportion of total thyroidectomies performed by low-volume surgeons decreased from 12% to 6%, and the proportion of same-day outpatient procedures increased from 42% to 73%. Among patients undergoing total thyroidectomy, the rate of 30-day all-cause readmissions decreased from 3.5% in 2014 to 2.6% in 2015-2016. The rate of hematomas decreased from 0.3% in 2014 to 0.1% in 2015-2016, and the rate of transient hypocalcemia decreased from 7.8% in 2014 to 6.2% in 2015-2016. In 2016, Lokahi funding supported spread to Colorado Permanente Medical Group (June), Northwest Permanente (August), Hawaii Permanente Medical Group (October), and Southern California Permanente Medical Group (December). Data on interregional spread will also be presented.

Discussion: Changing surgical practice to improve quality is possible with organization-specific data demonstrating the need for change, multidisciplinary champions building workflows that follow clinical practice guidelines and define provider responsibilities, development of provider-level reporting to assure quality outcomes and process adherence, and strong leadership support. Accelerating spread across Regions requires vertical and horizontal alignment of improvement priorities at national, regional, and local levels, executive support, streamlined access to analytic resources and expertise. Taking down the silos across the program to promote active collaboration on an ongoing basis fosters clinical leaders who are adept at both evidence-based care and ongoing performance improvement.

From Colorado, Georgia, Hawaii, Northern California, Northwest, Southern California, Program Offices

8. Sepsis Showdown: A Unified, Interregional Approach to Sepsis Diagnosis and Treatment

Cara Steinkeler, MD; Kenneth Robinson, MD

DOI: <https://doi.org/10.7812/TPP/18-071-08>

Background: Sepsis-related diagnoses (SEP) are life-threatening conditions caused by a dysregulated host response to infection or

inflammation. Progression from signs of an inflammatory response to severe sepsis and septic shock requires prompt recognition and treatment to achieve the best clinical outcomes. Kaiser Permanente (KP) has been on a sustained journey to improve the care of patients with sepsis, with a goal of minimizing sepsis-related deaths and injury. In the past year, an interregional group has worked on additional resources, tools, and data to support these efforts.

Methods: In 2008, KP developed a performance-improvement program to screen and provide effective treatments to patients identified as at-risk for sepsis. The program included education of sepsis champions, quality improvement staff, and operational leadership; development of sepsis scorecards with performance metrics; and ongoing sharing of quality improvement strategies and novel sepsis-related initiatives. Clinical strategies for evaluating and treating patients with less severe sepsis have continued. In 2017 an interregional Sepsis Workgroup was chartered by the KP National Quality Committee. Landscape analysis, definitions and guidelines, and analytics subgroups have completed work which will be shared during this session.

Results: During the past 6 years, increased awareness about sepsis has led to better identification of patients, resulting in an increased number of cases coded as having sepsis, severe sepsis, and septic shock. Mortality among patients admitted to Kaiser Foundation Hospitals with sepsis decreased from 12.0% to 8.1%, and for those patients with severe sepsis and septic shock, mortality over this same 6-year period has decreased from 20.2% to 13.1%. However, in Kaiser Foundation Hospitals, performance on SEP-1 (the bundle of sepsis and severe sepsis/septic shock process measures) varies from 46% to 86%. Although KP outcomes such as inpatient mortality for patients with sepsis-related conditions are lower than those reported in the literature, there are opportunities to improve performance on sepsis bundles/process measures.

Discussion: Chart audits for the Centers for Medicare and Medicaid Services core measures for sepsis may not reflect performance, and thus the focus of this work has been on mortality. However, standardization of metrics across Regions and an automated means of obtaining data will provide better information on performance. Members of the interregional Sepsis Workgroup will share leading practices from across KP for early identification and risk stratification of patients with sepsis. Decision-support and documentation tools will be shared as well educational resources. A status update will be provided on analytic work in progress to improve automated abstraction of sepsis processes and outcome measures.

From Northern California

9. Preventing Unrecognized Deterioration and Honoring Patients' Goals of Care by Embedding an Automated Early-Warning System in Hospital Workflows

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DOI: <https://doi.org/10.7812/TPP/18-071-09>

Background: Acute deterioration of hospitalized patients outside of the intensive care unit (ICU) is a preventable quality and patient safety issue that is associated with excess mortality and morbidity. The failure to recognize, communicate, or act on these early changes

can lead to delays in care and adverse events, including unplanned admissions to the ICU and unexpected deaths.

Methods: We describe the impact of implementing the advance alert monitor (AAM) early warning system using a remote quality nursing team in combination with standardized hospital rescue workflows (inclusive of supportive care to ensure patient preferences are respected) to reduce inpatient and 30-day postdischarge mortality in high-risk medical surgical patients who trigger the AAM alert. We compared mortality outcomes for cases (patients who triggered the AAM alert and received the AAM standard workflow intervention) with controls (patients who triggered the AAM alert and did not receive the AAM intervention) in hospitals in the same integrated network.

Results: Our analysis describes the results from a difference-in-differences evaluation comparing the preimplementation period to the postimplementation period at Kaiser Permanente Northern California hospitals with the AAM intervention relative to those without it, adjusting for patient characteristics. Hospitals employing the intervention showed a statistically significant reduction in hospital and 30-day mortality for the patients who triggered the early warning system relative to a similar patient population at hospitals without the intervention. Several hospitals with the AAM intervention also demonstrated statistically significant decreases in length of stay.

Discussion: The AAM tool combined with review by a remote nursing team and standardized hospital workflows represents a systematic approach to reducing mortality for this at-risk population. Although AAM is the technology for proactive detection, it is only through workflow, culture change, and increased situational awareness that we can make a difference in outcomes. We are spreading this program to all hospitals in Kaiser Permanente Northern California. AAM is a first step toward a vision where predictive analytics and remote monitoring ensure that acutely ill patients remain safe from harm, and their goals are incorporated into treatment decisions before adverse outcomes occur.

From Colorado

10. Using Lean Management to Drive Improvement at East Denver Medical Office

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DOI: <https://doi.org/10.7812/TPP/18-071-10>

Background: The East Denver Medical Office Building (MOB) has historically scored below the regional average in Patient Satisfaction and People Pulse scores. In early 2017, East Denver leadership partnered with the Kaiser Permanente (KP) Colorado (KPCO) Regional Performance Improvement team to implement a Lean Management system to drive MOB improvement. The system entailed conducting a value stream analysis, implementing an MOB visual management system and leader standard work, and conducting several innovative pilot projects aimed at improving the member experience.

Methods: In early 2017 the East Denver MOB leadership team consisting of department managers, chiefs, and unit-based teams coleads participated in a value stream analysis to identify areas of improvement. The analysis consisted of three interactive half-day sessions in which teams mapped the entire value stream of the member

experience from MOB entry to exit. Several areas of opportunity were identified including 1) patient reception and welcoming process, 2) patient wayfinding and physical navigation, and 3) interdepartmental communication. The goal was to improve member satisfaction and create a “Speak-up” culture at East Denver MOB.

Results: Patient satisfaction scores improved significantly from 2016 to 2017 on a number of scales including Overall Satisfaction (59% to 68%), Likelihood to Recommend KP (46% to 52%) and Coordination of Care (43% to 49%). MOB People Pulse scores improved across all 15 indexes from 2016 to 2017. The following themes achieved the greatest improvement: Line of Sight (9% improvement), Feedback and Development (8% improvement), and Engagement Index (5% improvement). In addition, East Denver MOB scored higher than the Colorado Region on all 15 indexes with the most pronounced being Integrity (7% higher than KPCO).

Discussion: Implementing a Lean Management system in an MOB engages frontline teams in solving problems that can improve the member experience, patient outcomes, as well as employee engagement and line of sight. It has the potential to improve efficiency, reduce waste, and enhance communication. However, this system will be most impactful when adopted by senior leadership and across the Region.

From Northern California

11. Spreading the News: Prevention of Hospital-Acquired Pneumonia is Possible

Cristine Lacerna, RN, MPH, CIC; David Witt, MD, FIDSA; Lawrence Block, Quality Oversight Support; Donna Patey, RN, CNS, WOCN

DOI: <https://doi.org/10.7812/TPP/18-071-11>

Background: A mortality review of hospitalized patients undertaken in 2008 identified hospital-acquired pneumonia (HAP) as a significant contributor to disability and death in the Northern California Region. A subsequent review done in 2012 showed that patients with HAP had longer hospital lengths of stay (an average of two weeks), were more likely to be discharged to skilled nursing facilities instead of home, and were six times more likely to die in the hospital. There were significantly more patients with HAP than those with ventilator-associated pneumonia (VAP). They were more likely to be recovering from routine surgery, elderly, tube-fed, or sedated than patients without pneumonia.

Methods: From 2010 to 2011, the HAP Prevention bundle was tested in pilot sites across the Region. We deployed the bundle to all sites in 2013. Interventions included patient ambulation, upright posture for meals, oral antiseptics, regular incentive spirometry, and reducing the use of sedatives. Decision-support tools were developed, such as banners that alert nurses that a patient is a pneumonia or aspiration risk, as well as a pneumonia provider order set. Reports on performance in the prevention measures were distributed regularly. Collaboration with perioperative teams allowed the inclusion of incentive spirometers in the scheduling kit for surgical patients. HAP was the outcome and confirmed by a natural language extraction algorithm from the radiology result identified as a new opacity, sustained for 24 hours in a chest x-ray obtained 48 hours after hospital admission. Process measures include ambulation rate, compliance with oral chlorhexidine, and benzodiazepine usage.

Results: In 2017, we reduced our HAP by more than 60% from a rate of 7.1 per 1000 admissions to 2.3 per 1000 admissions. Since the implementation, an estimated 308 deaths were prevented and 22,944 patient days saved.

Discussion: HAP was the leading cause of avoidable mortality in the Northern California Region. The reduction was substantial and addressed a risk lacking clinical practice guidelines and having a limited literature to base prevention practices on. This program fits perfectly with the Kaiser Permanente's mission to "provide high-quality, affordable health care services and to improve the health of our members." Preventing a hospital-acquired infection, such as pneumonia, demonstrates our commitment to high-quality care. Health care is made more affordable by preventing complications and associated increased lengths of stay. This project aligns with the organization's mission on affordability by decreasing significant patient morbidity and mortality.

From Colorado, Hawaii, Mid-Atlantic States, Northern California, Northwest, Southern California, Program Offices

12. Same-Day Bilateral Cataract Surgery: Providing More Value to Members and to Kaiser Permanente

Robin Cisneros; Neal Shorstein, MD; Alan Moreno

DOI: <https://doi.org/10.7812/TPP/18-071-12>

Background: Same-day bilateral cataract surgery (SDBCS) is patient-centered, translates evidence to practice, and improves value to members and Kaiser Permanente (KP). Value includes safety, health outcomes, quality, access, cost, convenience, or satisfaction. This project demonstrates results for patients undergoing cataract surgery and benefits from facilitating interregional clinical collaboration and interentity analysis. Work products include clinical and business cases that ease implementation burden and optimize SDBCS. Southern California Permanente Medical Group (SCPMG) Chiefs of Ophthalmology and Interregional Ophthalmology Practice Leaders established a 2018 goal to increase SDBCS.

Methods: *Population:* Approximately 90,000 members/y have cataract surgery. *Intervention:* The common cataract surgery in the US is performed on each eye, on separate days (delayed, sequential bilateral). *Comparison:* SDBCS is rare in the US because of Centers for Medicare and Medicaid Services reimbursement and fear of rare, bilateral complications. Worldwide rates of Same Day Bilateral Cataract Surgery (SDBCS) are rising. In 2015, KP's SDBCS regional rates varied from 0.3% (SCPMG) to 43.1% (Colorado Permanente Medical Group). *Outcome measures:* Refractive error, best-corrected visual acuity, and endophthalmitis. Evidence, including a large, published KP study, shows that SDBCS is safe and effective for appropriate patients and that risk of bilateral endophthalmitis is not supported in the literature.

Results: During the course of this 1-year project, cataract surgeons studied the evidence and compared available tools, process flows, and member and provider education. The Interregional New Technologies Committee reviewed the published evidence on health outcomes. Members who had both procedures were interviewed about their experiences. Decision Support analyzed surgery, visit, operative time, and pre- and postoperative times. Finance facilitated monthly meetings, documented work, and created deliverables such as the business and clinical cases. Though complete datasets are not yet available for 2017, SDBCS rates continue to increase whereas endophthalmitis rates

hold steady, as shown in the Northern California study. Conservative estimates of time savings from the member perspective because of SDBCS are approximately 3 hours, including visits, and 90 minutes of preoperative and postoperative time.

Discussion: Start with sound evidence of increased value to patients. Value was defined as what patients feel or care about. Member interviews demonstrated SDBCS added meaningful conveniences and savings; physicians not yet offering SDBCS listened. Patients' opinions and internal and external outcome data were packaged with implementation tools to reduce barriers to change. Clinicians received needed guidance from similarly motivated, interregional colleagues. The Health and Value Creation Initiative (HAVC)-accessed data, rallied administrative resources, facilitated monthly discussions, and provided business tools for physicians to work with their operational leaders. Regional work continues to translate this work into practice, monitor outcomes and utilization, and measure member satisfaction.

From Southern California

13. The Impact of Improving Access to Primary Care

David Glass, PhD; Michael H Kanter, MD; Paul Minardi, MD

DOI: <https://doi.org/10.7812/TPP/18-071-13>

Background: There is a large body of literature that posits that many problems in the US health care system would be greatly ameliorated if primary care were more readily available to patients. However, there is little evidence about how quickly and how much utilization would shift and costs change if ready access to primary care were provided. This study fills that gap. It also offers some sobering lessons about challenges that may be encountered.

Methods: This study examines patterns of utilization and costs of employees and dependents at a large employer across an eight-year period, both before (2007-2009) and after (2010-2014) the implementation of a worksite medical office in 2010. The worksite office offered convenient primary care services with no travel from work (for employees), essentially guaranteed same-day access, and had no copay. Trends in all visit rates and costs were compared for the intervention group at the employer with a control group of Kaiser Permanente members who lived in the same area.

Results: The worksite medical office intervention group had an increase in primary care visits relative to the control group (+43% vs +4%, $p < 0.001$). This was accompanied by a reduction in urgent care visits by the intervention group compared with the control group (-43% vs -5%, $p < 0.001$). There were no statistically significant differences in the other types of visits, and the total visit costs for the intervention group increased 5.7% vs 2.7% for the control group ($p = 0.008$). A subgroup analysis of the intervention group (comparing dependents to employees) found that the dependents achieved a reduction in costs of 2.7% ($p < 0.001$) across the study period.

Discussion: Worksite medical offices offer an avenue for providing highly convenient primary care to employees and dependents of large employers. The potential for long-term reduction in utilization and costs with better access to primary care is significant, but not easily nor automatically achieved. Four years after the opening of a worksite medical office, we found members did rapidly and strongly shift towards greater use of primary care. However, the path to cost savings was uneven. There is a large opportunity to further test this approach as 78% of large employers do not have a worksite medical office.

From Colorado, Southern California

14. Spreading and Scaling Kaiser Permanente's Primary Care Plus: An Interdisciplinary, Person-Centered Primary Care Model

Tracy Ellen Lippard, MD; Sara Armijo; Amy Wolf, MD; Linda Donner, MHA

DOI: <https://doi.org/10.7812/TPP/18-071-14>

Background: Kaiser Permanente (KP) is committed to developing and implementing a systematic, crossregional plan to design, test, and scale programs addressing patients with complex health and social needs. The positive impact of Primary Care Plus (PC+) in KP Colorado (KPCO) resulted in a desire to further learn about person-centered primary care team models across KP. In early 2017, KP launched a direct replication of the PC+ model in KP Southern California's (KPSC's) Woodland Hills Medical Center to understand the impact and scalability of PC+.

Methods: KPCO's PC+ followed strict eligibility criteria to capture high-need, persistently high-cost members older than age 65 years (or age 18-64 years who are enrolled in Medicare). The evaluation design was a prospective matched control study assessing cost and utilization of members from a single clinic at 12 months of enrollment. KPSC Woodland Hills' PC+ adheres to the same eligibility criteria, but the evaluation is a randomized controlled study design using an intention-to-treat approach. The evaluation will assess costs, utilization, and quality of life. All primary outcomes measures will be measured at 12 and 24 months from baseline.

Results: Most recent cohort study findings include statistically significant benefit in mean total health care costs at 12 months for PC+ members vs matched controls; cost savings in inpatient, Emergency Department, skilled nursing facility, and pharmacy expenditure buckets; and PC+ members were more likely to have been screened for depression and anxiety. In addition, the early assessment evaluation reported high satisfaction among practitioners, staff, members, and caregivers.

Discussion: As PC+ spread within KPCO and into KPSC, maintaining adherence to the patient population, core model components, and study design is critical in studying the long-term Triple Aim results of this complex care model. Documentation of PC+ protocols in an implementation guide played a critical role in the ability to spread the intervention to additional medical offices at KPCO and to a replication at Woodland Hills in KPSC. In 2017, Woodland Hills began replicating PC+, with consultative guidance from the KPCO PC+ leadership team; this allows for crossregional transfer and further study of this complex care model. Beginning in May 2018, PC+ will also be tested at the Los Angeles Medical Center in KPSC.

From Northern California

15. Imaging to Treatment: Leveraging Technology to Redesign Care for the Pulmonary Nodule Pathway

Ashish Patel, MD; Daniel Navarro, MD; Michael Rizzo, MD; Steven Levine, MD; Todd Osinski, MD

DOI: <https://doi.org/10.7812/TPP/18-071-15>

Background: A 68-year-old woman came to Kaiser Permanente (KP) Oakland Emergency Department in 2006 for symptoms of bowel

obstruction. Her hospital stay included a chest x-ray that showed an incidental lung nodule suspicious for cancer. She was treated for bowel obstruction, recovered, and went home. She returned 6 months later with shortness of breath and normal bowel function. Repeat chest x-ray showed a large mass consistent with advanced lung cancer.

Methods: A pilot study was started at KP Oakland in 2006 to see how we can improve our care for following-up abnormal lung nodules. All radiologists in the department were asked to flag any study that was suspicious of cancer. A medical assistant in the department kept the list and followed-up each patient to ensure the finding was addressed. Once the pilot demonstrated clinical need and patient benefit, the project was expanded to address the suspicious findings within 48 hours and support the primary care physician to expedite further work-up and treatment.

Results: Pilot: 650 patients (14/wk) were flagged with suspicious findings, of which 151 had cancer. Forty-eight patients (7%) were noted to have no intervention at 3 weeks, at which time the project intervened to ensure care. Expansion: 470 patients were followed. Of the 470 patients, 42 had cancer. The time from initial study, completion of the work-up, and seeing the treatment specialist was reduced from 40 days to 18 days.

Discussion: An effective program to follow incidental lung lesions was designed, tested, piloted, and spread to the entire KP Northern California Region by 2018. Our integrated technology tools allow radiologists to flag the study and the multidisciplinary care team members to take actionable steps in KP HealthConnect. Four centralized multidisciplinary teams (with pulmonologists, radiologists, thoracic surgeons, oncologists, and care coordinators) provide guidance to the primary care physician, on the basis of Comprehensive Cancer Network guidelines. The system provides a safety-net for new cancer diagnoses and expedites care for patients. The model is now being expanded for hepatobiliary, gastric, and adrenal cancer. This redesign in care, made possible by technology, will help us improve care for many more patients to come.

From Northern California, Southern California, Program Offices

16. Bringing Hospital Care into the Home: Designing for Spread of AMCAH and SY@H

Bruce Cohn, MD; David Wong, MD; Zeth Ajemian, MA

DOI: <https://doi.org/10.7812/TPP/18-071-16>

Background: The combination of an aging population requiring greater health care and increasing cost pressure on patients, families, and the health care system mandates that high-value solutions to common health care services be developed. Safety, efficiency, efficacy, and patient satisfaction help define high-value solutions to health care problems. Integrated health care systems need to exploit their unique assets to aggressively explore new models of high quality care. These programs are part of an ongoing trend to appropriately relocate care outside of the hospital setting.

Methods: The Advanced Medical Care at Home (AMCAH) program at Riverside Medical Center enrolls adult Kaiser Permanente (KP) members meeting InterQual criteria for hospital admission who present to the Emergency Department, Urgent Care Center, or Outpatient Clinic, or who meet early discharge requirements from the hospital with a qualifying diagnosis. This program targets patients who require

acute hospitalization for the following diagnoses: Congestive heart failure, cellulitis, diverticulitis, chronic obstructive pulmonary disease, pneumonia, and pyelonephritis. Key elements of the program include physician and nursing care, medication management, laboratory tests, member education, caregiver education, home safety assessment, and phone access to clinical support. The See You @ Home (SY@H) Program at Roseville Medical Center enrolls patients who either: 1) present to the Emergency Department; 2) are identified in the hospital; or 3) are identified as having increased risk for acute hospitalization and can receive appropriate interventions at home, in lieu of hospital admission or continued hospitalization. Patients receive daily physician interventions from hospital-based physicians that include home visits, administration of parenteral medications, and appropriate laboratory monitoring. Physicians are available to patients and families by direct telephone access 24/7. Home health nurses are used to provide care when appropriate. Following resolution and stabilization of the acute medical illness, care is transferred to typical outpatient practitioners. A case control matching analysis was used to evaluate program outcomes.

Results: AMCAH and SY@H have demonstrated excellent clinical outcomes, safe and effective medical care at home, prevention of decondition and reduced mobility, low programwide readmission rates, and the prevention of hospital-acquired conditions. Satisfaction results are positive in all aspects of care with patients once in the program requesting admission to AMCAH or SY@H vs hospitalization. AMCAH, on the basis of regional financial analysis, has shown the program is cost favorable compared with traditional hospital care for 7 and 30 days postepisode of care. SY@H has demonstrated utilization outcomes supporting expansion of this alternative care model. Enrolled patients were compared to nonenrolled patients based on diagnosis, gender, age, comorbidity (Comorbidity Point Score, v 2), and measures of acute physiologic derangement (Laboratory Acute Physiologic Score, v2).

Discussion: AMCAH and SY@H deliver the right care, at the right place, at the right time. These innovative models transform the way KP cares for patients and adds value by focusing on patient-centered care. Eligible members are receiving time-limited acute care services in the comfort of their own homes as an alternative to hospital admission and inpatient care. KP Southern California seeks to spread and scale the AMCAH program from Riverside Medical Center, starting with Panorama City Medical Center and working with additional demonstration sites to establish operating practices that support regional and national spread. KP Northern California has expanded SY@H to the Sacramento Medical Center as a first step toward spread.

From Colorado, Georgia, Hawaii, Mid-Atlantic States, Northern California, Northwest, Southern California, Washington, Program Offices
17. National Total Joint Replacement Initiative: A Case Study for Accelerated Systemwide Spread and Learning

Jeff Convissar, MD; Kate Koplan, MD; Ronald Navarro, MD; Violeta Rabrenovich, MHA, CHIE

DOI: <https://doi.org/10.7812/TPP/18-071-17>

Background: National Total Joint Replacement Initiative's (NTJRI's) approach balances safety, person centeredness, effectiveness, efficiency, equity, and timeliness. NTJRI provides an opportunity for clinically

appropriate patients to recover at home after surgery and to reduce any unnecessary time hospitalized in a facility, which can cut down on complications such as surgical infection and can allow patients to heal in a comfortable, safe environment by planning in advance for the support they will need after surgery. In addition, NTJRI provides a framework and a validated method to accelerate adoption of evidence-based practices and service improvement.

Methods: As the NTJRI work transitioned into a second year, NTJRI stakeholders recognized the importance of having a reliable methodology that evaluates performance on the basis of all aspects of Kaiser Permanente's (KP's) National Quality Strategy. The group developed an appropriate set of measures. Reports are issued quarterly, three months after the close of each quarter. Data for the previous three quarters are automatically updated and included in the charts in each report. In addition, we developed a process to set national and local targets, established a programwide directional target for each length of stay, and developed thresholds for monitoring of balancing measures and identified an appropriate set of benchmarks to compare our performance. The second-year regional gap analysis was conducted, demonstrating significant progress in the Regions.

Results: Each Region established its own length of stay targets that collectively combine to an overall KP programwide target of 22% 0-day and 57% 1-day surgeries. The NTJRI Quarter 3 2017 Report demonstrates an average length of stay (average of number of days past midnight between admission and discharge) decline during the past 12 months to 1.19, compared with 1.64 in Quarter 3 2016. At the national and local levels, quality and operational leaders monitor balancing measures to ensure safe and effective clinical care. Benchmarks have been set by the Total Joint Registry surgeon champions for return to Emergency Department and Urgent Care (ED/UC) within 7 days and hospital readmissions within 30 days. The benchmark for readmissions within 30 days is 3%. The benchmark for return to ED/UC within 7 days is 8%. According to NTJRI Quarter 3 2017 Report, our readmissions (2.7%) and return to ED/UC (7.1%) have remained stable.

Discussion: The learnings from NTJRI and the process can be transferred to other national and interregional initiatives. Collaborative efforts that support successful and reliable implementation of evidence-based practices require strong leadership and support of technical and operational leaders. Strategic alignment of national and regional improvement efforts enables accelerated improvements across the program. Strategically gathered and used patient input results in care delivery pathways that are embraced both by clinicians and patients.

From Colorado, Georgia, Hawaii, Mid-Atlantic States, Northern California, Northwest, Southern California, Washington, Program Offices
18. Care Without Delay

Serge Teplitsky, RN; Vivian Reyes, MD; Jennifer Misajet, RN; Catherine Winarsky, MPH, BSc (Pharm)

DOI: <https://doi.org/10.7812/TPP/18-071-18>

Background: Care Without Delay (CWD) is a model of care developed by Kaiser Permanente (KP) Southern California (KPSC) in Baldwin Park, which quickly produced remarkable outcomes. By aligning delivery system processes, CWD improves care timeliness, removes system barriers to care, provides a great care experience, and produces cost savings in a true Triple Aim fashion. Because of Baldwin Park's

outcomes, it was spread throughout KPSC and subsequently through KP Northern California (KPNC) with similar results. Now, it is being implemented in all Regions as KP's operating model.

Methods: *Problem:* Many hospital admissions are preventable and frequently patients are not cared for at the right level of care. Untimely care and care delays can lead to longer length of stay, hospital-acquired infections, increased costs, and reduced patient satisfaction. KP strives to improve quality of care in a highly reliable fashion. *Intervention:* A care team addresses all patient (medical and nonmedical) needs in a timely manner. The focus is on doing today's work today, long-term care planning, real-time peer review, escalations, communication and collaboration, and 24/7 staffing with strong leadership and oversight. *Comparison:* Baseline data (patient day rate [PDR], average length of stay, readmission rate, etc) from the previous year. *Outcome Measure:* Reduced PDR and improved quality, safety, and experience for patients.

Results: Benefits realized from CWD implementation have included a decline in PDR from > 300 to ~ 220 in KPNC and KPSC, decreased hospital mortality and reduced variation in PDR across KPNC facilities, and a decline in avoidable hospital days and care costs. The foundation for these results lie in the close patient care coordinator (PCC) and hospitalist partnership focused on the patient, including daily multidisciplinary rounding with the physician, the PCC, a bedside nurse, and the patient or patient's family, allowing immediate removal of barriers and escalation when necessary. Outcomes are a result of timely service availability at all hours, including weekends and after-hours (7-day hospitals), a focus on extended length of stay patients and reduced postacute placement barriers. In addition, CWD has received positive feedback from staff, physicians, and patients.

Discussion: CWD is an operating model that improves the quality and affordability of care KP members receive. It is a hospital-based model, but it can be adapted for non-KP facilities/Regions and services outside the inpatient setting. CWD provides a strong foundation on which to build other initiatives. Innovations for success include strong long view of care planning and application in other areas (eg, ambulatory care, skilled nursing facilities, behavioral health). Success factors for further spread include leveraging the Xcelerating Learning and Spread model as a common language for communication and to better understanding Regional status and needs.

MEDICATION MANAGEMENT

From Colorado, Georgia, Hawaii, Mid-Atlantic States, Northern California, Northwest, Southern California, Washington, Program Offices, The Permanente Federation

19. Optimal ESRD Starts: Moving Upstream Chronic Kidney Disease to Prevent or Delay End-Stage Renal Disease with Predictive Analytics

Sophie Taylor, RN; Alvina Sundang; Leonid Pravoverov, MD; Karen Ching, MD

DOI: <https://doi.org/10.7812/TPP/18-071-19>

Background: An Optimal End-Stage Renal Disease (ESRD) Start is defined as starting dialysis with a mature access such as arteriovenous fistula or graft, peritoneal dialysis catheter, or kidney transplant. Interventions in the earlier phases of chronic kidney disease (CKD) is the

next frontier in quality management of this population. A methodology for screening patients for proteinuria and accurately staging their CKD has been developed by members of the Nephrology Inter-Regional Clinical Practice Group and Federation Analytics staff. Findings show that 32% of eligible patients were not screened for proteinuria or albuminuria, and 87% of eligible patients have ACE inhibitor (ACEI) or angiotensin II receptor blockers (ARBs) ordered.

Methods: Members with progressive CKD stages 1-5 reaching ESRD. CKD stages defined using Kidney Disease Improving Global Outcomes Staging (stages glomerular filtration rate into nine groups and divides proteinuria stages into seven groups). CKD stages are assigned by requiring 2 outpatient serum creatinine tests > 90 days apart used to estimate glomerular filtration rate according to the CKD-epidemiology equation. To determine members' final CKD stage, a forward-looking algorithm is run until the algorithm reaches the most recent eGFR. Then, all Kaiser Permanente (KP) members are grouped using a standardized method across KP into distinct CKD groups, and this data becomes the foundation for tracking 2 metrics: Proteinuria Screening in CKD1-4 members and ACEI/ARB Treatment in hypertensive CKD1-4 members. The outcome measure will be to evaluate ESRD incidence over time.

Results: Of the 223,627 patients who met the criteria for screening of albuminuria/proteinuria, 32.38% did not receive screening. Of those meeting criteria for ACEI/ARB, 87.40% have ACEI or ARBs prescribed. Regional results for screening of albuminuria/proteinuria vary from 14% to 65%, and for ACEI or ARBs prescribed vary from 78% to 88%. Across the program, the estimated number of patients currently requiring albuminuria/proteinuria testing is approximately 72,000. The maximum for ACEI/ARB treatment is unknown but barring uncontrollable hyperkalemia, most nonallergic patients should be able to take one or the other. We believe 95% is attainable, and KP is currently at 87% nationally. Thus, there are about 4200 candidates for therapy.

Discussion: As the work on Optimal ESRD Starts continues, validation of the North-West Prediction Model in three Regions (Georgia, Northern California, and Hawaii) determined that the model performs very well. Further stratification of proteinuria screening-eligible candidates is needed to identify the most urgent patients at risk and to address this cohort first. Next steps include establishing workflows to screen, stage, and manage CKD patients in each Region.

From Colorado

20. Committee for Improvement of Performance Through People: Strengthening Influence Over Work and Engagement in Primary Care Clinical Pharmacy

Beverly Kroner, PharmD; Alex Block, PharmD

DOI: <https://doi.org/10.7812/TPP/18-071-20>

Background: Leaders in organizations often say people are their most important assets, yet actions may not always demonstrate this. Supervisors typically try to keep their barometer in the middle, with the organization at one end and the people at the other. In tough times, such as when the financial picture is not looking positive, people are often given less attention and may feel less valued. We wanted to move our barometer more towards people.

Methods: *Problem:* We say people are our number one priority,

but our actions may not always demonstrate this. *Intervention:* After a supervisory off-site meeting with the theme of people, supervisors invited 4 team members to work with them to ensure a renewed focus on people. *Comparison:* People Pulse results in 2017 increased in 16 of 16 indices compared with 2016. *Outcome Measures:* The work unit index (most influential for supervisors) increased by 6 points to 95% and the engagement index increased by 11 points to 90%. The statement, "I have enough say in how I do my job" increased 17 points to 86%.

Results: Primary Care Clinical Pharmacy Services (PCCPS) includes 38 clinical pharmacy specialists supporting patient care teams in 28 ambulatory medical offices. Four team members and the supervisory team formed the Committee for Improvement of Performance through People (CIP2) in April 2016. CIP2 members worked directly with the PCCPS team and supervisory team to identify perceived problems and to develop possible solutions. CIP2 members sent a survey to the team in May 2016. Five major themes were identified from the survey results (Flexibility, Autonomy, Collaboration, Work Environment, and Career Support), and items were further stratified into 1 of 4 quadrants: 1) easy, noncontroversial; 2) easy, controversial; 3) hard, noncontroversial; and 4) hard, controversial. CIP2 delegated responsibilities for individual items, commencing work with easy, noncontroversial items.

Discussion: The Colorado Region has faced significant challenges in providing affordable care to a growing population of shorter-term members with high-deductible coverage. A reaction has been to ask even more of care teams to improve performance. As an alternative reaction, the PCCPS supervisory team collaborated with a team of frontline staff on working smarter and removing barriers to allow the team to work even more efficiently while still delivering on quality, safety, and affordability initiatives. One limitation to expanding this concept is CIP2 members had the respect and credibility of the PCCPS team. Without this, they might not have been as successful.

From Northern California

21. Deprescribing: A Graduation in Medicine

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DOI: <https://doi.org/10.7812/TPP/18-071-21>

Background: By 2050, the US Census Bureau projects that the US population of adults older than age 65 years will nearly double. Human aging results in physiologic changes, frailty, and added comorbidities that require multiple medications to treat age-related medical conditions. Accordingly, the issue of polypharmacy is increasingly reported in the literature. With more medications, elderly patients tend to have complex medication regimens, often leading to nonadherence, adverse drug events, and a reduced quality of life.

Methods: In partnership with Kaiser Permanente (KP) Northern California Clinical Pharmacy, The Permanente Medical Group Quality, Primary Care, subject matter experts, the Institute for Healthcare Improvement, and the Commonwealth Fund, we designed a pharmacist-led deprescribing program to reduce potentially unnecessary/unsafe medication use in the elderly. *Targeted initiatives:* Well-controlled diabetes and blood pressure, chronic nonsteroidal anti-inflammatory drugs, controlled triglycerides on fibrates, and glucose test strips. Additionally, internal and external partnerships were established

to ensure effective dissemination of resources for the deprescribing movement. Although deprescribing exists in KP in siloed forms, we aim to address the big picture by establishing central deprescribing resources, sharing broadly, and supporting deprescribing conversations in all settings.

Results: The project went from idea to regionwide operation in 4 months. During the 15 months of operations since, the pharmacist-led deprescribing program has touched more than 5000 patient lives and decreased medication/self-testing burden for nearly 3000. Clinical and financial outcomes research is underway. An interim analysis showed 95% of patients with diabetes maintained goals of hemoglobin A_{1c} < 7.5% (n ~ 500) and 97% of blood pressure patients maintained goals of systolic blood pressure < 140 (n ~ 40) at 90 days postdeprescribing. The Permanente Medical Group and KP Northern California Clinical Pharmacy worked together to establish partnerships on this topic of deprescribing and polypharmacy. The team also received a grant from the Institute for Healthcare Improvement and Commonwealth Fund to apply performance improvement principles to the pharmacist-led deprescribing programs.

Discussion: A broad range of partnerships is crucial to creating a movement in health care: Nimble use of technology is vital. The core team created a central OneNote. Structured query language algorithms were quickly created and adjusted to identify potential patients to include in the program. Custom KP HealthConnect data elements were built. Tableau was used for automated dashboards. Performance improvement ensures monitoring toward goals. The team applied driver diagrams, process charts, Plan-Do-Study-Act cycles, run charts, Model for Understanding Success in Quality assessments, strengths, weaknesses, opportunities, and threats analysis, aim statements, and more. *Research:* The project is building the foundations of research for patients who have participated in the deprescribing program. Next steps are to spread the message of deprescribing systematically.

From Washington

22. Pharmacy and Care Management Collaboration to Improve Health Outcomes through Medication Reconciliation Program Expansion

Bryan Davis, PharmD

DOI: <https://doi.org/10.7812/TPP/18-071-22>

Background: Pharmacy and Care Management departments formed a collaboration to expand Kaiser Permanente Washington's (KPWA's) medication reconciliation program from approximately 4700 medication reconciliations per year to a target of more than 17,000 medication reconciliations per year because of a new Centers for Medicare and Medicaid Services 5-Star measure: Medication Reconciliation Postdischarge (MRP). Medication reconciliation has been shown to decrease adverse medication events and has demonstrated potential impact on hospital readmissions. Health and safety outcomes were followed for 6 months to evaluate the program's expansion impact.

Methods: *Population:* All KPWA Medicare patients. *Intervention:* KPWA expanded the medication reconciliation program to all Medicare patients as compared with the original program, which only served "high-risk" patients determined by an internal modified LACE (length of stay, admission, comorbidities, Emergency Department visits in last 6 months) risk stratification tool. *Comparison:* Baseline

measures from prior years. *Outcome measures:* Program impact will be measured by observing readmission data as it pertains to the Healthcare Effectiveness Data and Information Set (HEDIS) Plan All-cause Readmission (PCR) measure described as an O/E ratio (observed/expected readmission ratio). Two Tableau (Seattle, WA) dashboards were built to track the percentage of successful medication reconciliations and to track trends in the O/E ratio that include analyses of patients who have received medication reconciliation.

Results: Initial analysis suggests a correlation between increased successful medication reconciliations and decreased O/E ratio. Successful medication reconciliation increased from a baseline average of about 35% of all Medicare patients to approximately 70% of all Medicare patients during a 3-month timespan. During this 3-month period, the overall O/E ratio decreased 0.15 for all Medicare patients who received medication reconciliation. Evaluating a specific population that had not received postdischarge medication reconciliation in years prior (Medicare patients deemed as “moderate-risk” for readmission), an overall decrease of 0.56 was observed in the O/E ratio (0.44 decrease from year before); and an overall decrease of 0.03 was observed regardless of medication reconciliation, indicating minimal impact because of other process changes.

Discussion: Several variables can have contributions when it comes to evaluating impact on readmissions; however, the timing of the program expansion and the decrease in O/E ratio postulates a direct impact. Readmission data will continue to be followed to confirm the observed trends. The collaboration between pharmacists, care management nurses, home health clinicians, and primary care providers has shown a positive impact on health outcomes and allows for multiple perspectives to identify problems that provides a more holistic and patient-centered focus. This program highlights how medication reconciliation can be successfully leveraged across multiple providers and should be considered across KP programs.

From Northwest

23. “There’s No Place Like Home”: Creating a Safe, Individualized, Transitional Care Pathway After a Skilled Nursing Facility Stay

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DOI: <https://doi.org/10.7812/TPP/18-071-23>

Background: Care transitions from skilled nursing facilities (SNF) to home is a known clinical quality gap for medication reconciliation and safe, coordinated follow-up care. Kaiser Permanente Northwest 2016 baseline performance of Hospital 30-day All Cause Readmission Rate for this population is higher than expected at 21% and indicates an opportunity for improvement. The objective is to improve safe transitions of care from SNF, reduce avoidable hospital readmissions, and prevent serious medication discrepancies causing an adverse drug event.

Methods: The target population is patients from contracted SNFs in the East Service Area who discharge to home or to a homelike facility. The intervention is the execution of a SNF Transition Bundle, which includes risk stratification, a transition hotline number, standardized discharge summary, pharmacist medication reconciliation, a transition nurse (RN) follow-up call or mobile health partner home visit, and practitioner follow-up appointment within 7 days. The target population was compared with patients discharged from contracted SNFs

outside the East Service Area. The success measures are decreased 30-day hospital readmission rate, decreased harmful medication discrepancies and/or errors, and improved care experience with safer transitions.

Results: Outcomes and performance at Friendship SNF (baseline through September 2017): Hospital 30-day readmission rate decreased from 22.6% to 17.3% after Transition Bundle elements were implemented from January to year end. Serious medication errors at discharge decreased from 42% to 5%. Medication Reconciliation Post-discharge (Centers for Medicare and Medicaid Services 5-star) increased from 14% to 80% (rolling 12-month rate). East Service Area SNF Transition Bundle performance results from first 6 months (June-Nov): Pharmacist medication reconciliation for 91% of patients; follow-up contact (RN phone call or mobile health partner home visit) for 81% of patients; follow-up appointment within 7 days for 47% of high-risk patients.

Discussion: Medication issues are complex and confusing for patients after SNF transitions of care and require dedicated resources to optimize reconciliation in the home. Coordination of care is improved with transition RN calls including family education, assistance with follow-up appointment, transportation, financial assistance, coordination with multiple teams, and action on acute symptoms. Contracted SNFs can be influenced to support safer medication processes, discharge processes, and patient education. Workflow improvement is needed to reduce duplication and rework, and build efficiency. The next step is to spread the SNF Transition Bundle model of care to all contracted SNFs in the Region.

From Northern California

24. Collaborative Protocols between Physicians and Pharmacy Groups to Facilitate Opioid Reduction in the Napa-Solano Service Area

Jeff Chen, PharmD; Diparshi Mukherjee, DO

DOI: <https://doi.org/10.7812/TPP/18-071-24>

Background: The opioid epidemic is responsible for 6 out of 10 drug overdose deaths and, since 1999, prescription drug deaths from oxycodone, hydrocodone, and methadone have more than quadrupled. Historically, the Napa-Solano Service Area had the highest usage of hydrocodone/acetaminophen combination opioid prescription count out of any other service area in Northern California. The opioid reduction committee, commenced in March of 2016, is meant to tackle the issue of opioid use with support from medicine and psychiatry and with collaboration from the pharmacy group.

Methods: *Population:* Napa-Solano’s high rate of opioid utilization. *Intervention:* Physician education, academic detailing, peer-comparison information, and opioid taper. *Comparison:* Northern California service areas outside of the Napa-Solano Service Area. *Outcome measures:* Total morphine milligram equivalents (MME) reduction, total opioid tablet reduction, total opioid/acetaminophen combination tablet reduction, total oxycontin tablet reduction, and total alprazolam tablet reduction.

Results: Quantitative findings: Total MME reduction; total opioid tablet reduction; total hydrocodone/acetaminophen combination tablet reduction; alprazolam (Xanax) reduction; oxycontin reduction; and trinity (any opioid + benzodiazepine + skeletal muscle

relaxant combinations, including carisoprodol) reduction. Charts: Acetaminophen/Opioid Combination Prescriptions and Total Alprazolam Quantity Reduction.

Discussion: Establishment of site champions as point persons to facilitate communication of new opioid initiatives is vital to the success of the opioid reduction program. Assembly of the Opioid Reduction Committee with support from Chiefs of Medicine, Emergency Department, and Psychiatry is the key to obtaining buy-in. Pharmacy collection of opioid data and frontline escalation of appropriate prescriptions to providers fuel the momentum of opioid reduction initiatives. Intensification of current MME threshold to ≤ 50 MME. Implementation of 20-tablet opioid limit for nonsurgical and 50-tablet opioid limit for surgical patients allowing exception for complex orthopedic postoperative patients on a case-by-case basis.

From Colorado, Georgia, Hawaii, Northern California, Northwest, Southern California, Program Offices

25. Improving Performance on Medicare Stars Medication Adherence Measures through Predictive Analytics

Heather Qian, MBA; Lynn Deguzman, PharmD, BDGP; Scott Jacobs; Kevin Chiang, PharmD; Chris Chang, PharmD, BCGP, PMP

DOI: <https://doi.org/10.7812/TPP/18-071-25>

Background: Low medication adherence is associated with worse clinical and quality outcomes. Accordingly, Centers for Medicare and Medicaid Services measures adherence to statin, blood pressure, and diabetes medications as part of its Medicare Part C and D Star Ratings. These 3 triple-weighted measures represent 11% of the Star Ratings portfolio. Annual changes and competitor improvements continue to raise the bar on performance required for 5 stars.

Methods: *Population:* Actionable patient lists were created by Pharmacy Analytical Services starting in 2015 and delivered through the centralized Permanente Online Interactive Network Tool (POINT) Medication Adherence Tool (MAT) for all Regions. These lists identified patients for intervention by regional pharmacy teams and included a date for each patient by which time refills must be made or the patient will be below the 80% adherence goal (per Medicare 5-Star program threshold) at year end. *Interventions:* Aside from live telephone calls, interventions included automated reminder calls, interactive texting reminders, batch kp.org messages, and outpatient pharmacy clinical services (OPCS) consultation modules. To prioritize outreach under limited resources, a predictive risk score was introduced in Q3 2017 to identify the highest-risk patients.

Results: Adherence scores have improved since the 2015 inception of the medication adherence programs, which leveraged analytic reporting through the POINT/MAT tool. Pharmacist and support staff outreach improved refill rates compared with a control group (39% vs 16% within 7 days, 46% vs 29% within 14 days). Telephone calls are among the most effective interventions for medication adherence. Across 7 Regions, the programs touched more than 160,000 patients in 2016 and 200,000 in 2017. Predictive risk modeling was implemented in Q3 2017. Because of data availability constraints since year end, the impact of the model is still being assessed, with results anticipated in Q1 2018. Outreach data and refill outcomes were collected. Work and partnerships are ongoing to enhance the predictive models in an iterative process.

Discussion: To improve quality outcomes while maintaining 5-Star ratings in medication adherence, pharmacy is building actionable analytics for adherence outreach and developing risk models for population management. This is made possible by internal partnerships within and between Regions, and with Program Office and data partners. Choosing to build analytics in-house leads to a continued cycle of investigative learning, monitoring outcomes, and development of workflows. Setting up analytic plans to track and to evaluate new tools (eg, predictive models) before tool implementation is important for value capture. Work is underway across the Regions to evaluate and enhance the new predictive models, leading to a more efficient and effective programwide effort.

PATIENT ENGAGEMENT

From Colorado

26. A Successful Multimodal Initiative to Increase Access to Long-Acting Reversible Contraception Among Adolescents

Sharisse Arnold-Rehring, MD, FAAP; Jennifer Seidel, MD

DOI: <https://doi.org/10.7812/TPP/18-071-26>

Background: The US has the highest teen pregnancy rate of developed nations. These primarily unintended births suffer high rates of poor maternal and infant health outcomes. When financial, educational, and access barriers to contraception are removed, adolescents overwhelmingly choose long-acting reversible contraception (LARC), the most effective, safest, and most cost-efficient option. The Kaiser Permanente (KP) Colorado (KPCO) initiative was uniquely designed to address educational and logistical barriers within the KP integrated health system, using existing infrastructure and focusing on training frontline pediatric providers, resulting in wider use of LARC among adolescents.

Methods: The cohort included all female adolescents age 13-18 years cared for by KPCO pediatric, primary care, and women's health clinicians between January 2013 and December 2016. The educational intervention included journal clubs, live interactive educational sessions, and in-service training of clinical staff. Primary care clinicians who received training on LARC were linked with a mentor gynecologist to provide further support. The process improvement intervention included development of a LARC implementation toolkit in the electronic health record to assist with prescribing, documentation, consent, and procedural set up, as well as clinical library guidelines and patient education materials on contraceptive choice.

Results: The proportion of LARC placed by primary care clinicians increased from 5.8% in 2013 to 32.5% in 2016 ($p < 0.001$), with the overall rate of LARC placement increasing from 1.5/1000 members/quarter to 4.8/1000 members/quarter. By the end of the intervention, 61 primary care clinicians had LARC training (vs 8 at baseline) and they practiced in 22 of the 27 primary care clinics (vs 10 at baseline.) Pregnancy rates declined from 1.6/1000 women aged 13-18/quarter to 0.2/1000 women in the same time period. The rate of decline accelerated after the beginning of the intervention ($p < 0.0001$). LARC educational materials and toolkits have been disseminated to the KP inter-regional obstetrics/gynecology Chiefs and family planning groups, and thus the socialization and spread of this initiative is already underway.

Discussion: A multimodal initiative that combined principles of adult learning, effective education, behavior change, and system-based process improvement successfully transformed clinician behavior, resulting in increased uptake of LARC by adolescents at KPCO. Although this LARC intervention should be adopted as a KP best practice, the true promise of this work is to apply this comprehensive approach for promoting clinician behavior change to other important quality issues within KP.

From Hawaii

27. Patient Partners Redesign kp.org Personal Action Plans

Hewyon Jun, MD, MPH; Gordon Ching, MBA; Julia Gregory, RN, BSN

DOI: <https://doi.org/10.7812/TPP/18-071-27>

Background: The Personal Action Plan provides members, registered on kp.org, with individualized up-to-date personal information on cancer screenings, preventive care, heart health, chronic health conditions, medications, immunizations, and more.

Methods: The Personal Action Plan engages members to close care gaps. Program/product from Southern California was presented to Hawaii patient partners. Eleven patient partners worked with the analytics team and providers from the Hawaii Permanente Medical Group to redesign the product. These patient partners represented members from Oahu, Maui, and the Big Island (August 2017). Two sessions were facilitated to gather their input and the finished product was presented to the Patient and Family Centered Care Advisor Council meeting on Oahu and Maui.

Results: Qualitative: Satisfaction from advisors and staff in participating. Quantitative: Key revisions included changing structure to be more member centered, creating a framework for display layout, standardizing the “why” section text. The overall product before getting patient partner input was quite different from the product after patient partner input. Use of the Personal Action Plans has increased since launch of the redesign (November 2017).

Discussion: Take-home message: Patient partner input is invaluable. Learnings: Advisors could have been involved sooner. Staff learned that engaging with advisors was less intimidating than initially thought and exceeded expectations.

From Southern California

28. Nothing About Patients Without Patients: Strategically Partnering with Leadership for Patient-Centered Outcomes

Linda Fahey, RN, NP, MSN; Kerry Litman, MD; Susie Becken; Barbara Lewis; Diana Palma, MHA

DOI: <https://doi.org/10.7812/TPP/18-071-28>

Background: Engaging with patients/families improves quality, safety, care experience, and affordability but is not yet a “core value” throughout Kaiser Permanente (KP). Patient Advisory Councils exist in most KP Medical Centers but are not consistently used in improvement work. We will share tools and processes that make advisory councils and patient collaboration more effective, creating a “continuous cycle,” in which more positive results lead to more demand for future patient engagement, adding positive energy to this work.

Methods: Previously, KP had been behind the movement of creating effective Patient Advisory Councils and welcoming advisors’ feedback compared to many of the more than 5000 US hospitals. KP has pulled ahead as a leader in embedding the patient voice in health care with the strong support of our executive leaders. The KP Southern California (KPSC) Regional Patient Advisory Council (RPAC) has created a valuable model for a successful regional approach to improve person-centeredness. We have developed a powerful and effective workflow and improvement process with tools, surveys, and metrics leading to many successes. For example, groups requesting RPAC advisors fill out forms that provide RPAC with important information about the activity, and informs the group about advisors’ expectations.

Results: The RPAC in Southern California has created an impact log detailing the effect that our patient advisors have had on a range of activities. We will share examples and an in-depth case study outlining how involving patients has positively affected KPSC’s Online Personal Action Plan (oPAP), developed to provide virtual access for patients to personal health information/goals. KPSC oPAP leaders collaborated with RPAC to create a more patient-friendly, effective program than originally developed. The KPSC oPAP system has become more effective, and more widely used after implementation of the new patient “codesigned” system. In addition, redesign of colonoscopy prep instructions, implementation of the redesigned ambulatory offices, pharmacy issues, and many other areas were improved by asking for and acting on input from RPAC.

Discussion: “Nothing about patients without patients” is a key strategy noteworthy for adoption throughout KP. However, the process of embedding the patient voice in everything we do requires a clear process. RPAC has time-tested our workflow, incorporating advisors’ feedback to optimize impact. A comprehensive procedure ensures success for meaningful advisor participation on councils, conferences, committees, workgroups, etc. This session provides attendees with a road map and a playbook to demonstrate how embedding the patient voice can improve safety, enhance the patient experience, and save money to optimize patient- and family-centered care.

From Program Offices

29. Human-Centered Design@KP: Building Organizational Capacity in Innovation and Patient Engagement

Loulia Kachirskaia, PhD; Jeff Hall; Jonathan Bullock

DOI: <https://doi.org/10.7812/TPP/18-071-29>

Background: This is a new time in health care. Engaging and delighting our customers is a critical part of the Triple Aim. Human-centered design helps us uncover customer needs, define opportunities, imagine new possibilities, and rapidly test new ways to improve and design care. At Kaiser Permanente (KP), we take human-centered design to the next level by also partnering with our members through CoDesign.

Methods: Applied to multiple projects.

Results: We have trained 1000+ KP staff in human-centered design and CoDesign. By using Human-Centered Design@KP, staff report the following benefits: Greater customer engagement, more innovative solutions, solutions that meet customer needs better, and avoiding working on the wrong problem.

Discussion: Human-Centered Design@KP is spreading across the organization as a way to navigate a complex health care future together with our members and to tackle new challenges. It is an approach that is applicable to any role at KP. Learn how to leverage it for your team.

From Northern California, Northwest

30. Engaging with Members to Develop a Person-Centered Transgender Care Program

Felipe Dest, MHA; Erica Metz, MD; James Kelleher, RN; Stephanie Detlefsen, MD; Erin Waters

DOI: <https://doi.org/10.7812/TPP/18-071-30>

Background: Kaiser Permanente (KP) is dedicated to providing care to the diverse members and communities we serve. Involving members in designing care and services ensures that we are meeting their health care needs in a meaningful way. A recent survey by the National Center for Transgender Equality (NCTE) illuminated that 23% of transgender people avoided health care in the previous year because of fear of being mistreated; 33% had a negative experience receiving health care in the previous year related to being transgender; and 90% of transgender people surveyed believe there are not enough providers adequately trained to care for them. Both the KP Northwest (KPNW) and KP Northern California (KPNC) Regions engaged with members; through the CoDesign process, members helped to inform what services and performance improvements were needed to deliver high-quality, affirming care to transgender members.

Methods: *KPNW:* The Gender Pathways Clinic did not have adequate resources to meet the growing demand of members seeking transgender care. It was difficult for new members to find resources online. Patient partners and staff identified improvements, developed action plans and measures, and conducted tests of change. These are now in place with future plans to create a full-time patient advisory council. *KPNC: Problem:* There is no mechanism to engage with transgender members to ensure the care program we are building serves them and meets their needs. *Intervention:* Develop multiple mechanisms for patient engagement (Focus Groups, Councils, CoDesign Teams, Peer Navigation). *Comparison:* No engagement. *Outcome measures:* Implementation of improvement efforts that members identify as valuable to them.

Results: *KPNW:* Within the past year, 2 new members are now participating in the CoDesign meetings, making a total of 5 members. In addition, the clinic has been able to hire 2 pediatric providers, 1 licensed professional counselor, and 1 physician. The Community Navigator for the clinic has gone out to 38 different health care groups to educate staff about transgender care and promote the clinic. There is now a Web site for our patients and a folder for new members that can be customized on the basis of the needs and interests of each member. There is a plan to conduct prototype testing with new members to evaluate all the educational material that has been developed. *NCAL:* 1) Operational improvements (eg, a change in welcome scripting at the injection clinic); 2) informed meaningful implementation (eg, informed implementation strategy of training program by identifying high-need departments); 3) environmental improvements (eg, provided significant consultation on art and signage for new clinic).

Discussion: 1) Understand the importance of inviting patients to design solutions early and often, 2) apply tools to engage in CoDesign

with members and communities to build a care program that meets their needs, 3) develop tactics to transform information systems and create scalable trainings to increase culturally responsive skills for staff and providers, 4) build a framework for providing multidisciplinary care, 5) apply learnings from the KPNW and KPNC paths, challenges, and successes.

From Colorado, Georgia, Hawaii, Northern California, Northwest, Southern California, Washington, Program Offices

31. Putting the Patient First—Shared Decision Making at Kaiser Permanente

Andrew Felcher, MD; Matt Handley, MD

DOI: <https://doi.org/10.7812/TPP/18-071-31>

Background: Shared decision making (SDM) promotes personalized care that supports patients' values. Successful implementation of SDM furthers the Quadruple Aim, augments care delivery, and accelerates implementation of evidence-based practices. Good SDM programs use high-quality decision aids and point-of-care conversation aids, train physicians in SDM conversations, and measure effects on both patient and clinician satisfaction, resource use, and clinical outcomes. Current adoption of SDM varies by Kaiser Permanente (KP) Region and topic.

Methods: We present a few key studies of SDM programs that assess SDM aid use, including patient and provider satisfaction, referral counts, and provider time spent, and compare them with usual care, such as patient education booklets, in common preference-sensitive conditions such as back surgery. The programs include both patient decision aids and point-of-care conversation aids.

Results: SDM has been demonstrated to improve patient choices, provide a positive effective on patient-provider communication, and improve knowledge of and perception of outcomes with no adverse effect on health outcomes. SDM has received increasing attention from legislators and policy makers. In Regions where SDM aids and clinician training were readily available, use of the aids increased over time, and they have been favorably received with provider and patient satisfaction > 70%. However, KP still uses a variety of vendors and tools, and frontline providers may not understand SDM—many believe they are already engaging in SDM conversations. KP has not historically used a standard framework to evaluate SDM programs and aids. KP is actively developing new SDM topics and converging on high-quality aids, tools, and training.

Discussion: In this session, participants will learn how SDM is personalizing care delivery to help make informed decisions; how we are incorporating evidence-based clinical information and making it accurate and readily available to clinicians and patients at point of care; and how SDM benefits our patients, is doable at the point of care, saves time, and leads to better outcomes. For patients, previsit decision aids provide valuable information to patients and improve SDM. For providers and patients, we hypothesize that the most valuable SDM tools are embedded in the electronic medical record, are easily accessible, show clear risks and benefits, and are displayed in a patient-friendly format. We will be seeking audience input into the design of KP's programwide SDM efforts as well as helping the audience learn about SDM in their Regions and practices. Our hope is that participants will adopt and reliably use the aids and SDM methods showcased.

TEAMS

From Southern California

32. Improving the Culture of Safety: Workplace Safety Unit-Based Teams Interventions that Work

Barbara Zelinski, MBA; Leslie Pole, MA; Samantha Imada, MA

DOI: <https://doi.org/10.7812/TPP/18-071-32>

Background: Injury prevention is a value of Kaiser Permanente. In analyses done by Engagement and Inclusion, the Workplace Safety (WPS) Index has shown consistent correlations with department injury rates. The higher the WPS Index, the lower the incidence of harm to patients and health care workers. In addition, the higher the WPS Index, the higher the satisfaction of patients and employees. This work will share interventions that improved the unit safety performance.

Methods: Survey of unit-based teams (UBT) interventions that improved the WPS Index and safety outcomes. Interviews with selected high-functioning UBTs that improved safety outcomes and the WPS Index to become high scoring.

Results: UBTs were provided tools to develop plans to address the four People Pulse items that comprise the Workplace Safety Index. Departments that implemented tests of change and later spread the interventions are experiencing fewer injuries and higher WPS Index scores.

Discussion: Successful UBT interventions are not complex and do not need to be resource intensive. Many of the successful interventions were changes in how staff interacted, how managers communicated, and how the team resolved differences. Interventions do not need to be uniform across all departments to be effective. Successful interventions do appear to have common characteristics. *Next steps:* Safety plans at the department level will incorporate relationship and organizational effectiveness as well as systems of safety to create a safer environment for patients and staff.

From Program Offices

33. Leading Inclusively—Utilizing KP's Seven Inclusive Attributes to Build Trust and Increase Engagement and Team Productivity

Susan Terrill; Laura Long, MBA

DOI: <https://doi.org/10.7812/TPP/18-071-33>

Background: Piloted at the National Diversity and Inclusion 40th Anniversary Conference with a select cohort of executive participants (National Executive Team, Regional Presidents Groups, Executive Medical Directors, and their top direct reports), the Leading Inclusively workshop is fundamental to helping participants understand the critical role participants play in advancing Kaiser Permanente's Equity, Inclusion, and Diversity goals. To continue our journey to become a leader in pursuit of health equity and inclusion for all, we must inspire our own employees with tools and skills to lead inclusively; to tap into the wisdom of our diverse workforce; to act on self-awareness, lessen bias, speak up, challenge the status quo; and adjust readily to cultural and work style differences.

Methods: We have an inclusive culture problem. By helping participants understand that each individual's identity is an amalgamation of our shared experiences, we break down biases, build trust and connectivity, and minimize blind spots—all forceful levers of increased engagement, shifted mindset, and being agents for change.

Results: In our Leading Inclusively Executive Round Table pilot, we conducted a pre-self-assessment inclusion survey. The aggregate survey results were then distributed and discussed among participants and followed-up by individual assessment results. The findings were fascinating; for example, in every trait of the seven attributes assessed, there was a large disparity between one's own perceptions and the perception made by one's peers.

Discussion: Build engagement and excitement around inclusion. Create and practice tangible new habits of inclusive leadership with yourself and your teams. Build inclusive practices into your regular team meetings, and generate commitment and behavior change.

From Northwest

34. How Our Unique Multidisciplinary Care Model Leads to Superior Outcomes for Cardiac Surgery Patients

Yong Shin, MD; Brian Timm, PA-C; William Shely, MD; Thomas Lampros, MD; David Tse, MD; Josh Andrew, PA-C; Julie Faulk, PA-C; Piotr Starosta, PA-C; Victoria Brownlow, PA-C

DOI: <https://doi.org/10.7812/TPP/18-071-34>

Background: The mission of Kaiser Permanente is to provide high-quality, affordable health care services and to improve the health of our members and the communities we serve. A multidisciplinary approach to caring for complex patients has proven successful in serving this mission, which benefits our members and the health care team that serves them.

Methods: All cardiac surgery patients are cared for via a multidisciplinary team. Our team—physicians (surgeons, anesthesiologists, intensivists, internists), physician assistants, nurses, pharmacists, physical therapists, dietitians, care coordinators, and social workers—rounds twice daily on each patient. The commitment to rounding has established a culture of clear communication, daily goal setting, team accountability, and group decision making which has resulted in proven excellent outcomes including: markedly lower overall and coronary artery bypass graft mortality, decreased blood usage, increased early extubation, and decreased length of stay.

Results: Our multidisciplinary approach has led to the following excellent results: An overall mortality rate of 0.5%, coronary artery bypass graft outcomes of 0.0% mortality for 2 years in a row, transfusion rate of 13.3% compared with 42.6% nationally, early extubation rate of 78.9% with patients being extubated in the operating room regularly, and an average postprocedure length of stay of 4 days.

Discussion: Modeling the Kaiser Permanente Northwest multidisciplinary approach to caring for complex cardiac surgery patients will result in improved program quality and patient outcomes that further serve Kaiser Permanente's mission of providing high-quality, affordable health care services and improving the health of our members and the communities we serve. Quality is becoming an increasing driver of reimbursement; therefore sustainability is directly linked to quality outcomes.

From Southern California

35. May The Schwartz Be With You: Fostering Ethical Care Environments through Schwartz Rounds—A Live Demonstration

Paula Goodman-Crews, LCSW; Deborah Kasman, MA, MD; Felicia Cohn, PhD

DOI: <https://doi.org/10.7812/TPP/18-071-35>

Background: The Schwartz Rounds (SRs) facilitated interdisciplinary discussion fosters open dialogue about social, emotional, and ethical issues that arise in patient care. Attending SRs regularly has been shown to increase compassion, improve teamwork, offer new strategies to address challenging cases, and increase sense of belonging, which also is associated with lower employee turnover. Employee and caregiver experiences drive patient experiences; hence when health care staff experience compassion in the workplace, they in turn deliver more compassionate care. Compassionate care has been linked to better outcomes including reduction in costs and higher patient satisfaction.

Methods: *Population:* All Medical Center staff are invited to attend SRs to derive the benefit of improved compassion and teamwork, increased understanding of patient experience, and experience of different disciplines. *Intervention:* One-hour discussion facilitated by a trained individual. Each SR begins with four-minute narratives of three panelists who were directly involved in a challenging case and talk about the emotions generated. Narratives serve as a catalyst to engender similar narratives amongst attendees. *Comparison:* There are no metrics to discern experience of Medical Centers not offering SRs. *Outcome measures:* The Schwartz Center obliges contract Medical Centers to evaluate attendee experience, thus evaluations are completed after each SR.

Results: Kaiser Permanente Medical Centers currently offering SRs have reaped its benefits with more than 95% of participants gaining new insights into patient and family perspectives, and those of coworkers; more than 93% being more open to collaboration with colleagues; 83% feeling less isolated; and 97% planning to attend SR again. Most Medical Center SRs draw from 40 to 100 participants. Kaiser Permanente Southern California aggregate evaluations from 2015 demonstrates that regular attendance at SRs increases compassionate patient care; promotes self-care; improves teamwork; offers strategies to deal with challenging cases; and increases a sense of belonging, which can decrease employee turnover.

Discussion: Burnout rates of physicians are at an all-time high, rising to a mean of 55% across all physician specialties, which is a 10% rise in just 3 years. Nurses are experiencing rapidly rising rates from compassion fatigue and burnout as well. Building resilience amongst our health care providers facilitates better ability to cope with the psychosocial demands of care and perceived stress of care. Having SRs at our Medical Centers has helped our practitioners address the psychosocial demands of care, thereby fostering an improved ethical environment of care.

From Northwest

36. Nurse-Led Strategies to Improve In-Hospital Code Blue Survival Rates

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DOI: <https://doi.org/10.7812/TPP/18-071-36>

Background: Nationwide, there are more than 200,000 in-hospital cardiac arrests each year. Of these in-hospital cardiac arrests, only about 54% survive the actual code event, whereas far fewer, around 22%, survive to discharge. Rapid response team (RRT) nurses aimed to improve Code Blue response and actual code event survival by focusing on simulation education, cardiopulmonary resuscitation feedback tools, early team debriefing, and structured review of each code event to identify systems issues in a monthly Code Blue Workgroup.

Methods: In 2016, the Kaiser Sunnyside Medical Center (KSMC) Code Blue Workgroup committed to improving quality metrics that included the use of the Philips Q-CPR (Philips, Amsterdam, The Netherlands) feedback tool during code events, documenting end tidal capnography, early code team debrief, and a structured review of each code. Code Blue simulations were conducted with the KSMC Simulation Department and led by RRT nurses. The simulations were tailored for each hospital arena, focusing on code team member roles and competence using the Q-CPR tool. Each month, the Code Blue Workgroup members were assigned codes to review identifying potential contributing factors, systems issues, and adherence to quality metrics, which are presented for discussion.

Results: On the basis of the KSMC team efforts, survival of the code event increased by 18% during this time, or 63% in 2016 (n = 52) to 81% of patients in 2017 (n = 58). Performance measures were tracked on the basis of a percentage target. Q-CPR use during codes went from 61% in 2016 to 95% in 2017, with a target of 90% of code events that include chest compressions. Capnography documentation went from 36% in 2016 to 82% in 2017, with a target of 80% in code events that include pulselessness and intubation. Early debrief by the code team went from 82% in 2016 to 92% in 2017, with a target of 60% of codes. A structured code review by the Code Blue Workgroup remained at 100% of codes in both 2016 and 2017.

Discussion: The most important factors in the success of this work is a dedicated Code Blue team and Workgroup invested in the process and a robust action log based on team debrief concerns. The RRT team was present at each simulation and ensured consistent debriefing occurred. These debrief learnings were then brought to each Code Blue Workgroup meeting and entered in an action log. Concerns identified in codes that led to change included code compatible chairs in hemodialysis and a CareFusion Pyxis machine (Beckton, Dickinson, and Co; Franklin Lakes, NJ) located in the magnetic resonance imaging department. Given the success of this process, the goal is to replicate it with code events involving stroke or massive transfusion.

From Colorado, Georgia, Hawaii, Mid-Atlantic States, Northern California, Northwest, Southern California, Washington, Program Offices

37. Workplace Violence Prevention

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Background: According to the 2011 report from The Joint Commission, hospitals saw a significant increase in assault, rape, and homicide from 2007 to 2010. Between 2011 and 2013, workplace assaults ranged from 23,540 and 25,630 annually, with 70% to 74% occurring in health care and social service settings, according to Occupational Safety and Health Administration statistics. Violence-prevention programs reduce the risk of assault by training workers to recognize frequent cues such as drug use and threatening body language, and educating them about strategies to help defuse situations.

Methods: Kaiser Permanente's mission to provide high-quality care within the communities we serve requires an understanding of individual member experience and needs. As we strive toward continuous care delivery improvements, the implementation of a Defense and De-Escalation model supports our efforts to live up to member expectations, improves outcomes for all our members, and supports the workplace safety credo of creating a workplace free from harm.

Results: 1. Cultural approach critical: Assure we are grounded in the philosophy and basic tenets of our care approach. 2. Regional operation ownership: Ownership assures strategic alignment and a sustainable future. 3. Alignment with key stakeholders: Assure ongoing engagement, avoid duplication and use collective best practices. 4. Philosophy embedded in policy and procedure: Enculturation of a philosophy of care provides the foundation for all we do and guides the efforts to ensure collective understanding. 5. Standardize reporting with metric-driven improvement: Standardized reporting collects the necessary information to observe trends and help with decision making.

Discussion: Protecting patients and staff from violent acts is fundamental to ensuring quality patient care. Creating the appropriate systems, tools, and education is vital to reducing the frequency of situations that may result in harm to our members and staff. The increase in violence in some departments, such as Emergency Departments, has resulted in difficulties in recruiting and retaining highly qualified personnel. Patients with medical emergencies deserve a place of care that is free of physical dangers from other patients, and care from staff that is not distracted by individuals with behavioral or substance-induced violent behavior. Every employee has the right to work in an environment free of harm.

From Northern California

38. Pain Rounds: Implementing an Interdisciplinary Team-Based Approach to Pain Management for Inpatient Rehabilitation

Brian Theodore, PhD; Ryan Doan, MD

DOI: <https://doi.org/10.7812/TPP/18-071-38>

Background: Kaiser Permanente (KP) is renowned for excellent pain management across the system. In the inpatient rehabilitation setting, patients with acquired brain injuries and spinal cord injuries

can often suffer from moderate or greater pain. To address the needs of the patient for timely, safe, and more effective pain management, the leadership at Kaiser Foundation Rehabilitation Center (KFRC) piloted an interdisciplinary team-based Pain Rounds program in 2017 as one of our departmental quality-improvement projects.

Methods: *Population:* Patient satisfaction levels with pain care during inpatient rehabilitation remained below our desired benchmark (ie, only 70% of patients reported that their pain was well controlled). *Intervention:* Pain Rounds are conducted 2 times/wk for patients who report a 24-hour average pain rating of > 4 on the pain numeric rating scale. The team is led by a physiatrist and includes nurse and neuropsychology team members. In addition to prescription painkillers, other interventions offered include guided imagery, meditation, heat/ice, massage, a transcutaneous electrical nerve stimulation unit, and aromatherapy. *Comparison:* Comparison of patient satisfaction pre- and postimplementation of Pain Rounds. *Outcome measures:* Patient satisfaction with pain management and longitudinal pain ratings.

Results: Pain Rounds was piloted in a single unit at KFRC occurring 2 times/wk. After successful implementation and documentation of protocols, we expanded it at the end of Q4 2017 to other units within KFRC and increased coverage to include any patient identified by nurses to have poorly controlled pain (even if 24-hour average pain rating < 4). In addition, a dot phrase was designed to be implemented into KP HealthConnect to better document pain ratings, interventions used, and patient satisfaction. During the pilot phase, we successfully elevated patient satisfaction levels from a baseline of 71% to a high of 80% (a 13% increase over baseline), exceeding the departmental target of 77.6% satisfaction. Data collection for the expanded phase of Pain Rounds is ongoing.

Discussion: We have developed a successful pilot for timely, adequate, and safe interdisciplinary team-based pain management for patients undergoing inpatient rehabilitation at KFRC. Next steps include 1) evaluating the usability of the implementation of the dot phrase into KP HealthConnect, 2) identifying the most useful interventions that have resulted in satisfactory pain control, and 3) finalizing and disseminating our Pain Rounds model throughout the Region.

From Northern California

39. Optimizing Specialty Palliative Care: Five Key Strategic Initiatives

Dana Benton, RN, MS, CNS; Melissa Stern, MBA

DOI: <https://doi.org/10.7812/TPP/18-071-39>

Background: At Kaiser Permanente Northern California (KPNC), there is an identified need for expanding services upstream of hospitalizations to increase consistency in practice and to provide referring practitioners and patients with a clear understanding of what to expect from specialty palliative care (SPC) consults. We have implemented five large-scale initiatives to address these gaps and support our vision that all patients with serious illness and their families live as well and as fully as possible.

Methods: 2017 quality goals: Long-term care plan (LCP) or palliative care (PC) before death: Percentage of adult members with a LCP or PC before death; seven-day-a-week staffing: Percentage of Saturdays and Sundays with PC consult documentation. Optimizing specialty palliative care in KPNC and addressing the above gaps,

KPNC rolled out the following five initiatives: the development of a prospective patient registry, a transdisciplinary staffing model, a uniform approach to assessment and documentation, customized training for all SPC clinicians, and a comprehensive measurement strategy.

Results: Prospective patient registry: Monthly medical record number (MRN) level reporting and identifying more than 11,000 KPNC members in need of specialty palliative care. Transdisciplinary staffing model: The staffing model aims to ensure both access and care consistency for all patients who would benefit from SPC in both inpatient and outpatient settings. Standardized assessment tools and documentation: Three tools are used as part of a comprehensive assessment for every consultation. Customized training for SPC clinicians: Trained more than 300 nurses, social workers, and chaplains. Comprehensive measurement strategy: Measuring the impact of these initiatives included the production of monthly dashboards and leadership reports.

Discussion: These five initiatives set a standard for what every patient across KP receives as part of initial and follow-up SPC consultation and allows us to be deliberate in our measurement strategy to drive optimization in SPC. With monthly data for 2017 providing baseline trends, we have set targets for 2018 for registry penetration and will be considering process measures to assure continued provision of a transdisciplinary staffing model and use of assessment tools.

From Northern California

40. Northern California Medi-Cal Onboarding: Upstream Engagement

Sarita Mohanty, MD; Bryan K Lee, MD; Molly Drebes, MS; Irene Alvarez-Zamzow, MPH

DOI: <https://doi.org/10.7812/TPP/18-071-40>

Background: The Affordable Care Act and Kaiser Permanente's (KP's) own efforts to enroll more Medi-Cal-eligible patients led to an influx of new members (85% increase from 2013-2017), challenging KP Northern California (KPNC) to meet the social, behavioral, and medical needs of this population. Medi-Cal members have a higher rate of avoidable, high-cost utilization; gaps in access to preventive care; and are more likely to face behavioral health and nonmedical social needs that impact their health, such as financial barriers and food insecurity.

Methods: New member onboarding (NMO) began in the Sacramento Valley Area in Fall 2015 and has since spread to the Napa-Solano Area and Greater Southern Alameda Area. NMO intervention has six key components: 1) family calls, 2) robust orientation, 3) resources and referrals, 4) scheduling, 5) medication concerns, and 6) documentation enhancements. Process and outcome measures are: Initial Health Assessment (IHA) completion rate (physical exam and questionnaire), Emergency Department visits, patient days, clinic visits, and total cost. NMO evaluation has three components: 1) monthly IHA performance monitoring, 2) observational/case control-matched evaluation (initial results complete), and 3) randomized control trial evaluation (results expected Q3 2018).

Results: Performance results indicate significantly higher IHA completion rate compared with KPNC for the 3 locations that have

implemented NMO (Sacramento Valley, Napa-Solano, Greater Southern Alameda), (24.1% for the 3 locations compared to 4.5% for other KPNC locations). The observational/case control-matched evaluation conducted by KP Decision Support and Division of Research KPNC showed that overall, related to the matched control group, Sacramento Valley new Medi-Cal members (cases) showed higher nonpsychiatric patient days, higher Emergency Department visits, lower clinic visits, and lower cost. The subanalysis of Sacramento Valley Medi-Cal adults who completed the IHA (cases) showed lower nonpsych patient days (significant, 46% lower), lower Emergency Department visits (11% lower), higher clinic visits (significant, 23% higher), and higher cost (10% higher) than non-Sacramento Valley Medi-Cal adults (matched control) who did not complete the IHA.

Discussion: NMO is showing promising results. NMO is successful in increasing the IHA completion rate for the three locations that have implemented NMO (Sacramento Valley, Napa-Solano, Greater Southern Alameda), indicating early engagement with the member's primary care physician. The initial evaluation indicates it is possible that the intervention had a favorable impact (lower avoidable high-cost services and higher rates of outpatient services) on members who completed the IHA. Next steps are to continue evaluation efforts, which will include the randomized evaluation (Q3 2018), quality outcomes, no-show rate, pharmacy script rate, patient satisfaction, and trending over time members that received NMO intervention.

From Southern California

41. Embrace New Culture in Postacute Care: Shaking up the Status Quo

David Wong, MD; Karen Sirski-Martin, RN, MSN, CCRN, HACCP; Cora Bailey, RN, MSN, PHN, CLNC

DOI: <https://doi.org/10.7812/TPP/18-071-41>

Background: The Continuing Care Quality Management (CCQM) program models the Integrated Quality Management (IQM) philosophies, tools, and principles for continuing care services of Kaiser Permanente Southern California (KPSC) beginning with skilled nursing facility (SNF) partners. The CCQM model enhances systems for service and oversight and moves our organization's goal of matching patients with the "Right Care, Right Place, and Right Time." This results in improved quality of care by standardizing workflows and setting expectations with SNF partners.

Methods: Previously, SNFs were used as a discharge destination because they were the path of least resistance. Patients frequently did not meet the medical necessity for skilled level of care. Because of inappropriate admissions, a rise in length of stay (LOS) and varying workflows in the SNFs, the increased costs created a need for workflow standardization, collaboration, and robust oversight. Implementation of the CCQM model of care in the postacute setting, which was modeled after the IQM philosophies, tools, and principles, began in 2013. To measure performance, the following metrics were monitored: 1) SNF patient day rate (PDR), 2) average LOS (ALOS), 3) 30-day Healthcare Effectiveness Data and Information Set (HEDIS) readmission observed/expected (O/E), and 4) SNF discharge rate.

Results: After implementing CCQM in 2013, performance measures significantly decreased from the 2013 baseline through the current year: 1) SNF PDR for the Riverside Service Area (Central, West, and East markets) decreased 16.7 points and 26.1 points for Riverside Service Area (Coachella Valley market), 2) ALOS for the service area decreased 2.7 days, 3) 30-day HEDIS O/E for the service area increased slightly from 2016 to 2017 by 0.01; however, it decreased significantly from 2015 to 2016 by 0.08. 4) SNF discharge rate for the service area continues to decrease steadily: -0.7 points in 2016 and -0.5 points in 2017.

Discussion: The CCQM model of care enhanced the collaboration with IQM and SNF partners to adopt consistent workflows to increase efficiency and quality of services at the SNFs. Our primary learning was and continues to be the high turnover rate of SNF partners (leadership and staff). To ensure continuity, continual education and engagement on the CCQM model of care is needed. The next step is to spread the CCQM model to our nursing home partners to deliver the same standardized care to our long-term care patients.

From Colorado, Georgia, Hawaii, Mid-Atlantic States, Northern California, Northwest, Southern California, Washington, Program Offices

42. Effective Rounding for Quality and Safety

Maggie Robbins, MPH; Lizabeth Taghavi

DOI: <https://doi.org/10.7812/TPP/18-071-42>

Background: Rounding for safety in department/facility includes asking staff about safety risks and observing environmental hazards. Rounding with timely, effective follow-up action is essential to safety excellence. Safety rounding increases communication within a department and related support functions. Regular rounds and effective follow-up can identify problems and risks, surface ideas on better ways to do the work, and reduce risk and inefficiency. The session will include small-group activities to generate discussion on key messages.

Methods: Rounding is recognized as an important tool for employee engagement, and as the starting point for a comprehensive hazard identification and mitigation process. Safety rounds are an important leading indicator and performance metric and foundational component of any safety program, and of the High Reliability Operating Model currently under development.

Results: Metrics related to effective safety rounding are on the list of potential leading indicators the National Workplace Safety Leadership Team is developing for use across the program.

Discussion: Kaiser Permanente is in the process of consolidating various rounding platforms into an integrated rounding tool that can be used across various specialties. The development of many different rounding systems indicates many parts of the organization believe rounding is an important process.

From Southern California

43. Pursuing Health Equity: Our Journey to Improve Diabetes Control With Our Hispanic/Latino Population at Kaiser Permanente in Indio, California

Frank Flowers, MD; Jose Fernandez, MD; Robert Blair, MPH; Patrick Calasan, BSN RN MHA

DOI: <https://doi.org/10.7812/TPP/18-071-43>

Background: Diabetes is worsening in our vulnerable populations in areas that are struggling to maintain the necessary health care and resources needed for glycemic control. Kaiser Permanente (KP) race and ethnicity data show a significant disparity gap of 16% between Hispanic/Latino and white/Caucasian members with diabetes. Indio, CA, has a large population of Hispanic/Latino KP members with Spanish being the second most preferred/spoken language at the Indio Medical Office Building (MOB). The Indio MOB was one of the first KP clinics in the area. There was limited awareness of cultural needs and a necessity for an internal quality improvement framework focusing on education of staff and employer groups, and complete care management.

Methods: We stratified our selection criteria based on the disparity gap between Hispanic/Latino and white populations from KP Indio Healthcare Effectiveness Data and Information Set (HEDIS) data. This finding led to the identification of 38% of Indio Hispanic/Latino members with uncontrolled diabetes. We implemented patient-centered diabetes support groups. In these groups, members shared personal stories, struggles, and advice on their own experiences with diabetes. We also included a manager leadership group to give its feedback and opportunities to help improve quality of care. We intend to employ telephone appointment visits, increase remote glucose monitoring utilization, implement a diabetes "One Stop Shop" model, and enhance community engagement.

Results: Our results indicate that successful outcomes are crucial in making change happen. Here are several ways in which the team will review and create interventions to help decrease the disparity gap: Educate members on culturally sensitive food options; increase medication titration by improving provider inertia changes; engage members to check their blood sugars and offer new technology with the remote glucose monitoring; and increase diabetes quality composite scores by being proactive with foot exams, retinal photos, and medication adherence.

Discussion: Overall, the health equity challenge in Indio, CA, is very important to KP and its capacity to help address the social determinants of our disparity populations. This will help us to learn how to perform better with patient-centered focused outcomes. Some lessons along the way in our journey are: Knowing and understanding the population of interest; developing lead and lag metrics for successful outcomes; availability of resources and tools needed; communicating plans to the member, staff, and community; and using interdisciplinary teams such as leadership, physician groups, and frontline staff.



Status Single
photograph

Sapna Reddy, MD

From the artist: "Perhaps the biggest reward of pursuing photography is that it increases our awareness of the beauty that surrounds us. This is a flower in my backyard that was illuminated by the distant light from a neighbor's house. The long exposure with the soft light helped to enhance the detail in the petal, the delicate architecture, and the soft velvet texture."

Dr Reddy is a Radiologist at the Walnut Creek Medical Center in CA and is pursuing a dual career as a landscape/nature photographer. More of her work can be seen at www.sapnareddy.com, and in this and other issues of *The Permanente Journal*.

Refractory Hypoxemia in a Patient with Submassive Pulmonary Embolism and an Intracardiac Shunt: A Case Report and Review of the Literature

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ABSTRACT

Introduction: Acute pulmonary embolism is the third leading cause of cardiovascular death. Management options include anticoagulation with or without thrombolysis. Concurrent persistent hypoxemia should be a clue to the existence of an intracardiac shunt.

Case Presentation: A 46-year-old man experienced acute hypoxemic respiratory failure requiring mechanical ventilation after anesthesia induction for elective hip arthroplasty. He was found to have submassive bilateral pulmonary emboli with acute right ventricular dysfunction and a coexisting patent foramen ovale with right-to-left shunt. He remained profoundly hypoxemic despite catheter-directed thrombolysis. He underwent surgical embolectomy with partial endarterectomy, resulting in clinical improvement.

Discussion: The management of acute submassive pulmonary embolism is undertaken on an individualized basis because of the wide spectrum of clinical presentations. In this report we review the literature and discuss the evidence behind the management of cases of acute pulmonary embolism complicated by hypoxemia from a patent foramen ovale. In a case of acute pulmonary embolism complicated by refractory hypoxemia from an intracardiac shunt, adjunctive therapies in addition to anticoagulation and thrombolysis must be considered.

his family history contained a Factor V Leiden mutation.

During induction of anesthesia, he remained hemodynamically stable but had progressively worsening hypoxemia demonstrated on serial arterial blood gas values. He was sedated with propofol, paralyzed initially with succinylcholine and maintained with rocuronium, and received mechanical ventilation with volume assist/control with a 100% fraction of inspired oxygen (FiO₂) and positive end-expiratory pressure (PEEP) of 10 cm H₂O. An arterial blood gas test on this setting showed a pH of 7.29, PCO₂ of 50 mmHg, and PO₂ of 65 mmHg. A transesophageal echocardiogram demonstrated right-sided heart dysfunction with a large right ventricle (RV) to left ventricle (LV) ratio and was positive for McConnell sign (contraction of the right ventricular apex with akinesis of the free wall).

INTRODUCTION

Acute pulmonary embolism (PE) is the third leading cause of cardiovascular death.¹ PE can be stratified by prognosis to guide treatment decisions. Submassive or intermediate-risk PE is diagnosed on the basis of normal blood pressure in conjunction with evidence of cardiac dysfunction, shown either on cardiothoracic imaging or with elevated serum cardiac biomarkers. Acute management options for PE include anticoagulation alone or in combination with systemic thrombolytic therapy or catheter-directed thrombolysis, although guideline recommendations reserve thrombolytic therapy for cases of PE associated with hypotension (massive or high-risk PE). Persistent hypoxemia in cases of acute PE should alert clinicians to the possibility of an intracardiac shunt, such as a patent foramen ovale (PFO).

CASE PRESENTATION

Presenting Concerns

Acute hypoxemic respiratory failure developed in a 46-year-old white man during anesthesia induction for elective left total hip arthroplasty. Four days before the surgery, the patient and his wife had noticed that he was having episodes of palpitations and dyspnea. He had been largely sedentary because of chronic hip pain. His medical history included morbid obesity, pseudotumor cerebri maintained on a regimen of acetazolamide, obstructive sleep apnea, and stable schizoaffective disorder. His prior cardiac workup, which was performed in the setting of chest pain and was ultimately deemed nonanginal, included a normal transthoracic echocardiogram and a coronary angiogram demonstrating non-obstructive coronary arterial disease. His social history was unremarkable, although

Therapeutic Intervention and Treatment

Acute PE was suspected, and an unfractionated heparin infusion was started. The patient's scheduled elective hip arthroplasty was aborted because of the degree of hypoxemia. The patient was transferred to the intensive care unit.

On arrival to the intensive care unit, he was afebrile, with a heart rate of 91 beats/min and blood pressure of 121/61 mmHg by arterial line. Laboratory findings included leukocytosis (15.2 × 10⁹/L) with 3% band forms. Lactate level was 1.39 mmol/L (within the normal range). Troponin I level was 0.05 ng/mL (normal range, 0-0.4 ng/mL) and did not change on serial testing.

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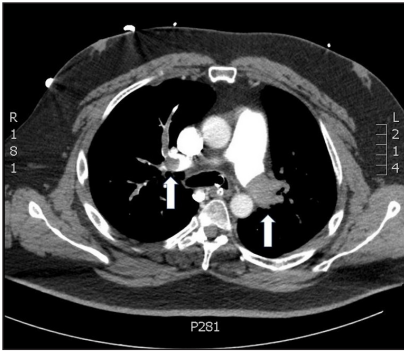


Figure 1. Computed tomography angiogram of the chest demonstrating bilateral large pulmonary emboli (arrows), nearly occluding the right and left pulmonary arteries.

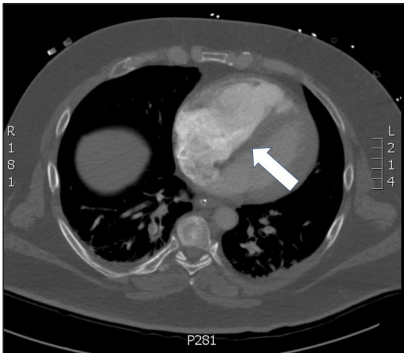


Figure 2. Computed tomography angiogram of the chest demonstrating dilation of the right ventricle (arrow).

A computed tomography angiogram of the chest showed bilateral large pulmonary emboli, nearly occluding the right and left pulmonary arteries, with extension into the upper and lower lobes as well as into the right middle lobe (Figures 1 and 2). Because of his hypoxemia while receiving an FiO_2 of 100%, we were concerned he had an intracardiac shunt. A transthoracic echocardiogram with agitated saline confirmed the presence of a PFO with right-to-left shunt. The estimated shunt fraction was approximately 40%. Because the patient had severe hypoxemia secondary to the acute PE, which was causing elevated RV pressures and right-to-left cardiac shunting, we performed catheter-directed thrombolysis with infusion of alteplase through bilateral femoral lysis catheters at 1 mg/h for 5 hours, and then 0.5 mg/h for 48 hours. The presence of a PFO was also confirmed during this procedure.

The patient continued to have intermittent desaturations despite oxygenation with 100% FiO_2 . The PEEP was lowered to 5 cm H_2O , and inhaled nitric oxide therapy was started in an attempt to reduce the shunt fraction. Cardiothoracic surgery was consulted for possible embolectomy in light of unsuccessful directed thrombolysis. However, our patient's hypoxemia stabilized with the administration of 100% FiO_2 and inhaled nitric oxide on 30 ppm, with arterial partial pressure of oxygen maintained above 60 mmHg. He was unable to wean off inhaled nitric oxide despite 48 hours of thrombolytic therapy, so we made the decision to pursue surgical intervention. Surgical embolectomy (Figure 3), partial endarterectomy, and closure of the PFO were performed on hospital day 4. The patient was successfully extubated on hospital day 6.

The hospital course was complicated by right-sided hemiparesis that was discovered on sedation hold that was performed a few hours before embolectomy. A noncontrast-enhanced computed tomography scan of the head demonstrated multiple small embolic strokes affecting the left premotor cortex. These were probably paradoxical emboli in the setting of the PFO, without evidence of hemorrhagic conversion. The patient was discharged to a skilled nursing facility on hospital day 11. Table 1 shows a timeline of the case.

Follow-up and Outcomes

On follow-up with his primary care physician four weeks after hospital discharge, our patient was noted to be

well-appearing and without residual deficits from his stroke. As of this writing, he remains on an anticoagulation regimen of rivaroxaban. He was evaluated for an underlying hypercoagulable state but did not have Factor V Leiden mutation or antiphospholipid antibodies.

Written informed consent was obtained from the patient. Institutional review board approval was waived by the Veterans Affairs Portland Health Care System in OR because the patient's demographic information was deidentified in this case report.

DISCUSSION

The all-cause mortality for patients in the US and Europe with acute PE ranges from 9% to 17%.¹ Acute PE is categorized into massive, submassive, and nonmassive types. Massive, or high-risk, PE occurs in the setting of persistent hypotension with systolic blood pressure less than 90 mmHg for 15 minutes or greater. Normotensive individuals with evidence of right-sided heart dysfunction, whether on imaging such as computed tomography or echocardiography, or by elevated cardiac biomarkers such as troponin or creatine kinase-myocardial band, are classified as having submassive, or intermediate-risk, PE.^{2,3} PE may also be stratified by the PE Severity Index, which is a validated scoring system based on independent predictors of mortality.³ We presented a case of a patient with a submassive PE and right ventricular dysfunction. He had an intermediate-risk PE Severity Index score (Class III), which gave him a 3% to 7% risk of 30-day mortality.



Figure 3. Thrombi removed from the pulmonary arteries during surgical embolectomy.

PA = pulmonary artery.

Table 1. Case timeline

Milestone	Events/Interventions/Outcomes
Hospital day 1	Hypoxemia on anesthesia induction for elective hip repair
	Transthoracic echocardiogram: Increased RV to LV ratio; positive McConnell sign; PFO seen
	Computed tomography angiogram of the chest: Pulmonary emboli in both pulmonary arteries
	Catheter-directed thrombolysis administered
Hospital day 2	Persistent hypoxemia
	Inhaled nitric oxide administered
Hospital day 4	Computed tomography of the head: Left premotor cortex embolic strokes
	Surgical embolectomy with PFO closure
Hospital day 6	Extubation
Hospital day 11	Discharge to rehabilitation facility
4-week outpatient follow-up	No residual neurologic deficits or hypoxia

LV = left ventricle; PFO = patent foramen ovale; RV = right ventricle.

Acute PE is often considered when hypoxemia develops. However, PE alone rarely causes hypoxemia to the degree seen in our patient, and it may be useful in such cases to perform an evaluation for an intracardiac shunt. On the basis of autopsy studies, approximately 35% of the general population have a probe-patent PFO, and 5% to 10% have a flow-patent PFO, which is determined with the application and sudden removal of PEEP.⁴ In acute PE, the PFO acts as a “pop-off valve” such that the right atrial pressure increases, causing a right-to-left shunt. The shunt permits LV filling and near-normal cardiac output, thus preventing hypotension. However, hypoxemia ensues because of the intracardiac mixing of deoxygenated with oxygenated blood.⁴⁻⁸ The presence of PFO was associated with a significantly lower arterial partial pressure of oxygen among 85 patients with a hemodynamically significant PE, in whom there was a 39% prevalence of PFO.⁴ Unlike many other causes of severe hypoxemia, such as in acute respiratory distress syndrome, the administration of PEEP often worsens the hypoxemia, as it did in our case.^{9,10}

We conducted a PubMed search using the search terms [pulmonary embolism OR embolus] AND [hypoxemia OR hypoxemic] AND [patent foramen ovale] for articles published between 1990 and 2016. Individual cases, presented in either case reports or case series, were selected. Further relevant case reports were extracted

from the bibliography of articles gathered from the search. In total, there were 9 articles with 12 individual cases reported of acute PE occurring in the setting of PFO and resulting in persistent hypoxemia (Table 2).^{4,6-13} Submassive PE was present in 45% of patients, and of these, survival was 100%. In those with massive PE, survival was 20%. The overall survival was 45%. Two patients without hypotension received systemic thrombolytics, 27% of the total.^{7,8} In one case report describing a patient without hypotension

Two recent meta-analyses, both including [pulmonary embolism thrombolysis], found that systemic thrombolysis decreases overall mortality while increasing major bleeding for acute [pulmonary embolisms] of both high and intermediate risk.

who received thrombolysis, the authors advocated for systemic thrombolysis because of the size of the emboli and the impending risk of hemodynamic collapse.⁸ Surgical intervention was reported in 18% of patients. No patients received catheter-directed thrombolysis.

Among 1006 patients with submassive PE in the PEITHO (Pulmonary Embolism Thrombolysis) randomized controlled trial, systemic thrombolysis with tenecteplase resulted in significant

improvement in the combined primary outcome of all-cause mortality or hemodynamic compromise within 7 days over the administration of unfractionated heparin alone (2.6% vs 5.6%, odds ratio [OR] = 0.44, 95% confidence interval [CI] = 0.23-0.87, $p = 0.02$). However, there was no overall mortality benefit, and there were more patients with major extracranial hemorrhages (6.3% vs 1.2%, OR = 5.55, 95% CI = 2.3-13.39, $p < 0.001$) and strokes (2.4% vs 0.2%, OR = 12.10, 95% CI = 1.57-93.39, $p = 0.003$) within 7 days.¹⁴

The ULTIMA (Ultrasound-Assisted, Catheter-Directed Thrombolysis for Acute Intermediate-Risk Pulmonary Embolism) trial demonstrated that ultrasound-assisted, catheter-directed thrombolytic therapy in patients with submassive PE resulted in benefit in terms of change in RV-to-LV ratio from baseline to 24 hours, over unfractionated heparin alone (0.30 ± 0.20 vs 0.03 ± 0.16 , $p < 0.001$). There were no instances of major bleeding in this study. Patients with a right-to-left heart shunt, such as a PFO, were excluded from the study population.¹⁵

Two recent meta-analyses,^{16,17} both including PEITHO, found that systemic thrombolysis decreases overall mortality while increasing major bleeding for acute PEs of both high and intermediate risk. The meta-analysis by Marti et al¹⁶ found that 30-day mortality was significantly decreased with systemic thrombolysis (2.3% vs 3.9%; OR = 0.59, 95% CI = 0.36-0.96, $p = 0.034$) while there were significantly increased rates of major hemorrhage (9.9% vs 3.6%; OR = 2.91, 95% CI = 1.95-4.36, $p < 0.0001$) and fatal or intracranial hemorrhage (1.7% vs 0.3%; OR = 3.18, 95% CI = 1.25-8.11, $p = 0.008$). However, 30-day overall mortality was not significantly different when the analysis included only intermediate risk PE. The analysis also did not include ULTIMA.¹⁶ The meta-analysis by Chatterjee et al¹⁷ found a similar significant benefit in the 30-day all-cause mortality rate for all acute PEs with a number needed to treat of 59, which was counterbalanced by a significant increase in the rates of major bleeding (number needed to harm

Table 2. Literature review of reported cases of acute pulmonary embolus in the setting of patent foramen ovale and intracardiac shunting

Source	Age, years/ sex	Presentation	Diagnostics	Hemodynamic classification	Mechanical ventilation	Management	Survival
Brydon et al, 1993 ⁴	64/M	Found unresponsive	RHC: PFO, bilateral PE	Submassive	Yes	Surgical closure of PFO; surgical embolectomy	Yes
Estagnasié et al, 1996 ⁶	74/F	Acute respiratory failure	TEE: PFO, atrial septal aneurysm; angiography: PE	Massive	Yes	Unfractionated heparin; inhaled nitric oxide	No
	68/F	Subacute dyspnea leading to respiratory failure and shock	TEE: PFO, atrial septal aneurysm	Massive	Yes	NR	No
	77/F	Respiratory failure	TEE: PFO, atrial septal aneurysm; angiography: Bilateral PE	Massive	Yes	NR	No
Mirarchi et al, 2000 ¹¹	74/M	Acute dyspnea and chest pain with hypotension and respiratory failure	TEE: PFO and right atrial thrombus	Massive	Yes	Unfractionated heparin alone	No
Slebos et al, 2000 ⁷	33/F	Respiratory failure	Angiography: PE; presumptive diagnosis of PFO	Submassive	No	Systemic thrombolytics	Yes
Rajan, 2007 ⁹	89/M	Intraoperative respiratory failure during open reduction and internal fixation of hip	CT: Multiple bilateral PEs; TTE: Dilated RV and PFO	Submassive	Yes; worsening oxygenation with increasing PEEP	NR	NR
Moua et al, 2008 ⁸	80/F	Acute dyspnea and presyncope	CT angiography: Bilateral PE; TTE: Dilated RV and PFO	Submassive	No	Systemic thrombolytics	Yes
	75/M	Acute dyspnea and dizziness	CT angiography: Bilateral PE; TTE: McConnell sign and PFO	Submassive	Yes	Unfractionated heparin, with addition of systemic thrombolytics	Yes
Weig et al, 2011 ¹²	34/F	Respiratory failure 4 weeks after biventricular assist device placement for postpartum dilated cardiomyopathy	TEE: PFO	Massive	Yes	Venovenous ECMO; surgical embolectomy; inhaled pulmonary vasodilator; percutaneous transcatheter closure of PFO with PFO occluder ^a	Yes
Vaid et al, 2011 ¹³	62/M	Respiratory failure 6 hours after vitrectomy to treat retinal detachment	CT angiography: Limited examination; TTE: McConnell sign; autopsy: PE, PFO present	NR	Yes; high PEEP and high FiO ₂ used	Systemic thrombolytics	No
Granati, 2016 ¹⁰	40/M	Acute dyspnea	CT angiography: PE with right-sided heart strain; TTE: PFO and atrial septal aneurysm; duplex ultrasonography: Left lower extremity DVT	NR	Yes; increasing PEEP caused worsening SaO ₂ ; improvement with switch to airway pressure release ventilation	NR	Yes

^a PFO occluder manufactured by Amplatzer, St Jude Medical, St Paul, MN.

CT = computed tomography; DVT = deep vein thrombosis; ECMO = extracorporeal membrane oxygenation; F = female; FiO₂ = fraction of inspired oxygen; M = male; NR = not reported; PE = pulmonary embolus; PEEP = positive end-expiratory pressure; PFO = patent foramen ovale; RHC = right-sided heart catheterization; RV = right ventricle; SaO₂ = arterial oxygen saturation; TEE = transesophageal echocardiogram; TTE = transthoracic echocardiogram.

of 18) and intracranial hemorrhage (number needed to harm of 78). Additionally, a systematic review of 35 trials demonstrated a pooled survival of 87% among patients with massive PE treated with catheter-directed interventions; 60% to 67% of these individuals also had received systemic thrombolytics.¹⁸ We could not find analyses from these trials that separately reported outcomes for patients with significant intracardiac right-to-left shunts.

The 2016 revision of the American College of Chest Physicians guidelines for venous thromboembolism,² as well as the 2014 European Society of Cardiology guidelines for acute PE,³ recommend systemic thrombolysis for acute massive PE (a Grade 1B recommendation in the American College of Chest Physicians guidelines). Both sets of guidelines recommend against routine systemic thrombolysis in individuals with PE but who do not have shock or hypotension, unless they have clinical deterioration (Grade 1B recommendation).^{2,3} We elected to treat our patient's submassive PE with thrombolysis because we did not expect his severe hypoxemia to improve otherwise.

Although there are no comparative trials of catheter-directed vs systemic thrombolytics,¹⁹ we pursued catheter-directed thrombolysis because of the possible lower risk of bleeding and our institutional experience with this procedure (Grade 2C recommendation per American College of Chest Physicians guidelines).² In one systematic review and meta-analysis, the risk of major bleeding from catheter-directed thrombolysis was about 10% from 24 studies performed in both massive and submassive PE²⁰; in another systematic review stratified by PE classification, the risk of major bleeding was 3.9 per 100 cases of catheter-directed thrombolysis in hemodynamically stable PE.²¹ In our literature review of similar patients, none of the reported cases used catheter-directed interventions; however, only 1 of these cases was published after ULTIMA.

Another negative consequence of PFO is the risk of paradoxical emboli resulting in strokes. Such patients may hypothetically be at increased risk of intracranial

hemorrhage from hemorrhagic conversion of these paradoxical strokes after undergoing systemic or catheter-directed thrombolysis. The coexistence of a PFO was associated with the increased incidence of ischemic stroke among patients with acute PE in 1 observational study, with a 13% rate of stroke in 48 patients who were found to have a PFO, and 2.2% stroke rate among 91 patients who did not have a PFO. However, there was no between-group difference in the proportion of patients receiving systemic thrombolysis.²² Although our patient was found to have strokes from paradoxical emboli, the use of catheter-directed thrombolysis in his case did not result in intracranial hemorrhage.

Other management considerations in patients with PE besides thrombolytics or anticoagulation therapy include mechanical or medical support of RV failure and surgical embolectomy. Pulmonary vasodilators may also be used to decrease pulmonary vascular resistance in situations of acute RV failure, such as acute PE. Inhaled nitric oxide has a rapid onset and short half-life, making it easily titratable.²³ Inhaled pulmonary vasodilators were used in 2 cases in our literature review.^{6,13} Extracorporeal membrane oxygenation (ECMO) can be used as another bridge to definitive therapy for persistent shock (venoarterial ECMO) or hypoxemia alone (venovenous). Venovenous ECMO was used in 1 case in our literature review as a bridge to surgery; that patient had concurrent cardiac failure and was reliant on a biventricular assist device.¹³ Surgical embolectomy is the definitive management for cases in which thrombolytics have failed or are contraindicated. The 1-year survival rate for surgical embolectomy in 1 series was 80% for submassive PE, compared with 66% for massive PE.²⁴ Surgical intervention was successful in resolving our patient's hypoxemia.

CONCLUSION

The management of acute submassive PE is undertaken on an individualized basis, given the spectrum of clinical presentations of such cases. The use of systemic thrombolysis should be weighed against the risk of severe bleeding. The

outcomes of catheter-directed interventions compared with systemic thrombolysis are yet unknown. In acute PE with refractory hypoxemia in which an intracardiac shunt is the cause, there is even less evidence to guide decision making, because many of the large trials exclude patients with PFO or do not specifically identify these patients. When deciding between systemic or catheter-directed thrombolysis or anticoagulation therapy alone, the clinician should consider individual patient factors and the potential increased risk of intracranial hemorrhage because of a PFO. Finally, if there is a failure of systemic thrombolysis to decrease pulmonary arterial pressure and the intracardiac shunt, then bridging therapies such as ECMO or surgical embolectomy must be considered. ♦

Disclosure Statement

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

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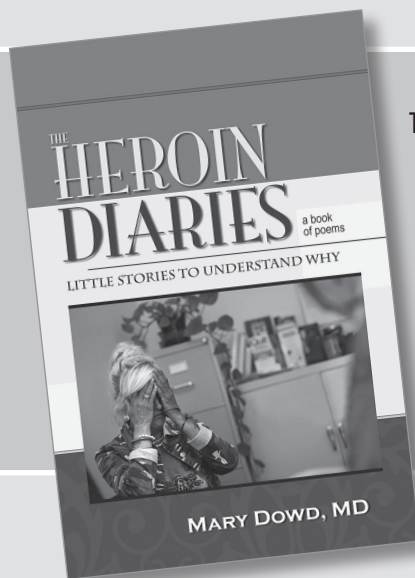
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Blue Eyes

Patricia Lynes, RN

E-pub: 04/13/2018

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His blue eyes gazed at me helplessly, hopelessly, and vulnerably. I wanted to read meaning into Robert's eyes, knowing full well that he would never recover. He was a patient with a traumatic brain injury. After graduating high school, he joyfully went on a graduation trip to Canada. He and his buddies drove day and night to get to their campsite. One night after he had just moved to sit shotgun, the truck entered a construction site and slammed into rebar, which lodged in Robert's forehead. Many surgeries later, he now occupied a bed on the neuro floor. Unable to move his contracted body, he only communicated with his beautiful blue eyes. He would blink and squeeze your hand when you asked him if he wanted to go home. His doctors, therapists, and nurses had become his family; we all loved this 18-year-old boy with the uncertain future and cared for him like a brother. ❖

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Accompanying artwork: Blue Eyes by Tatum Howlett.

Sinonasal Ewing Sarcoma: A Case Report and Literature Review

Jonathan K Lin, MD, MBA; Jonathan Liang, MD

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ABSTRACT

Introduction: Ewing sarcoma (ES) of the sinonasal tract and associated primitive neuroectodermal tumors are rare. To our knowledge, only 10 case reports of sinonasal ES of the nose or paranasal sinuses have been reported. Furthermore, there has been only 1 case of sinonasal ES arising from the middle turbinate. Recommended management of sinonasal ES stems from the management of its osseous counterpart, ES, but treatment with surgery, radiotherapy, and chemotherapy is varied. Five-year survival rates vary from 21% to 70%, with the lower rates representing patients presenting with metastatic disease.

Case Presentation: A 26-year-old man presented with persistent left-sided nasal obstruction. Endoscopy demonstrated a friable mass in the left nasal cavity originating from the middle turbinate with extension into the nasopharynx, confirmed with computed tomography and magnetic resonance imaging. There was no evidence of metastatic disease on positron emission tomography-computed tomography. Histopathologic results were consistent with sinonasal ES. The result of fluorescent in situ hybridization was positive for the EWS gene translocation. A multidisciplinary tumor board evaluated the patient. The patient then underwent neoadjuvant chemotherapy, followed by definitive endoscopic surgical resection and postoperative radiotherapy.

Discussion: Our literature review found more involvement of the maxillary and ethmoid sinuses compared with the nasal cavity, and that the role of radiation and surgical approach was varied. ES of the sinonasal tract is a rare entity with high mortality, but few standardized treatment protocols exist. Further study and evidence-based treatment protocols are needed. This article outlines the role of relevant imaging, a multidisciplinary team approach, and the optimal timing of surgery, chemotherapy, and radiation.

INTRODUCTION

Ewing sarcoma (ES) is a rare and aggressive tumor that typically involves the long bones of the extremities (skeletal form). The less common extraskeletal form involves soft tissues and rarely manifests in the head and neck region.¹ Genetically, the abnormal t(11;22) chromosome translocation is a hallmark of diagnosis.¹ ES of the nose or paranasal sinuses is a rare subset of ES, with treatment consisting primarily of chemotherapy followed by surgery and/or radiotherapy.

CASE PRESENTATION

Presenting Concerns

A 26-year-old man presented to the Head and Neck Surgery Clinic with persistent left-sided nasal obstruction. Flexible nasal endoscopy showed a left-sided friable mass originating from the middle turbinate and extending into the nasopharynx. This endoscopic image is not

available, but a very similar endoscopic image, performed later in our patient's course of treatment, is shown in Figure 1. The patient was treated for sinusitis and nasal polyps with oral antibiotics, oral corticosteroids, a steroid nasal spray, and an oral antihistamine. Computed tomography (CT) was scheduled for 1 month after completion of treatment. The CT scan showed a soft-tissue mass in the left posterior nasal cavity.

Therapeutic Intervention and Treatment

After being lost to follow-up for 3 months, the patient was seen again, and plans were made for a biopsy of the lesion. The biopsy specimen confirmed the diagnosis of ES. Magnetic resonance imaging (MRI) and positron-emission tomography were then performed for staging and treatment planning. Figure 2 shows the extent of the mass as seen on the initial MRI. Pathologic evaluation on



Figure 1. Rigid nasal endoscopy image from study performed at halfway point of chemotherapy. A purple friable mass is seen extending from the left posterior lateral nasal wall between the middle and inferior turbinates in the sphenoidal recess. Biopsy specimen showed persistent disease.

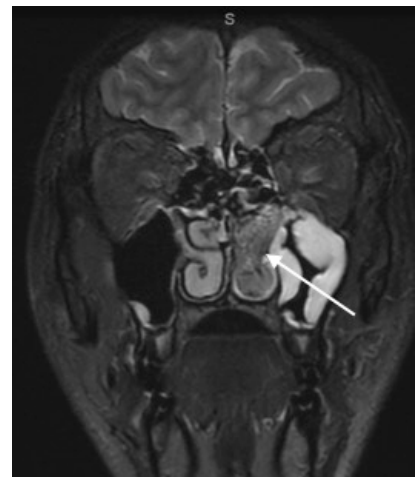


Figure 2. Coronal, T2-weighted magnetic resonance image of the head after contrast enhancement, showing a 4.5-cm enhancing mass centered in the left posterior nasal cavity with extension into the nasopharynx, consistent with Ewing sarcoma/primitive neuroectodermal tumor.

hematoxylin-eosin staining revealed cords of tissue infiltrated by cords and nests of neoplasm with small round blue cell features. Scattered mitotic and apoptotic

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figures were seen (Figures 3 and 4). Immunohistochemistry showed positive staining for CD99 antigen (Figure 5). Findings were supportive of ES/primitive neuroectodermal tumor (PNET). Fluorescent in situ hybridization testing was positive for the t(11;22) translocation associated with the EWS gene in 89% of the cells. Flow cytometry revealed atypical cells that were not further characterized.

The patient's case was presented to our institution's multidisciplinary tumor board. A referral was made to a hematologist-oncologist, who recommended chemotherapy. The result of a bone marrow biopsy performed before chemotherapy did not show any evidence of metastatic disease via pathology or fluorescent in situ hybridization analysis.

One month after diagnosis, our patient started chemotherapy with a regimen of vincristine, doxorubicin, and cyclophosphamide alternating with cycles of ifosfamide and etoposide. He underwent 4 cycles of this regimen. Repeated positron-emission tomography/CT performed 2 months after the start of chemotherapy showed resolution of the previous hypermetabolic left-sided posterior nasopharyngeal mass, without fluorodeoxyglucose-avid metastatic disease. However, there was a persistent nonfluorodeoxyglucose-avid, ovoid, soft-tissue density that on repeat biopsy showed persistent disease. The findings during this biopsy are shown in Figure 1. Repeat MRI showed a small (8 mm × 14 mm × 18 mm) enhancing soft-tissue mass in the location of the original lesion. After the patient was evaluated by a radiation oncologist, his case was again presented to our regional tumor board. The decision was made to perform surgical resection with another round of chemotherapy and possible radiation therapy pending surgical margins and final pathology.

The patient was taken to the operating room for endoscopic surgery and removal of the mass centered along the left lateral nasal wall. Surgery was conducted with imaging guidance. A septoplasty was performed for improved exposure. The specimen was resected en bloc, with good exposure. Margins included the posterior antrostomy, inferior turbinate, anterior lateral nasal wall, and uncinata and ethmoid bulla.

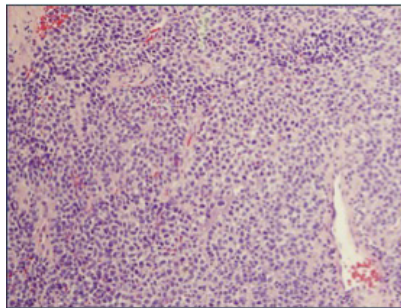


Figure 3. Hematoxylin/eosin-stained tissue section of mass (magnification x20). Neoplastic cells are small to medium sized and have hyperchromatic nuclei with mild variation in nuclear size. Cytoplasm is fine to granular.

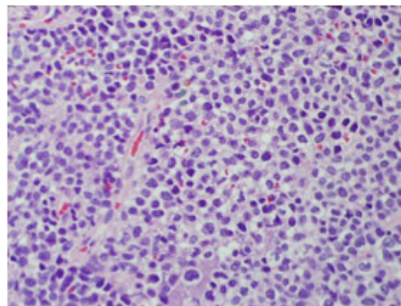


Figure 4. Hematoxylin/eosin-stained tissue section of mass (magnification x40). Same description as in Figure 3. In addition, cords and sheets of small round blue cells with high nuclear-cytoplasmic ratios are seen.

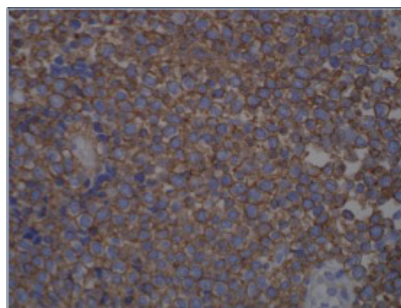


Figure 5. Immunohistochemical CD99 antigen stain (magnification x40). Tumor cells diffusely express CD99 antigen.

Follow-up and Outcomes

All intraoperative margins were negative for tumor. Final pathology confirmed residual disease with negative margins and no evidence of lymphovascular or perineural involvement.

The patient healed well postoperatively and continued his original course of chemotherapy. He did not require radiotherapy because of the absence of high-risk features

and negative margin status on final pathology. Twelve-month postoperative follow-up showed no evidence of tumor recurrence.

Figure 6 shows a timeline of the case. Our patient gave written, informed consent for inclusion in this report.

DISCUSSION

We describe what we believe is the first reported case of ES originating from the middle turbinate in a young man. By itself, ES is a rare disease, making up only 4% to 6% of all primary bone tumors.^{2,3} Furthermore, ES involves the head and neck region in only 1% to 4% of cases, and tumors with a sinonasal origin form another rare subset.³ Simons et al⁴ describes the difficulty in diagnosis of small round blue cell tumors as well as a systemic approach to aid clinicians. ES is described as part of a family of tumors with neuroectodermal differentiation. More specifically, ES is classified as a peripheral PNET.⁴ Immunohistochemistry often narrows the diagnosis greatly. For example, a lesion that is positive for CD99 antigen and vimentin would be either alveolar rhabdomyosarcoma or ES/PNET. Staining for desmin or myogenin would help direct the clinician toward a diagnosis of ES/PNET in the former scenario and alveolar rhabdomyosarcoma in the latter. Strong membrane-only CD99 positivity would again point toward ES/PNET. Clinical parameters can be of aid as well. Typically ES/PNET presents in patients younger than age 30 years, with men affected more often than women.⁴ Molecular analysis is particularly useful if the diagnosis is already narrowed to 2 or 3 entities.⁴ For ES, the t(11;22)(q24;q12) translocation corresponding to EWSR1/FLI-1 fusion is often diagnostic and used for confirmation.⁴ However, variant translocations are seen in 10% to 15% of ES cases.⁴

After diagnosis of ES is confirmed, additional necessary studies include CT and MRI to help anatomically define the lesion as a baseline before starting treatment as well as for surgical planning purposes should surgery be pursued. Furthermore, positron-emission tomography should be performed to stage the disease and look for evidence of metastatic disease. Previous studies have found a rate of metastatic disease at diagnosis of around 12.5% for ES of the head and neck, and 20% to 30% for ES

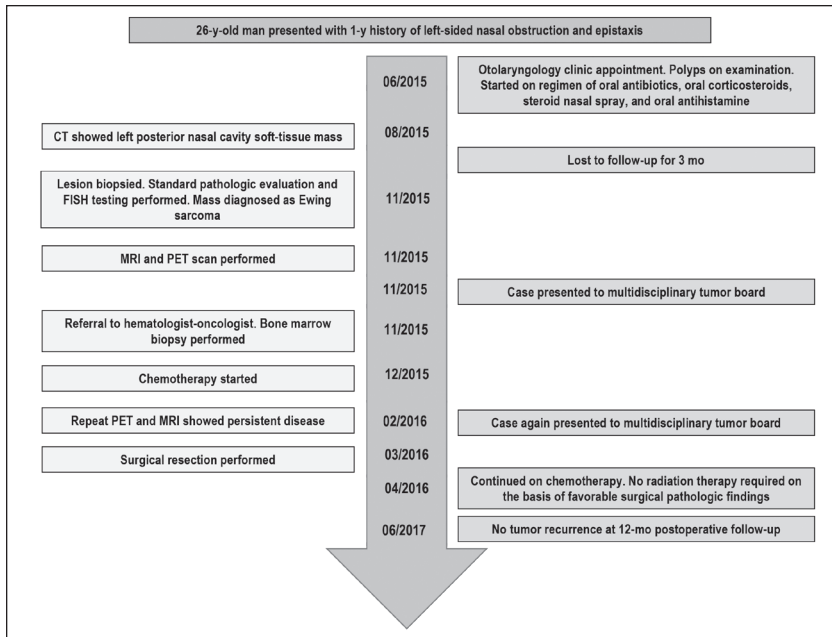


Figure 6. Case timeline.

CT = computed tomography; FISH = fluorescent in situ hybridization; MRI = magnetic resonance imaging; PET = positron-emission tomography.

of all sites.⁵ In one of the largest case series of patients who received systemic chemotherapy and in some instances radiotherapy as well, 57% achieved complete remission and 43% achieved partial remission.⁵ Local relapse in this group occurred in 29% of patients, and distant metastasis developed in 46% during the follow-up period.⁵ Overall survival at 5 years in this group was 53%.⁵ This highlights the potential aggressiveness of the disease and the need for clinical vigilance and appropriate follow-up care.

Although radiation therapy was not used in our case, its use should be considered. Despite substantial associated morbidity, including visual disturbances, pituitary dysfunction, and xerostomia, the report by Lepera et al⁶ in 2016 advocates for the use of radiation therapy in select cases of sinonasal ES (eg, for cases of suboptimal resection). No study to date has shown clear evidence of increased survival with adjuvant radiotherapy. In our case, the patient underwent evaluation by a multidisciplinary tumor board that believed that the patient would have a good response to chemotherapy and could be treated with salvage surgery before radiation therapy, if radiation therapy was needed. As mentioned in Lepera et al, given the favorable surgical margins in our case, radiation

therapy was ultimately avoided, and chemotherapy was given postoperatively only because the patient was in the midst of his chemotherapy protocol when the residual disease was identified.

Previous studies that routinely reported radiotherapy along with chemotherapy as an initial management option primarily included large tumors (> 10 cm).⁵ This may be because of decreased access to imaging modalities and health care, a hypothesis outlined by the authors of the largest series to date.⁵ As in our case, surgery is often not recommended as the first-line treatment given the substantial morbidity associated with large head and neck tumor resection. However, with the earlier detection of tumors and the development of advanced endoscopic techniques, treatment patterns may shift. Given the rarity of this disease, no uniform follow-up regimen is currently recommended. Previous authors have suggested regular follow-up every 3 months for the first year, every 6 months for the second year, and then yearly thereafter.^{5,6} Our patient followed a similar follow-up plan, with imaging as needed on the basis of clinical suspicion of tumor recurrence. Of course, any follow-up plan will depend on the aggressiveness of the tumor and patient or clinician limitations.

CONCLUSION

ES of the sinonasal tract is a rare entity that has a high mortality and for which few standardized treatment protocols exist. This report outlines the role of relevant imaging, pathologic, and cytogenetic studies; the importance of a multidisciplinary team; the timing of surgery; and a proposed chemotherapy regimen. Our patient received chemotherapy up front, followed by surgical salvage therapy for residual disease and completion of chemotherapy without evidence of recurrence at 12-month follow-up. In our literature review, we underscore the gaps in the current research literature, including the role of radiation therapy, various surgical options, and the ideal follow-up period. ❖

Disclosure Statement

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

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ECG Diagnosis: Accelerated Idioventricular Rhythm

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Accelerated idioventricular rhythm (AIVR) is a ventricular rhythm consisting of three or more consecutive monomorphic beats, with gradual onset and gradual termination.^{1,2} AIVR is usually seen during acute myocardial infarction reperfusion (following thrombolytic therapy or percutaneous coronary intervention), and rarely manifests in patients with completely normal hearts or with structural heart disease.² As percutaneous coronary intervention has become a more common treatment for patients presenting with acute myocardial infarction (versus thrombolytic therapy), the observation of AIVR by Emergency Department physicians has become less common than it was during the thrombolytic era.² AIVR has also been associated with several drugs (eg, halothane, aconitine, desflurane, cocaine, and digitalis), electrolyte imbalances (eg, hypo- and hyperkalemia), cardiomyopathies, and during the postresuscitation period following cardiac arrest.²⁻⁵

Electrocardiogram characteristics of AIVR include a regular rhythm, 3 or more ventricular complexes with QRS complex > 120 milliseconds, a ventricular rate between 50 beats/min and 110 beats/min, and occasional fusion or capture beats. This rhythm has two postulated, possibly coexisting causes.⁶ First, the sinoatrial or atrioventricular node may suffer structural damage with depression of nodal automaticity potentiated by enhanced vagal tone. Second, an abnormal ectopic focus within the ventricle may assume the role of dominant pacemaker.⁶ The ventricular ectopic focus manifests when the sinus rate slows down (below the ectopic focus) or when the ectopic focus accelerates above the intrinsic rate by 30 beats/min to 40 beats/min.² When both discharge rates (sinus and ectopic focus) are similar,

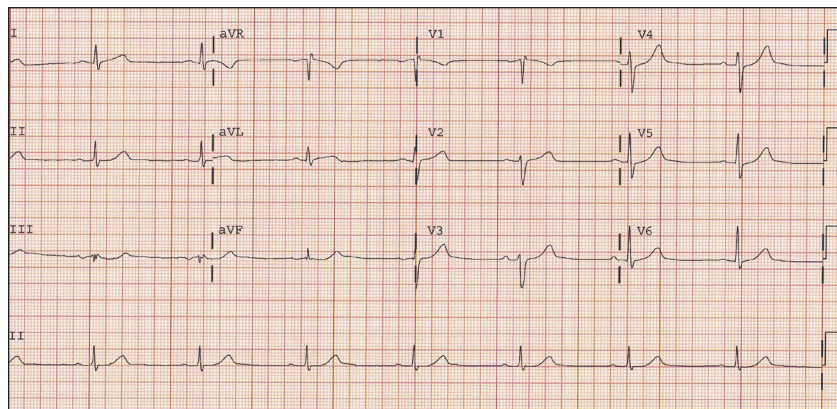


Figure 1. 12-lead electrocardiogram from a 61-year-old man presenting to the Emergency Department with 2 hours of chest pain, demonstrating sinus bradycardia, heart rate of 47 beats/min, minimal (< 1 mm) ST-segment elevation in leads I and aVL, and reciprocal ST-segment depressions in leads III and aVF, which are characteristics consistent with an evolving high lateral-wall myocardial infarction. The electrocardiogram does not meet ST-segment elevation myocardial infarction criteria of ≥ 1 mm ST-segment elevation in 2 or more contiguous leads.

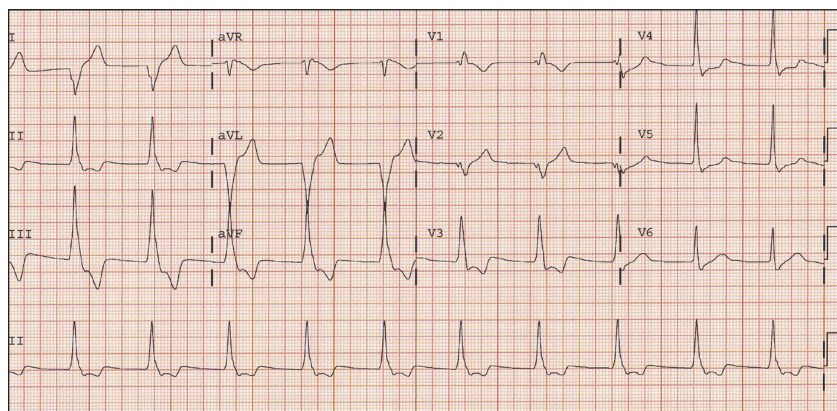


Figure 2. Repeat 12-lead electrocardiogram from the same patient as in Figure 1, obtained 1 hour after the initial electrocardiogram (after treatment with aspirin and sublingual nitroglycerin, with improvement in chest pain), demonstrating a wide-complex, regular, accelerated junctional rhythm, heart rate of 63 beats/min, which is consistent with an accelerated idioventricular rhythm. In the setting of evolving lateral wall ST-segment elevation myocardial infarction, this finding is suggestive of spontaneous reperfusion of an occluded coronary artery.

isorhythmic dissociation, fusion beats, and capture beats can be seen.

AIVR is usually a benign and well-tolerated arrhythmia.² Most cases of AIVR

will require no immediate treatment for this dysrhythmia, because AIVR is usually self-limiting and resolves when the sinus rate exceeds that of the ventricular

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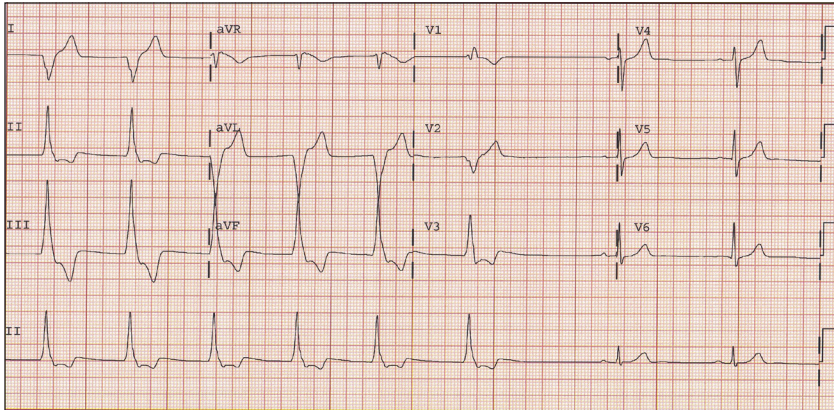


Figure 3. Repeat 12-lead electrocardiogram from the same patient, obtained 1 minute after the electrocardiogram in Figure 2, demonstrating conversion from accelerated idioventricular rhythm back into sinus bradycardia. Subsequent coronary angiography demonstrated 99% stenosis of the first diagonal branch of the left anterior descending coronary artery, which was successfully treated with percutaneous coronary intervention and stenting.

foci.⁶ Administration of antiarrhythmics to patients with AIVR may cause precipitous hemodynamic deterioration and should be avoided.⁶ In cases of AIVR, remember to treat the underlying cause: For example, restore myocardial perfusion (thrombolytics or percutaneous coronary intervention), or correct electrolyte abnormalities. Patients with low cardiac-output states (eg, severe biventricular failure) may benefit from restoration of atrioventricular synchrony to restore atrial kick. In cases of

low cardiac output associated with AIVR, atropine may be used in an attempt to increase sinus rate and atrioventricular conduction.⁷ ❖

Disclosure Statement

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The Law of the Heart

The law of the heart is thus the same as the law of muscular tissue generally, that the energy of contraction, however measured, is a function of the length of the muscle fibre.

— Ernest Henry Starling, 1866-1927, British physiologist

■ NARRATIVE MEDICINE

This is a story and illustration from the upcoming book *100 Little Stories of Big Moments* published by The Permanente Press.

The stories were written by clinicians in 15 minutes in writing workshops about meaningful moments in their work and life of practicing medicine. Professional artists were asked to create a visual representation of the story.

Nebraska Farm Scenes

Lisa Schuman, NP

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My patient was 85 years old and dying of metastatic pancreatic cancer. It seemed as though her daughters, in expressing their angst over the death and dying of their mother, overshadowed the real patient. They consumed her waking moments, suffered loudly their mother's pain so that she could not allow her own pain to push out of her; not through movement, no writhing, no crying, no moaning.

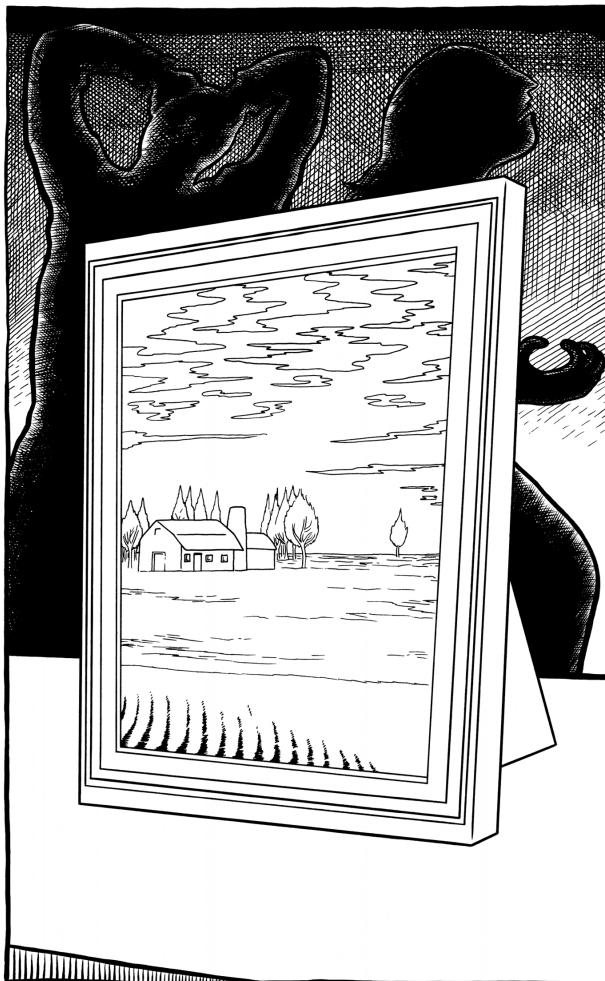
The girls, in their 60s, insisted that pictures of their dead father surround the patient's head so that when she opened her eyes they would be all she would see.

The mother disclosed that she was distressed by these photographs. Her husband had abused her, suppressed her and her spirit. He took her from the Nebraska farm where she was born and belonged. He took her away to Seattle when she was 16 years old and never fulfilled his promise to allow her to go home.

She wanted the pictures replaced with images of farmland and cattle but without disclosing to her daughters how terrorized she felt by the images of their father. She asked to be kept asleep so she wouldn't have to bear her children's loud crying, disturbing her busy thoughts about her own life. They would wake her to her pain and scream when they saw agony on their mother's face, forcing her to beat down her pain. She could manage only a few minutes. They woke her over and over in search of their mother's comfort—Mommy is leaving.

I had to orchestrate replacing the pictures with Nebraska farm scenes and keep her sedated against her children's need ... making up rules about noise, visits, needed procedures just to give her the privacy she needed for her dying moments.

She ultimately got her solitary wish, her private review and her beautiful cow-covered grasslands and, I am sure, in her thoughts, made it back home. ❖



Accompanying artwork: *Nebraska Farm Scenes* by Ryan Alexander-Tanner.

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Meditation and Mindfulness: A Call to Action in Elevating Primary Care

Ami Kapadia, MD

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ABSTRACT

Mindfulness meditation has vast physiologic benefits that can reduce physician burnout and improve physician well-being. Collective meditation and mindfulness practices with organized continuity among physician groups can synergistically elevate the practice of primary care by fostering creativity and innovation needed for sustainable solutions. A cohesive frontline physician voice rooted in higher purpose cultivated by meditation and mindfulness practices in a platform directly linked to quality improvement can lead to meaningful change in primary care for all.

INTRODUCTION

Medicine for me was romantic when I was a student: The idea of making house calls carrying a black medical bag filled with lifesaving tools and treatments; the notion of being called to action in leading community relief efforts; and the privilege of studying a complicated case for endless hours like a mad scientist. As I was entering primary care, I felt optimistic about these opportunities. But then I burned out to the point where service to patients felt disconnected from my higher purpose in medicine. Cynicism had hijacked my mind.

THE HEALER NEEDS TO BE HEALED

The all-encompassing breaking point was on a typical hectic day in my second year of primary care practice. I viewed my job as a relentless schedule, an overloaded inbox filled with clerical tasks, angry patients with chronic pain and disability requests, numerous quality performance report cards, and insufficient time to enjoy synthesizing anything complex. I did not feel like I was helping anyone. I did not feel set up to be a proper doctor. My practice felt stuck in a box of protocols, riddled with fear of liability, and devoid of artful solutions. Toward the end of the day, one of my very pleasant patients looked at me during our visit and respectfully asked, “Doctor, you seem so tired. Is everything okay?” I thought to myself after he left, the healer definitely needs to be healed.

RECONNECTING WITH TRUTH

From that moment, I embarked on a desperate journey toward reconnecting with truth in medicine. I realized that my attitude needed to change. I grew up with meditation, and I started to consciously apply my meditation practices to my work. With time, an internal shift occurred. I found myself naturally infusing compassion, gratitude, and intellectual curiosity into my

practice no matter how much longer I worked. At one point, I became chronically behind schedule and felt that this effort was not sustainable. But over time, I noticed a surge of creativity that enhanced my efficiency and stamina. My faith in doing the right thing increased. My member/patient satisfaction scores sharply increased. I felt liberated by living in the present moment, and I was deriving energy from putting patients first again. I felt happier and stronger in all aspects of my life, no matter what adversity I faced. My family benefited as well.

My journey through burnout is not uncommon. The triple aim—enhancing patient experience, improving population health, and reducing costs—has been noted to be imperiled by physician burnout.¹ Growing awareness in the medical community of collective physician burnout allowed me to identify this state in myself. From a quality and safety standpoint, there is urgency to this matter because we know that burned-out physicians give burned-out care. What is the solution?

A SOLUTION IN MEDITATION

Meditation and mindfulness are ancient methods that have helped me. A growing body of literature and research has validated meditation and mindfulness programs for physicians as effective in reducing burnout and improving physician well-being. This particularly holds true when in a structured, continuous course with maintenance activities.²

Numerous physiologic changes have been shown to occur during meditation when practiced regularly. Emotional equanimity is restored, and immune function is strengthened. By calming the mind in real time, the meditative state enhances focus, attention, and self-awareness. In a summary of a meta-analysis of multiple studies in experienced healthy meditators, three seemingly beneficial clusters of activity were noted on brain imaging to support this view: The caudate in attentional disengagement from irrelevant information; the entorhinal cortex (parahippocampus) in control of mental thought streams; and the medial prefrontal cortex in enhanced self-awareness.³

In *Harvard Business Review*, Seppala⁴ writes that “Meditation enhances creativity. Research on creativity suggests that we come up with our greatest insights and biggest breakthroughs when we are in a more meditative and relaxed state of mind. That is when we have ‘eureka’ moments. This is likely because meditation encourages divergent thinking (ie coming up with the greatest number of possible solutions to a problem), a key component of creativity.” In an article titled, “The Neuropsychological

Connection Between Creativity and Meditation,” Horan⁵ presents scientific evidence that creative thinking and innovation are boosted as “Strong associative thinking habits are suppressed allowing for the generation of new ideas.”

For me, the internal shift created by meditation that I described also changed my outlook on primary care. I found myself more engaged in thinking about solutions and concrete ways to strengthen multidisciplinary care for various patient groups, for example, patients with chronic pain and disability, those with depression and anxiety, and noncompliant patients. The limitations of our system started to appear more as opportunities for improvement that could augment joy in medicine as in no other time in history.

Primary care evolved to reduce disparities and cost while improving outcomes and quality. In 1996, the Institute of Medicine defined *primary care* as “the provision of *integrated, accessible health care services* by *clinicians* who are *accountable* for addressing a large *majority of personal health care needs*, developing a *sustained partnership* with *patients*, and practicing in the *context of family and community*.”⁶

I started to recognize that carving out the field of primary care with this patient-centric model was a grand and pure feat that aligns with the spirit of service. Resources and investment may have been underestimated with unintended consequences that have made it increasingly challenging to do the right thing, but such a movement expanded the potential yang to the yin. The intensity of our system’s problems enhances the intensity of positive solutions. In this sense, because of the existence of primary care, medicine is now exponentially slanted to leverage higher purpose with greater power in the evolution of an increasingly complex medical system.

A HIGHER REFERENCE POINT FOR MEANINGFUL CHANGE

Expanding meaningful and effective change in our primary care system starts with transforming collective physician burnout into renewed optimism and creativity on a larger scale. I believe that we must build organized, frontline physician platforms anchored

in continuous, collective meditation and mindfulness practices in the workplace. Such practices can cultivate a cohesive lens that more robustly inspires creative and sustainable solutions to the problems we face as we intersect with the business and politics of medicine. We could then channel our shared visions into focused improvement project planning. In this way, we can systematically redefine and redesign primary care within a multidisciplinary framework from a higher reference point. The ideal outcome is higher quality care in a safer system for more people. Such a movement en masse could benefit all of society. Primary care is truly romantic. ❖

Disclosure Statement

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In Silence

In the attitude of silence the soul finds the path in a clearer light, and what is elusive and deceptive resolves itself into crystal clearness. Our life is a long and arduous quest after Truth.

— Mohandas Karamchand Gandhi, 1869-1948, Indian activist



Harmony
photograph

Sapna Reddy, MD

Every year the rolling hills of Palouse, in eastern WA, come alive with myriad shades of green as heads of wheat and barley herald the arrival of spring. This photograph captures the view from Steptoe Butte looking south. The serenity of this pastoral setting depicts the harmony between man and nature.

Dr Reddy is a Radiologist at the Walnut Creek Medical Center in CA and is pursuing a dual career as a landscape/nature photographer. More of her work can be seen at www.sapnareddy.com, and in this and other issues of *The Permanente Journal*.

A Patient-Centered Approach to a Rural General Practice in Distress and the Search for a Solution

Venetia Young, MB, FRCOG, dipFT; Lewis Mehl-Madrona, MD, PhD; Barbara Mainguy, MA

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ABSTRACT

Context: A general practice in rural UK (Cumbria) was overwhelmed by staff burnout.

Objective: To present a case study for how the staff of a practice came together, used data, agreed on a plan for improvement, implemented the plan, improved subjective distress, and objectively evaluated the intervention.

Design: We conducted an audit using the electronic health record for patients coming to the practice 5 or more times annually from 2008 to 2012 (frequent attenders). We planned an intervention to reduce utilization (frequency of visits) while still serving patients. The intervention used a genogram, psychoeducation, and up to six 30-minute sessions of solutions-focused psychotherapy, in which difficult interpersonal relationships were identified and efforts were made to resolve 1 major problem related to those relationships.

Main Outcome Measures: Quantitative data (number of visits per year) and qualitative data about the changes that resulted in the practice from the audit and the intervention.

Results: The frequency of visits for patients with mental health conditions (41.0% of all frequent attenders in the practice) dropped significantly from 2007 to 2012 ($p = 0.019$; initial visits per year, 10.0, standard deviation = 2.51; final visits per year = 5.6, standard deviation = 3.8). The frequency of visits for patients without mental health diagnoses did not change.

Conclusion: Intervening with frequent attenders of primary care who have mental health conditions improved their symptoms and reduced their health care utilization, with beneficial impact on practitioners and improvement in the morale of the staff.

INTRODUCTION

Patients who frequently visit their general practitioner (GP) often have multiple comorbidities and are costly in primary and specialist health care.¹ More than one-third of Australians (35.3%) went to a GP 6 or more times in 2012 to 2013. Those who went most often tended to be older and less wealthy, were more likely to have several long-term health conditions, and were more likely to see several different GPs² (as was the case in our practice in the UK). One in 8 Australians (12.5%) saw a GP at least 12 times in 2012 to 2013, accounting for 41% of the \$16 billion Medicare Australia paid in out-of-hospital benefits. Patients with a large number of visits to the GP, called very high attenders (20 or more visits per year), were almost twice as likely as low attenders (1-3 visits per year) to have lived in areas of low socioeconomic status (29% vs 16%).

Psychological interventions can reduce frequent attendance.³ Fewer patients contacted their GPs specifically for psychological or social problems (46.3% vs 38.8%) and fewer patients had anxiolytic drug prescriptions (15.5% vs 7.6%) after psychological treatment. People with mental health issues make more use of general practice services and use more medication,⁴ even after controlling for physical health status.⁵ Bellón et al⁶ provided an interactive, 15-hour workshop training session on a psychological team intervention with GPs in southern Spain. Of the 137 frequent attenders registered with 3 GPs randomly allocated to perform the intervention, 66 frequent attenders were randomly allocated to receive the intervention and 71 to a usual care control group. A multilevel model was built with 3 factors: Time, patient, and GP. After adjusting for

covariates, the new intervention resulted in a significant and relevant reduction in frequent-attender consultations.

In a 2-year prospective study of 623 adult frequent attenders in 2009 in the Netherlands, panic disorder, other anxiety, negative life events, illness behavior, and lack of a sense that they could change their lives were independently associated with persistence of frequent attendance.⁷ The authors found no evidence for synergistic effects of somatic, psychological, and social problems and no evidence for any effects of GP characteristics. Also in the Netherlands, among 503 patients listed in 1 of 150 participating GP practices in 2008 to 2010, people who had psychological treatment during 2009 significantly dropped their frequency of medical contacts afterward (6.1 to 4.8).³ They contacted their GPs less for psychological or social problems (46.3% vs 38.8%) and had fewer anxiolytic drug prescriptions (15.5% vs 7.6%) after psychological treatment. Although contact rates decreased, these clients of psychologists were still frequent GP attenders.

This article describes a process of addressing the related problems of patient overattendance in primary care and physician burnout in a general practice in Cumbria, UK.

METHODS

Setting

The practice serves 5500 patients in a market town in Cumbria, UK, with 3 full-time equivalent GPs (5 people) and 2 full-time practice nurses. In 2007, the practice was at a breaking point—up to 6 extra appointments added onto the end of every half-day. The staff experienced burnout, partly from the impact of the many

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frequently attending patients. Staff members were tired and grumpy, and several GPs were using sick days sufficiently often to necessitate the use of locum tenens. A decision was made to implement an internal process using a talking circle format to explore the causes of this burnout.

Process

The talking circles—a group communication technique in which only one person is allowed to talk at a time⁸—aimed to identify the source of practitioner burnout and to identify simple strategies to improve it. The group concluded that reducing the visits of its frequent users of services (frequent attenders) could improve the quality of life of the practitioners.

An audit identified 163 patients as frequently attending the practice. All 5 GPs in the practice were intrigued that each of them knew a little about most of the patients. These patients had seen each GP several times. Each consultation appeared appropriate. The notes were detailed well. The GPs noted, however, that most of the patients had symptoms that “didn’t amount to much” because they were not explained by disease. The GPs decided not to call the patients specifically, but to deal with them as they came for visits. An effort would be made to ensure that patients sought help from their usual GP. Unlike reports in the literature showing that frequent attenders returned to baseline rates over time,⁹ a core group of patients in this practice were stable in their being frequent attenders over the years (at least 5 years). The results of this intervention were compared with those of 3 other practices in the same region for the same period.

Intervention

As part of the talking circle process, the GPs assessed the skills they had for intervention and planned accordingly. They settled on a maximum of six 20- to 30-minute individual sessions. If more care was needed, a referral was made to the Primary Care Mental Health team. The first visit was designed to establish the important relationships in the person’s life using the genogram, a common tool in primary care, which graphically

represents a patient’s family relationships and medical history. The second session consisted of psychoeducation about the effect of interpersonal conflict and life stress on bodily symptoms, designed to provide the rationale for the remainder of the interventions. The remaining interventions consisted of problem-solving sessions in the major areas of the patient’s life problems, in the style of solutions-focused therapy (for which manuals exist¹⁰). This intervention was strongly influenced by the work of Alasdair MacDonald¹¹ and his outline for conducting therapy. As is the practice in solutions-focused psychotherapy, after the identification of the most stressful relationships using the genogram in the first session and the explanation in the second session for how the stress from these relationships was contributing to the patient’s physical symptoms and number of medical visits, the patient and the physician selected the most problematic relationship on which to focus for the next 4 sessions. Most patients, however, needed only 2 or 3 sessions. Included among the problem-solving techniques were some of the solution-focused questions,¹¹ the 7/11 breathing exercise (inhalation to the count of 7 and extending exhalation to the count of 11),¹² and the explanation of the stress cycle.^{13,14}

The intervention was implemented in January 2009 and was studied over 4 years, although the intervention continues. Each year for 4 years, the 50 most frequent attenders were invited to participate in the intervention. We attempted to keep patients seeing the same GP. We gathered data on overattendance for 4 years after the close of the study. No patient received the intervention twice.

We provided community trainings for other practices that became involved as a result of discussions in the community. The other practices did their own frequent-attender audits. Their communities were equivalent sociodemographically with ours.

Statistical Analysis

Our primary outcome measure was the number of visits per year. We used multi-level modeling methods (Mixed-Effects Models procedure of SPSS, Statistical

Package for the Social Sciences Version 22, IBM Corp, Armonk, NY). We had comparison data from 3 other practices in the region and used a coding variable for each practice. We coded each of the major diagnoses listed in Table 1, as well as whether the patient was on any of the existing chronic disease registries, whether s/he was receiving antidepressants, and the patient’s age and sex. The dependent variable was the number of visits per year. Time of observation was nested under diagnosis, which was nested under practice. A number of potential interactions were also explored.

Qualitative Data Analysis

In keeping with case study methods,¹⁵ we attempted to instantiate and develop the themes that emerged from meetings with the frequent attenders. We did this to understand what drove them to come so often to the practice and to further assist some of them to meet their needs in such a way that they could consult the GP less frequently. This inductive process, as defined by Charmaz,¹⁶ relies on the “study of a range of individual cases and extrapolates patterns from them to form a conceptual category,” which then leads to a solutions-focused intervention.

The clinical approach used is consistent with the goal for the GP to avoid dominating the interview, as has been recommended for qualitative researchers.¹⁷ Our goal was to understand the patient’s life and context in which the frequent visits were occurring and to understand what the patient hoped to accomplish by coming to the GP. The aim was to elicit all the problems and all the symptoms to make sense of their presentation.

The discussions of these frequent attenders by all the GPs and nurses in the practice provided the function of triangulation described by Creswell.¹⁸ Solutions-focused therapy is based on the idea of checking all inferences with the patient for verification, which is similar to what has been called member checking in qualitative research.¹⁹ Solutions-focused therapy uses an approach that resembles the constant comparison method of qualitative data analysis. This method of analyzing data returns frequently to the participants for clarification and further explication on a topic.²⁰

RESULTS

During the course of 4 years, 356 individuals were found to be frequently attending patients. Table 1 presents the diagnoses active at the time of visit for these 356 patients and shows which diagnoses are statistically significantly more common among the frequent attenders. The frequent attenders had an average of 5 active diagnoses each visit, whereas a group of randomly selected patients had 2.86 active diagnoses at the time of each visit. The mean age of frequently attending patients was 53.27 years with a standard deviation of 24.30 years. The practice decided to intervene with the top 50 attenders each year, a number determined by physician time availability.

During the first year, 2 of the top 50 patients were seriously ill, and both died shortly after the audit period. The top 5 attenders were all people with serious

mental illness. Seven of the 50 had straightforward physical health problems, which were being managed through lifestyle and medication. Twenty-six of the 50 had a variety of medically unexplained symptoms, dyspepsia being the most common.

The percentages for specific diagnoses did not differ among practices. Nor was the age distribution or sex ratios different among the four practices. Age and sex ratios did not change significantly from year to year.

Statistical Analysis

The interventions enacted reached statistical significance for patients with a mental health diagnosis (41.0% of the frequent attenders). For them, the changes enacted in the practice reduced the rate at which patients consulted physicians over time (p = 0.019). A total of 186 patients

received the intervention over 4 years. Time was nested under condition. The estimate of the slope was 0.3878 with standard error of 0.1532, *t* value of 2.974, and 95% confidence interval from 0.0358 to 0.9199. The -2 restricted log likelihood was 794.310. No significance was found for the patients who did not have a mental health diagnosis. The number of chronic diseases, age, or specific illnesses for which there were registries was not significant. Illnesses considered included chronic obstructive pulmonary disease (COPD), congestive heart failure, coronary artery disease, diabetes, atrial fibrillation, obesity, thyroid disorder, hypertension, cerebrovascular accident, chronic kidney disease, asthma, cancer, dementia, and terminal illness resulting in palliative care. The data from 3 other practices were analyzed for this same period, and no statistically significant changes occurred in the number of visits in any of the 3 practices during the same time period. The prevalence of mental health diagnoses did not change; rather, the rate of utilization changed after the intervention.

Practice Changes

Table 2 presents the major themes that arose during interventions. Arising from conversations with frequent attenders during the interventions and from the talking circles conducted with the medical team, a number of changes were implemented in the practice. These changes parallel the major themes that emerged:

- Stress is a major contributor to frequent use along with health-related anxiety; the staff was given training on stress management.
- Anxiety and health-related anxiety were identified as major drivers of patients' frequent use, so staff received training in recognizing and treating anxiety.
- Frequent attenders had negative views of their mental health; positive psychology²¹ can mitigate this to some degree, and staff received training in these areas.
- Patients reported more abuse and domestic violence than was anticipated. Personality disorders were underappreciated. Therefore, all staff received training on personality disorders and on recognizing abuse and domestic violence.

Table 1. Number of visits associated with specific diagnoses among frequent attenders and randomly selected attenders

Diagnosis	Diagnoses of frequent attenders, N = 356, no. (%)	Diagnoses of random attenders, N = 356, no. (%)	χ^2	p value
Pain (except back and head)	332 (93.2)	142 (39.9)	227.8	< 0.00001
Back pain	87 (24.4)	31 (8.7)	30.5	< 0.00001
Asthma and breathing complaint	123 (34.6)	92 (25.8)	NA	NS
CHF	95 (26.7)	30 (8.4)	41.0	< 0.00001
GI complaint (GERD, dyspepsia, etc)	113 (31.7)	55 (15.4)	26.2	< 0.00001
Headache	148 (41.6)	74 (20.8)	35.2	< 0.00001
Hypertension	122 (34.2)	71 (19.9)	18.5	0.00017
Anxiety	72 (20.2)	69 (19.4)	NS	NS
Depression	67 (18.8)	31 (8.7)	15.3	0.00009
Other psychiatric diagnosis	109 (30.6)	59 (16.6)	19.5	0.00001
COPD-related	63 (17.7)	36 (10.1)	8.5	0.003
Acute infection	57 (16.0)	56 (15.7)	NS	NS
CAD	54 (15.2)	26 (7.3)	11.0	0.0009
Diabetes	54 (15.2)	17 (4.8)	21.4	< 0.00001
Cognitive disorder	51 (14.3)	40 (11.2)	NS	NS
CVA/TIA	36 (10.1)	37 (10.4)	NS	NS
Chronic kidney disease	39 (11.0)	28 (7.8)	NS	NS
Gynecologic problem	42 (11.8)	43 (12.1)	NS	NS
Diabetes complications	53 (14.9)	37 (10.4)	NS	NS
Cancer-related	37 (10.4)	34 (9.6)	NS	NS
Obesity	33 (9.3)	13 (3.7)	9.3	0.002
Active diagnoses per visit	5.0	2.9	NA	< 0.0001

CAD = coronary artery disease; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; CVA/TIA = cerebrovascular accident/transient ischemic attack; GERD = gastroesophageal reflux disease; GI = gastrointestinal; NA = not available; NS = not significant.

- Frequent attenders were anxious about getting time with the GP and being able to get an appointment to see the GP. They reported that the 15-minute appointment was too short, and they believed that the could not discuss everything they needed addressed. Changes were made for the GP to specify when the patient should return and for how much time. Patients were given their next appointment when they left the office.

Independent of the patients, the medical team decided to delegate more work, including, for example, medical assistants taking vital signs instead of the GPs doing so. All these activities resulted in less use of locum tenens by the practice.

As the GPs reviewed the interviews with the frequent-attender population, they observed gaps in services or poorly functioning services that were not meeting patients' needs. During the first year of the program, this resulted in:

- more regular meetings of the GPs with the health visitor and school nurse
- better communication with the Primary Care Mental Health team
- the realization that thinking about patients' actual needs is fun and interesting, and the formation of a commitment to continue to do so
- the realization that thinking about patients in the context of their family and life situations worked better than thinking about patients as individuals
- the realization that thinking about the mental well-being of the practice itself was helpful.

As a result of hearing about the intervention and the effects it had on the practice, nine other practices in the region began doing frequent-attender audits and were similarly pleasantly surprised. A consultation skills training group was created, consisting of a GP and a nurse practitioner. Talking circles⁸ were adopted as a means for enabling change in GP partner meetings and in managing interdisciplinary meetings with the patients. Frequent significant-event case discussions were held.

These changes in the practice evolved during the 4 years of the intervention. Finally, a 60% reduction in face-to-face patient contact occurred when the GPs

Table 2. Major themes identified among patients who received interventions

Theme category	Number of patients
General anxiety	166
Family stress	76
Work stress	74
Health-related anxiety	66
Sexual abuse	65
Domestic violence	62
Relationship stress	62
Emotional abuse	61
Negative self-evaluation	28
Nondomestic physical abuse	26
Institutional stress	21
Lack of self-agency	16

began returning calls to every patient who had called to make an appointment, to determine what was needed. Advice could be given and laboratory studies scheduled in advance, and often, a visit could be avoided.

Case Studies

The following case studies of frequent attenders provide some of the richness of the qualitative data that led to the aforementioned actions. All the patients whose cases are presented carried a mental health diagnosis of anxiety. All patient names have been changed.

Case Study 1: Dyspepsia

Margaret was 60 years old. She presented to the practice with dyspepsia, shortness of breath, hypertension, abdominal pain, neck pain, back pain, and headaches. She was on the obesity and hypertension registries. She had also consulted a mental health specialist for stress and related a few family worries but never went into extensive detail.

Margaret sat down heavily in the chair and sighed. After dealing with her immediate agenda, the primary author VY commented to her that she had been in to see the GPs with many different problems during the last six months. VY wondered if it might be a good idea to take a step back and try to make sense of it all. Because she didn't know Margaret and was interested in families, VY said it might be helpful to map out the members of her family. Margaret readily agreed and sat a bit straighter in her chair. They filled in a

genogram. Margaret's first utterance after commencing the genogram was that, ten years earlier, her husband had announced that the marriage was over and that he had found someone else. He left the same evening. She looked visibly shocked as she described this event, which had left her with four teenage children. Her eldest son had just resumed living with her accompanied by his six-year-old son, whom she described as "a handful." The boy's mother had drug problems and couldn't care for him and neither could his other grandmother. Margaret's house didn't have enough bedrooms.

She said her other three children gave her an "average amount of grief" and weren't very helpful to her. She felt less stressed now that she was retired and had her pension. She described her siblings: A brother with palsy who lived in a residential home and a sister with a diagnosis of multiple sclerosis, whose two daughters were child care workers and whose husband was very busy at work. She then mentioned her frail, elderly mother. Her father had died ten years previously at the time her marriage broke up, a double grief.

As Margaret looked at what she had drawn, she reflected that there didn't appear to be much time for her. She said she had talked about most of her problems except for the divorce with her GPs, but had never put all the problems together. She thought this was very important but wondered how it linked to her symptoms. As the scheduled visit had run out of time, Margaret and VY agreed to meet again the next week to talk about how stress gets into the body. VY informed Margaret that she thought another four or five appointments would be necessary to sort out her problems.

Margaret looked puzzled but grateful at hearing this and went out to make the appointment with an appointment slip, which would get her past the screening of the receptionists.

The next week VY and Margaret reviewed the stress cycle, which VY drew, listing Margaret's problems at the top of the paper and writing adrenaline beneath them. Margaret knew that adrenaline was the fight or flight hormone. VY explained the effects of adrenaline on the

body: Sweating, palpitations, increased breathing rate, and stimulation of the brain (arousal, hypervigilance, and alertness). Overbreathing lowers carbon dioxide, which increases muscle tension. This could happen in any muscle but is especially noticeable in the small muscles controlling the intestines, the esophagus, the bronchi, and the bladder. Spasm in any of these areas could cause neck pain, back pain, irritable bowel, indigestion, and irritable bladder.

Margaret mentioned a few of these symptoms that she hadn't reported yet, including palpitations and difficulty swallowing. Margaret reflected aloud, "It all fits together. Each time I get a new pain, I have been convinced that I have cancer."

VY then taught Margaret how to do 7/11 breathing,¹⁴ and she started to relax. The second appointment finished with a relaxation process called the 5-finger exercise.²² Margaret commented at the end of the appointment that she had never before felt relaxed and, now that she knew what it was, she was not going to let it go.

During the next four appointments, VY used a solution-focused style to help Margaret problem-solve about her domestic situation and the need to create boundaries for herself in her own home. She agreed to a referral to a local caregivers' organization (whose staff carried on with the relaxation theme). The staff there organized more focused help for her sister. She read a self-help book called *Women Who Love Too Much* by Robin Norwood.²³ At her last appointment she said, "Do you know, I don't think I need any more appointments. I think I've got it and can do it on my own." She has not been a frequent attendee since that time, despite hip surgery and deep venous thrombosis.

Case Study 2:

Chronic Obstructive Pulmonary Disease

Beryl was a 52-year-old woman with COPD. She had come to an educational event about COPD with 50 other patients, during which she had learned about the mental health aspects of having COPD and that breathing better could help her. She was married, with 2 adult children who had recently left home for work. She had had 2 "episodes of bronchitis" the previous winter, which had

frightened her, leading her to think that her breathing was becoming terribly bad. She was scared for the future and believed her life was coming to an end. She had stopped doing what she had previously enjoyed: Dancing and seeing her girlfriends. She didn't work outside the home. She came from a family in which women didn't speak up for themselves; they just accepted their lot.

Her first genogram appointment lasted 20 minutes. Beryl's breathing was not too bad; she had mild to moderate COPD. She readily accepted that her anxiety was interfering with her COPD. Her hopelessness was clouding her judgment, as was her guilt at having caused her illness by smoking. On examination, her shoulders were high and she was breathing with the upper part of her chest. Her respiratory rate was 16 breaths/min, and her oxygen saturation was 96% on room air. She couldn't manage abdominal breathing while sitting, so she lay on the examination table. Gradually she unlearned her paradoxical abdominal movements, which were restricting her breathing. Then with each breath she learned to extend exhalation to the count of 11 and inhale to the count of 7, and then to let her shoulders fall with each breath out. Then she learned to breathe in so that her lower ribs expanded outward and her posterior ribs also moved. Her respiratory rate dropped to 12 breaths/min, and her oxygen saturation rose to 98%.

Beryl sat up and said how very different she felt—calm and purposeful. She agreed to practice the 7/11 breathing several times a day at home, and not just when she felt stressed. She decided on an appointment in 2 weeks for follow-up. Physiologically she was much better and somewhat surprised. This breathing training appointment lasted 20 minutes.

At the third appointment, solution-focused questioning revealed that she had stopped dancing and socializing. She had also stopped talking with her husband about how she felt. One of the initial solution-focused questions is to ask, "What have you been doing differently since the last appointment?" She had already started talking with her husband since filling in the genogram. She had realized that they both needed to get

their lives back on track now they had an empty nest. They were planning a long vacation—their first without children. She was at 6 on a subjective scale of 0 to 10, with 0 indicating the worst and 10 the best. She said she had been at 2 when she first started attending the intervention sessions. Moving up the scale would happen if she planned going dancing with some girlfriends. She decided she wanted to come back in a month. She commented that she hadn't felt the need to use additional albuterol since she learned to breathe properly. This appointment had lasted 10 minutes.

Beryl returned 1 month later saying, "I don't know why I'm here, [because] I'm fine; 9 out of 10. You shouldn't come to the doctor's if you are well!" VY commented that it was encouraging to the GPs' morale to see patients improving.

Beryl said she had gotten her life back and was extremely grateful that it had been so easy. VY then asked a mischievous question with her consent. "I'm not suggesting at all that you would do this, but supposing a part of you decided to make yourself unwell again, what three things would you do to be sure that you would get worse?" She was clear that she would start breathing from the top of her chest and deliberately breathe faster. She would stop going out socially and she would stop talking with her husband.

"Why do you think I asked that mischievous question?" VY asked.

After a pause she reflected, "Now I know the most important things to watch out for, so I can step in early, [because] I never want to go back like that."

Case Study 3:

Previous Chest Surgery

A practice nurse referred a 14-year-old to learn breathing exercises. The patient had asthma and had been complaining she was becoming more and more breathless. The nurse was puzzled by her case and didn't want to escalate her treatment needlessly. This girl had had a thoracotomy to remove a large but benign lung cyst when she was 8 years old. She came with her father to the appointment.

On examination, the adolescent was breathing with her upper chest and her shoulders were high. There was no audible wheeze, and her peak expiratory flow rate

was 350 L/min. On examination of her chest wall, she had a neat thoracotomy scar. A large area around this scar was not moving. VY explained that she thought her body was still remembering the operation and could stop holding that memory. Her chest wall could move without any problem.

Monitoring the intervention led to changes in the practice that improved the quality of life for its practitioners. These changes were made by the physicians themselves using tools accessible to general practitioners and usable in the general practice setting.

They went through an exercise of 7/11 breathing, with which she struggled initially until it was reduced to 3/5 breathing. She practiced breathing into her scar area and was able to expand it surprisingly easily, pushing VY's hand away with the chest wall, so there weren't any contractions. She and her father were given a handout on breathing properly. This constituted a 20-minute appointment for breathing training.

She returned a week later saying, "I'm fine; can I leave now?" This was a 5-minute consultation. Her father reported several months later that she had reduced all her asthma medication, and he and the nurse were querying whether she was asthmatic at all! They thought the source of her breathing problem was a faulty breathing technique.

Case Study 4: Severe Chronic Obstructive Pulmonary Disease

Doris was in her late 60s. She had bullous emphysema after years of heavy smoking. She was worried that she was going to be put on oxygen therapy and that would restrict her social life. She was a lively soul. She had had several scary episodes of "pneumonia" in the previous 6 months.

On examination, her shoulders were high and her respiratory rate was 20 breaths/min. Her oxygen saturation level was 92% on room air. After she learned 7/11 breathing, her respiratory rate dropped to 12 breaths/min and her oxygen saturation rose to 96%. In addition, she learned to add a second hold after inhalation. She was amazed with the improvement in how slowly she breathed and how calmer she felt. She

wanted to understand how this miracle had happened, so VY explained how her rapid breathing wasn't allowing oxygen the time it needed to cross the alveolar membrane but that carbon dioxide, which diffuses faster, was getting blown off. This had the effect on her blood cells of not letting them release the oxygen,

and it also caused her chest wall muscles to become more tense and reactive. This tension made her feel like she needed to take more breaths.

In discussion, we learned that Doris had the mistaken belief that because her lungs were damaged, she had to take as many breaths as possible. She was very interested in the fact that if she could manage her breathing well, infections would be less likely because she would be clearing her airways properly. She found it difficult to maintain 7/11 breathing on her own, so she was referred to a respiratory physiotherapist for more intensive work. He reinforced the abdominal breathing. He taught her how to cough effectively and taught her husband how to percuss her chest to aid in sputum clearance. A trial of carbocysteine also helped. She became more motivated to start early antibiotic therapy when she knew a "chest" infection was starting. She was grateful for the deeper understanding of her lung physiology and the better sense of control this gave her.

DISCUSSION

An intervention arising as a result of an audit process reduced frequent attendance in a primary care general practice in Cumbria, UK, among patients who had a mental health diagnosis. Monitoring the intervention led to changes in the practice that improved the quality of life for its practitioners. These changes were made by the physicians themselves using tools accessible to general practitioners and usable in the general practice setting. Other practices in the region became inspired by what had happened and implemented similar activities.

For understanding frequent attendance, the severity of the patient's distress was more important than how minor the GP felt the illness was. Knowing patients' backgrounds (stories) improved care by providing a context for the GP to place the patient's distress. Simple skills can have large impact, including teaching breathing practices to reduce hyperventilation, the 7/11 breathing technique, and the 5-finger exercise. Genograms are useful to open the dialogue about family relationships.

Strengths and Limitations

This study may be limited in its potential generalizability. It arose from an audit process in one general practice in rural northern England. Practices and patients differ around the world, and the brief intervention employed here might not work elsewhere. The strength of the study is its demonstration that general practices can transform adverse circumstances through an audit process, can implement an intervention on the basis of the results of that audit, can monitor the results of that intervention, and can thereby improve the quality of the physicians' experience as well as the patients'.

The case studies showed the importance of physicians being able to carry out these interventions. Although behavioral therapists can help greatly in encouraging healthful change, the GP's knowledge of medicine and having a long-term relationship seemed important for most patients in this practice, at least for accomplishing change in 6 visits of 20 to 30 minutes' duration.

Comparisons with Existing Literature

A meta-analytical review showed that 90% of the 91 studies analyzed reported a decrease in medical utilization after psychological intervention.⁴ The most dramatic effects were seen in patients with more severe forms of psychological and physical symptoms. It seems reasonable to expect that psychological interventions in primary care will decrease mental health problems, resulting in overall decreases in medical care utilization.^{4,24} Our report shows that psychological interventions can be done by the general practitioner within the timeframe typically allowed

for encounters in the primary care setting and with short treatment periods.

CONCLUSION

Further work is indicated to understand how to optimally deliver medical care to people with multiple physical complaints who visit the GP often. This report shows that psychological intervention among frequent attenders decreases their use of primary care, improves GP and staff morale, and is possible in a rural general practice setting. Further work is also needed on how practices can self-audit and use those processes to change their process of care and solve problems. ❖

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

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Author Contributions

Venetia Young, MD, was a member of the practice and performed the bulk of the interventions. Barbara Mainguy, MA, and Lewis Mehl-Madrona, MD, PhD, consulted to the practice and provided training to the staff on narrative practices, talking circles, narrative medicine, and brief interventions. Lewis Mehl-Madrona, MD, PhD, conducted the statistical analyses. The remainder of the interventions and the changes in the practice were implemented by the staff of the practice.

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The Secret

Remember to breathe. It is, after all, the secret of life.

— Gregory Maguire, b 1955, American novelist

This is a story and illustration from the upcoming book *100 Little Stories of Big Moments* published by The Permanente Press.

The stories were written by clinicians in 15 minutes in writing workshops about meaningful moments in their work and life of practicing medicine. Professional artists were asked to create a visual representation of the story.

Fishbowl

Eileen Ogasawara-Chun, MD

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It was another busy night on the floor of Labor and Delivery. I was a brand-new medical student on rotation.

Just sitting in the fishbowl. Fishbowl—funny thing. They sat us at a desk in the middle of the ward, surrounded by glass walls. Fishbowl.

Even from inside, I could hear the muffled moans of women in labor. I could see nurses busily going from room to room. I felt a little protected in the fishbowl, but also helpless.

Then came a call—they needed help in Room 8. A woman was going to deliver soon. So off I went with the nurse. Having never seen a woman in labor, I was taken aback. She was in pain. *How do I help?* Her family was nervous and exhausted from the long labor. *What should I do?*

The attending physician came in, and like a ray of light, brought new energy into the room. The family jumped up. It was time to push!

I fumbled to unlock the bed and managed to not get run over as we moved into the Delivery Room.

“Gown up!” the attending told me. He must’ve seen the look of inexperience on my face. “Like this. Now, hand here.”

What? Why?

“Hold your hands like this.”

Really?

The woman gave a deep groan and started pushing. I saw the head of the baby start to emerge. Then I was guiding the baby out.

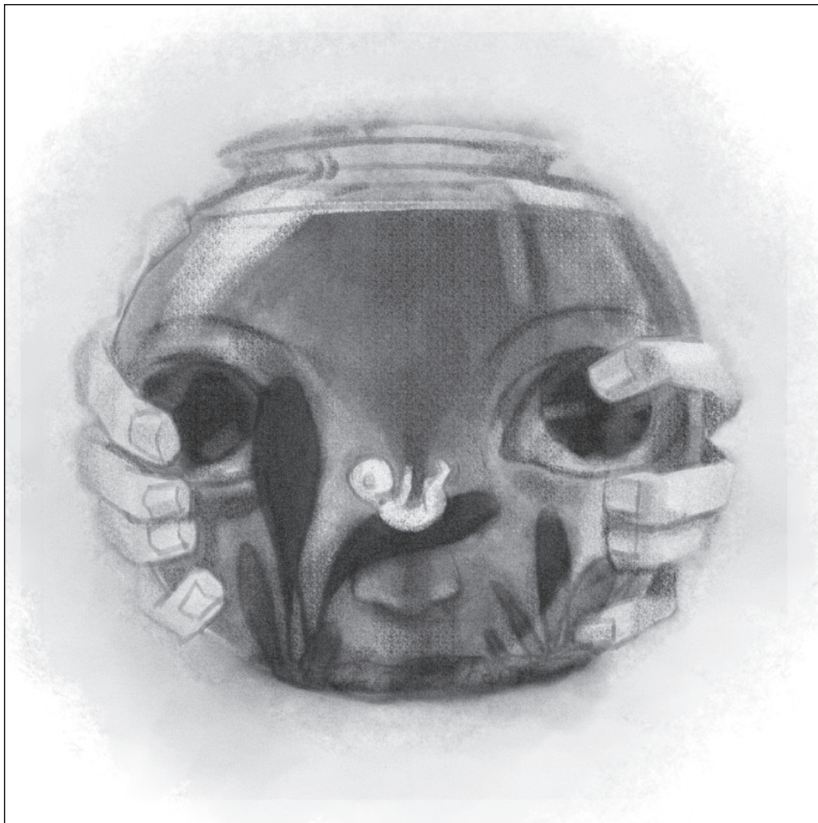
“Hold tight. They’re slippery little devils.”

I ran my hand down the back of the baby and cradled him until he was finally free.

I heard nothing then. No shouts of joy. No “It’s a boy!” No crying of relief. I just saw the baby, with his scrunched-up face, slightly blue and slippery.

Then I felt a nudge. It was the attending. He said, “You don’t need to hold that tight; the kid’s got to breathe.”

“Sorry!” In that moment I knew my life was going to be in the fishbowl. ❖



Accompanying artwork: **Fishbowl** by Aster Pang.

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Implementing a Narrative Medicine Curriculum During the Internship Year: An Internal Medicine Residency Program Experience

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ABSTRACT

Introduction: Narrative medicine develops professional and communication skills that align with Accreditation Council for Graduate Medical Education competencies. However, little is known about a narrative medicine curriculum's impact on physicians in training during residency. Implementing a narrative medicine curriculum during residency can be challenging because of time constraints and limited opportunity for nonclinical education.

Methods: Six sessions were implemented throughout one academic year to expose first-year internal medicine residents (interns) to narrative medicine. Attendance and participation were documented. At the end of the year, interns completed an open-ended survey to gauge their perception of their experience with the sessions.

Results: In total, 17 interns attended at least 1 narrative medicine session, and each session averaged 5.4 attendees. Thirteen eligible interns completed the survey. Thematic analysis identified 3 predominant themes: Mindfulness, physician well-being, and professionalism.

Discussion: Overall, the narrative medicine sessions were well attended and the curriculum was well received. This intervention demonstrates the value of a narrative medicine curriculum during medical resident training. Large prospective studies are necessary to identify the long-term benefits of such a curriculum.

INTRODUCTION

In 2001, Rita Charon defined narrative medicine as listening, reflecting, and responding to patient stories to promote healing.¹ The use of narrative techniques in medicine, however, is not novel. Medicine is saturated with storytelling.^{2,3} Today's rigorous medical school curriculum focuses on seven areas ranging from biomedical sciences to interprofessional collaborative skills, leaving little room to teach medical humanities.⁴ The assumption that medicine is an objective science based on technical skills and the perception that the humanities lack clinical relevance further hinder the inclusion of humanities in the curriculum.⁵ Narrative medicine does not propose a completely new practice, but rather a new framework within which to conduct current medical practice.¹ A narrative medicine curriculum was first developed at Columbia University College of Physicians and Surgeons in 2000.⁶

Since then, other medical schools have introduced narrative components into their curricula,⁷⁻⁹ recognizing value in developing professionalism skills. Narrative medicine also can help medical students meet Accreditation Council for Graduate Medical Education competencies, including interpersonal and communication skills and professionalism.^{10,11}

Medical students respond favorably to narrative medicine curricula.^{6,10} However, little is known about the benefits of a narrative medicine curriculum during residency training and thereafter.¹² Few structured efforts encouraging narrative medicine during residency training exist even though narrative skills are essential to ensure effective physician-patient and physician-physician communication.^{13,14} Single-center and multicenter studies demonstrate the increased risk for burnout attributable to emotional exhaustion and depersonalization during the internal medicine internship year

of residency.^{15,16} A narrative component to medical education can help foster a professional identity on the basis of affiliation, representation, and attention, which are needed in graduate medical education to balance the confusion, depression, and frustration often experienced during residency.

It is a challenge to implement a narrative medicine or other humanities curriculum during residency. Liao and associates¹⁴ highlighted four barriers to implementation: The increased complexity of care delivery and duty hours limit activities in nonclinical education; the Budget Control Act cut indirect medical education funding, prioritizing clinical activities; most residency programs do not have the structure or culture necessary to support a narrative medicine curriculum; and nonclinical activities focus on research, quality improvement, and other medical education valued in fellowship and job applications. A 2013 study discussed resistance among faculty and residents who were unfamiliar with narrative medicine and cited this lack of knowledge as a barrier to implementation.¹⁰ Nevertheless, opportunities exist within training to provide residents with the opportunity to engage in narrative and reflection activities. These opportunities include implementing activities during residents' protected time (morning report or noon conference), using in-house resources (building space, library, and art displays), and encouraging residents to participate in unfamiliar activities. In an effort to stimulate and encourage writing and reflection in medicine, the Louisiana State University Health Sciences Center (LSUHSC) Internal Medicine Residency Program in Baton Rouge implemented a narrative

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medicine curriculum for first-year house officers (interns). The benefits of this pilot program are discussed here.

METHODS

During the 2015–2016 academic year at the LSUHSC Internal Medicine Program in Baton Rouge, incoming interns were invited to participate in a series of reflective sessions based on a narrative medicine curriculum. Each of 6 sessions was offered twice, for a total of 12 sessions throughout the academic year. To increase participation, the first occurrence of each session took place during the evening, and the next occurrence of the same session took place the next month during noon conference. Noon conference is part of a resident's protected time for didactic activities, so the ability to make use of this time every other month ensured that interested interns could attend a session. One week before the session, we e-mailed reminders to all interns with time and place information. Participation was voluntary, and interns were encouraged to attend at least 4 sessions throughout the year.

Each session consisted of a 30-minute discussion of a short essay, poem, article, or movie, followed by a 5-minute narrative exercise and a 10-minute wrap-up conversation. Narrative exercises included prompts that encouraged interns to briefly write and subsequently read aloud to the group. A discussion that followed the writing exercise allowed participants to reflect on their experiences with the group. Interns were allowed to keep their written narrations to protect confidentiality and encourage honest writing practices. The sessions took place in 2 areas of the LSUHSC Medical Education and Innovation Center that were designed with the value of medical education in mind: The Reconciliation Room, which is designed to encourage constructive feedback and foster feelings of completion, lack of hierarchy, wholeness, and unity (participants sit at a large round table to eliminate the sense of hierarchy), and the Teaching Terrace, which is an open outdoor space designed to foster humanism attributes in trainees.¹⁷

After the last sessions, we surveyed the interns using an anonymous, open-ended

questionnaire to assess their perception of the narrative medicine sessions attended during their intern year. The survey consisted of 6 questions previously developed by Arntfield and associates.¹⁰ Four addi-

that personal reflection led to increased awareness of emotions, insight into experiences encountered during their intern year, and a better understanding of the things that truly are significant in the fast-paced

Respondents stated that personal reflection led to increased awareness of emotions, insight into experiences encountered during their intern year, and a better understanding of the things that truly are significant in the fast-paced world of medicine.

tional questions captured the interns' time and location preferences (see Sidebar: Ten-Item Narrative Medicine Sessions Survey). The final 10-item paper-based survey was completed 1 week after the last narrative medicine session of the internship year in June 2016. Survey responses were entered into a database, and thematic analysis was performed for each question. Responses had to be categorized into the same theme by at least 2 readers for inclusion. Survey procedures were approved by the LSUHSC New Orleans institutional review board (IRB 9410).

RESULTS

Among 18 interns, 17 attended at least 1 session; 6 were preliminary and 8 were categorical interns, and 12 were men and 5 were women. On average, participants attended 3.8 sessions, with each session averaging 5.4 attendees. Thirteen interns completed the survey at the conclusion of the year. Course feedback was overwhelmingly positive, with 3 consistent themes emerging in the responses: Mindfulness, physician wellness, and professionalism. Interns defined mindfulness as increased personal reflection and awareness of patient feelings; physician wellness as good health and the ability to share difficult experiences to promote emotional well-being; and professionalism as strengthening of peer comradery, humanism, and public speaking skills. These themes are further discussed below.

Mindfulness

The interns stated that the sessions they attended gave them an avenue for personal reflection and encouraged them to be more thoughtful, both personally and professionally. Respondents stated

world of medicine. Moreover, reflection challenged them to be mindful of patient feelings and patient experiences. Most responses included statements on patient empathy acquired through awareness and reflection. Interns also revealed heightened empathy toward each other and their peers in the medical profession:

I enjoyed the sessions. I felt as though they helped me take a step back and evaluate my views and attitudes. I think it helped me to refocus on patient care and let go of the frustrations of intern year.

[The sessions were] a wonderful opportunity to reflect on our experiences and relate to one another. I now know that more people have the same feelings and struggles as me than I initially thought. It will help me to better understand colleagues. This course also helped me better empathize with my patients.

Physician Wellness

Many sessions led to discussions about the role of a physician in modern society. Interns reported feeling stressed and overwhelmed by the daily requirements of internship training, which leave little time for reflective or emotional outlets. There was a general consensus that the internship year can lead to compassion fatigue. The interns said the sessions had a positive impact on their emotional health and that narrative medicine was one of the only nonmedical outlets they had encountered throughout their medical education:

Talking about compassion fatigue is something that really struck me. Discussing this subject allowed me better insight into how I feel at times and how others may be feeling.

Unlike other avenues for dealing with stress and fatigue, I felt that the abilities

to discuss things with peers provided a uniquely cathartic way to air out feelings. I left every session feeling more at peace than when it started.

Professionalism

Throughout the narrative medicine sessions, multiple recurring topics that involve the Accreditation Council for Graduate Medical Education definition of professionalism were discussed. Respondents indicated that participating in the sessions led to an increase in peer camaraderie, which strengthened their sense of affiliation to each other and to the institution. Peer-to-peer bonding was possible through the sharing of difficult experiences and emotions encountered during medical training. Interprofessional communication is an essential component of professionalism according to Accreditation Council for Graduate Medical Education standards. Residents reported that these discussions strengthened their communication skills by improving their ability to listen and encouraging public discussion about difficult topics. Respondents also revealed there was no other venue in which they could discuss these difficult topics, and that such conversations are not encouraged in medicine.

I thought it was a great opportunity to bond with my classmates and talk about our experiences ... it allowed me to learn the importance of discussing your opinions and thoughts with others, which can be invaluable to help improve stress and anxiety.

The sessions did help to push us to open up and share things that otherwise may not have been discussed de novo amongst us.

When asked about the structure of the narrative medicine sessions, respondents said their attendance at noon or evening sessions was dependent on their clinical schedule. Respondents were split regarding their preference for an indoor or outdoor venue, yet most recommended including off-campus sessions. Suggestions on ways to improve the sessions included more variety in the format (use of different multimedia), more prompts, and offering the sessions to participants from other medical and health care disciplines.

DISCUSSION

Here we demonstrate the successful implementation of a narrative medicine curriculum during internship year and summarize the reported benefits to participants in an internal medicine residency program. The intern year is touted as the most difficult year in a physician's life. It is characterized by numerous pressures from patients, attending physicians, other residents, and interns' families; an exponential learning curve; and a lack of time to eat or sleep. The most common barriers to implementation of extracurricular activity during residency are time constraints and a lack of structural and cultural support.¹⁴ Yet the narrative medicine sessions were well attended. We attribute this success to two factors. First, the sessions took advantage of the

residents' protected didactic time (such as noon conference) or sessions took place at the end of clinical time. If an intern could not attend a session, a repeat session was offered the following month to ensure that both sessions did not fall on the same clinical rotation month. Attendance was not mandatory, but participation was encouraged through morning report and e-mail announcements. Second, program support was essential to ensure intern participation. The narrative medicine initiative was promoted by the Program Director, who teaches medicine with a focus on the art of medicine and humanism.

The high survey response rate captured interns' perspectives on narrative medicine. Respondents highlighted a lack of alternative outlets for stress during residency training. The narrative medicine sessions provided a forum in which they could talk about topics they usually did not discuss in their personal or professional relationships. Internship year in internal medicine is characterized as relearning medicine as an applied science and the pressure of acting as a physician for the very first time, which can cause burnout.^{15,16} Providing structured time for reflective writing can help residents deal with the clinical demands of the intern year.

Today's medical training is shifting from listening to patient narratives toward a more mechanical approach to care that is focused on quick information assessment. Such an approach eliminates consideration of a patient's experience from physician training. Narrative medicine involves listening to the intricacies of patients' stories as they unfold and "translating" subjective words into objective information to gain a better understanding of an illness. Moreover, storytelling often is therapeutic for patients and has demonstrated healing effects.³ Storytelling also can transform a medical encounter into a more empathetic and understanding experience between patients and physicians, which enhances the quality of care.¹⁴ This type of practice helps physicians improve their personal awareness and avoid succumbing to the confusion, loneliness, depression, and frustration that can be associated with caring for critically ill patients.^{10,18} The mindfulness, physician well-being, and professionalism

Ten-Item Narrative Medicine Sessions Survey

1. What is your overall impression of the narrative medicine sessions?^a
2. List/identify skills or tools that you have gained through narrative medicine that have already been or will be helpful to you personally and professionally.^a
3. Is there an instance or moment or particular session that these things clicked for you and if so, can you describe that moment?^a
4. Have these sessions been helping you relate to your peers overall? Please explain.^a
5. What about these sessions is unique? What is redundant?^a
6. If someone asked you why sessions like these are part of your internship, what would you say?^a
7. How do you think the sessions could be improved? What is missing?
8. Did you prefer the session in the Reconciliation Room or the Teaching Terrace? Why?
9. Did you prefer the session at night or during noon conference? Why?
10. How many sessions did you attend? (Circle one) 1 2 3 4 5 6

^a Modified from Arntfield et al, 2013.¹⁰

themes support previous findings that including narrative practice in medical training can result in the availability of physicians who listen to their patients, reflect on their own experiences, and become well-rounded professionals as they improve patient-physician, physician-self, and physician-colleague relationships.

This residency program's small sample size was a study limitation. Selection bias also was an issue because the interns who attended the most sessions were more interested in the value of the curriculum. Future research endeavors will focus on metrics that evaluate the curriculum's impact on residents' approach to patient care. Larger, prospective, and multicenter studies in residency programs are needed to measure the value of narrative medicine in graduate medical education.

CONCLUSION

An enthusiastic response following participation in a narrative medicine curriculum supported our endeavor. These results strengthen our belief that narrative medicine, acknowledged as beneficial to residents training in this program, will continue to gain momentum in the academic medicine community. ❖

Disclosure Statement

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Linking

The greatest enterprise of the mind always has been and always will be the attempt to link the sciences and the humanities.

— Edward O Wilson, b 1929, American biologist, researcher, theorist, naturalist, and author

Thoughts on Sexual Health

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ABSTRACT

As a practicing obstetrician/gynecologist for more than 18 years, I have realized the importance of sexual health as well as the embarrassing lack of training in this very important part of our patients' overall mental and physical health. If anyone should be expected to be not only comfortable but knowledgeable about sex, it should be us. Unfortunately, many of us had little or no education in sexual health during medical school or residency. I have been on a journey to educate myself so I might better help my patients.

INTRODUCTION

I often find myself sharing with patients how little education we, as physicians, get in sexual medicine. And in the specialty I chose, obstetrics and gynecology, it's even more disturbing to admit this. As a female physician in my 50s, I have found that many of my patients will share their sexual concerns with me—often whether I directly ask them or not. And it's embarrassing to admit that even as a female obstetrician/gynecologist, I often haven't asked. It wasn't that I didn't care or want to know; it was that I didn't feel I knew enough to be able to offer much help.

But women would share things. They would share that a family member molested them as a child. They would share about a first sexual experience in which they contracted a sexually transmitted disease and felt "dirty" ever since. Women would tell me that "sex was great" for a while, but now they have a job and 2 kids and have gained 6.75 kg (15 lb) and have been married for 11 years, and things aren't "the same" anymore. I've seen patients whose breast cancer treatments led to premature menopause, causing not only body image concerns but also vaginal dryness to the point at which sex feels "like sandpaper." When their oncologists told them absolutely no estrogen, I found myself empathetic but feeling fairly useless.

I wanted to help. I went into this profession to help women. I can deliver a baby; I can do surgery; I can help with irregular bleeding and pelvic pain (sometimes!). But there are so many factors that are involved in sexual health. And as we all know, it takes time. Time we often feel we don't have to ask and listen and learn. It takes time for a patient to trust you. But when a patient does get up the courage to share her concerns, how can we not offer her something?

EDUCATING MYSELF

Because I didn't feel very well educated, even as a gynecologist, I started to focus on lectures and conferences that addressed these issues. I tried to learn more about menopause and perimenopause and vaginal dryness. I did research on vulvodynia and vaginismus. The more I learned, the more I

realized how little I actually knew about the extremely wide variety of sexual experiences, attitudes, and practices.

I began to realize that I inadvertently made assumptions regarding sexual preferences. If a woman stated she was married, I assumed this meant to a male partner and that she had no other partners. The more I learned, the more I asked and tried to adjust my questioning to be as open and as unassuming and nonjudgmental as possible.

I learned not to act surprised when a woman asked to be "tested everywhere" for sexually transmitted infections. I learned that sometimes when a woman says, "I don't have any other partners, but I'm not sure about my husband," this could be true, or it could be that she or they both have other partners but she doesn't want to share that they are "swingers" or "polyamorous" or "consensual nonmonogamists."

I started investigating other sexual practices and lifestyles so I could be more aware and less likely to be surprised (or even shocked) when a woman shared an intimate detail with me. I found myself actually honored when a woman shyly told me her partner wanted to try anal intercourse, and she was curious but also scared and didn't know whom to ask about this.

In the process of trying to educate myself, I have met some wonderful marriage and family therapists, sex therapists, and sex coaches. I have also been unpleasantly enlightened about the harm we sometimes do to patients when they are brave enough to share their sexual concerns. One therapist I met shared a story of her client who had been making great progress in her work with vaginismus, until she went to see a gynecologist and was told it was just something she would have to "deal with." I have to hope that this physician's response was based on the fact that he didn't know there are ways to help with this condition, not that he didn't care.

OPENING A DIALOGUE

The American College of Obstetricians and Gynecologists (ACOG) recently issued a Committee Opinion stating that obstetricians/gynecologists are in a "unique position to open a dialogue on sexual health issues."¹ In this opinion, the College addresses much of what I've been feeling, including "a lack of adequate training and confidence in the topic, a perception that there are few treatment options, a lack of adequate clinical time to obtain a sexual history, patients' reluctance to initiate the conversation, and the underestimation of the prevalence of sexual dysfunction."

I was encouraged that in this report, ACOG acknowledged sexual health as an important "element of overall health" and also supported the World Health Organization statement that

sexual health is “a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity.”²

Additionally, ACOG warns that sexually transmitted infections are on the rise. It quotes the alarming fact that 2015 was the second year in a row in which the rates of chlamydia, gonorrhea, and syphilis have increased. As health care practitioners we may be able to have an impact on this and on related health risks (eg, pelvic inflammatory disease, ectopic pregnancy, infertility, epididymitis) by asking all patients about being tested, discussing safer sex practices with everyone, and never making the presumption that it isn't necessary.

Primary care physicians are usually aware that medical conditions such as diabetes, hypertension, thyroid disorders, cancer, and depression can have an impact not only on a patient's physical and emotional health but also on his/her sexual health. Often, however, we don't know much about what we can do to help, and because of this, we don't even want to ask.

One technique that is simple but useful is the PLISSIT Model³ of giving permission (P) for patients to discuss their sexual concerns, providing limited information (LI) and specific suggestions (SS) to help, and then referring for intensive therapy (IT) if needed.

There are also simple questionnaires such as the Decreased Sexual Desire Screener (DSDS), which has 5 yes or no questions. If a clinician is interested in going into more depth, there is the Female Sexual Function Index (FSFI),⁴ which has 19 questions to which a patient rates her responses from 1 to 5. There is also the Sexual Health Inventory for Men (SHIM). These questionnaires, including how to interpret them, are easily found online and are free to download and use.

COMMON PATIENT CONCERNS AND TREATMENTS

Decreased sexual desire is the most common concern brought up by my patients (and the one we often dread hearing a patient bring up as our hand is on the doorknob). There are medication options now, but for most women it seems to be reassuring when we discuss how very common this is (up to 40% of women) and that this is not necessarily a medical problem. It may help women to discover that, although they may not walk around thinking about sex all the time, if they are able to respond to their partner's advances or an erotic film or image or book, they are very normal. We discuss that there may be a discrepancy in how often they want or initiate sex as opposed to their partner (there is actually a term for this called *desire discrepancy*), and it can help to address all the varied factors that come into play (so to speak!). We discuss that sexual motivation can be complicated and include many important factors, such as their relationship with their partner, the length of time in the relationship, children or concerns about getting pregnant or not getting pregnant, work/life stress, body image, aging, history of abuse, lack of experience, boredom/routine, cultural upbringing, religion, medications, hormones, and so on.

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Many of my perimenopausal and menopausal patients, and sometimes even breastfeeding women and women using oral contraception, complain of vulvovaginal pain with vaginal penetration. This is often caused by hypoestrogenic atrophic vaginal changes or the “genitourinary syndrome of menopause,”⁵ which can cause vaginal dryness and subsequent pain with penetration as well as vaginal itching, burning, and discharge.

I knew to inform women to avoid harsh soaps and detergents, but now I've learned about the variety of lubricants, including water-based, silicone, hybrids, and oil-based. I've learned about additives or preservatives to avoid, such as propylene glycol (often found in antifreeze) and chlorhexidine, that can cause burning and irritation and, like glycerine or sometimes coconut oil, even yeast infections. I knew about not using oil-based lubricant with latex condoms but have learned that it is acceptable with nitrile and polyurethane but not polyisoprene barriers. And I've discovered that you shouldn't use silicone lubricants with silicone vibrators as they can cause disintegration of the vibrator. I've been able to share this information with my patients. I also recommend vaginal moisturizers (eg, Luvena, Replens, Lubrigin), which, used on a regular basis, can help improve vaginal dryness in some women, especially those who don't want to use vaginal estrogen.⁶

Many physicians are still not aware that vaginal estrogen appears to be more effective than systemic therapy for the treatment of vaginal atrophy. They are also concerned that the Food and Drug Administration (FDA) has applied the black-box warning regarding the potential risks of oral and transdermal estrogen to vaginal preparations. I talk to women about the benefits of vaginal estrogen, including the fact that low-dose options such as vaginal estrogen tablets and the vaginal estrogen ring have minimal to no systemic absorption of estrogen and, as such, appear to carry minimal if any risk. However, the vaginal tablets (Yuvafem, Vagifem) and the ring (Estring) sometimes do not help enough. They tend to only improve lubrication in the upper two-thirds of the vagina. If penetration is painful, it's not enough for the upper two-thirds to be lubricated when the lower one-third remains dry and painful. Vaginal estrogen cream (Estrace, Premarin) does appear to be slightly more systemically absorbed, but often provides better overall lubrication and improvement in vulvovaginal atrophy.

In 2016, ACOG issued a Committee Opinion regarding the use of vaginal estrogen for managing urogenital symptoms in women currently undergoing treatment of breast cancer or with a personal history of breast cancer.⁷ ACOG advises that nonhormonal approaches are still the recommended first-line choices, but that vaginal estrogen could be considered for those patients unresponsive to nonhormonal treatment, and that data do not show an increased risk of cancer recurrence. I discuss this with my patients and suggest they try silicone lubricants and vaginal moisturizers first, but let them know vaginal estrogen could be an option. For many patients, even before the ACOG opinion, this is a quality-of-life issue and an option they are relieved to have.

There is now an FDA-approved product for the treatment of moderate to severe dyspareunia available for prescribing since July 2017.⁸ It is a daily intravaginal suppository of dehydroepiandrosterone called prasterone (Intrarosa). It is a prohormone that gets converted to local estrogen and testosterone and has been demonstrated to improve lubrication; decrease pain at sexual activity; and consequently, improve sexual function, desire, arousal, orgasm, and satisfaction. Because prasterone is not an actual estrogen, it does not have the mandated black-box FDA warning that all estrogen products currently must have, but there still may be potential concern.

Ospemifene, a selective estrogen receptor modulator that acts as an estrogen agonist in the vagina, can also address this problem. It is a daily, oral medication, approved by the FDA in 2013 for the treatment of moderate to severe dyspareunia caused by vulvovaginal atrophy in menopausal women. It appears to have minimal estrogenic effect on the endometrium and breast but may cause systemic side effects such as hot flashes and the potential increased risk of thromboembolism. This product is also contraindicated in women with a prior history of breast cancer or in women with an increased risk of thromboembolism.

The laser devices that are touted as treatments of vulvovaginal atrophy are still not FDA approved for this condition, and at least currently, there is scant published evidence that this procedure improves vaginal epithelium and subsequently symptoms of atrophy. It is also quite expensive.

Many of us have attempted to examine patients who have extreme difficulty tolerating a speculum. I certainly wasn't taught that vaginismus (the marked tensing and tightening of the vaginal muscles) can be voluntary or involuntary when a woman is anticipating pain, and that this often develops in response to a past painful experience. It can be related to a less-than-optimal first sexual experience, a history of abuse, or simply a former painful vulvovaginal condition that left the memory in both her emotional and physical response. We can even cause this condition if a patient has a bad first experience with a pelvic examination or Papanicolaou test.

I sometimes gently joke with my patients and tell them, "Your vagina isn't stupid. It's trying to protect you." I work on having a patient consciously contract her vaginal muscles while I gently place a gloved, lubricated finger at her introitus. I then have her intentionally relax those muscles and breathe while I gradually and gently insert my finger a little farther. If it's too much, she tells me, and we stop. We repeat this slowly until a woman is able to accommodate my finger and later a speculum.

Retail Web Sites

AdamandEve.com: www.adamandeve.com
 Babeland.com: www.babeland.com
 Eve's Garden: www.evesgarden.com
 Good Vibrations: www.goodvibes.com
 MiddleSexMD: <http://middlesexmd.com>
 Walgreens: www.walgreens.com (sexual wellness)

Dilator Resources

Vaginal dilators can be purchased online at:

- CooperSurgical: www.coopersurgical.com
- Current Medical Technologies Inc: www.cmtmedical.com
- MiddleSexMD: <http://middlesexmd.com>
- Pure Romance: www.pureromance.com
- Soul Source: www.soulsource.com/
- Vaginismus.com: www.vaginismus.com

Resources for Genitourinary-Pelvic Pain Disorders in Women

International Pelvic Pain Society: www.pelvicpain.org
 National Vulvodynia Association: www.nva.org
 Vaginismus.com: www.vaginismus.com
 Vulvodynia.com: <http://vulvodynia.com>

If that doesn't work, we start with a small vaginal dilator either in the office or at home, again using time and lubrication and relaxation techniques and gradually increasing the dilator size (see Sidebar: Dilator Resources). This allows women to be in control of the situation, alone or with a partner. Because many partners are fearful of hurting the woman, it can be comforting to them to be able to participate in helping her relax and start to be able to enjoy intercourse and be comfortable with penetration (if this is the goal). It helps, of course, if the patient and her partner are motivated and have good communication. But this can even help improve communication around sex and what feels good and what doesn't (see Sidebar: Resources for Genitourinary-Pelvic Pain Disorders in Women).

Orgasmic dysfunction can be related to a medical condition or medication, but I have had women share with me that they are nonorgasmic (or their male partners have told them this) because they never had an orgasm from penile-vaginal intercourse. For these women to be reassured that this is quite normal and that most women need some type of direct stimulation of the clitoris can be very affirming. It may require open discussion with a partner regarding what she enjoys or requires to achieve orgasm, or some experimentation with stimulatory devices, but often just the knowledge that she is not "abnormal" is empowering.

There are an almost endless variety of vibrators, including an erection-enhancing ring for men, which may also contain a clitoral stimulation device for a female partner to better provide direct clitoral stimulation during penile-vaginal intercourse.

There are also personal care products such as the Fiera, a vibrating device that provides vacuum suction to increase circulation to genital tissues and, as such, may help with stimulation, lubrication, and orgasm, and potentially with hypoactive desire. It can cost around \$200 though, and, if the patient seems receptive, I will sometimes try joking that there are other, less costly ways to provide suction to the clitoris that may have the same effect. However, we certainly must exercise caution, because it can be very difficult to know a patient's comfort level

with various sexual practices or even with the discussion of something such as a vibrator or “self-stimulator” (see Sidebar: Retail Web Sites).

As an obstetrician/gynecologist, I don't deal as much with male sexual dysfunction, but conditions such as premature ejaculation or erectile dysfunction can certainly have an impact on my female patients, their sexual response, and, of course, their relationships. In addition to looking at the possible medical and psychological causes of these conditions, the distress that this may cause both partners must be addressed.

I believe we should do what we can to open communication around the important sexual aspect of our overall health. Patients should be able to speak freely to their health care practitioner without shame, embarrassment, or the fear of being judged. Few of us may currently encounter patients who are lesbian, gay, bisexual, transgender, or gender-dysphoric (feeling distress that the gender you are born does not match the gender with which you identify yourself); or perhaps we do but just don't realize it. In a recent survey, a large percentage of these patients stated that they delayed or did not seek medical care as a result of discrimination.⁹ For a homosexual woman or a transgender man (a person born female but who self-identifies as male), a

Bibliotherapy for Patients

Heiman J, LoPiccolo J. *Becoming orgasmic: A sexual and personal growth program for women*. New York, NY: Fireside; 1987.

Paget L. *The big O: How to have them, give them, and keep them coming*. London, UK: Piatkus Books; 2002.

Barbach LG. *For each other: Sharing sexual intimacy*. New York, NY: Anchor; 1983.

Barbach L. *For yourself: The fulfillment of female sexuality*. New York, NY: Berkley; 2000.

Berman J, Berman L. *For women only: A revolutionary guide to overcoming sexual dysfunction and reclaiming your sex life*. New York, NY: Holt Paperbacks; 2001.

Leiblum S, Sachs J. *Getting the sex you want: A woman's guide to becoming proud, passionate, and pleased in bed*. Lincoln, NE: ASJA Press; 2002.

Raskin VD. *Great sex for moms: Ten steps to nurturing passion while raising kids*. New York, NY: Fireside; 2002.

Joannides P. *The guide to getting it on: A new & mostly wonderful book about sex*. Waldport, OR: Goofy Foot Press; 2000.

Altman AM, Ashner L. *Making love the way we used to ... or better—secrets to satisfying midlife sexuality*. Chicago, IL: Contemporary Books; 2001.

Perel E. *Mating in captivity*. New York, NY: Harper; 2006.

Butler RN, Lewis MI. *The new love and sex over 60: Completely revised and updated*. New York, NY: Ballantine Books; 2002.

David MW. *The sex starved marriage: A couple's guide to boosting their marriage libido*. New York, NY: Simon and Schuster; 2003.

Informative Web Sites for Patients and Clinicians

American Association of Sex Educators, Counselors and Therapists: www.aasect.org

American College of Obstetricians and Gynecologists: www.acog.org

American Sexual Health Association: www.ashsexualhealth.org

Association of Reproductive Health Professionals: www.arhp.org

International Society for the Study of Women's Sexual Health: www.isswsh.org

Kinsey Institute: www.kinseyinstitute.org

North American Menopause Society: www.menopause.org; module on “Sexual Health & Menopause” (www.menopause.org/for-women/sexual-health-menopause-online)

Society for Sex Therapy and Research: www.sstarnet.org

pelvic examination can be very uncomfortable. Many of these patients are nulliparous, and some have had limited or no vaginal penetration. Use of relaxation techniques, communication, sometimes topical lidocaine jelly at the introitus, and the smallest, narrowest speculum possible can be helpful during a pelvic examination.

REFERRALS AND RESOURCES

A multifaceted approach can be helpful for many medical and psychological conditions as well as sexual disorders or concerns. A qualified physical therapist can be quite helpful in the treatment of vaginismus and dyspareunia. Mindfulness-based stress reduction, now more commonly called “mindfulness” or “being present” focuses on nonjudgmental awareness of one's thoughts, feelings, perceptions, and environment.¹⁰ It may help improve sexual functioning, as can cognitive behavioral therapy.

For patients whose issues are too complex to be dealt with in ordinary office practice, practitioners or patients can find a certified sex counselor or therapist in their area at the American Association of Sexuality Educators, Counselors and Therapists (AASECT) Web site (www.aasect.org). A licensed marriage and family therapist can also be helpful, because sexual problems can certainly affect a relationship, or conversely, the relationship can be part of the reason for a sexual problem. I have found that an AASECT-certified therapist is often a very good resource for patients dealing with the many interrelated components of sexual and relationship issues. The Society for Sex Therapy and Research (www.sstarnet.org) can also be helpful for finding a reliable and knowledgeable professional (see Sidebar: Informative Web Sites for Patients and Clinicians).

For patients whom I believe might benefit from reading material, I use bibliotherapy (see Sidebar: Bibliotherapy for Patients) and printed handouts (eg, on recommended lubricants and information regarding the risks and benefits of vaginal estrogen) as well as informative and retail Web sites (see Sidebars: Retail Web Sites and Informative Web Sites for Patients and Clinicians).

CONCLUSION

It is refreshing to me that, although I may not have all the answers, I can help women by asking and listening, and often normalizing their experiences and concerns. There is no shame in not knowing all the answers, but there is shame if a woman never feels comfortable enough to ask for our help. ❖

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- 3 Palmisano B. PLISSIT model: Introducing sexual health in clinical care [Internet]. New York, NY: Psychiatry Advisor; 2017 Jan 4 [cited 2018 Jan 18]. Available from: www.psychiatryadvisor.com/practice-management/improving-provider-education-regarding-sexual-health/article/629446/.
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Consecration of Marriage Vows

She [the bride] should be informed that it is a consecration of the marriage vows and a bond of union between her husband and herself. She should be told that it is right and proper for her to experience pleasure in its performance ... it is only fair for the girl to understand that there is no immodesty in her active participation, but on the contrary that such action on her part will increase the interest of the event for both her husband and herself.

— Denslow Lewis, 1856-1913, gynecologist, teacher, and author

A View from the Other Side of the Consultation Desk

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ABSTRACT

In this reflection on being both a physician and a patient, I consider the events that happened to me as a patient with cancer and how this will change my practice as a doctor in the future.

INTRODUCTION

Every day in my role as an orthopedic trauma surgeon, I deal with people who have their lives turned upside down because of a completely unexpected event. Normal life is carrying on when, *bang*, something happens. This event may be not seeing a vehicle in a side mirror, an unexpected noise spooking a horse, or tripping at the top of the stairs. A single moment changes everything. All the trials and tribulations of normal life are suddenly inconsequential. Rapidly the expectations of normal life such as being able to work and care for themselves, or even their very existence, is challenged. The future that they had mapped out, whether it be for the next few days, weeks, months, or years, is suddenly destroyed.

Physicians see this every day. But as the years go by, on call days merge into one, and one clinic becomes indistinguishable from the next, it is easy to lose touch with what our patients are really going through. Emotional self-preservation can diminish empathy. Pattern recognition is vital to focused case management, but there is a risk that classification leads to a loss of individuality and desensitization toward our patients.

It is easy to assume that we are just the physicians, the providers of care, and are totally separate and immune to this patient experience. The process of identifying and treating conditions artificially separates us from our patients. This allows us to believe that the patient experience cannot happen to us. We are wrong.

In April 2017, I was going about my normal working day, putting the final

touches to my afternoon presentation to the orthopedic trauma team, and wondering if I had time to take my 1-year-old daughter to buy some new shoes after work. I went to a routine follow-up clinic appointment, where I was told a biopsy from a suspected benign lesion had very unexpectedly been identified as probable metastatic cancer. My life was suddenly blown into a thousand pieces. I am 34 years old, have a little girl to look after, and am an orthopedic surgeon. This couldn't be happening to me. But it did.

A LEARNING EXPERIENCE

The several months after my diagnosis have been some of the toughest times of my life. But I have also learned a huge amount about myself, my family, and my wonderful colleagues. These past few months have been spent in a complex network of appointments, scans, surgeries, second opinions, conflicting advice, and uncertainty. As I now emerge from the other side of this fog of bewilderment and confusion over what my treatment and future might hold, I want to share what I have learned and how I will act differently after this experience.

No person exists in isolation. The patient in front of you is entwined in a network of people and decisions. What happens to that patient has implications for many other people. Whether it be the patient's ability to look after children or an elderly relative, his/her mother who is worried halfway across the country, the work colleague who is about to cancel his/her holiday to cover for that person, a patient's health condition can deeply affect a whole web of situations. Minor decisions to us as physicians can have huge consequences for people's lives and livelihoods. In my role as a surgeon, I am now much more careful and diligent to ask all my patients about their job responsibilities, if they provide a caring role for children or elderly people,

and if there is anything logistically I can do to improve the situation. I am much more supportive in amending dates and timings of clinics and procedures around my patients. I now routinely send a copy of my notes in a letter to the patient so s/he can answer questions from family or employees. I try to provide a rough estimate for every patient in terms of length of hospital stay and likely time to return to independence so that the person can plan his/her schedule and inform those around them with as much notice as possible. As physicians, we often talk about patient-centered care, but I believe that we also need to consider the patient in the context of his/her place in the complex society in which we live.

As a patient, time moves incredibly slowly. Physicians juggle the demands of many patients, and it often seems like there are not enough hours in the day to get everything done. As a patient, with only one focus and each decision having huge consequences, time drags. It can seem incredibly reasonable that we might tell a patient that his/her case is going to be discussed at the trauma meeting in four days' time, or they need to wait for the multidisciplinary team outcome next Wednesday. For patients, this time seems like a lifetime, and their life is put on hold waiting for the result. Obviously, decisions and treatment take time, and there is often little that can be done to improve this. When counseling patients, I now explain why this time is needed, detail what steps will be involved, and make sure they always have a point of contact. Most of all, I make sure they are contacted as soon as a decision has been made.

I have spent hours, if not days, during the past few months waiting for a hospital switchboard to answer, leaving voice mail and messages on answering machines for people who never call back. I know the system, how it works, and

who does what. I was glued to my phone for months, not knowing when it might ring or what snippet of news I might hear next. I felt reluctant to put my cell phone down or go anywhere with poor reception in case someone called and left a number I couldn't make out, or no number—or worse—no message at all. I once left my phone inside while I took the recycling out, and of course, I missed an important call, and it took me three hours to get back in touch. It wasn't the caller's fault; he's a busy person. Many people told me they would call me back, and they didn't. It became an ongoing joke to me and my husband: Guess what? No one called again! However, one nurse specialist always called back the next workday, or her colleagues would. And if I didn't answer, she left me a message saying who it was, when she was available to answer the phone, and when she would try again. I can't tell you what a difference that made to me. Previously, I would not have even considered that this information and reliability would be important, but to me it was amazing. Now when I call a patient or patient's family member, I always leave a message and contact details and try again in half an hour. I respond to every e-mail asking me to call a patient as quickly as I can, and if there is going to be a delay, I write a quick note, so the patient can be informed when to expect my call.

There is a huge amount of work that goes on in the hospital that as a patient you don't see, hear about, or even realize exists. As a more informed patient, I realized what a fundamental role these hospital staff play. The support "specialties" play a huge role in patient care but can so easily be overlooked by the patient. Where would orthopedic surgeons be without any imaging, specialist scan reports, blood test results, or a secretary? For me, the pathologist has played a crucial role during my cancer diagnosis. The surgeon provides the tissue, but it is the pathologists who find out what the problem might be. Their knowledge of special staining, receptor status, and diligence over finding tumor margins have determined my treatment more than anything. I've sent my pathologist a thank-you card. I'm not sure many pathologists receive thank-you cards. But she made a huge difference to me, and I wanted her to know. It is easy as the front-line physician to receive the praise and the

thanks, but this experience has humbled me in realizing we are perhaps a smaller cog in the wheel than we sometimes think.

Hospitals can be frightening places, especially operating rooms. At work, I try to spend as much time as possible operating. I know how it works, how many thousands of operations go well, and how safe it is. As I shuffled into the anesthetic room wearing my fetching antiembolism compression stockings, I was scared. However irrational it is, there is something about handing over control of your body to someone else that will always be terrifying. Before I went into surgery, my wonderful surgeon bent down and looked me in the eye. She told me she would look after me. Her reassurance and the smiles and professionalism of all the operating room staff made such a huge difference to me. In a busy operating day, it's easy to lose patience and become irritated at minor inconveniences. I have changed my attitude to contact with patients on the day of surgery. I now focus on explanation and reassurance. The first thing I do now when I've finished an operation is find the family member in the waiting room. Dictating the operation note can wait. At the end of the operating day to-do list, I sit down with each patient, explain how the operation went, and what will happen now. I will never forget how important smiles and reassurance were to me.

I have spent hours sitting in different waiting rooms. Once my husband and I had been waiting so long that we ended up playing a game of "If you were on a desert island and could only have 3 items, which would you choose?" In the oncology waiting rooms, there is a certain understanding among the patients. People there don't talk to each other (that would be very un-British!), but I have observed reassuring smiles among my fellow patients. It is easy to spot the person who is frightened and often tearful at the beginning of his/her cancer journey. As my husband and I entered one oncology clinic for the first time, it was obvious that I was the youngest person there by about 20 years. The pity and sympathy on many people's faces initially made me upset, but actually this reaction was from a group of people who knew what I was going through. It is amazing that in a group of patients, there is enough empathy for the other people

around them. Seeing another patient exiting a consultation room desperately upset and knowing that person didn't hear the news that s/he wanted to can have a palpable effect in a waiting room. Patients get support from a variety of places, and I have begun to recognize and appreciate this more. Specialist nurses, charities, and patient support groups can all be there for our patients when we are not, and advertising these services to patients from an early stage can provide a huge benefit to them.

CONCLUSION

In the end, I didn't have metastatic cancer, but rather a rare primary tumor, which has been completely excised. I feel I have been incredibly lucky. Perhaps we forget for our own emotional protection and to survive in the jobs that we do, but it is worth remembering that our patients could be us. Stepping back from our role as a physician and seeing things from the patient's perspective is something all physicians should do from time to time. That reassuring smile, the extra time explaining something again, or the return phone call all make a difference. As I pass the oncology center on my way into work, I often look up to the building in which I was treated. I remember the kindness and dedication of the people who treated me. I also think of those people I met along the way whose journeys did not have such a happy ending. I hope my experience makes me a better and more compassionate physician. ❖

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- Score at least 50% in the posttest
 - Complete the evaluation in Section B and provide your contact information

Section A.

Article 1. (page 27) Barriers and Facilitators to the Deprescribing of Nonbenzodiazepine Sedative Medications Among Older Adults

- Which of the following was not cited as a barrier to the deprescribing of nonbenzodiazepines by primary care clinicians?
- a. lack of evidence about the risks of nonbenzodiazepine use among older adults
 - b. patient characteristics and attitudes
 - c. institutional structures
 - d. clinician characteristics and attitudes

- Which of the following is an adverse effect of long-term nonbenzodiazepine use among older adults?
- a. hypertension
 - b. inability to sleep
 - c. falls
 - d. elevated blood sugar

Article 2. (Online) Prevalence and Safety of Intravenous Immunoglobulin Administration During Maintenance Chemotherapy in Children with Acute Lymphoblastic Leukemia in First Complete Remission: A Health Maintenance Organization Perspective
 (Online at: <http://x.co/6nOxB>)

- In the multivariate analysis, which two factors were significantly correlated with intravenous immunoglobulin use?
- a. high risk at diagnosis and episodes of bacteremia or fungemia before maintenance chemotherapy
 - b. administration of double-delayed intensification chemotherapy and high risk at diagnosis
 - c. administration of double-delayed intensification chemotherapy and episodes of bacteremia or fungemia before maintenance chemotherapy
 - d. days of treatment from induction to maintenance chemotherapy and days of hospitalization before maintenance chemotherapy

- When reviewing the intravenous immunoglobulin doses given for adverse reactions, which of the following adverse reactions was not found?
- a. low-grade fever
 - b. nausea and vomiting
 - c. headache
 - d. hypotension

Article 3. (page 43) Diagnostic Pathway of Oral Cavity Cancer in an Integrated Health Care System

- On the basis of the article, which of the following methods to improve early detection of oral cavity cancer is not recommended?
- a. annual dental visits
 - b. monitoring of premalignant oral lesions
 - c. annual computed tomography screening for head and neck cancer
 - d. streamlining referrals between dentists and physicians

- Which time interval in the diagnostic pathway for oral cavity cancer patients was the longest?
- a. patient symptom onset to first medical visit
 - b. primary care physician to otolaryngologist/head and neck surgery visit
 - c. head and neck surgery visit to diagnosis
 - d. diagnosis to treatment

Article 4. (Online) A Practical Guide for Physicians and Health Care Workers to Reduce Their Carbon Footprint in Daily Clinical Work
 (Online at: <http://x.co/6nOxA>)

- Which of the following statements is not correct?
- a. it is estimated that the health care sector is responsible for approximately 8% of total US greenhouse gas emissions
 - b. the amount of carbon dioxide generated from air travel is almost negligible when it comes down to calculating carbon footprint estimations of medical conferences
 - c. according to the World Health Organization, the 7 elements of a climate-friendly hospital include, amongst others, energy efficiency, green building design, and optimized supply chains
 - d. a single medical conference, such as the annual meeting of the Society for Neuroscience in Washington, DC, may add up to 22,000 metric tons of carbon dioxide to the atmosphere

- Which of the following statements is not correct?
- a. some studies suggest that organic foods are significantly lower in pesticide residues as well as nitrates
 - b. individuals who eat a well-balanced, whole-foods, plant-based diet are still at a high risk of protein deficiency
 - c. reducing consumption of meat and dairy products is one way to promote both environmental protection, via reduced production, and one's personal health
 - d. at their annual meeting, the American Medical Association called on hospitals to improve the health of patients, staff, and visitors by eliminating processed meats from menus

Section B.

Referring to the CME articles, how likely is it that you will implement this learning to improve your practice within the next 3 months?

	Objective 1 Integrate learned knowledge and increase competence/confidence to support improvement and change in specific practices, behaviors, and performance.	Objective 2 Lead in further developing "Patient-Centered Care" activities by acquiring new skills and methods to overcome barriers, improve physician/patient relationships, better identify diagnosis and treatment of clinical conditions, as well as, efficiently stratify health needs of varying patient populations.	Objective 3 Implement changes and apply updates in services and practice/policy guidelines, incorporate systems and quality improvements, and effectively utilize evidence-based medicine to produce better patient outcomes.
Article 1	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]
Article 2	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]
Article 3	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]
Article 4	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]	[5] [4] [3] [2] [1] [0]

Key
 5 = highly likely
 4 = likely
 3 = unsure
 2 = unlikely
 1 = highly unlikely
 0 = I already did this

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Section C.

What other changes, if any, do you plan to make in your practice as a result of reading these articles?

Section D. (Please print)

Name _____
 Physician Non-Physician

Title _____

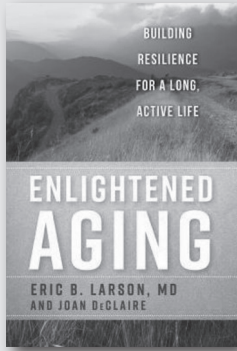
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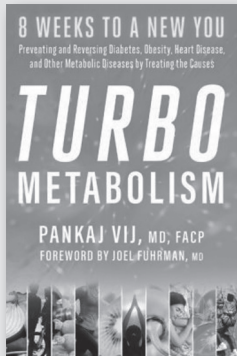
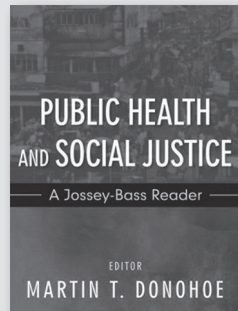
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