Author Affiliation: Palliative Care Program, University of California, San Francisco.
Correspondence: Dr Pantilat, Palliative Care Program, University of California, San Francisco, 521 Parnassus Ave, Ste C-126, San Francisco, CA 94143-0903 (stevep@medicine.ucsf.edu).
Author Contributions: *Study concept and design:* O'Riordan and Pantilat. *Acquisition of data:* Kerr and Pantilat. *Analysis and interpretation of data:* Berger, O'Riordan, Kerr, and Pantilat. *Drafting of the manuscript:* Berger, O'Riordan, and Pantilat. *Critical revision of the manuscript for important intellectual content:* O'Riordan, Kerr, and Pantilat. *Statistical analysis:* O'Riordan. *Obtained funding:* Pantilat. *Administrative, technical, and material support:* Kerr. *Study supervision:* O'Riordan and Pantilat.
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1. Temel JS, Greer JA, Muzikansky A, et al. Early palliative care for patients with metastatic non-small-cell lung cancer. *N Engl J Med.* 2010;363(8):733-742.
2. Rabow MW, Dibble SL, Pantilat SZ, McPhee SJ. The comprehensive care team: a controlled trial of outpatient palliative medicine consultation. *Arch Intern Med.* 2004;164(1):83-91.
3. Meier DE, Beresford L. Outpatient clinics are a new frontier for palliative care. *J Palliat Med.* 2008;11(6):823-828.
4. Rabow MW, Smith AK, Braun JL, Weissman DE. Outpatient palliative care practices. *Arch Intern Med.* 2010;170(7):654-655.
5. Pantilat SZ, Kerr KM, Billings JA, Bruno KA, O'Riordan DL. Palliative care services in California hospitals: program prevalence and hospital characteristics [published online July 29, 2011]. *J Pain Symptom Manage.* doi:10.1016/j.jpainsymman.2011.03.021.
6. National Consensus Project. *Clinical Practice Guidelines for Quality Palliative Care.* 2nd ed. Pittsburgh, PA: National Consensus Project for Quality Palliative Care; 2009.

Effect of Integrated Care on Advanced Chronic Obstructive Pulmonary Disease in High-Mortality Rural Areas

Guideline-based care only reaches approximately 50% of patients with chronic illnesses, including chronic obstructive pulmonary disease (COPD),[1] suggesting that implementation strategies are flawed. Inadequate care for COPD is likely to be greatest in rural areas where access to care is limited and COPD-related mortality is high.[2] Disease education and management programs have been developed to enhance patient knowledge, improve delivery of guideline-based care, and maximize early identification and treatment of exacerbations. In a small, prospective randomized clinical trial, we showed that a proactive model of integrated care (PIC) results in dramatic improvements of quality of life and effectively identifies COPD exacerbations.[3] PIC differs from other self-management or integrated care models by combining disease-specific education and self-management principles with a simple remote monitoring platform (Health Buddy; Robert Bosch Healthcare, Palo Alto, California). We hypothesized that our novel disease management program would improve quality of life and increase guideline-based care[4] in a predominantly rural group of patients with exceptionally high COPD-related mortality.

Methods. One hundred patients with advanced COPD were enrolled in a 12-week longitudinal, cohort study. Subjects resided in 1 of 16 Colorado counties with the highest COPD-related mortality (90-129 deaths per 100 000),[2] well above the 2005 national average (64.3 deaths per 100 000). Fourteen counties were rural or frontier (≤6 persons per square mile). Details of the management, monitoring and educational program have been published.[3] Assessments were made at enrollment and study completion, including quality of life as measured by the St George's Respiratory Questionnaire (SGRQ), guideline-based therapies, BODE index (body mass index [B], the degree of airflow obstruction [O] and dyspnea [D], and exercise capacity [E]), and health care utilization. Univariable analysis was performed to see which component(s) of PIC had the most impact on improvement in quality of life. Variables with $P<.15$ were then entered into multiple linear regression to determine independently significant factors. Finally, worsening symptoms were flagged by the Health Buddy, and the symptoms most commonly associated with an acute exacerbation were noted.

Results. Baseline characteristics for the 100 enrollees, 82 completers, and 18 noncompleters are given in eTable 1 (http://www.archinternmed.com). At baseline, subjects' mean FEV_1 was 43% predicted, and they had 53 pack-years of tobacco use; long-acting inhaler use ranged from 34% to 57%, and postexercise oxygen saturations were low at 85.5%. Of the 82 completers, 60 (73%) resided in rural counties.

The **Table** shows that PIC improved SGRQ by 11.6 units, increased inhaled medication use by 18 to 23 percentage points, and improved oxygen use and saturations. PIC increased the 6-minute walk distance (6MWD) by 45 m, improved the BODE index by 1.14 units, and decreased COPD-related emergency department visits and hospitalizations. In addition, smoking rates tended to decrease from 24.4% to 18.3% ($P=.06$).

Multiple linear regression analysis (eTable 2) showed that only the initiation of a long-acting β-agonist (LABA) medication and an improvement in 6MWD showed significant effects on improvement in SGRQ ($\beta=-10.3$ [$P=.03$] for LABA initiation; $\beta=-0.06$ [$P<.001$] for 6MWD improvement). However, LABA initiation and 6MWD improvement only explained 27% of the variation in SGRQ change.

Twenty-four subjects had 31 documented COPD exacerbations. As given in eTable 3, of the 68 red and yel-

Table. Changes in Health-Related Outcomes and Health Care Utilization in 82 Patients

Measurement	Before Study	After Study	Change[a]	*P* Value
Quality of life, mean (SD), score				
Total SGRQ	50.8 (17.2)	39.2 (17.1)	−11.6 (10.5)	<.001
Activity SGRQ	66.1 (19.4)	60.2 (21.3)	−5.9 (12.9)	<.001
Symptom SGRQ	62.3 (21.6)	43.1 (20.4)	−19.2 (19.1)	<.001
Impact SGRQ	38.3 (18.8)	25.9 (18.3)	−12.4 (12.8)	<.001
Inhaled medications, %				
SABA	65.9	89.0	23.2	<.001
LABA	53.7	73.2	19.5	<.001
SAA	23.2	17.1	−6.1	.18
LAA	37.8	56.1	18.3	<.001
ICS	58.5	78.0	19.5	<.001
Oxygenation				
Resting Spo_2, %	92.4 (3.5)	93.8 (2.3)	1.4 (3.8)	<.001
Exercise Spo_2, mean (SD), %	85.7 (6.4)	90.0 (3.8)	4.4 (6.0)	<.001
LTOT, %	61.0	69.5	8.5	.04
BODE index and components				
BODE index, mean (SD)	4.3 (2.5)	2.9 (2.0)	−1.1 (1.6)	<.001
6MWD, mean (SD), m	265.1 (101.2)	319.4 (103.2)	44.9 (65.4)	<.001
FEV_1, mean (SD), % predicted	43.2 (17.5)	44.5 (18.4)	1.1 (8.7)	<.001
BMI, mean (SD)	28.0 (6.6)	28.2 (6.8)	0.3 (1.0)	<.001
MMRC, mean (SD), units	2.0 (1.0)	1.7 (1.0)	−0.3 (0.9)	<.001
COPD-related health care				
Hospitalizations, mean (SD)[b]	0.110 (0.39)	0.037 (0.19)	−0.073 (0.31)	.03
ED visits, mean (SD)[b]	0.122 (0.46)	0.037 (0.25)	−0.085 (0.28)	.01

Abbreviations: BODE, body mass index (B), the degree of airflow obstruction (O) and dyspnea (D), and exercise capacity (E); COPD, chronic obstructive pulmonary disease; ED, emergency department; FEV_1, forced expiratory volume in 1 second; ICS, inhaled corticosteroid; LAA, long-acting anticholinergic; LABA, long-acting β-agonist; LTOT, long-term oxygen therapy; MMRC, Modified Medical Research Council Dyspnea Scale; SAA, short-acting anticholinergic; SABA, short-acting β-agonist; SGRQ, St George's Respiratory Questionnaire; Spo_2, pulse oximetry oxygen saturation; 6MWD, 6-minute walk distance.

[a] Change for a continuous variable is calculated only for those who had measurements in both prestudy and poststudy periods so that its mean may not equal the difference of prestudy and poststudy means, which used all available subjects. Absolute difference of prestudy and poststudy percentages (in percentage point units) is shown to illustrate the change for a dichotomous variable.

[b] Patients reported number of hospitalizations, emergency department visits, and urgent physician visits for the 3 months prior to enrollment and the 3-month study period. Data are expressed as number of events per patient.

low flags that occurred in the 3 days prior to an exacerbation, shortness of breath was the most commonly flagged category (see eTable 4 for flag definitions). Oxygen desaturation, difficulty with activity and worsening cough or sputum production were also commonly flagged. A decline in forced expiratory volume in 1 second (FEV_1) and wheezing were flagged the least.

Comment. There is a dearth of data on outcomes for rural patients with COPD, with only a handful of publications specifically evaluating rural patients with chronic respiratory illnesses and no studies targeting patients with COPD in high-mortality areas. Our results suggest that programs focusing on optimization of care in areas with limited access to health care may have an impact that is equivalent to the introduction of a new medication.

While other disease management studies have demonstrated improvements in quality of life,[3,5-8] none have demonstrated an improvement to the degree shown herein. We found that the addition of LABA and improvements in 6MWD were mediators of this impressive improvement in quality of life. However, they only partially explain this improvement. We suspect that daily interaction with the Health Buddy, with its educational and monitoring components, was also an important factor.

Guideline-based care is a cornerstone of COPD management with many positive effects.[4] For example, long-acting bronchodilators and inhaled corticosteroids improve quality of life, reduce exacerbations, and decrease hospitalizations.[4] PIC led to substantial increases in the use of long-acting bronchodilators and inhaled corticosteroid. PIC also improved the use and titration of long-term oxygen therapy and tended to decrease smoking rates. Although participation in pulmonary rehabilitation was very low, patients performed 6-minute walks daily. This may have led to the observed increases in 6MWD and SGRQ, which are similar to that seen in both traditional and home-based pulmonary rehabilitation programs.

In conclusion, PIC significantly improved quality of life and guideline-based care, identified COPD exacerbations, and reduced health care utilization in a predominantly rural population with high COPD-related mortality.

Derek J. Linderman, MD
Patricia B. Koff, MEd
Tammie J. Freitag, BSN
Sung-Joon Min, PhD
R. William Vandivier, MD

Author Affiliations: Divisions of Pulmonary Sciences and Critical Care Medicine (Drs Linderman and Vandivier) and Health Care Policy and Research (Dr Min), University of Colorado, Denver, Anschutz Medical Campus, Aurora; and University of Colorado Hospital, Aurora (Mss Koff and Freitag).

Correspondence: Dr Linderman, Division of Pulmonary Sciences and Critical Care Medicine, COPD Center, University of Colorado, Denver, Anschutz Medical Campus, Research Bldg 2, 12700 E 19th Ave, PO Box C272, Aurora, CO 80045 (Derek.Linderman@ucdenver.edu).
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Online-Only Material: eTables 1-4 are available at http://www.archinternmed.com.

1. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348(26):2635-2645.
2. McGhan R, Kinney G. *2007 Colorado Chronic Obstructive Pulmonary Disease (COPD) Surveillance Report*. Greenwood Village, CO: Colorado COPD Coalition, American Lung Association of Colorado; August 21, 2007.
3. Koff PB, Jones RH, Cashman JM, Voelkel NF, Vandivier RW. Proactive integrated care improves quality of life in patients with COPD. *Eur Respir J*. 2009; 33(5):1031-1038.
4. Rabe KF, Hurd S, Anzueto A, et al; Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med*. 2007;176(6):532-555.
5. Bourbeau J, Julien M, Maltais F, et al; Chronic Obstructive Pulmonary Disease axis of the Respiratory Network Fonds de la Recherche en Santé du Québec. Reduction of hospital utilization in patients with chronic obstructive pulmonary disease: a disease-specific self-management intervention. *Arch Intern Med*. 2003;163(5):585-591.
6. Casas A, Troosters T, Garcia-Aymerich J, et al; members of the CHRONIC Project. Integrated care prevents hospitalisations for exacerbations in COPD patients. *Eur Respir J*. 2006;28(1):123-130.
7. Rice KL, Dewan N, Bloomfield HE, et al. Disease management program for chronic obstructive pulmonary disease: a randomized controlled trial. *Am J Respir Crit Care Med*. 2010;181(1):21-30.
8. Effing T, Monninkhof EM, van der Valk PDLPM, et al. Self-management education for patients with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2007;(4):CD002990.

The Role of Gender in Examination and Counseling for Melanoma in Primary Care

Melanoma is increasing in incidence and is often not detected in time for curative excision, despite being clearly visible on the skin surface. More than 80% of the US population sees an outpatient medical provider annually[1]; however, primary care providers (PCPs) generally do not examine areas of skin where melanomas arise.[2] This study measures the role of gender in examination and counseling for melanoma in primary care.

Methods. Data for this analysis were collected at baseline for a randomized controlled trial to test the efficacy of a Web-based skin cancer early detection continuing education course (Basic Skin Cancer Triage curriculum) in a sample of primary care physicians.

We assessed PCP performance of skin examination, counseling for skin cancer issues during routine visits, skin cancer triage skills, attitudes and knowledge regarding skin cancer issues through physician surveys and skill tests, patient telephone interviews, and patient medical chart data collected by the research assistants. We recruited physician participants from 4 collaborating centers: Mid-Atlantic (center 1), Ohio (center 2), Kansas (center 3), and Southern California (center 4).

To study the binary-valued primary outcome of interest, we fit a generalized linear mixed-effects model. In this model, the main effects were physician gender and patient gender. The patient gender–physician gender interaction effect was also included in the model. To account for the correlation in the outcome among responses seen by physicians in the same clinic, we included a facility-specific random effect as an intercept in the logit link. Tests of statistical significance were conducted using the likelihood ratio test.

Results. Fifty-three primary care physicians completed the baseline assessment, of which 34 were men and 19 were women. Physician mean age was 48 years for men and 43 years for women.

A total of 1434 patients completed the baseline telephone survey (an average of 27 patients per physician). The patient population was predominantly white and non-Hispanic, with a slight predominance of women and a mean age of 56 years for both men and women. Only 29% of patients reported that their PCPs asked them to totally undress with or without removing undergarments.

Post–clinical examination telephone interviews demonstrated that female physicians performed skin examinations and asked patients if they usually examined their skin more frequently than male PCPs, both for male and female patients (**Table**). Female PCPs also were more active in discussing skin self-examination with their patients (Table).