

# ORIGINAL Research

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## Improving the Delivery of Preventive Care Services

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Performance of preventive services is an important indicator of high-quality health care, but many recommended services are not regularly offered in primary care practices. Health risk assessments, counseling, and referral to community-based programs help address risk behaviors, many of which are leading causes of preventable death and disability in the United States. This study examined various influences on the delivery of preventive services designed to address smoking, excessive consumption of alcohol, unhealthy diets, and sedentary lifestyles. More than 300 health care providers in 52 practices nationwide have contributed data to this study. Staff participation in quality improvement enhanced work relationships and also diminished the effect of practice size on the performance of preventive care. The use of nurse practitioners, allied health professionals, clinician reminders, and patient registries were positively associated with care delivery.

Chronic illnesses affect more than 100 million Americans and account for 75% of national health care costs.<sup>1</sup> Half of U.S. mortality from the 10 leading causes of death results from lifestyle-related behaviors that cause or exacerbate chronic illness.<sup>2,3</sup> To address preventable risk behaviors such as smoking, excessive alcohol consumption, unhealthy diet and physical inactivity, the United States Preventive Services Task Force (USPSTF) recommends delivering services such as health risk assessments, counseling, and referrals to community-based programs.<sup>4</sup> Such services have become important indicators of high-quality health care, in terms of clinical effectiveness. Furthermore, they help address rising consumer demand and policy requirements for preventive care coverage.<sup>5</sup> Indeed, the National Committee for Quality Assurance (Washington, DC) now uses prevention performance measurements as part of its accreditation process for MCOs.<sup>6</sup>

Although access to clinical preventive care has increased over the past 2 decades, many recommended services are offered sporadically, if at all.<sup>5</sup> Primary care practices serve as strategic venues for preventive services, because they provide accessible and familiar continuous care to patients.<sup>7</sup> Nevertheless, these opportunities are often missed.<sup>8-12</sup> Barriers to effective preventive care

include a lack of time and organizational clinical-systems support.<sup>13-17</sup> Many practitioners may also lack training in behavioral counseling and may not positively reinforce the time invested in prevention.<sup>8,18-20</sup>

Barriers, from a practice-management perspective, may include failure to involve staff in quality improvement and other related initiatives where participation plays a prominent role. Organizations may address the underutilization of "human resources" by encouraging employees to participate, which may prove especially beneficial because it increases both the creativity and the amount of information and knowledge possessed by the health care team.<sup>21-23</sup> Another benefit results improved clarification of goals among employees who implement decisions and therefore will achieve better understanding of reasons for organizational policies.<sup>24</sup> In addition, a human-relations perspective emphasizes the need for employees to feel valued and satisfied in the workplace.<sup>21,25-28</sup> From this viewpoint, participation leads to greater worker morale and identification with organizational goals.<sup>29-31</sup>

This study explored relationships between various factors in primary care practices and the delivery of preventive care to address health risk behaviors. The first area examined was the influence of staff participation in quality-improvement efforts. Specifically, the study examined whether differing levels of staff participation moderate or influence existing practice attributes, such as work relationships, work stress, and practice size.

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Owing to the emerging roles and skills of nonphysician health care providers, as well as the limitations of physician time, increased clinical staff support may aid in the delivery of behavioral preventive services. Thus, the study examined whether use of nonphysician clinical staff enhances preventive care.<sup>13,32</sup> Whereas treatment decisions derived from evidence-based guidelines are important starting points, these principles have limited effectiveness unless they are well-integrated into practice, such as through the aid of clinical reminders and other information systems.<sup>8</sup> For that reason, this study also examined whether regular use of clinical information systems can improve preventive care processes.<sup>13,33</sup>

## METHODS

**Data Source.** Data were collected from a national health promotion initiative sponsored by the Robert Wood Johnson Foundation (Princeton, NJ). Primary care practices participating in this initiative were located throughout the northeastern, southern, midwestern, and western regions of the United States. All practices were asked to complete two cross-sectional survey instruments: (1) the Practice Information Form (PIF) and (2) the Practice Staff Questionnaire (PSQ). One PIF was to be completed by each practice. This survey was designed to obtain general characteristics of each primary care practice and was completed by a clinic administrator, medical director, or other staff member at each site. The PIF was sent to 124 primary care practices; 104 practices returned completed questionnaires (84%). The PSQ was used to assess the performance of clinical activities and perceptions of the work environment, and was distributed to all practice staff members for voluntary completion and return. For this study, only practices with at least a 50% PSQ response rate were eligible for analysis. Of the 104 primary care practices that returned a PIF, 52 met the minimum PSQ response rate. Further analysis compared these 52 study practices with the excluded practices (i.e., those that did not have a 50% PSQ response rate), and found no statistically significant differences among key study variables ( $P > .05$  for all variables).

**Measures.** The outcome variable for this analysis was a composite performance score of preventive services reported by providers on the PSQ. This score consisted of four services: (1) health risk assessments, (2) referral to community programs, (3) individual counseling, and (4) group counseling activities conducted within the practice. The frequency of performing each preventive service was surveyed with regard to four health behaviors: (1) tobacco use, (2) excessive drinking, (3) dietary habits, and (4) physical inactivity. Responses for each behavior were measured on a five-point Likert scale and ranged from 0 (never) to 4 (always). Responses were averaged to obtain a score for each service, and all four service scores were then averaged to create a final composite measure of preventive care for health risk behaviors.

**TABLE I: CHARACTERISTICS OF PRIMARY CARE PRACTICES (N = 52)**

Characteristic	Value*	Range
<b>Practice Type</b>		
Solo (N = 7)	13.5%	---
Single-specialty group (N = 33)	63.4%	---
Multispecialty group (N = 12)	23.1%	---
<b>Practice Ownership</b>		
Clinician (N = 13)	25.0%	---
Hospital system (N = 22)	42.3%	---
University system (N = 10)	19.2%	---
Public sponsor (N = 7)	13.5%	---
<b>Specific Managed Care Plan</b>		
Controls > 50% of Business		
Yes (N = 5)	9.6%	---
No (N = 47)	90.4%	---
Practice Size (FTEs) (N)	17.9 ± 15.6†	(1.50-64.7)
Financial Status‡	0.49 ± 0.30	(0-1)
<b>Percentage of Part-Time</b>		
Clinicians	34.5% ± 35.1%	(0-100)
<b>Practice Culture‡</b>		
Group-oriented	34.6 ± 11.2	(17.0-58.5)
Developmental	12.8 ± 3.9	(4.0-20.0)
Rational	24.6 ± 6.5	(4.5-39.0)
Hierarchical	24.4 ± 8.6	(12.0-55.0)
<b>Staff Participation in Quality</b>		
Improvement§	0.64 ± 0.12	(0.28-1.00)
Work Relationships¶	0.68 ± 0.12	(0.40-1.00)
Work Stress**	0.51 ± 0.14	(0.13-0.78)

\*All values given as a percent or ± mean standard deviation.

†Based on a score from 0 (large financial loss) to 1 (large financial gain).

‡Based on a scale from 0 (low) to 100 (high).

§Based on a scale from 0 (low) to 1 (high).

¶Based on a scale from 0 (poor) to 1 (good).

\*\*Based on a scale from 0 (low) to 1 (high).

N = Number; FTEs = full-time employees.

Based on factor analysis, a set of PSQ items with loading coefficients greater than or equal to 0.60 were used to assess the level of staff participation in quality improvement. These items demonstrated high internal consistency and reliability with a Cronbach alpha coefficient of 0.87. Examples included such statements as, "Staff members are involved in developing plans for improving quality" and "This practice encourages staff input for making changes and improvements." Statements were based on a five-point Likert scale which was rescaled between 0 (strongly disagree) and 1 (strongly agree). Responses were averaged over the items, and then aggregated across members from common practices to obtain a measure of participation in each practice.

A second set of PSQ items, also based on factor analysis, was used to assess the quality of work relationships (e.g., "Our staff has constructive work relationships" and "When there is a conflict in this practice, the people involved usually talk it out and resolve the problem successfully"). A third set of PSQ items assessed the degree of work stress in the practice (e.g., "The staff members of

**TABLE II: CHARACTERISTICS OF HEALTH CARE PROVIDERS (N = 318)**

Characteristic	Value*	Range
Age (yr)	43 ± 10.1	(20-70)
Gender		
Male (N = 110)	34.6%	---
Female (N = 208)	65.4%	---
Provider Type		
Doctor of medicine (N = 137)	43.1%	---
Doctor of osteopathy (N = 17)	5.4%	---
Nurse practitioner (N = 27)	8.5%	---
Physician assistant (N = 8)	2.5%	---
Registered nurse (N = 36)	11.3%	---
Licensed practical nurse (N = 65)	20.4%	---
Other (N = 28)	8.8%	---
Years in the Practice (N)	7.67 ± 7.68	(0-43)†
Use of Clinician Reminder Systems‡		
High-technology reminders	0.25 ± 0.30	(0-1)
Low-technology reminders	0.53 ± 0.19	(0-1)
Use of Patient Registry‡	0.26 ± 0.29	(0-1)
Perceived Staff Participation‡	0.62 ± 0.21	(0-1)

\*All values given as a percent or mean ± standard deviation.  
 †Minimum of 0 yr indicates < 1 yr spent in the practice.  
 ‡Based on a scale from 0 (low) to 1 (high).  
 N = Number.

this practice very frequently feel overwhelmed by the work demands” and “This practice is experienced as stressful”). Both constructs demonstrated high internal consistency and reliability with Cronbach alpha coefficients = 0.82. Responses were based on a five-point Likert scale and were rescaled between 0 (strongly disagree) to 1 (strongly agree). For all three constructs, in which individual items were aggregated to the practice level, significant analysis of variance results confirmed greater between-practice than within-practice variation ( $P < .001$ ).

Practice size was measured on the PIF as the number of full-time equivalent employees in the practice. All practice attributes described thus far were mean-centered to facilitate interpretation of regression results and to avoid problems of multicollinearity (Pearson  $r \geq 0.80$ ).<sup>34-36</sup> The product of staff participation with each of these attributes—work relationships, work stress, and practice size—formed separate interaction terms to examine moderated effects of participation on preventive-care delivery.

All individual characteristics were obtained from the PSQ. Health care providers included allopathic (MD) and osteopathic (DO) physicians, nurse practitioners, physician assistants, registered nurses, licensed practical nurses, and other allied health professionals (e.g., clinical social workers, health educators). Use of both high- and low-technology reminder systems was measured to assess the frequency of using various tools and systems to facilitate care delivery. High-technology systems included computerized clinician reminders, and a computerized patient recall system. Low-technology systems included

**TABLE III: PREVENTIVE CARE DELIVERY AS REPORTED BY HEALTH CARE PROVIDERS (N = 318)**

Service	Value*	Range
Health Risk Assessment	2.09 ± 1.26	(0-4)
Tobacco use	2.30 ± 1.46	(0-4)
Risky drinking	2.10 ± 1.38	(0-4)
Dietary habits	1.97 ± 1.28	(0-4)
Physical inactivity	2.01 ± 1.33	(0-4)
Referral to Community Programs	2.05 ± 0.78	(0-4)
Tobacco use	1.86 ± 1.03	(0-4)
Risky drinking	2.18 ± 0.95	(0-4)
Dietary habits	2.16 ± 0.91	(0-4)
Physical inactivity	1.98 ± 0.95	(0-4)
Individual Counseling Within Practice	1.42 ± 1.10	(0-4)
Tobacco use	1.41 ± 1.21	(0-4)
Risky drinking	1.28 ± 1.22	(0-4)
Dietary habits	1.66 ± 1.20	(0-4)
Physical inactivity	1.35 ± 1.21	(0-4)
Group Counseling Within Practice	0.73 ± 0.93	(0-4)
Tobacco use	0.79 ± 1.06	(0-4)
Risky drinking	0.71 ± 1.06	(0-4)
Dietary habits	0.76 ± 1.05	(0-4)
Physical inactivity	0.67 ± 1.00	(0-4)
Composite Score	1.58 ± 0.73	(0.13-4.00)

Note: All values given as mean ± standard deviation.  
 \*As measured on a 5-point Likert scale ranging from 0 = never to 4 = always.  
 N = Number.

checklists or flowcharts for chronic diseases and screening; risk-factor chart stickers; telephone recall by nurse/office staff; patient reminder cards; and periodic chart audits. Frequency responses were based on a five-point Likert scale, rescaled from 0 (never) to 1 (always), and averaged over each set of items. The frequency of using a registry to track patients with specific conditions was measured by a separate question also scaled from 0 to 1.

Additional variables from the PIF and PSQ controlled for possible effects on preventive care delivery. Practice type and ownership reflected varying organizational structures (e.g., solo practice and clinician-owned), whereas financial status in the last three years, ranging from 0 (large financial loss) to 1 (large financial gain), provided some indication of how monetary factors might affect the offering of preventive services. Control by a specific managed care plan indicated whether a preventive or health maintenance approach may have been instituted in the practice (e.g., formal reimbursement mechanisms for delivering preventive care). The percent of part-time clinicians was controlled for its potential effect on care continuity and patient-provider relationships. Practice culture accounted for possible influences of organizational norms and values on provider behavior, and consisted of four variables measuring the degree to which practices exhibited group-oriented (e.g., trustful), developmental (e.g., innovative), hierarchical (e.g., stable),

TABLE IV: CORRELATION MATRIX OF KEY STUDY VARIABLES\*

Variable	Preventive Care Delivery†	Staff Participation In QI	Work Relationships	QI × Relationships	Work Stress	QI × Stress	Practice Size	QI × Size	Non-physician Provider	High-Tech Clinician Reminders	Low-Tech Clinician Reminders	Patient Registry Use
Preventive Care Delivery†	1.00											
Staff Participation In QI	0.10	1.00										
Work Relationships	0.15†	0.72†	1.00									
QI × Relationships	0.14†	-0.02	0.01	1.00								
Work Stress	-0.20†	-0.57†	-0.59†	-0.12	1.00							
QI × Stress	-0.18†	-0.05	-0.12	-0.15†	0.11	1.00						
Practice Size	-0.11	0.25	0.16	1.00	0.30‡	0.35‡	1.00					
QI × Size	-0.12‡	-0.54†	-0.36†	-0.35‡	-0.10	1.00						
Nonphysician Provider	0.21†	0.08	-0.01	0.05	-0.08	-0.06	1.00					
High-Tech Reminders	0.27†	0.05	0.03	-0.07	-0.03	0.16†	0.16†	1.00				
Low-Tech Reminders	0.41†	0.00	0.03	-0.13‡	-0.08	0.08	-0.01	0.06	1.00			
Patient Registry Use	0.33†	-0.03	0.04	-0.11	-0.02	0.11	-0.06	0.02	0.09	1.00		

\*All table values indicate Pearson correlation coefficients.  
 †Composite score of preventive care delivery.  
 ‡P < .01 (2-tailed).  
 §P < .05 (2-tailed).  
 QI = Quality improvement.

and rational (e.g., pragmatic) culture types. Each type was measured on a scale ranging from 0 to 100, representing the balance of cultures in a given practice. Last, respondent characteristics such as age, gender, and years of working in the practice were controlled for possible effects on the outcome.

**Statistical Analysis.** A hierarchical linear modeling (HLM) approach to regression analysis was used to estimate the frequency of preventive care delivery reported by health care providers. This model measured the effects of independent variables—staff participation in quality improvement, clinical staff support, and clinical systems use—on the delivery of preventive care.

**RESULTS**

A total of 52 primary care practices were analyzed (Table I). Approximately 63% were single-specialty group practices, and 42% were owned by a hospital system. Average practice reports of staff participation in quality improvement and work relationships were 0.64 and 0.68, respectively, on a scale from 0 (low) to 1 (high). Practices were moderately stressful, as indicated by an average score of 0.51 across study sites. The average practice size was approximately 18 full-time equivalent employees.

A total of 318 health care providers were included for analysis (Table II). The highest proportion of providers were doctors of medicine, followed by licensed practical nurses, registered nurses, nurse practitioners, and other allied health professionals. Providers reported average use of low-technology reminder systems (0.53 on a scale from 0–1), and minimal use of both high-technology reminder systems and patient registries (0.25 and 0.26, respectively).

Table III shows average frequencies of preventive care delivery. Across all preventive services and health behaviors, providers had a mean composite score of 1.58 on a scale from 0 (never) to 4 (always). A correlation matrix of key variables demonstrates that unadjusted interaction terms (the effects moderated by staff participation in quality improvement), nonphysician health care providers, and use of clinical systems were positively

correlated with the delivery of preventive care (Table IV).

Staff participation in quality improvement significantly enhanced the association between work relationships and preventive care delivery (Table V). Specifically, the slope of preventive care on work relationships increased by approximately 11.36 units when staff participation increased by one unit ( $P < .01$ ). In contrast, staff participation in quality improvement did not affect the relationship between work stress and the delivery of preventive services. Although the relationship changed slightly when participation increased by one unit, the effect was insignificant. However, staff participation in quality improvement significantly influenced the association between practice size and prevention, albeit in a negative direction with the slope of the outcome on practice size estimated to be decreasing by 0.11 units with every unit increase in staff participation ( $P < .01$ ).

With regard to clinical staff support, nurse practitioners ( $b = 0.28$ ,  $P < .05$ ) and the other allied health professionals ( $b = 0.29$ ,  $P < .05$ ) reported more frequent delivery of preventive care, compared with the reference group of allopathic physicians. Both high-technology ( $b = 0.32$ ,  $P < .05$ ) and low-technology ( $b = 1.22$ ,  $P < .01$ ) clinical reminder systems were positively associated with addressing health risk behaviors. In addition, use of registries to track patients with specific conditions was associated with increased preventive service delivery ( $b = 0.48$ ,  $P < .01$ ). Other study results included negative associations between prevention of risk behaviors and both hierarchical ( $b = -0.03$ ,  $P < .01$ ) and rational ( $b = -0.04$ ,  $P < .05$ ) practice cultures. Staff participation as perceived by individual respondents was positively associated with the performance of preventive care ( $b = 0.50$ ,  $P < .01$ ).

**TABLE V: HIERARCHICAL LINEAR MODELING RESULTS FOR PREVENTIVE CARE DELIVERY\***

Fixed Effect	Beta Coefficient	SE	T	DF	P Value
Intercept	2.22	0.99	2.23	33	.033
Practice Type (Ref. solo)					
Single/multispecialty group	0.01	0.19	0.06	33	.954
Practice Ownership (Ref. clinician-owned)					
Hospital system	0.09	0.18	0.49	33	.628
University system	0.03	0.20	0.14	33	.898
Public sponsor	0.01	0.19	0.03	33	.980
Specific Managed Care Plan Controls > 50% of Practice Business	0.04	0.12	0.35	33	.728
Financial Status	0.09	0.23	0.40	33	.693
Percentage of Part-Time Clinicians	0.002	0.001	1.14	33	.263
Practice Culture					
Group-oriented	-0.02	0.01	-1.32	33	.196
Developmental	-0.00	0.01	-0.02	33	.988
Rational	-0.04	0.01	-2.69	33	.011
Hierarchical	-0.03	0.01	-2.99	33	.006
Staff Participation in QI†	-1.52	0.65	-2.33	33	.026
Work Relationships‡	0.30	0.90	0.33	33	.742
Interaction: QI × Relationships	11.36	3.52	3.23	33	.003
Work Stress‡	-0.17	0.45	-0.37	33	.712
Interaction: QI × Stress	5.79	5.62	1.03	33	.310
Practice Size‡	-0.004	0.003	-1.24	33	.224
Interaction: QI × Size	-0.11	0.03	-3.70	33	.001
Age	0.002	0.004	0.44	247	.662
Female	0.04	0.08	0.51	247	.610
Provider Type					
Doctor of osteopathy	0.02	0.18	0.08	247	.934
Nurse practitioner	0.28	0.11	2.44	247	.016
Physician assistant	-0.10	0.25	-0.38	247	.704
Registered nurse	0.10	0.07	1.33	247	.186
Licensed practical nurse	0.19	0.12	1.63	247	.105
Other	0.29	0.13	2.17	247	.031
Years in the Practice	-0.001	0.006	-0.12	247	.911
Use of Clinician Reminder Systems					
High-technology reminders	0.32	0.15	2.16	247	.032
Low-technology reminders	1.22	0.22	5.67	247	.000
Use of Patient Registry	0.48	0.13	3.73	247	.000
Perceived Staff Participation in QI	0.50	0.18	2.83	247	.005

\*Composite score.

†Estimated effect of staff participation in quality improvement (QI) when work relationships, work stress, and practice size are simultaneously set to their sample means.

‡Estimated effect of constituent variable when staff participation in QI is set to its sample mean.

§ $P < .05$ .

¶ $P < .01$ .

SE = Standard error; DF = degrees of freedom.

## DISCUSSION

Preventive services targeting tobacco use, excessive alcohol consumption, unhealthy diet, and physical inactivity have great potential for improving health and reducing costs associated with chronic disease management. This study found participation in quality improvement is an important organizational feature that positively affects the delivery of preventive care for health risk behaviors. By providing focused and purposeful direction to work

interactions, staff participation in quality improvement enhances the effect of good work relationships on the performance of high-quality care.

In contrast, practice size had a negative effect on preventive care delivery in larger organizations. Increasing staff participation in formal quality-improvement activities may be counterproductive in larger settings, because of challenges of task coordination and communication among members. This observation argues for breaking down large practices into smaller, more manageable groups and teams. This study also suggests that much of the difficulty with large groups may result from a conflict between the participative process and the ability to reach agreement on goals.<sup>37</sup>

At the individual level, this study highlights the effectiveness of nonphysician clinical staff members in delivering preventive services.<sup>32,38</sup> Indeed, nurse practitioners and allied health professionals perform services that address health risk behaviors more often than physicians, perhaps because they have more time and training in behavioral interventions. Hence, this research suggests a continued and even increased role for qualified nonphysician clinical staff in helping patients develop and maintain healthy behaviors. In addition, this shift in roles may also alleviate the time constraints and demands placed on physicians.

Such organized support systems as information technology and decision support improve preventive-care processes.<sup>13,14</sup> This study found the use of patient registries as well as both high- and low-technology clinician reminders are associated with significant increases in the delivery of preventive care. Recommendations based on these findings include the proactive, systematic use of clinical support systems to aid in conducting often neglected, yet vital, services.

## CONCLUSIONS

Efforts to improve preventive care for health behaviors should include active participation in quality improvement by both clinical and nonclinical staff, utilization of nonphysicians to deliver preventive services, and increased use of clinical support systems, such as clinician reminders and patient registries. Staff participation in quality improvement can be viewed as a functional attribute of the microsystem or small unit of care that includes patient care teams or small clinical practices. Findings from this research highlight the benefit of staff participation and collaborative work, especially in appropriately sized practices or groups. Many supportive commentaries on teamwork in health care have been written, including the Institute of Medicine's affirmation of a central role for primary care teams.<sup>13,39-44</sup> Facilitated, open communication and cultivation of good work relationships, combined with reinforced staff involvement in quality improvement, can enhance the delivery of recommended preventive services.<sup>45</sup> In addition, cultivation of workforce and human resource knowledge and skills

is necessary to improve the effectiveness of health care microsystems.<sup>45</sup> Greater involvement of nonphysician clinical staff and increased use of information technology to facilitate access to patient information and to support clinical decision making can facilitate improved delivery of preventive-care services.

## REFERENCES

1. *Chronic Care in America: A 21st Century Challenge*. San Francisco, Institute for Health and Aging, University of California, 1996.
2. McGinnis JM, Foege WH: Actual causes of death in the United States. *JAMA* 1993;270:2207-2212.
3. Mokdad AH, Marks JS, Stroup DF, et al: Actual causes of death in the United States, 2000. *JAMA* 2004;291:1238-1245.
4. U.S. Preventive Services Task Force: *Guide to Clinical Preventive Services 2005*. Report No AHRQ-05-0570, Washington, DC, U.S. Department of Health and Human Services, 2005.
5. Bondi MA, Harris JR, Atkins D, et al: Employer coverage of clinical preventive services in the United States. *Am J Health Promot* 2006;20:214-222.
6. Corrigan JM, Nielsen DM: Toward the development of uniform reporting standards for managed care organizations: the Health Plan Employer Data and Information Set (Version 2.0). *Jt Comm J Qual Improv* 1993;19:566-575.
7. Hulscher ME, Wensing M, Grol RP, et al: Interventions to improve the delivery of preventive services in primary care. *Am J Public Health* 1999;89:737-746.
8. Wolf SH, Atkins D: The evolving role of prevention in health care: Contributions of the U.S. Preventive Services Task Force. *Am J Prev Med* 2001;20(suppl 3):13-20.
9. Kottke TE, Solberg LI, Brekke ML, et al: Delivery rates for preventive services in 44 midwestern clinics. *Mayo Clin Proc* 1997;72:515-523.
10. Woo B, Woo B, Cook EF, et al: Screening procedures in the asymptomatic adult: Comparison of physicians' recommendations, patients' desires, published guidelines, and actual practice. *JAMA* 1985;254:1480-1484.
11. Pommerenke FA, Weed DL: Physician compliance: Improving skills in preventive medicine practices. *Am Fam Physician* 1991;43:560-568.
12. Lewis CE: Disease prevention and health promotion practices of primary care physicians in the United States. *Am J Prev Med* 1988;4(suppl 4):9-16.
13. Institute of Medicine: *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC, National Academy Press, 2001.
14. Jaen CR, Stange KC, Nutting PA: Competing demands of primary care: A model for the delivery of clinical preventive services. *J Fam Pract* 1994;38:166-171.
15. Crabtree BF, Miller WL, Aita VA, et al: Primary care practice organization and preventive services delivery: A qualitative analysis. *J Fam Pract* 1998;46:403-409.
16. Solberg LI, Kottke TE, Brekke ML, et al: Using continuous quality improvement to increase preventive services in clinical practice: Going beyond guidelines. *Prev Med* 1996;25:259-267.
17. Dietrich AJ, Woodruff CB, Carney PA: Changing office routines to enhance preventive care. The preventive GAPS approach. *Arch Fam Med* 1994;3:176-183.
18. Kottke TE, Brekke ML, Solberg LI: Making "time" for preventive services. *Mayo Clin Proc* 1993;68:785-791.
19. McPhee SJ, Richard RJ, Solkowitz SN: Performance of cancer screening in a university general internal medicine practice: Comparison with the 1980 American Cancer Society Guidelines. *J Gen Intern Med* 1986;1:275-281.
20. Thompson RS, Taplin SH, McAfee TA, et al: Primary and secondary prevention services in clinical practice. Twenty years' experience in development, implementation, and evaluation. *JAMA* 1995;273:1130-1135.
21. Miles RE: Human relations or human resources? *Harv Bus Rev* 1965;43:148-163.
22. Miles RE, Ritchie JB: Participative management: Quality vs. quantity. *Calif Manage Rev* 1971;13:48-56.
23. Simon HA: *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations*. Ed. 2. New York City, Macmillan, 1957.
24. Locke EA, Schweiger DM: Participation in decision making: One more look, in Staw BM (ed): *Research in Organizational Behavior*.

- Greenwich, CT, JAI Press, 1979; 265-339.
25. Mayo E: *The Social Problems of an Industrial Civilization*. Boston, Graduate School of Business Administration, Division of Research, 1945.
  26. Argyris C: *Integrating the Individual and the Organization*. New York City, John Wiley, 1964.
  27. Likert R: *New Patterns of Management*. New York City, McGraw-Hill, 1961.
  28. McGregor D: *The Human Side of Enterprise*. New York City, McGraw-Hill, 1960.
  29. Lewin K: Group decision and social change, in Swanson GE, Newcomb TM, Harley EL (eds): *Readings in Social Psychology*. New York City, Holt, Rinehart and Winston, Inc., 1952.
  30. Patchen M: Participation in decision-making and motivation: What is the relation? *Personnel Administration* 1964;27:24-31.
  31. Tannenbaum AS: Systems of formal participation, in Strauss G, Miles RE, Snow CC, et al (eds): *Organizational Behavior: Research and Issues*. Madison, WI, Industrial Relations Research Association, 1974.
  32. Hollis JF, Lichtenstein E, Mount K, et al: Nurse-assisted smoking counseling in medical settings: Minimizing demands on physicians. *Prev Med* 1991;20:497-507.
  33. Casalino L, Gillies RR, Shortell SM, et al: External incentives, information technology, and organized processes to improve health care quality for patients with chronic diseases. *JAMA* 2003;289:434-441.
  34. Berry WD, Feldman S: *Multiple Regression in Practice*. Newbury Park, CA, Sage Publications, Inc., 1985.
  35. Gujarati DN: *Basic Econometrics*, Ed. 3. New York City, McGraw-Hill, Inc., 1995.
  36. Achen CH: *Interpreting and Using Regression*. Newbury Park, CA, Sage Publications, Inc., 1982.
  37. Fried BJ, Topping S, Rundall TG: Groups and teams in health services organizations, in Shortell SM, Kaluzny AD (eds): *Health Care Management: Organization Design and Behavior*. Albany, NY, Delmar Publishers, 2000.
  38. Cargill VA, Conti M, Neuhouser D, et al: Improving the effectiveness of screening for colorectal cancer by involving nurse clinicians. *Med Care* 1991;29:1-5.
  39. Starfield B: *Primary Care: Balancing Health Needs, Services, and Technology*. New York City, Oxford University Press, 1998.
  40. Bodenheimer T: Primary care in the United States. Innovations in primary care in the United States. *BMJ* 2003;326:796-799.
  41. Granbach K, Bodenheimer T: Can health care teams improve primary care practice? *JAMA* 2004;291:1246-1251.
  42. Rothman AA, Wagner EH: Chronic illness management: What is the role of primary care? *Ann Intern Med* 2003;138:256-261.
  43. Safran DG: Deflating the future of primary care: What can we learn from patients? *Ann Intern Med* 2003;138:248-255.
  44. Wagner EH: The role of patient care teams in chronic disease management. *BMJ* 2000;320:569-572.
  45. Berwick DM: A user's manual for the IOM's 'Quality Chasm' report. *Health Aff* 2002;21:80-90.

**DISCLOSURE**

Dr. Hong has indicated that she has no relevant commercial or financial affiliations to disclose.

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