

gained), although this strategy resulted in lower health benefits than current screening.

Comment. Our analysis has 2 main findings: (1) compared with current practice, screening all eligible women every 2 or 3 years can yield equal or greater health benefits at a significant cost savings, and (2) routine screening more often than every 3 years exceeds conventional thresholds for cost-effectiveness in the United States. Together, these findings support recent guidelines recommending routine cytologic screening at 3-year intervals.^{4,5}

Investments in programs to achieve high coverage of 3-year screening can be considerable, up to \$1200 per screen-eligible woman, before spending on cervical cancer screening reaches current levels. Programs, such as call/recall systems and community-based outreach—likely to be less than \$1200 per woman—can focus not only on removing barriers for underscreened women but also on decreasing use in women who unnecessarily get annual routine screening. Attaining high coverage across all eligible women has the added advantage of promoting equity in health gains across subgroup populations, such as minorities and the uninsured, known to have high rates of cervical cancer incidence and mortality.

Our analysis has limitations. Because we did not explicitly model heterogeneous subgroups, our estimates may be conservative if improved access to screening leads to the reduction of cases that otherwise would have differentially worse outcomes and/or higher costs than average. We also did not assess the impact of improving compliance to diagnostic visits and access to timely treatment among women who are screened appropriately, efforts that are paramount to reducing cervical cancer burden in the United States.

We conclude that improving cervical cancer screening does not necessitate increased expenditures in the United States. Indeed, shifting away from the status quo, with at least half of women getting screened too frequently and over a quarter not frequently enough, can likely reduce current expenditures without compromising the tremendous health gains already achieved in cervical cancer prevention. This cost savings can be invested in more prudent ways to improve health, whether through cervical cancer prevention or other health interventions.

Jane J. Kim, PhD
Monisha Sharma, MS
Jesse Ortendahl, MS

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Author Affiliations: Harvard School of Public Health, Department of Health Policy and Management, Center for Health Decision Science, Boston, Massachusetts.

Correspondence: Dr Kim, Harvard School of Public Health, Department of Health Policy and Management, Center for Health Decision Science, 718 Huntington Ave, Second Floor, Boston, MA 02115 (jkim@hsph.harvard.edu).

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1. American Cancer Society. Cancer facts and figures 2011. <http://www.cancer.org/Research/CancerFactsFigures/CancerFactsFigures/cancer-facts-figures-2011>. Accessed October 4, 2012.
2. Roland KB, Soman A, Benard VB, Saraiya M. Human papillomavirus and Papanicolaou tests screening interval recommendations in the United States. *Am J Obstet Gynecol*. 2011;205(5):447, e1-e8.
3. Spence AR, Goggin P, Franco EL. Process of care failures in invasive cervical cancer: systematic review and meta-analysis. *Prev Med*. 2007;45(2-3):93-106.
4. Saslow D, Solomon D, Lawson HW, et al; ACS-ASCCP-ASCP Cervical Cancer Guideline Committee. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. *CA Cancer J Clin*. 2012;62(3):147-172.
5. Moyer VA; US Preventive Services Task Force. Screening for cervical cancer: US Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2012;156(12):880-891, W312.
6. National Center for Health Statistics. *National Health Interview Survey, 2010: Sample Adult Cancer File*. Hyattsville, MD: US Department Of Health and Human Services, Centers for Disease Control and Prevention; 2011.
7. Eichler HG, Kong SX, Gerth WC, Mavros P, Jönsson B. Use of cost-effectiveness analysis in health-care resource allocation decision-making: how are cost-effectiveness thresholds expected to emerge? *Value Health*. 2004;7(5):518-528.

Healthcare and Lifestyle Practices of Healthcare Workers: Do Healthcare Workers Practice What They Preach?

Healthcare workers (HCWs) represent an important group in which to study individual health behaviors, both because they are more knowledgeable than others about health care choices and because they serve as role models for patients.^{1,2} We sought to describe the prevalence of preventative and lifestyle behaviors among HCWs in a nationally representative sample of American adults.

Methods. The Behavioral Risk Factor Surveillance System (BRFSS)³ is an annual telephone survey of the adult US population conducted by the Centers for Disease Control and Prevention. We included all respondents to the question “Do you provide direct patient care as part of your routine work?” asked in 2008 and 2010. Overall response rates were 53.3% in 2008 and 54.6% in 2010. The Beth Israel Deaconess Medical Center committee on clinical investigations (Boston, Massachusetts) approved our analyses.

We assessed 6 preventative health behaviors and 14 lifestyle factors as binary variables (**Table**), defining outcomes as less desirable behaviors. We used logistic regression to estimate risk ratios (RR) when outcomes were

Table. Comparison of Prevalence of Health Behaviors and Lifestyle Factors Between Healthcare Workers and Other Americans

Health Behavior or Lifestyle Factor	No. (%)	RR (95% CI)	
	Subpopulation Prevalence	Model 1 ^a	Model 2 ^b
Health behavior			
No personal physician	222 255 (19)	0.72 (0.66-0.81)	0.76 (0.69-0.84)
No checkup in past 2 y	220 866 (18)	0.85 (0.78-0.93)	0.88 (0.81-0.96)
No Papanicolaou test in past 3 y	93 255 (18)	0.88 (0.77-0.99)	0.90 (0.79-1.03)
No mammogram in past 2 y	87 204 (21)	1.08 (0.97-1.21)	1.13 (1.01-1.26)
No dental visit in past year	222 028 (30)	0.92 (0.87-0.98)	0.96 (0.91-1.02)
No sigmoidoscopy/colonoscopy	144 230 (36)	0.96 (0.91-1.01)	0.95 (0.91-1.00)
Lifestyle factor			
Body mass index ≥ 25 kg/m ²	216 227 (64)	0.99 (0.97-1.02)	0.99 (0.96-1.01)
No exercise in past 30 d	222 463 (25)	0.81 (0.76-0.87)	0.83 (0.77-0.89)
Any alcohol in past 30 d	222 384 (52)	1.05 (1.02-1.07)	1.01 (0.99-1.04)
Heavy drinker in past 30 d ^c	219 791 (5)	0.78 (0.68-0.91)	0.76 (0.66-0.88)
Binge drinking in past 30 d ^d	220 828 (15)	0.93 (0.84-1.04)	0.88 (0.79-0.98)
Driving after drinking in past 30 d	108 487 (4)	0.83 (0.65-1.05)	0.83 (0.65-1.06)
Do not always use seatbelt	222 523 (14)	0.95 (0.87-1.05)	0.95 (0.87-1.04)
Current smoker	221 847 (18)	1.03 (0.95-1.12)	1.08 (0.99-1.17)
Smokeless tobacco use	196 080 (4)	1.22 (0.99-1.50)	1.20 (0.97-1.47)
HIV risk behaviors in past year ^e	153 484 (3)	1.05 (0.87-1.27)	1.12 (0.93-1.36)
Any sunburn in past year	10 508 (29)	1.04 (0.83-1.30)	1.00 (0.80-1.26)
Dissatisfied/very dissatisfied with life	221 419 (5)	0.79 (0.69-0.91)	0.97 (0.85-1.12)
Unintentional sleep during day in past 30 d	17 415 (31)	1.76 (1.03-3.01)	1.65 (0.97-2.82)

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); HIV, human immunodeficiency virus; RR, risk ratio.

^aModel 1 adjusted for age, age squared, sex, race, education, and state.

^bModel 2 adjusted for the same variables as model 1 plus income and employment.

^cHeavy drinkers were defined as men having more than 2 drinks and women having more than 1 drink per drinking day.

^dBinge drinkers were defined as men having at least 5 drinks and women having at least 4 drinks on 1 occasion.

^eBehavioral Risk Factor Surveillance System HIV risk behaviors were defined as intravenous drug use, treatment for any sexually transmitted disease, giving or receiving money or drugs in exchange for sex, or anal sex without a condom.

uncommon (prevalence <25%), and Poisson regression when more common.⁴ We created a first multivariate model adjusted for age, age squared, sex, race, state, and education, and a second that added income and employment.

Results. The study population included 260 558 participants, including 21 380 HCWs. The Table shows the prevalence and weight-adjusted RRs for selected health behaviors and lifestyle factors, comparing HCWs with non-HCWs. As anticipated, HCWs reported more desirable behaviors than non-HCWs for several outcomes: HCWs were more likely to have a personal physician, to have a checkup within 2 years, to have exercised within 30 days, and to deny recent heavy or binge drinking.

However, for many behaviors, HCWs demonstrated no difference in the likelihood of the outcomes. We observed no significant differences in the likelihood of having a recent Papanicolaou test or dental visit, ever having a sigmoidoscopy or colonoscopy, being overweight or obese, drinking and driving, failing to wear a seatbelt, smoking, using smokeless tobacco, engaging in human immunodeficiency virus (HIV) risk behaviors, getting sunburned, or being dissatisfied with life. Most surprisingly, female HCWs were significantly more likely to report not having a mammogram within the past 2 years.

Since HCWs include individuals with a wide range of professional training, we performed analyses stratified by college graduate status. While HCWs were more likely to have seen a personal physician in the past year than

non-HCWs, this advantage was significantly greater among HCWs with less education. In contrast, the lower likelihood of overweight and obesity among HCWs seemed limited to those with at least a college education ($P < .001$ for both interactions). No outcomes demonstrated significant interaction by sex.

Comment. In this large, population-based survey of Americans, HCWs seemed to be better than other Americans at maintaining a healthy lifestyle in some areas, but there were many other areas in which they reported performing no better than other Americans in adhering to health guidelines. Notably, female HCWs were less likely to undergo regular mammography screenings than non-HCWs.

To our knowledge, ours is the first nationally representative report about a full range of health care practices of HCWs. A key question for our study is whether our findings should be viewed as reassuring. It is reassuring to know that, as expected, HCWs performed better in several aspects. More immediate access to health care may have influenced the likelihood of having a personal physician or a recent checkup. However, access alone cannot be the only explanation since similar health care behaviors (eg, colonoscopy) were not always more common among HCWs. Healthcare workers were less likely to report heavy or binge drinking, consistent with previous studies.⁵

There were many areas, however, where HCWs performed no differently than other Americans and have sub-

stantial opportunities to perform better. Where absolute rates of adverse behaviors were low, such as HIV risk behaviors, most Americans adhere to public health recommendations, and the lack of difference between HCWs and other Americans is reassuring.

Perhaps most surprisingly, female HCWs older than 50 years were less likely to adhere to the guidelines of having a mammogram within the past 2 years. Other studies have also observed this paradoxical, unexplained finding.⁶

Among respondents who were not college graduates, HCWs were more likely to have a personal physician than non-HCWs, an association absent among graduates. If confirmed, working in health care may improve access preferentially among individuals at greatest risk for not having a regular provider.⁷

Specific limitations should be mentioned. The BRFSS is limited to self-reported information, which cannot be externally confirmed. Because HCWs did not report their specific positions, we cannot differentiate between physicians, nurses, aides, and other HCWs.

In conclusion, HCWs adhered variably to healthy life choices, often no differently and, for mammography, even less than other Americans. Interventions directed toward HCWs or their employers may improve overall adherence rates.⁸ Despite serving as role models, HCWs frequently do not “practice what they preach.”

Benjamin K. I. Helfand, MSc
Kenneth J. Mukamal, MD, MPH

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Author Affiliations: Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, Boston, Massachusetts.

Correspondence: Dr Mukamal, Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, 1309 Beacon St, Second Floor, Brookline, MA 02446 (kmukamal@bidmc.harvard.edu).

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1. Frank E, Breyan J, Elon L. Physician disclosure of healthy personal behaviors improves credibility and ability to motivate. *Arch Fam Med.* 2000;9(3):287-290.
2. O'Brien K. The lifestyle influence: “Do as I say, not as I do.” *Virtual Mentor.* 2007;9(7). <http://virtualmentor.ama-assn.org/2007/07/oped1-0707.html>. Accessed July 24, 2012.
3. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System: questionnaires. <http://www.cdc.gov/brfss/questionnaires/questionnaires.htm>. Accessed August 14, 2012.
4. Spiegelman D, Hertzmark E. Easy SAS calculations for risk or prevalence ratios and differences. *Am J Epidemiol.* 2005;162(3):199-200. doi:10.1093/aje/kwi188.

5. Frank E, Brogan DJ, Mokdad AH, Simoes EJ, Kahn HS, Greenberg RS. Health-related behaviors of women physicians vs other women in the United States. *Arch Intern Med.* 1998;158(4):342-348.
6. Frank E, Rimer BK, Brogan D, Elon LUS. US Women Physicians' personal and clinical breast cancer screening practices. *J Womens Health Gen Based Med.* 2000;9(7):791-801. doi:10.1089/15246090050147763.
7. Imai S. Disparities in health status and health risk factors in Eastern North Carolina: data from the behavioral risk factor surveillance system, 2005-2009 aggregated. www.ecu.edu/cs-dhs/chsrd/BehRiskFactors/upload/BRFSS-disparities-in-health-and-risk-factors-2005-09.pdf. Accessed July 24, 2012.
8. Shahar DR, Henkin Y, Rozen GS, et al. A controlled intervention study of changing health-providers' attitudes toward personal lifestyle habits and health-promotion skills. *Nutrition.* 2009;25(5):532-539. doi:10.1016/j.nut.2008.11.020.

Effect of Patient Navigation on Enrollment in Cardiac Rehabilitation

Globally, cardiovascular diseases are the leading causes of morbidity and mortality.¹ Secondary prevention measures, such as outpatient cardiac rehabilitation (OCR), effectively reduce this burden.^{2,3} Randomized controlled trials and quantitative reviews demonstrate that OCR programs result in significant reductions in morbidity, mortality, and cost of care compared with usual care. Despite this evidence, referral to and enrollment in OCR is low, averaging 19% in the United States.⁴ It is important to identify new approaches to improve enrollment in OCR because there are limited intervention studies targeting participation among eligible cardiac patients.^{2,5,6}

The objective of this study was to test the hypothesis that a patient navigation (PN) intervention would achieve significantly higher rates of OCR enrollment compared with usual care.

Methods. The study design was a randomized controlled trial approved by the human subjects committee at Stony Brook University. From May 2009 to June 2011, patients were screened on the general cardiology and thoracic surgery floors at Stony Brook University Hospital. Inclusion criteria were age 21 years or older and a diagnosis or procedure clinically indicated for OCR referral (myocardial infarction, heart failure, stable angina pectoris, percutaneous coronary intervention, coronary artery bypass graft surgery, or heart valve replacement or repair). Patients were excluded if they were not proficient in the English language, had a major noncardiac comorbidity with a poor prognosis, had a recent uncontrolled psychiatric or substance abuse disorder, were participating in another study that would interfere with the trial, were unable to provide a telephone number, or declined participation. All consenting patients were consecutively assigned to either PN or usual care groups using computer-generated block randomization.

Consistent with prior research on the use of lay health advisors in cancer care coordination,⁷ 2 individuals with no prior clinical knowledge were trained to help patients navigate the inpatient to outpatient cardiac care system, with a particular focus on enrolling in a local OCR program. Each patient assigned to PN had a navigator meet with them prior to discharge. Patients in the PN intervention were educated about OCR (ie, the likely benefits of participation, the location of local programs, and