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RESEARCH BRIEF

The Importance of a High-Performance Work Environment in Hospitals

Dana Beth Weinberg, Ariel Chanan Avgar, Noreen M. Sugrue, and Dianne Cooney-Miner

Objective. To examine the benefits of a high-performance work environment (HPWE) for employees, patients, and hospitals.

Study Setting. Forty-five adult, medical-surgical units in nine hospitals in upstate New York.

Study Design. Cross-sectional study.

Data Collection. Surveys were collected from 1,527 unit-based hospital providers (68.5 percent response rate). Hospitals provided unit turnover and patient data (16,459 discharge records and 2,920 patient surveys).

Principal Findings. HPWE, as perceived by multiple occupational groups on a unit, is significantly associated with desirable work processes, retention indicators, and care quality.

Conclusion. Our findings underscore the potential benefits for providers, patients, and health care organizations of designing work environments that value and support a broad range of employees as having essential contributions to make to the care process and their organizations.

Key Words. Acute inpatient care, quality of care/patient safety (measurement), patient assessment/satisfaction, health care organizations and systems, work environment, high performance work systems, management practices, organizational behavior

Work environment, sometimes also called "work climate" or "culture," has become an important factor in health services research, shown in numerous studies to be associated with positive outcomes for workers, patients, and organizations. However, what do we mean when we say an organization has a good work environment or culture or climate? Does an organization have multiple cultures or work environments, for example, on different units or among different professions? If so, whose work environment matters for understanding what an organization does or how it performs? These

[Correction statement added after first online publication 20 June 2012: The columns for Table 2 (page 9) were published in incorrect order. The table has been altered and is now correct.]

questions motivated the current study, which examines the diversity of work environments in hospitals as well as the implications for processes and outcomes for organizations, employees, and patients.

Drawing on the literature on high-performance work systems, we define work environment as being comprised of a bundle of practices designed to promote broader worker engagement and organizational commitment. This bundle includes but extends beyond sufficient material resources and support for the work itself. It also encompasses managerial practices, such as an emphasis on worker discretion and participation in decision making; facilitation of communication and information sharing; and human resource management practices focused on developing workers' skills and recruiting and retaining qualified workers (Baron and Kreps 1999; Appelbaum, Bailey et al. 2000; Guthrie 2001; Doeringer, Evans-Klock et al. 2002; Bartel 2004; Evans and Davis 2005). Together, this bundle of management practices comprises what we term a high-performance work environment (HPWE).

The HPWE measures we use resemble those identified by Aiken and colleagues in a series of studies describing a supportive work environment for nurses. That research suggests that organizational arrangements that promote nurses' professional status and discretion yield greater job satisfaction for nurses and better patient outcomes, including greater satisfaction and lower mortality rates (see, e.g., Aiken, Smith et al. 1994; Aiken, Sloane et al. 1997a, b; Aiken and Patrician 2000; Clarke, Sloane et al. 2002; Vahey, Aiken et al. 2004). The strength and consistency of these findings begs the question of whether the benefits of a supportive work environment extend to the experience and performance of other care providers as well.

The Institute of Medicine (IOM) recommends that health care be analyzed and understood as a system (Kohn, Corrigan et al. 1999) in which patient safety and quality of care require collaborative, interdisciplinary teamwork focused on patient-centered care (Corrigan, Donaldson et al. 2001). This framework suggests the fruitfulness of expanding the scope of investigation—beyond nurses or any single occupational group for that matter—to include all

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Address correspondence to Dana Beth Weinberg, Ph.D., Associate Dean of Social Sciences, Associate Professor, Queens College and The Graduate Center-CUNY, Department of Sociology, 65-30 Kissena Blvd, Flushing, NY 11367; e-mail: dana.weinberg@qc.cuny.edu. Ariel Chanan Avgar, Ph.D., is with the School of Labor and Employment Relations, University of Illinois at Urbana-Champaign, Champaign, IL. Noreen M. Sugrue, is with the Women and Gender in Global Perspectives Program, University of Illinois at Urbana-Champaign, Champaign, IL. Dianne Cooney-Miner, Ph.D., RN, is with the Wegmans School of Nursing, St. John Fisher College, Rochester, NY.

providers involved in delivering patient care. Such an approach is consistent with the work on high-performance work system in other industries, which emphasizes the importance of engaging and empowering the entire workforce regardless of education, job title, or experience, such that, for example, even the assembly-line worker in a manufacturing plant becomes a crucial partner in organizational performance (Macduffie 1995; Appelbaum, Bailey et al. 2000). In this study, we adopt this same democratic approach and test its applicability in the hospital setting.

We hypothesize that a high-performance work environment, as characterized by the perceptions of a broad range of occupations engaged in care, will relate positively to desirable work processes, such as collaboration and empowerment; retention as measured by intent to quit, job satisfaction, and actual turnover; and care quality as measured by patient ratings and adverse events.

DATA AND METHODS

We collected data from 45 units across 9 hospitals and 7 health systems in upstate New York and included a range of hospital types from large academic health science centers to small rural community hospitals. IRB approval was obtained from all participating hospitals.

Hospital Employee Sample

Surveys were distributed to all unit-based staff over a given 4- to 6-week period with 1,527 returned for an overall response rate of 68.5 percent. Hospital response rates ranged from 45 percent to 95 percent. The response rate among nurses, including both licensed practical nurses (LPNs) and registered nurses (Young, Charns et al. 1998), was 75 percent. The nursing departments closely tracked the number of surveys distributed to nurses and reported a 55 percent sampling rate for FTEs. Applying this rate to FTE information on other groups, we estimate the following response rates by occupation: RNs, 76 percent; LPNs, 69 percent; nurse practitioners, 91 percent; nurses' aides, 83 percent; doctors, 46 percent; and remaining occupational groups, 54 percent.

Patient Samples

Five hospitals provided Hospital Consumer Assessment of Health Plans Surveys (H-CAHPS) for the patients discharged from the study units during the

study period. For those that only sampled 5 percent of discharged patients for H-CAHPS, we extended the H-CAHPS window to include 6 months before the study. Five hospitals provided H-CAHPS data for a total of 2,920 surveys (the range per hospital was 51–1168 surveys). We treat these data as a convenience sample, as response rates are unknown and we anticipate selection bias in returned surveys.

All nine hospitals provided discharge data for the full population of patients discharged from study units during the study period, a total of 16,459 patients, with a range from 8 to 708 per unit and an average of 374 patients per unit.

Measures

High-Performance Work Environment. The HPWE measures are based on items from the Revised Nursing Work Index (Aiken and Patrician 2000), the Picker Hospital Employee Survey (The Picker Institute 2006), and a variety of tools from other workplace settings, with particular focus on research on high-performance work systems and teams (Weinberg, Cooney-Miner et al. 2011). It consists of four subindices (Cronbach's alpha = 0.78): staffing and support resources (6 items, Cronbach's alpha = 0.81); communication and information technology (6 items, Cronbach's alpha = 0.80); human resource management and rewards for performance (8 items, Cronbach's alpha = 0.84); and control over work (6 items, Cronbach's alpha = 0.74). At the individual level, this index (described in fuller detail as "supportive organizational context" in Weinberg, Cooney-Miner et al. 2011) is made up of 25 core items that are scored on a 5-point frequency-based scale ranging from 0 "never" to 4 "always." These items are first combined into their subscale means and then averaged into the larger index, which has a maximum score of 4. Higher scores indicate that organizations use HPWE practices with greater frequency and consistency.

The unit-level measure of HPWE is a composite of equally weighted average scores for each of eight occupational groups: physicians, nurse practitioners and physician's assistants, rehabilitation therapists (occupational therapists, physical therapists, and speech and language pathologists), case managers and social workers, registered nurses, nurse's aides, clerks and secretaries, as well as all other providers. Our measurement strategy emphasizes the prevalence of HPWE across occupations and privileges the patient care functions performed by an occupational group on a unit instead of its sheer size. For example, many of our units had only one or two case managers or

social workers. While their numbers are small relative to the number of nurses, their function in care is both unique and direct, affecting every patient discharged.

Work Process. We measure professional empowerment using Spreitzer's Psychological Empowerment Scale (Spreitzer 1995), a widely used 16-item measurement tool (Spreitzer and Quinn 2001). Questions include items like "I have significant autonomy in determining how I do my job," "My opinion counts in departmental decision making," and "I am self-assured about my capabilities to perform my work activities." The responses from all items are averaged to produce a score where higher values indicate greater empowerment. We measure collaborative influence, the extent to which providers influenced others' care decision, with the question, "How often do you have a say in what they do with patients?" Responses were on a 5-point scale from never (0) to always (4). The index averages a respondent's ratings across all applicable provider groups. The resulting index has a Cronbach's alpha of .99.

Retention-Related Measures. Job satisfaction is assessed with the following item, "Overall, how satisfied are you with your job?" with a response of "very satisfied" given a value of one and all others ("somewhat satisfied," "somewhat dissatisfied," "very dissatisfied") coded as 0. Intent to quit is assessed with the question, "Thinking about the next three months, how likely are you to continue working on your unit?" with the answer choice "very likely to leave" and all other choices ("very likely to continue," "somewhat likely to continue," "somewhat likely to leave") coded as 0. In both cases, we convert the original Likert scale to a dichotomous variable as the more extreme answer choice is of greatest interest. Nurse and nurse's aide turnover rates are based on human resources reports from study units.

Care Quality. We measure patient care rating using a single item from the H-CAHPS survey: "Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?" Patient discharge records were used to identify occurrence of adverse events using the International Classification of Disease, 9th Edition (ICD-9), for all 20 patient safety indicators in the AHRQ Patient Safety Indicators system (PSI). Given the differing number of diagnostic

codes received from each hospital, we could not run the full AHRQ PSI software and instead use up to six diagnostic codes to identify the presence of any PSI. This measure is conservative because inpatient claims generally include more than six diagnostic codes in no particular order. Thus, an adverse event many have occurred on a code we did not see.

Control Variables. All employee models include a series of theoretically driven employee-level covariates. These include total years of experience in the occupational role reported, a dummy variable for race reported as black or African American, for ethnicity reported as Hispanic, for sex reported as female, and for whether the respondent is foreign born. We also include dummy variables for each occupational group with RNs as the comparison category. In the unit-level models of turnover rates, we control for the FTE of RNs and nurse's aides, respectively.

Various patient characteristics, including age, gender, race, and health status, may influence patients' ratings of their care (Cleary, Edgman-Levitan et al. 1991; Kane, Maciejewski et al. 1997; Young, Meterko et al. 2000; Powers and Bendall 2004). In the care ratings model using H-CAHPS, we control for race and ethnicity using patients' self-report of their race as black or African American (the other racial categories, other than white, were less than 5 percent of the sample) and of their ethnicity as Hispanic. Self-reported health is measured with a single item: "In general, how would you rate your overall health?"

In the adverse events model, we control for whether a respondent is older than 65 years of age and for number of co-morbidities, based on diagnostic codes. The patient-level risk-adjusters were limited due to the hospitals' various interpretations of HIPAA and resulting differences in the format and availability of data. Subset analyses with other variables, including sex, race, and a continuous variable for age, did not show these other variables to be significant.

ANALYSIS

We use ANOVA-generated intraclass correlations (Bliese 2000) to examine nonindependence and group-mean reliability by hospital, unit, and occupation as a validation of our measurement approach. We use hierarchical linear models with fixed effects for hospitals (not shown) and random effects for units in our individual-level employee and patient models. Both linear and logistic models are used, depending on the nature of the dependent variable, using the

xtreg and xtlogit commands, respectively, in *STATA*10 (StataCorp, College Station, Texas, USA). At the unit level, we then examine nurse and nurse's aide turnover using aggregate perceptions of work environment for each of these occupations, respectively. In these latter models, hospitals are included as the random effect.

RESULTS

As shown in Table 1, registered nurses are the largest provider respondent group, comprising about 44 percent, followed by nurse's aides (15 percent), other (10 percent), and rehabilitation therapists (10 percent).Using employee surveys, we examined in Table 2 the relationship between group membership and work environment with separate one-way ANOVAs for hospital, unit, and occupational groups; we calculated the proportion of variance explained by group membership, ICC (1), and the group-mean reliability, ICC (2), for each, respectively (Bliese 2000). The proportion of variance explained by hospital is 0.03 with a group-mean reliability of 0.83; the proportion explained by unit is 0.09 with a group-mean reliability of 0.73; and the proportion explained by occupation is 0.05 with a group-mean reliability of 0.89. In an ANOVA (not shown) with all three independent variables, the proportion of variance explained is 0.15.

These results suggest that the greatest degree of nonindependence of responses occurs at the unit level; however, the relative consistency of responses among raters on a unit may be more diverse due to the diversity of occupational groups and their different experience within organizations. Responses within an occupation on a unit represent consensus about the prevalence of work environment practices for a given occupational group (Klein, Conn et al. 2001). The aggregate of occupational responses at the unit level represents a fuzzy compilation (Bliese 2000) that differs more greatly from an individual's rating because it incorporates a wider range of experiences. Taken together, these results suggest that compiling perceptions of work environment by unit and occupation provide a reasonable aggregation of group perception. The same would also be true for further aggregating to the hospital level were our units sampled randomly within hospitals.

Using the unit- and occupation-aggregated measure of HPWE, we find a positive, significant relationship with both measures of work process. As shown in Table 3, providers in more supportive work environments also

Table 1: Sample Description

Variable	*N*	*Mean or Percent*	*SD*	*Minimum*	*Maximum*
Staff survey data					
Individual-level work environment	1,526	2.52	0.47	0.69	4
Unit-level work environment	55	2.53	0.23	2.06	3.14
Staffing	1,525	2.59	0.55	0.33	4
Decision	1,525	2.34	0.65	0.00	4
Reward	1,520	2.55	0.67	0.25	4
Communication	1,506	2.63	0.67	0	4
Collaborative influence	1,519	2.34	0.89	0	4
Empowerment	1,510	5.46	0.90	1	7
Job satisfaction (percent very satisfied)	1,510	40.39%			
Intent to quit (percent planning to leave job in next 3 months)	1,512	4.37%			
Experience (years)	1,504	8.54	9.45	0	43
Foreign born	1,518	39.99%			
Female	1,520	86.91%			
Black or African American	1,527	7.07%			
Hispanic	1,503	3.13%			
Physicians	1,527	3.60%			
Nurse practitioners or physician's assistants	1,527	5.24%			
Rehabilitation therapists	1,527	9.76%			
Case managers or social workers	1,527	4.98%			
RNs	1,527	44.20%			
Nurse's aides	1,527	15.00%			
Clerks and secretaries	1,527	6.75%			
Other	1,527	10.48%			
Human resources data (unit level)					
RN work environment	45	2.54	0.21	2.14	3.07
Nurse's aide work environment	37	2.39	0.28	1.95	3.06
RN turnover	45	5.80	5.60	0	17.70
Nurse's aide turnover	37	7.92	9.46	0	33.3
RN full-time equivalents	45	36.02	54.45	11	236.5
Nurse's aide full-time equivalents	45	10.91	10.12	0	43.44
Patient survey data					
Care rating	2,303	8.49	1.85	0	10
Self-rated health	2,307	2.68	1.04	1	5
Hispanic	2,939	34.23%			
Black or African American	2,351	5.23%			
Patient discharge data					
Adverse event	16,476	6.84%			
Diagnosis count	16,476	3.27	1.95	0	6
Age 65+	16,476	47.91%			

Table 2: Hierarchical Linear Models of Employee Measures

	Empowerment			*Collaborative Influence*			*Job Satisfaction*			*Intent to Quit*		
	Coef.	*SE*	$p > \|z\|$	*Coef.*	*SE*	$p > \|z\|$	*Odds Ratio*	*SE*	$p > \|z\|$	*Odds Ratio*	*SE*	$p > \|z\|$
Work environment	0.45	0.12	.000	0.43	0.09	.000	4.66	1.48	.000	0.13	0.11	.012
Experience	0.01	0.00	.000	0.00	0.00	.915	1.01	0.01	.082	0.94	0.02	.003
Foreign-born	0.00	0.06	.942	−0.03	0.05	.576	0.80	0.12	.141	0.71	0.27	.368
Female	0.06	0.08	.425	−0.01	0.06	.869	0.77	0.14	.141	0.48	0.17	.041
Black or African American	0.09	0.10	.359	0.17	0.07	.018	0.70	0.17	.130	1.17	0.59	.760
Hispanic	−0.44	0.13	.001	0.10	0.10	.329	0.83	0.27	.555	0.37	0.38	.329
Physicians	0.10	0.14	.484	0.61	0.11	.000	1.29	0.42	.437	0.83	0.58	.784
Physicians' assistants or nurse practitioners	0.06	0.11	.560	0.41	0.08	.000	1.38	0.34	.198	0.56	0.42	.439
Rehabilitation therapists	−0.07	0.09	.426	−0.54	0.06	.000	1.42	0.30	.100	0.79	0.42	.659
Case managers and social workers	−0.28	0.11	.010	−0.30	0.08	.000	0.98	0.25	.949	0.28	0.29	.221
Nurses' aides	−0.02	0.07	.738	−0.90	0.05	.000	0.90	0.16	.568	1.03	0.38	.927
Clerks and secretaries	−0.17	0.10	.087	−1.78	0.07	.000	1.20	0.28	.433	0.84	0.53	.782
Other occupations	−0.01	0.08	.940	−0.28	0.06	.000	1.04	0.21	.837	1.40	0.62	.450
Constant	4.22	0.34	.000	1.54	0.26	.000	0.02	0.01	.000	36.56	79.84	.099
/lnsig2u							−3.99	1.79		−11.87	26.16	
sigma_u	0.00			0.00			0.14	0.12		0.00	0.03	
sigma_e	0.88			0.66								
rho	0.00			0.00			0.01	0.01		0.00	0.00	
Number of observations	1454			1463			1454			1456		

Note: Hospital fixed effects were included in the models but are not shown. 54 units, designated based on reported primary affiliation (which may have differed from intended study unit), were included as a random effect.

Table 3: Hierarchical Linear Models of Unit-Level Turnover

	RN Turnover			*Nurse's Aide Turnover*		
	Coeff.	*SE*	$p > \|z\|$	*Coeff.*	*SE*	$p > \|z\|$
Work environment	−6.78	3.46	.050	−3.01	5.33	.572
Full-time equivalents	−0.03	0.02	.086	0.05	0.19	.797
Constant	24.39	8.94	.006	15.50	13.34	.245
sigma_u	3.19			4.91		
sigma_e	4.02			8.59		
Rho	0.39			0.25		
Number of observations	45			37		

As these are unit-level models, the nine hospitals are included as a random effect.

report higher levels of professional empowerment (coeff. = 0.45, $p < .000$) and greater levels of collaborative influence (coeff. = 0.43, $p < .00$).

Similarly, we find a significant association between HPWE and retention-related indicators drawn from employee surveys. In the hierarchical logit models, a one-point increase in HPWE is associated with an odds ratio of 4.66 ($p < .000$) that individual hospital workers will report being "very satisfied" with their jobs and an odds ratio of 0.13 ($p < .012$) that they will report planning to leave their jobs in the next 3 months. However, we find only weak support for an association between HPWE and unit-level turnover. Shown in Table 3, RN-reported HPWE on their units shows a marginally significant relationship with nurse turnover, potentially related to a 6.78 percent lower rate of annual turnover ($p = .050$), but no significant relationship with nurse's aide turnover.

As shown in Table 4, HPWE is significantly associated with patients' experience and safety. HPWE is related to lower odds that a patient will experience an adverse outcome during the hospital stay (odds ratio = 0.43, $p = .027$) and to higher patient survey ratings of the hospital stay overall (coeff. = 0.65, $p < .008$).

DISCUSSION

This article pushes the boundary for conceptualizing the role of work environment in hospital care. Our consideration of work environment extends beyond any single occupational group to include a range of frontline staff involved in patient care, regardless of status or educational credentials. Moreover, we emphasize not only workload and staffing but also high-performance management practices related to worker engagement and commitment.

Table 4: Hierarchical Linear Models of Patient Care Quality

	Adverse Events			*Care Rating*		
	Odds Ratio	*SE*	$p > \|z\|$	*Coeff.*	*SE*	$p > \|z\|$
Work environment	0.43	0.16	.027	0.65	0.24	.008
Age 65+	1.23	0.08	.002	–		
Diagnosis count	1.52	0.05	.000	–		
Self-rated health	–			−0.25	0.04	.000
Hispanic	–			0.16	0.18	.382
Black or African American	–			0.17	0.19	.371
Constant	–			7.50	0.71	.000
/lnsig2u	−1.81	0.31		–		
sigma_u	0.40	0.06		0.00		
sigma_e	–			1.85		
rho	0.05	0.01		0.00		
Number of observations	16,701			2,115		

The adverse events model includes fixed effects, not shown, for nine hospitals, and random effects for 45 discharge units. The care ratings use fixed effects, not shown, for five hospitals and random effects for 35 discharge units.

Echoing IOM's perspective, this article underscores the interdisciplinary nature of health care work and the range of providers, both professional and paraprofessional, contributing to patient care. We find greater variation in work environment within hospitals than between them. Within hospitals work environment varies both by unit and by occupation. These findings highlight the importance of measurement at the workgroup or unit level and may indicate the important role of the middle manager. Moreover, variations by occupational group, even among providers working on the same unit, suggest a number of possibilities—differences in perceptions, differences in treatment, and differences in support needs for various occupational groups. Future research is needed to address the nature of these differences, but the significant variation suggests the need to attend to these occupational differences and their impact on the work of individual providers as well as of the full interdisciplinary team. Furthermore, we find that for all providers, a high-performance work environment (HPWE) as perceived by the broad spectrum of providers on a unit is associated with better retention—strongly at the individual level in terms of job satisfaction and turnover intention and weakly if at all in terms of unit turnover rates—as well as with greater engagement in the care process through enhanced professional empowerment and interdisciplinary collaboration. The combined perceptions of work environment also relate to higher patient ratings of their hospital stays and to fewer adverse events. Although

the employee portions of our analysis may suffer some same-instrument bias, the findings related to unit turnover rates and patient care, which hail from three independent sources, underscore the face validity of our contention that a high-performance work environment matters.

The cross-sectional nature of the data only allows us to draw inference about associations, not causality. To the extent that there is a causal relationship, our models likely understate the contribution of HPWE given the potential indirect effects in the system of relationships. The various measures in this study likely relate to each other through feedback loops, mediation, or other pathways. Specifying these complex relationships calls for longitudinal and perhaps intervention-focused research.

In sum, this paper demonstrates the potential value of examining high-performance management practices—practices aimed at developing, retaining, and supporting employees to maximize employee engagement and commitment—as central components of a supportive work environment. We show that the perceptions of this type of work environment vary within organizations, both by department and by occupation, suggesting the importance of incorporating multiple viewpoints. Taken together, our findings underscore the potential benefits for providers, patients, and health care organizations of designing work environments that value and support a broad range of employees as having essential contributions to make to the care process and their organizations.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

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