



Published in final edited form as:

Geriatr Nurs. 2020 ; 41(2): 158–164. doi:10.1016/j.gerinurse.2019.08.007.

Nursing Home Work Environment, Care Quality, Registered Nurse Burnout and Job Dissatisfaction

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Abstract

The objective of this cross-sectional study was to examine the relationships between work environment, care quality, registered nurse (RN) burnout, and job dissatisfaction in nursing homes. We linked 2015 RN4CAST-US nurse survey data with LTCfocus and Nursing Home Compare. The sample included 245 Medicare and Medicaid-certified nursing homes in four states, and 674 of their RN employees. Nursing homes with good vs. poor work environments, had 1.8% fewer residents with pressure ulcers ($p=.02$) and 16 fewer hospitalizations per 100 residents per year ($p=.05$). They also had lower antipsychotic use, but the difference was not statistically significant. RNs were one-tenth as likely to report job dissatisfaction ($p<.001$) and one-eighth as likely to exhibit burnout ($p<.001$) when employed in good vs. poor work environments. These results suggest that the work environment is an important area to target for interventions to improve care quality and nurse retention in nursing homes.

Keywords

nursing home; registered nurses; work environment; burnout; quality

Introduction

Care quality varies widely across nursing homes.^{1,2} A 2014 report from the Department of Health and Human Services Office of Inspector General found that from 2008–2012, 22% of Medicare beneficiaries receiving post-acute care in nursing homes experienced adverse events, resulting in an estimated \$2.8 billion annual excess spending on hospitalizations.¹ Registered nurses (RNs) provide important clinical leadership and oversight in nursing homes to prevent such events from occurring and ensure that residents receive appropriate care. In their roles as directors of nursing, supervisors, and charge nurses, RNs are responsible for supervising other nursing personnel, coordinating care, conducting resident

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surveillance, interfacing with medical staff, and overseeing infection control, wound care, and quality improvement programs.^{3,4}

The ability of RNs to carry out these roles is largely influenced by the work environment in which they practice.⁵ In good work environments, RNs have adequate staff and resources, supportive managers, strong nursing foundations underlying care, productive relationships with colleagues, input into organizational affairs, and opportunities for advancement.⁶ Extensive research has shown that hospitals with these features have better patient outcomes including lower mortality, reduced length of stay, and higher satisfaction,^{7–10} as well as lower RN burnout and job dissatisfaction.^{11–13} Nursing home RNs report higher rates of burnout and job dissatisfaction than RNs employed in any other setting, including hospitals,¹⁴ and are often unable to complete necessary care due to insufficient time and resources.¹⁵ Burnout and job dissatisfaction are both key drivers of staff turnover,^{13,16} a significant problem in nursing homes that has been consistently linked to worse care quality.^{17–20}

Nursing home work environment studies have been limited in both scope and number. The relationship between RN staffing—one component of the work environment—and quality has been studied extensively, but results have been mixed.^{21–25} There have been many critiques of the staffing literature, the largest being that most studies used facility-reported staffing data which are prone to reporting bias.^{22–25} Another factor explaining why RN staffing has been inconsistently associated with quality may be that staffing is so low in some nursing homes that small increases do not lead to significantly more RN oversight of residents. Additionally, staffing improvements alone may have limited influence without other elements of good work environments being in place.⁷ Supportive leadership, RN involvement in organizational decisions, safety climate, and teamwork have been linked to better nursing home quality.^{26–31} Only one study sampled RNs independently of their employers to reduce response bias at the organizational level, and used a comprehensive measure of work environment.^{32,33} No studies have examined the impact of work environment on RN burnout in nursing homes.

The purpose of this study was to examine the empirical relationship of work environment with care quality, RN burnout, and job dissatisfaction in nursing homes. We hypothesized that nursing homes with better work environments would have lower rates of pressure ulcers, antipsychotic medication use, and hospitalizations, and fewer RNs with job dissatisfaction and burnout. This study is the first to use multi-state RN survey data with the Practice Environment Scale of the Nursing Work Index (PES-NWI),⁶ a comprehensive National Quality Forum-endorsed measure, to examine the relationship of work environment with care quality and nurse outcomes in nursing homes.^{6,12,34,35}

Methods

Design and Data Sources

This study was a cross-sectional secondary data analysis of three linked datasets from 2015: (1) RN4CAST-US nurse survey data, (2) LTCfocus, and (3) Nursing Home Compare. We used RN4CAST-US for measures of the work environment, RN characteristics, and RN

outcomes; LTCfocus for provider characteristics and the hospitalization measure; and Nursing Home Compare for the pressure ulcer and antipsychotic measures.

RN4CAST-US.—The RN survey was conducted to investigate relationships between nursing resources, care quality, and patient and nurse outcomes, across a large number of healthcare organizations. From January to December 2015, Aiken and colleagues surveyed a 30% random sample of licensed RNs in four states (CA, NJ, FL, and PA) – a total of 231,000 RNs.³⁶ Surveys were mailed and emailed to RNs using contact information on file with state boards of nursing. RNs were asked to provide their employer’s name and address in order to link their responses to their employer, and were sent multiple reminders and offered small incentives to participate. This sampling approach permits study of many organizations, while eliminating potential bias that comes with surveying RNs via their employers.

The final response rate was 26%, reflecting a growing trend in survey non-response³⁷ and lack of information prior to sampling on whether and where RNs were currently employed. To evaluate for response bias, Aiken et al. completed a non-responder survey on a random sub-sample of 1,400 non-responders, yielding an 87% response rate.³⁸ These individuals received a shorter survey, more intensive attempts to contact, and a cash incentive. This double-sample approach is considered to be the gold standard for assessing non-response bias.³⁹ There were no significant differences in the measures of interest between long-term care RN responders and non-responders. Survey methods are described in detail elsewhere.^{38,40}

LTCfocus.—This publicly-available dataset from Brown University has provider characteristics of all Medicare and Medicaid-certified nursing homes in the US. LTCfocus merges data from the Minimum Data Set (MDS), the Certification and Survey Provider Enhanced Reports (CASPER) system, Medicare claims, Nursing Home Compare, and other sources to generate information at the facility, county, and state levels.⁴¹ The 2015 facility-level LTCfocus file was downloaded from <http://lctfocus.org>.

Nursing Home Compare.—Nursing Home Compare data are extracted from MDS, CASPER, and Medicare claims, and are updated on a quarterly basis. To ensure temporal congruency, we used second quarter data to match with LTCfocus, which calculates its prevalence estimates based on data from the first Thursday of each April. We merged the provider information file with the MDS second quarter quality measure files downloaded from the 2015 archived files at <https://data.medicare.gov>.

Study Population

We identified RNs from the parent survey who worked in nursing homes by cross-matching respondents’ employers’ names and addresses with a list of all Medicare and Medicaid-certified nursing homes. This created a sampling frame of 1,540 RNs (2.6% of respondents) who were employed in 1,008 nursing homes in CA, FL, NJ, and PA. We excluded RNs who did not complete the work environment measure in the survey (n=311), but found no statistically significant differences in other variables of interest between RNs with and

without missing data on that measure. We further excluded RNs who were the sole employee of a nursing home represented in the survey (n=555), since aggregated reports from multiple employees per nursing home produced a more reliable facility-level measure of the work environment.¹² This yielded a final sample of 674 RNs employed in 245 nursing homes. The nursing home and RN sample sizes also varied somewhat by outcome because cases were deleted when outcome data were missing.

Variables and Measures

Work Environment.—The 31-item Practice Environment Scale of the Nursing Work Index (PES-NWI) is a comprehensive National Quality Forum-endorsed measure^{6,12,34,35} that has been previously validated in nursing homes.³³ It is derived from questions on the RN survey, and has five subscales: (1) nurse participation in organizational affairs; (2) nursing foundations for quality of care; (3) nurse manager ability, leadership, and support of nurses; (4) staffing and resource adequacy; and (5) collegial nurse-physician relationships. RNs report the degree to which various elements are present in their work setting using a four point Likert scale, where higher scores indicate more favorable responses. We found each subscale mean, averaged them across all RNs in each facility to create facility-level subscale scores, and then averaged the subscale scores in each facility to create a facility-level composite scale score.^{6,42} We grouped nursing homes with composite scores and subscale scores to contrast those in the lowest 25th percentile (which we labeled “poor”), middle 50th percentile (“average”), and upper 25th percentile (“good”). Across the 245 nursing homes, the facility-level score was determined from a range of two to eight RNs, with a mean of 2.5 RNs per facility. Compared to CASPER staffing data, this represented a mean of 20% of total employed RNs per facility.

Nursing home quality measures.—We examined three measures of quality, the first two from Nursing Home Compare, and the third from LTCfocus: (1) percent of high risk long-stay residents with Stage II-IV pressure ulcers, (2) percent of long-stay residents who received antipsychotic medication, and (3) hospitalizations per resident year. The pressure ulcer and antipsychotic measures are both derived from MDS data and reflect the facility-level unadjusted rate, after excluding cases where the outcome was either unavoidable or out of the facility’s control.⁴³ The LTCfocus hospitalization measure is derived from MDS and claims data, and represents the total number of hospitalizations for short and long-stay residents from the facility relative to all nursing home days for all residents in the facility that calendar year. These measures were chosen because they are widely accepted measures of nursing home quality that have been previously linked to organizational elements of nursing such as staffing and turnover.

Nurse outcomes.—Nurse outcomes came from the RN survey. Job dissatisfaction was measured on a four point Likert scale response to the question “How satisfied are you with your primary job?”, and was dichotomized as “very or somewhat dissatisfied” vs. “very or somewhat satisfied”. Burnout was measured with the Emotional Exhaustion scale of the Maslach-Burnout Inventory, a validated measure of occupational burnout.⁴⁴ As specified in the instrument’s scoring guidelines, RNs were classified as having burnout if their score was 27 or higher, the published average for healthcare workers.⁴⁵

Analysis.—We first generated descriptive statistics to examine nursing home and RN characteristics, and determine differences in quality measures and RN outcomes across facilities, using F-tests, t-tests, and chi-square tests as appropriate. We then estimated the effects of the overall (composite) work environment, and its different components, on the nursing home quality measures and the RN outcomes, controlling for potentially confounding factors. We used nursing home-level data and linear regression models for the quality measures (i.e. the pressure ulcer, antipsychotic, and hospitalization outcomes), and controlled for nursing home factors including ownership type, chain affiliation, Medicare census, Medicaid census, RN skill mix, certified nursing assistant staffing, presence of an Alzheimer’s unit, average resource utilization group (RUG) score (a measure of case mix), and an indicator of whether the facility accepts ventilator-dependent patients. For the RN outcomes (job dissatisfaction and burnout), we used multilevel data and robust logistic regression models to account for clustering of RNs in nursing homes. In these models, we controlled for both nursing home characteristics and RN characteristics (age, sex, race, position, years of experience, native language).

To compensate for the problem of heteroscedasticity due to our work environment measure being based on a small number of RNs per nursing home, we used analytic weights to weight the aggregated facility score in our linear regression models by the number of respondents per facility, giving greater weight to nursing homes with more respondents.^{46,47} We also controlled for the number of respondents per nursing home in all models. Data were analyzed using Stata version 15.1 (Stata Corp., College Station, TX). The University of Pennsylvania institutional review board approved this study.

Results

Table 1 shows nursing home and RN sample characteristics. Nursing homes with poor work environments were more often for-profit, chain-owned, had a higher Medicaid census, and lower staffing than nursing homes with average or good environments, but none of these differences were statistically significant. RNs in nursing homes with good environments were significantly more likely to be employed in managerial and other roles, and less likely to be employed as direct care staff, than RNs in nursing homes with average or poor environments. No other RN characteristics differed across nursing home work environments.

Table 2 summarizes variation in quality measures and RN outcomes across nursing homes with different characteristics. These unadjusted differences reveal that nursing homes with poor environments had significantly higher rates of pressure ulcers and antipsychotic use, and more RNs who were dissatisfied and exhibited burnout. Other organizational characteristics had less consistent effects across outcomes.

Table 3 shows results of bivariate and adjusted linear regression models for the nursing home quality measures. The three work environment categories are treated as a linear term for both the overall PES-NWI and its subscales. As such, a one unit change represents the difference between average vs. poor or good vs. average environments, while a two unit change represents the difference between good vs. poor environments. Controlling for other organizational characteristics, nursing homes with average vs. poor work environments, and

good vs. average environments, had 0.9% fewer long-stay high risk residents with pressure ulcers ($p=.02$), and 0.08 fewer hospitalizations per resident year ($p=.05$). This implies that nursing homes with good vs. poor environments had $2 \times 0.9\% = 1.8\%$ fewer pressure ulcers and $2 \times 0.08 = 0.16$ fewer hospitalizations per resident year, or 16 fewer hospitalizations per 100 residents per year. Since these differences represent about one-half of a standard deviation in the case of pressure ulcers and one-third of standard deviation with respect to hospitalizations, the difference between nursing homes with good vs. poor work environments would equate, all else being equal, to being in the 40th vs. 60th percentile for pressure ulcers, and in the 43rd vs. 56th percentile for hospitalizations. Nursing homes with good vs. poor work environments had fewer residents on antipsychotics, but the difference was not statistically significant in adjusted models.

Similar effects were found for the different subscales, though only roughly half of them were statistically significant in the adjusted pressure ulcer and hospitalization models. Strong nursing foundations, nursing leadership, and collegial nurse-physician relationships were significantly associated with reduced pressure ulcers. Staffing/resource adequacy and collegial nurse-physician relationships were significantly associated with reduced hospitalizations. None of the subscales were significant in adjusted models for the antipsychotic outcome.

Table 4 summarizes results of bivariate and adjusted logistic regression models for the RN outcomes. Controlling for nursing home and RN characteristics, the odds ratios in the table indicate that RNs in nursing homes with good vs. average work environments, and in nursing homes with average vs. poor environments, were significantly less likely to report job dissatisfaction and to exhibit high burnout, by factors of 0.32 and 0.35, respectively. Since these coefficients are multiplicative, the squared odds ratios shown in the table indicate that RNs in nursing homes with good vs. poor work environments, were one-tenth as likely to be dissatisfied with their jobs, and one-eighth as likely to exhibit burnout, as RNs employed in facilities with poor environments. All subscales were significantly associated with both outcomes.

Discussion

Nursing homes with better RN work environments had fewer pressure ulcers and hospitalizations. RNs employed in these facilities were significantly less likely to exhibit job dissatisfaction and burnout than RNs employed in facilities with poor environments. Our subscale analysis showed that multiple components of the work environment were associated with outcomes we examined, not just staffing and resource adequacy. This suggests that, in addition to having adequate staffing and resources, other work environment elements are necessary to support RNs in providing high quality care in nursing homes. And while this study specifically examined RNs, it is likely that these same elements also help to support licensed practical nurses (LPNs) and certified nursing assistants (CNAs), who provide much of the direct patient care in this setting.

Nursing home leaders often function under tight budgetary constraints due to heavy dependence on Medicaid, yet there are still many evidence-based interventions that can

improve work environments through changes in organizational culture and practices.^{6,32,33,48} Strong nursing care foundations were significantly associated with the pressure ulcer and nurse outcomes in our study. Multiple nursing care processes are integral to the prevention and treatment of pressure ulcers such as risk assessment, skin surveillance, mobility and positioning, nutrition interventions, and incontinence management.⁴⁹ Interventions to support nursing staff in this regard include providing regular continuing education opportunities, organizing formal preceptor programs to train and mentor new hires, and maintaining active quality assurance programs that engage nurses in identifying and addressing areas for improvement.⁶ Nurse leadership was also associated with both the pressure ulcer and nurse outcomes. To provide effective leadership, staff nurses must have support from their supervisors, supervisors must have support from their director(s) of nursing, and the director(s) of nursing must have support from other senior level administrative staff. This means offering mentorship and training for nurses to develop leadership skills, recognizing employees when work is done well, and creating a culture where mistakes are used as learning opportunities instead of for criticism or punishment.⁶

Collegial nurse-physician relationships were associated with the pressure ulcer, hospitalization, and nurse outcomes, supporting an existing literature that has shown effective nurse-physician communication to be an important factor in maintaining resident safety and preventing avoidable hospitalizations from the nursing home.^{50,51} Though the PES-NWI specifically measures communication between nurses and physicians, these findings likely also apply to advanced practice clinicians, who are playing an increasingly visible role as medical providers in nursing homes. Interventions in this domain include encouraging regular participation of all staff in interdisciplinary gatherings such as morning rounds and careplan meetings, and offering training on best communication practices between nurses and medical staff. Finally, nurse participation in organizational affairs was associated with both job dissatisfaction and burnout. Interventions to improve nurse engagement include offering clinical ladders and other career development opportunities, involving nurses on quality improvement committees, leadership working with staff to find solutions to problems, and having formal processes for responding to employee concerns.⁶

Some limitations of our study should be noted. First, the cross-sectional design prevented examination of causal relationships between the work environment and outcomes. Second, the facility-level quality measures did not allow for resident-level adjustment beyond what was already built into Nursing Home Compare. Third, our nursing home PES-NWI measures are based on a small number of RNs per facility, a trade-off of using a state-wide RN sample rather than surveying RNs through their employers. The former approach offers a clear advantage of reduced response bias at the employer level, but also makes it harder to find nursing homes with multiple respondents, particularly since nursing homes employ far fewer RNs than hospitals. We used analytic weights in our linear regression models and controlled for the number of RN respondents per facility to compensate for heteroscedasticity. Finally, our sample of 245 nursing homes represents just over 8% of all nursing homes in our four states, which may limit generalizability of our findings. Still, this was the first study to use a multistate sample of RNs to study the impact of work environment in nursing homes.

Conclusions

The work environment is an important area for interventions to improve nursing staff retention and care quality in nursing homes. Nursing home RNs exhibit high rates of job dissatisfaction and burnout which contribute to turnover, a significant problem in this setting. An extensive body of evidence has already shown that better nurse work environments are associated with improved patient safety and reduced staff burnout and job dissatisfaction in hospitals. This study is one of the first to show similar relationships in nursing homes and has implications not just for RNs, but also for other nursing staff. Interventions to improve work environments reflect recommendations in the Institute of Medicine's 2004 report *Keeping Patients Safe: Transforming the Work Environment of Nurses*,⁵ and hold potential to bolster systems of care in nursing homes to improve quality and safety.

Funding:

This research was supported by the National Institute of Nursing Research, T32 NR-007104 (Aiken, PI) and R01 NR-014855 (Aiken, PI).

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Table 1.

Nursing Home and Registered Nurse Characteristics Across All Nursing Homes, and Across Nursing Homes with Poor, Average, and Good Work Environments

Nursing home characteristics	Nursing Home Work Environment							
	Total Sample (n=245)		Poor (n=62)		Average (n=122)		Good (n=61)	
Ownership, n(%)								
For-profit	124	(50.6%)	35	(56.5%)	63	(51.6%)	26	(42.6%)
Nonprofit or government	121	(49.4%)	27	(43.5%)	59	(48.4%)	35	(57.4%)
Chain-owned, n(%)	132	(53.9%)	37	(59.7%)	65	(53.3%)	30	(49.2%)
Payer mix, mean (SD)								
% primary payer Medicaid	56.2	(25.1)	61.2	(23.1)	55.8	(25.0)	52.1	(26.8)
% primary payer Medicare	13.7	(12.1)	11.6	(9.7)	15.2	(12.5)	12.7	(13.1)
Staffing [†] , mean (SD)								
RN hours per resident day	0.64	(0.37)	0.57	(0.21)	0.65	(0.34)	0.70	(0.52)
LPN hours per resident day	0.82	(0.40)	0.77	(0.24)	0.84	(0.48)	0.83	(0.37)
CNA hours per resident day	2.46	(0.53)	2.36	(0.51)	2.46	(0.53)	2.57	(0.56)
% total licensed nurse (RN +LPN) hours per resident day provided by RNs	43.9	(17.4)	42.5	(14.6)	44.1	(18.7)	44.9	(17.6)
Registered nurse characteristics	Nursing Home Work Environment							
	Total Sample (n=674)		Poor (n=168)		Average (n=356)		Good (n=150)	
Age in years, mean(SD)	51.7	(12.1)	52.6	(11.2)	51.0	(12.2)	52.4	(13.0)
Years of experience, mean (SD)	20.6	(14.1)	21.5	(13.2)	19.8	(14.2)	21.5	(14.6)
Sex, female, n(%)	631	(93.6%)	156	(92.9%)	331	(93.0%)	144	(96.0%)
Race, non-white, n(%)	121	(18.0%)	29	(17.3%)	69	(19.4%)	23	(15.3%)
Native language English, n(%)	584	(86.6%)	149	(88.7%)	310	(87.1%)	125	(83.3%)
Position, n(%)								
Direct care staff RN	304	(45.1%)	87	(51.8%)	164	(46.1%)	53	(35.3%) *
Nurse manager/administrator	221	(32.8%)	47	(28.0%)	116	(32.6%)	58	(38.7%) *
Other nursing role	149	(22.1%)	34	(20.2%)	76	(21.3%)	39	(26.0%) *

* Differences in characteristics across nursing homes with poor, average, and good work environments significant at $p < .05$, as tested using Pearson chi-square statistics for categorical variables, and F-tests from ANOVA for continuous variables.

[†] RN = registered nurse; LPN = licensed practical nurse; CNA = certified nursing assistant

Table 2.

Differences in Quality Measures and Registered Nurse (RN) Outcomes by Nursing Home Organizational Characteristics

Organizational Characteristics	Quality Measures						RN Outcomes			
	Percent of long-stay high risk residents with pressure ulcers (n=222) [†]		Percent of long-stay residents who received antipsychotics (n=230)		Number of hospitalizations per resident year (n=244)		Number of RNs dissatisfied with their job (n=656)		Number of RNs with burnout (n=577)	
	Mean	SD	Mean	SD	Mean	SD	n	%	n	%
All nursing homes	5.1	(3.8)	15.5	(6.8)	1.1	(0.5)	161	(24.5)	196	(34.0)
Work environment										
Poor	5.6	(3.6) *	17.5	(7.3) *	1.1	(0.5)	76	(46.6) *	77	(55.4) *
Average	5.2	(4.4)	14.9	(6.6)	1.1	(0.6)	73	(21.1)	100	(32.4)
Good	4.3	(2.7)	14.7	(6.5)	1.0	(0.6)	12	(8.2)	19	(14.7)
Ownership										
For-profit	5.5	(4.5)	15.5	(6.8)	1.2	(0.6) *	88	(28.8) *	99	(36.8)
Nonprofit or government	4.6	(3.0)	15.5	(7.0)	0.9	(0.5)	73	(20.9)	97	(31.5)
Chain-owned										
Yes	4.6	(3.5) *	14.8	(6.9)	1.2	(0.6) *	87	(26.1)	108	(35.6)
No	5.7	(4.2)	16.3	(6.7)	1.0	(0.5)	74	(23.0)	88	(32.2)
Medicaid census										
High [‡]	5.1	(3.2)	16.7	(7.4) *	1.0	(0.4)	90	(25.5)	102	(32.8)
Low	5.1	(4.5)	14.0	(5.8)	1.1	(0.7)	71	(23.4)	94	(35.3)
Medicare census										
High [‡]	5.0	(4.1)	14.5	(5.6)	1.4	(0.6)	44	(25.0)	66	(40.2) *
Low	5.1	(3.8)	15.9	(7.2)	0.9	(0.5)	117	(24.4)	130	(31.5)
Average Resource Utilization Group score										
High [‡]	4.9	(4.0)	15.4	(6.4)	1.2	(0.6) *	107	(26.6)	130	(36.3)
Low	5.4	(3.6)	15.7	(7.5)	0.9	(0.4)	54	(21.3)	66	(30.1)
RN hours per resident day [§]										
High [‡]	5.2	(4.3)	14.7	(7.1)	1.1	(0.6)	84	(23.3)	115	(35.0)
Low	4.9	(3.3)	16.4	(6.4)	1.0	(0.4)	77	(26.1)	81	(32.7)
LPN hours per resident day [§]										
High [‡]	5.1	(3.7)	16.1	(7.3)	1.1	(0.6)	65	(24.5)	75	(34.3)
Low	5.1	(3.9)	15.1	(6.5)	1.1	(0.5)	96	(24.6)	121	(33.8)
CNA hours per resident day [§]										
High [‡]	5.0	(4.0)	14.8	(6.1)	1.1	(0.6)	82	(23.4)	94	(30.8)

Organizational Characteristics	Quality Measures						RN Outcomes			
	Percent of long-stay high risk residents with pressure ulcers (n=222) [†]		Percent of long-stay residents who received antipsychotics (n=230)		Number of hospitalizations per resident year (n=244)		Number of RNs dissatisfied with their job (n=656)		Number of RNs with burnout (n=577)	
	Mean	SD	Mean	SD	Mean	SD	n	%	n	%
Low	5.2	(3.7)	16.3	(7.5)	1.1	(0.5)	79	(25.9)	102	(37.5)
% of total licensed nurse (RN+LPN) hours per resident day provided by RNs										
High [‡]	5.4	(4.4)	14.7	(7.0) [*]	1.1	(0.6)	97	(23.5)	126	(33.6)
Low	4.7	(2.8)	16.7	(6.5)	1.0	(0.5)	64	(26.3)	70	(34.7)

* Differences significant at $p < .05$, as indicated by F-tests or t-tests.

[†] Sample sizes vary across quality measures and nurse outcomes because of missing outcomes data.

[‡] "High" and "Low" represent values that are at/above and below the national mean, as determined from LTC Focus data.

[§] RN = registered nurse; LPN = licensed practical nurse; CNA = certified nursing assistant

Table 3.

Effects of the Work Environment Composite Scale and Subscales on Quality Measures, Adjusting for Other Nursing Home Characteristics

Work Environment Measures	Quality Measures								
	Percent of long-stay residents with pressure ulcers (n=222) [†]			Percent of long-stay residents on antipsychotics (n=230)			Number of hospitalizations per resident year (n=244)		
	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>
PES-NWI Composite Scale									
Bivariate	-0.88 *	(-1.61, -0.14)	.02	-1.42 *	(-2.67, -0.18)	.03	-0.05	(-0.15, 0.05)	.32
Adjusted	-0.90 *	(-1.64, -0.17)	.02	-1.10	(-2.32, 0.12)	.08	-0.08 *	(-0.15, -0.001)	.05
PES-NWI Subscales									
Nurse participation in organizational affairs									
Bivariate	-0.59	(-1.34, 0.16)	.12	-1.39 *	(-2.65, -0.13)	.03	-0.01	(-0.11, -0.10)	.92
Adjusted	-0.57	(-1.32, 0.19)	.14	-0.92	(-2.15, 0.32)	.14	-0.03	(-0.11, 0.04)	.39
Nursing foundations for quality of care									
Bivariate	-0.86 *	(-1.60, -0.13)	.02	-1.34 *	(-2.58, -0.11)	.03	-0.06	(-0.16, 0.03)	.20
Adjusted	-0.86 *	(-1.61, -0.12)	.02	-1.01	(-2.23, 0.21)	.11	-0.06	(-0.14, 0.02)	.12
Nurse manager ability, leadership, and support									
Bivariate	-0.78 *	(-1.51, -0.05)	.04	-1.22	(-2.45, 0.01)	.05	-0.03	(-0.13, 0.63)	.48
Adjusted	-0.81 *	(-1.54, -0.08)	.03	-0.96	(-2.16, 0.24)	.12	-0.06	(-0.13, 0.02)	.12
Staffing/resource adequacy									
Bivariate	-0.65	(-1.42, 0.11)	.10	-1.37 *	(-2.65, -0.08)	.04	-0.12 *	(-0.23, -0.02)	.02
Adjusted	-0.72	(-1.50, 0.07)	.07	-1.14	(-2.44, 0.16)	.09	-0.10 *	(-0.18, -0.02)	.01
Collegial nurse-physician relationships									
Bivariate	-1.47 *	(-2.27, -0.66)	<.001	-0.32	(-1.70, -1.07)	.65	-0.14 *	(-0.24, -0.03)	.01
Adjusted	-1.46 *	(-2.26, -0.66)	<.001	-0.28	(-1.63, 1.07)	.69	-0.12 *	(-0.19, -0.04)	.005

* Differences were significant at $p < .05$, as indicated by *z*-scores in bivariate and adjusted linear regression models. β coefficients represent the difference in outcomes between nursing homes with average vs. poor, and good vs. average work environments. Adjusted models control for nursing home ownership type, chain affiliation, Medicare census, Medicaid census, and RN skill mix. Additional covariates vary by outcome, as follows: (1) for pressure ulcers, certified nursing assistant (CNA) staffing was also controlled; (2) for antipsychotics, CNA staffing and presence of Alzheimer's unit were controlled; and (3) for hospitalizations per resident year, average Resource Utilization Group (RUG) score, and an indicator for whether the facility accepts ventilator-dependent patients were controlled. All models, including bivariate models, weight the aggregated nursing home work environment score by the number of respondents per facility using analytic weights, and control for the number of respondents

per facility. The three categories of the composite Practice Environment Scale of the Nursing Work Index (PES–NWI), and the subscales that comprise it, are treated as a linear term; thus, a one unit change represents the difference between average and poor environments, and a two unit change represents the difference between good and poor environments. CI = confidence interval; p = the probability that the coefficients are zero.

[†]Sample sizes vary across outcomes because of missing outcomes data

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Table 4.

Effects of The Work Environment Composite Scale and Subscales on Nurse Job Dissatisfaction and Burnout, after Adjusting for Other Facility Characteristics.

Work Environment Measures	Dissatisfied with job (n=656) †				Burnout (n=577)			
	OR	OR ²	95% CI	p	OR	OR ²	95% CI	p
PES-NWI Composite Scale								
Bivariate	0.31 *	0.10	(0.24, 0.41)	<.001	0.38 *	0.14	(0.29, 0.48)	<.001
Adjusted	0.32 *	0.10	(0.24, 0.42)	<.001	0.35 *	0.12	(0.27, 0.46)	<.001
PES-NWI Subscales								
Nurse participation in organizational affairs								
Bivariate	0.39 *	0.15	(0.30, 0.51)	<.001	0.49 *	0.24	(0.37, 0.63)	<.001
Adjusted	0.39 *	0.15	(0.29, 0.51)	<.001	0.47 *	0.22	(0.36, 0.61)	<.001
Nursing foundations for quality of care								
Bivariate	0.37 *	0.14	(0.29, 0.49)	<.001	0.40 *	0.16	(0.31, 0.51)	<.001
Adjusted	0.38 *	0.15	(0.29, 0.51)	<.001	0.38 *	0.15	(0.29, 0.50)	<.001
Nurse manager ability, leadership, support								
Bivariate	0.40 *	0.16	(0.31, 0.52)	<.001	0.48 *	0.23	(0.38, 0.61)	<.001
Adjusted	0.41 *	0.17	(0.32, 0.53)	<.001	0.47 *	0.22	(0.36, 0.61)	<.001
Staffing/resource adequacy								
Bivariate	0.33 *	0.11	(0.25, 0.44)	<.001	0.40 *	0.16	(0.31, 0.52)	<.001
Adjusted	0.34 *	0.12	(0.25, 0.47)	<.001	0.38 *	0.15	(0.29, 0.51)	<.001
Collegial nurse-physician relationships								
Bivariate	0.55 *	0.30	(0.40, 0.74)	<.001	0.48 *	0.23	(0.37, 0.62)	<.001
Adjusted	0.56 *	0.31	(0.41, 0.77)	<.001	0.48 *	0.23	(0.36, 0.62)	<.001

* Differences significant at $p < .05$. All estimates are from adjusted robust multivariate logistic regression models, in which the 3 categories of the composite Practice Environment Scale of the Nursing Work Index (PES–NWI), and the subscales that comprise it, are treated as a linear term. Thus, odds ratios (OR) indicate the difference in the odds of RNs reporting the two outcomes in nursing homes with good vs. average and average vs. poor work environments, and the odds ratios squared (OR²) represent the difference in the odds of RNs reporting the two outcomes in nursing homes with good vs. poor environments. All models account for clustering within nursing homes, and control for the number of RN respondents per nursing home; nursing home characteristics (ownership type, chain affiliation, Medicare census, Medicaid census, RN skill mix); and RN characteristics (age, sex, race, position, years of experience, native language). CI = confidence interval; p = the probability that the odds ratios are 1.0, which indicates no difference.

† Registered nurse (RN) sample sizes for job dissatisfaction and burnout differ due to the number of RNs with missing data on the two outcomes.