

# Importance of work environments on hospital outcomes in nine countries

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Accepted for publication 10 April 2011

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## Abstract

**Purpose.** To determine the effect of hospital work environments on hospital outcomes across multiple countries.

**Design.** Primary survey data using a common instrument were collected from separate cross sections of 98 116 bedside care nurses practising in 1406 hospitals in 9 countries between 1999 and 2009.

**Main Outcome Measures.** Nurse burnout and job dissatisfaction, patient readiness for hospital discharge and quality of patient care.

**Results.** High nurse burnout was found in hospitals in all countries except Germany, and ranged from roughly a third of nurses to about 60% of nurses in South Korea and Japan. Job dissatisfaction among nurses was close to 20% in most countries and as high as 60% in Japan. Close to half or more of nurses in every country lacked confidence that patients could care for themselves following discharge. Quality-of-care rated as fair or poor varied from 11% in Canada to 68% in South Korea. Between one-quarter and one-third of hospitals in each country were judged to have poor work environments. Working in a hospital with a better work environment was associated with significantly lower odds of nurse burnout and job dissatisfaction and with better quality-of-care outcomes.

**Conclusions.** Poor hospital work environments are common and are associated with negative outcomes for nurses and quality of care. Improving work environments holds promise for nurse retention and better quality of patient care.

**Keywords:** Hospital work environments, nurse burnout, nurse job satisfaction, and quality of care

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Organizational behavior has been identified as an important factor in improving the quality and safety of hospital care [1, 2]. Yet, there are few cross-national studies that compare how organizational features of the hospital work environment impact on patient outcomes.

A substantial body of literature, largely from North America but increasingly from other countries, has been amassed showing that nurse staffing varies substantially across hospitals, and that the variability in staffing has important implications for the recruitment and retention of nurses, the quality of care they deliver and the outcomes they produce for their patients [3–6]. Nurse staffing and nursing skill mix measures, and sometimes physician hospital staffing, tend to be the only organizational variables available in many countries, thus explaining why the existing research literature on staffing is more robust than the study of how other

features of hospital organizations impact patient outcomes. While nurse staffing has been consistently shown to be related to nurse and patient outcomes, our research suggests that nurse staffing might better be thought of as one dimension of a broader organizational factor that, by virtue of being multi-dimensional, is somewhat more difficult to measure—namely, the hospital work environment.

We developed a measure of the hospital work environment through multiple studies of hospitals in the USA over more than a decade [7, 8]. We employed surveys of hospital bedside care nurses as informants of the organizational context of hospital care. Nurses are ideally suited as informants about the features of the organizations where they work because of their proximity to patients and families, their interactions with physicians and other care providers, and their frequent contact with hospital decision-makers [9].

Our intention in developing the Nursing Work Index (NWI) Revised [10] and the associated Practice Environment Scale (PES) [11] was to create an empirical measure of the organizational context of hospital care delivery that was likely to impact on care by all providers.

Research findings in the USA have shown that the PES-NWI composite score and the individual subscales are associated with nurse outcomes such as job-related burnout, job dissatisfaction and the quality of nursing care [4], with patient outcomes such as mortality [8] and with patient perceptions of the quality of care in US hospitals [12, 13]. The effects of the nurse work environment on patient and nurse outcomes using the PES-NWI have been confirmed in a few countries individually, including Australia [14], Canada [15, 16], Iceland [17], Switzerland [18] and the USA [8]. Until now, data were not available to describe and compare the work environments of nurses, as well as patient and nurse outcomes, in many different countries around the world.

In this paper, we use data from nearly 100 000 nurses in nine countries who reported on work environments in over 1400 hospitals to determine the effect of hospital work environments on hospital outcomes. Hospitals in each country were classified according to whether various dimensions of their work environments were consistently poor, mixed or generally better than average, as reported by their bedside nurses. A pronounced and remarkably consistent effect of the work environment was found across countries on all of the nurse and patient outcome measures we considered, which suggests that improving work environments may have an important and wide-ranging impact on many dimensions of hospital performance.

## Methods

This study began as a unique collaborative research project known as the International Hospital Outcomes Study (IHOS) originally involving seven research teams from five countries [the USA, Canada, UK (England and Scotland) and Germany] that used a common protocol in 1999 to collect a broad range of nurse survey data, hospital administrative data and patient outcomes for almost 700 hospitals [19]. A team from New Zealand replicated the study design with an identical nurse survey in 2001 and again in 2004 [20]. The USA study that had originally been conducted in the state of Pennsylvania in 1999 was replicated and expanded in 2006 to include all hospitals in four large states accounting for 25% of hospitalizations in the country. In that same year, the study was replicated in Japan [21], and over the next 3 years it was replicated in Thailand (2007), South Korea (2008–09) and China (2009). In this report, we compare results across these nine countries, using the data from the more recent year for the two countries (the USA and New Zealand) that surveyed hospitals and nurses twice. The survey instruments, which in the parent study were written in English, were translated into the languages of the different countries in which English was not the primary language spoken. They were then back translated by separate

translators into English, and ultimately each country's research team ensured that the resultant language and content were relevant to nurses in their country. After comparing and reconciling the original and back-translated versions of the instruments, they were pilot-tested to assess the need for further revisions. As noted elsewhere, most of these revisions were minor [22].

Nurses were sampled primarily to allow researchers to assess the patient care environment in a significant number of general adult acute care hospitals in each country. The sampling of hospitals differed across countries due to differences in the number and types of hospitals and the availability of detailed information on patient outcomes that was a major focus of the International Hospital Outcomes Study. In the USA, all hospitals in the states of Pennsylvania, California, Florida and New Jersey were studied. In Canada, all hospitals in the three provinces of Ontario, Alberta and British Columbia were included. In the UK, all hospital trusts in Scotland were targeted. Because of the large number of hospitals in England and Germany (and the need for risk-adjusted mortality data for the IHOS), study hospitals in these countries were randomly selected from a sample of hospitals stratified by region from the rolls of commercial health outcomes benchmarking organizations. In New Zealand, all general public hospitals were studied. In Japan, a convenience sample with broad geographic representation was accrued into the sample based on whether directors of nursing consented to participate. In Thailand, a stratified sample of government regional and general hospitals was targeted to include hospitals from the four major geographic regions. In South Korea, a stratified-random sample of hospitals was selected, after grouping hospitals according to their size and region. Stratification was also used in China to assure representation of different regions of the country and was limited to larger level 2 and 3 hospitals; within regions convenience samples of hospitals were selected conditional on consent. In this analysis, data are from six of nine regions in China that had completed data collection.

The sampling of nurses in hospitals also differed across countries. In the USA, between one-third and one-half of all licensed registered nurses living in the four states were randomly sampled from licensure lists. In the Alberta province of Canada, a complete census of registered nurses working in hospitals was undertaken. Representative samples were drawn of nurses employed in all acute care hospitals in the Ontario and British Columbia provinces of Canada, and in Scotland as well. In England, Germany and New Zealand nurses at target hospitals were approached at their employing hospitals and sampled from hospital employment records. In Japan and Thailand, all nurses within the targeted hospitals were invited to participate. In China, between three and seven typical medical and surgical and intensive care units were selected for study and in South Korea, units were randomly selected and all nurses on the targeted units were invited to participate. In those countries where surveys were distributed at nurses' places of employment, the completed surveys were deposited in sealed envelopes to a locked box on each unit and returned unopened to the research team. Response rates

ranged from 27% in New Zealand to 84% in Japan and 98% in China. Evidence provided by the different research teams suggests that in most countries we have reasonable and representative samples of hospital nurses, though this may be somewhat less true in Japan than elsewhere since in that country a convenience sample of hospitals was selected.

The work environment in each hospital was assessed using the 28-item PES of the NWI [11], a tool that has been well validated in the USA and a substantial number of other countries as well [23]. The five subscales in the PES-NWI include (i) staffing-resource adequacy (four items), (ii) nurse manager ability and leadership (four items), (iii) nurse-physician relations (three items), (iv) nurse participation in hospital affairs (eight items) and (v) nursing foundations for quality of care (nine items). Nurses were asked to indicate the extent to which they agreed that each feature was present in their current jobs on a 4-point scale ranging from 'strongly disagree' (coded 1) to 'strongly agree' (coded 4). The mean score for all items in every subscale was calculated for each nurse and then averaged across all nurses reporting from every hospital. These subscales appeared to be defensible and to have desirable psychometric properties, since the reliability coefficient (Cronbach's alpha) for all subscales in all countries exceeded 0.70, and for the one exception (the 'nurse manager ability and leadership' subscale in Thailand) it was 0.67. Analyses were confined to nurses in hospitals from which at least 10 nurses provided responses. This criterion is based on our previous work with the USA data sets that showed that 10 or more nurses were sufficient to provide reliable estimates of the organizational characteristics of hospitals [4]. Because working conditions and the interpretation of the items were likely to vary systematically across countries, medians for each subscale were then calculated for all hospitals in the same country. A summary work environment measure was constructed by counting the number of subscales on which each hospital scored above the median. Hospitals in each country with scores below that country's median on 4 or 5 subscales were categorized as having 'poor' work environments, hospitals that were above average on 4 or 5 subscales were considered to have 'better' environments and hospitals with 'mixed' environments were those with 2 or 3 subscales above average (and 2 or 3 below average).

Four outcome variables reported by nurses were examined: two relate to nurse outcomes and two involve nurses' assessments of quality of care in their hospitals. Nurse burnout was measured using the emotional exhaustion subscale of the Maslach Burnout Inventory, a well-researched standardized tool with excellent psychometric properties [24, 25]. Nurses with a total score of 27 or above on this 9-item subscale exceeded norms for health-care workers published by Maslach and Jackson were considered to have 'high' burnout. Nurse job dissatisfaction was measured by distinguishing nurses who reported being 'very dissatisfied' or 'moderately dissatisfied' with nurses who were 'somewhat satisfied' or 'very satisfied' with their current jobs.

Quality of care was measured by nurses' assessments of whether they were only 'somewhat confident' or 'not at all confident' as opposed to 'very confident' that their patients

were prepared to care for themselves at the time of discharge, and whether nurses rated the care on their units over the past year as being of 'fair' or 'poor' quality, as opposed to 'good' or 'excellent.'

The results below describe the numbers of hospitals and nurses in the samples from each country and information on selected characteristics of the nurses, including their education, work status and experience in nursing. The distributions of work environment subscales for the hospitals in each country are presented, as well as results of classifying hospitals using the summary work environment measure described above. The percentages of nurses reporting each of the negative outcomes, overall and then by the type of work environment (worst, mixed, better) within each country were calculated. Then, the effects of the work environment on each outcome in the different countries are estimated, using models that take account of differences across hospitals in nurse personal characteristics and also adjust for the clustering of nurses within hospitals. The effect of the work environment on the odds of nurses reporting poor outcomes were calculated using logistic regression models with Huber-White (sandwich) robust standard-error estimation procedures, with hospital as the clustering variable. Analyses were conducted using Stata Version 8.0 using a  $P < 0.05$  statistical significance level.

## Results

Table 1 shows the numbers of hospitals and nurses in each of the different countries in the study, as well as the average number of nurses per hospital. There were decidedly larger samples of hospitals in the USA ( $n = 762$ ) and Canada ( $n = 293$ ) than in the other countries, where the samples of hospitals ranged from 19 (in Japan) to 121 (in China). The mean

**Table 1** Numbers of hospitals and nurses in the study, by country

Country	Hospitals	Nurses	Nurses per hospital	
			Mean	Median
USA (2006)	762	39 148	51	36
China (2009)	121	6571	54	52
South Korea (2008)	59	4904	83	66
Thailand (2007)	39	8222	211	181
Japan (2006)	19	5956	313	283
New Zealand (2004)	26	3944	152	116
UK (1999)	60	9851	164	139
Canada (1999)	293	16 844	57	38
Germany (1999)	27	2676	99	89
Total	1406	98 116		

*Note.* The numbers of hospitals and nurses are for those hospitals in each country from which there were 10 or more nurse respondents to our surveys.

**Table 2** Nurse characteristics and reports of job satisfaction and quality of care in nine countries

	USA (2006)	China (2009)	South Korea (2008)	Thailand (2007)	Japan (2006)	New Zealand (2004)	UK (1999)	Canada (1999)	Germany (1999)
Staff nurse vs. other title (%)	79.2	100.0	90.7	89.9	92.3	78.9	81.2	98.1	81.9
University graduate (%)	44.5	20.1	43.7	87.7	17.0	47.4	10.7	14.6	15.5
Part time (%)	51.1	0.0	0.5	0.6	3.6	50.1	31.2	56.6	28.2
Non-permanent (%)	7.1	53.5	3.9	0.3	0.0	7.3	2.4	2.9	7.4
Male (%)	6.8	1.1	4.8	1.8	4.0	6.5	8.1	2.5	15.4
Years of experience in nursing (mean $\pm$ SD)	15.1 $\pm$ 13.2	8.0 $\pm$ 7.3	5.8 $\pm$ 5.5	9.2 $\pm$ 6.7	7.3 $\pm$ 7.2	16.7 $\pm$ 10.7	10.9 $\pm$ 8.4	17.7 $\pm$ 9.2	12.5 $\pm$ 8.9
Nurse self-reports (%)									
High burnout level	33	39	60	42	58	34	33	35	15
Dissatisfied with current job	22	46	36	27	60	33	37	33	17
Nurse-rated quality of care (%)									
Not confident patients ready for discharge	45	48	78	48	85	47	42	70	19
Unit quality-of-care fair or poor	16	30	68	19	60	12	14	11	20

number of nurse respondents in the study hospitals was substantial, ranging from 51 nurses per hospital in the USA to 313 nurses per hospital in Japan.

Table 2 displays the characteristics and outcomes of the surveyed nurses. Most nurses in all countries were staff nurses (as opposed to nurses in managerial positions). The percentages of nurses who were university graduates ranged from 11% in the UK to 88% in Thailand, while the percentage of nurses who were employed part time was nil in China but >50% in the USA, New Zealand and Canada. Nurses in non-permanent positions were relatively rare in most countries. China is an exception where more than half of all hospital nurses did not have permanent positions, but non-permanent nurses are generally indistinguishable from permanent nurses in that country except for contract details. The percentage of nurses that were male was higher in Germany (15%) and lower in China (1%) than in the other countries, and the average years of experience was highest in Canada (18 years) and lowest in South Korea (6 years).

The bottom four rows of Table 2 compare nurse-reported outcomes across the nine countries. The percentage of nurses reporting high burnout was over a third in most countries and decidedly higher in South Korea and Japan (near 60% in both countries) than elsewhere. Germany was an outlier with only 15% of nurses reporting high burnout.

Job dissatisfaction varied from 17% in Germany to around a third of nurses in most countries and a high of 60% dissatisfied in Japan. Almost half of nurses in all countries, except in Germany, and many more than half of the nurses in a few of the countries, lacked confidence that patients could manage their care after discharge. South Korean and Japanese nurses were more likely than other nurses to report that the quality of patient care on their unit was only fair or poor (as opposed to good or excellent). Unit quality was judged to be fair or poor by only 11% of nurses in Canada compared with a high of 60 and 65% in Japan and South Korea, respectively.

While the variability in these nurse outcomes and nurse assessments of quality of patient care across countries is notable, what is of most interest is how much these outcomes and assessments vary across hospitals within countries, and whether and to what extent the variability is a function of differences across hospitals in terms of their work environment. Table 3 shows that each of the patient care environment scales ranges considerably across hospitals in each country, and the average values range considerably across countries as well. Moreover, Table 3 provides indirect evidence that these different subscales are related in each country, since the percentage of hospitals that are above average on at least 4 of the 5 subscales (i.e. the 'better' hospitals) or below average on at

**Table 3** Distributions of work environments for 1406 hospitals in 9 countries

Scores on NWI/PES scales	USA (2006)	China (2009)	South Korea (2008)	Thailand (2007)	Japan (2006)	New Zealand (2004)	UK (1999)	Canada (1999)	Germany (1999)
Staffing-resource adequacy									
Range	1.6–3.6	2.5–3.7	1.7–2.7	2.4–3.1	1.8–2.3	1.9–2.7	1.9–2.6	1.3–3.2	2.0–2.9
Median	2.5	3.1	1.9	2.7	2.1	2.4	2.2	2.2	2.3
Nurse manager ability and leadership									
Range	1.7–3.6	2.8–3.8	2.1–2.8	2.6–3.0	2.2–2.9	2.5–3.1	2.4–3.1	1.3–3.7	2.2–2.9
Median	2.6	3.4	2.5	2.8	2.6	2.7	2.7	2.4	2.6
Nurse–physician relations									
Range	2.2–3.8	2.9–3.9	2.3–3.0	2.9–3.4	2.3–2.7	2.8–3.2	2.7–3.1	1.8–3.6	2.6–3.1
Median	2.9	3.5	2.5	3.1	2.5	3.1	2.9	2.8	2.9
Nurse participation in hospital affairs									
Range	1.7–3.5	2.5–3.6	1.9–2.6	2.6–3.0	2.1–2.6	2.1–2.7	2.0–2.5	1.7–3.2	2.2–2.8
Median	2.6	3.2	2.3	2.8	2.5	2.5	2.2	2.3	2.5
Foundations for quality of care									
Range	2.2–3.6	3.0–3.7	2.0–2.9	2.7–3.2	2.6–3.0	2.6–3.2	2.7–3.1	2.0–3.5	2.6–3.2
Median	3	3.4	2.4	2.9	2.8	2.9	3	2.7	2.8
Overall classification of work environment									
Poor (0 or 1 NWI-PES scores above national median)	269 (35.3)	53 (43.8)	17 (28.8)	12 (30.8)	5 (26.3)	8 (30.8)	17 (28.3)	92 (31.4)	8 (29.6)
Mixed (2 or 3 scores above national median)	210 (27.6)	13 (10.7)	25 (42.4)	13 (33.3)	7 (36.8)	9 (34.6)	23 (38.3)	103 (35.2)	10 (37.0)
Better (4 or 5 scores above national median)	283 (37.1)	55 (45.5)	17 (28.8)	14 (35.9)	7 (36.8)	9 (34.6)	20 (33.3)	98 (33.5)	9 (33.3)

**Table 4** Percentages of nurses reporting negative outcomes and poor quality of care by quality of work environments in hospitals and country (N = 98 116 nurses in 1406 hospitals)

Country	High burnout			Job dissatisfaction			Not confident patients prepared for discharge			Quality of unit poor/fair		
	Work environment			Work environment			Work environment			Work environment		
	Poor	Mixed	Better	Poor	Mixed	Better	Poor	Mixed	Better	Poor	Mixed	Better
USA (2006)	39.6	35	27.5	30.4	24.7	15.9	54.1	45.8	39.5	24.1	16.2	9.6
China (2009)	42.7	38.4	35.1	55.1	47.4	37.2	51.7	50.4	43.4	34.6	28.3	26.7
South Korea (2008)	64.6	61.1	56.9	50.5	37.7	25.5	85.3	80.6	70.9	82.8	73.2	53.1
Thailand (2007)	43.1	40.1	41.5	27.2	26.6	27.6	50.6	51.4	42.3	19.9	21.0	17.3
Japan (2006)	62.3	52.9	58.6	66.3	56.7	58.8	84.7	88.3	82.8	67.7	57.3	57.4
New Zealand (2004)	37.1	35.9	28.7	35.8	35.2	27.6	48.1	46.5	43.8	13.4	11.3	9.2
UK (1999)	36.8	33.5	29.5	42.2	38.3	33.3	46.7	40.8	40.2	16.7	15.1	10.3
Canada (1999)	42.7	35.6	28.5	39.2	32.8	27.1	74.9	70.9	65.1	14.1	11.2	6.5
Germany (1999)	17.0	18.1	10.9	22.4	18.4	12.9	22.6	20.7	15.1	26.0	20.2	16.5

least 4 of the 5 subscales, i.e. the 'poor' hospitals) both exceed the percentage we would expect (18.75%) if the subscale scores were independent of one another across hospitals in each country. That is, if the different subscales were independent of one another (and given that half the hospitals are above average on each subscale), we would expect 1 out of every 32 hospitals to be above average on all 5 subscales, we would expect 5 in 32 to be above average on 4 of the 5, and  $5 + 1 = 6$  in 32 (or 18.75%) to be above average on at least 4 of the 5 subscales. And we would expect the same percentage to be below average on at least 4 of the 5 subscales. Notably, between one-quarter and one-third of hospitals in each country were judged to have poor work environments, with China having 44% of its hospitals scoring in the poor category, and similarly high percentages were found to have better work environments. Furthermore, as Table 4 shows, in all countries hospitals with 'better' work environments tend, in most cases, to have smaller percentages of nurses reporting negative outcomes (high nurse burnout, job dissatisfaction, not confident patients are prepared for discharge, quality-of-care rated fair or poor) than hospitals with 'mixed' work environments, that in turn tend to have smaller percentages of nurses reporting negative outcomes than hospitals with 'poor' work environments. While the percentage of nurses reporting negative outcomes does not decline monotonically for all outcomes in every country, some of the departures in the observed percentages from what we would expect may be due to the fact that these percentages reflect gross or unadjusted differences that do not take account of differences across hospitals with better and poorer environments in the characteristics of the nurses reporting the outcomes.

Table 5 takes these analyses a step further by presenting the results of logistic regression models, fitted separately to the data for each country, which estimate the effect of the nurse work environment on the odds of nurses reporting the four negative outcomes, after controlling for differences across hospitals in nurse characteristics that might affect reporting [i.e. nurse specialty, staff nurse designation, nursing

education, years of experience in nursing, part-time status, non-permanent status (except in Japan) and gender] and after adjusting for the clustering of nurses within hospitals. In these models, we treat the three-category work environments variable as ordered and linear in its effect, so the estimated odds ratios reflecting the difference between hospitals with 'mixed' vs. 'poor' environments are the same as that of the difference between hospitals with 'better' vs. 'mixed' environments, and the estimated odds ratio indicating the difference between 'better' vs. 'poor' hospitals is equal to that associated with the difference between 'better' vs. 'mixed' hospitals squared.

Employment in a hospital with a better work environment (as opposed to a poor one) was associated with decreases in the odds of reporting high burnout across the nine countries, by factors ranging from 0.54 to 0.94, and in all but two cases these associations were statistically significant at the  $P < 0.05$  level. Employment in a hospital with a better work environment as opposed to a poor one was also associated with significant decreases in the odds of reporting job dissatisfaction in eight of the nine countries (all but Thailand), by factors ranging from 0.33 to 0.72, though in Japan the decrease was only marginally significant (or significant at the 0.10 level). Better work environments were also associated with decreases in reports of little or no confidence in discharge readiness and poor or fair quality of care in all countries, and these differences too were significant, or very nearly so, in virtually all countries. The few instances in which significant results were not obtained involved countries with smaller numbers of hospitals, and all results, except in Japan where no effect of the work environment on job dissatisfaction was found, were in the expected direction. While in general the effects of the work environment on the outcomes appear somewhat less pronounced in Thailand and Japan than elsewhere, which might suggest a cultural difference in the effect of this nursing factor, or in its measurement, it does not appear to be pervasive across the Asian countries. On some of these outcomes, the effect of the work environment is as

**Table 5** Odds ratios indicating the differences in nurses reporting negative job outcomes and poor quality of care across hospitals with mixed vs. poor work environments and better vs. poor work environments, in nine countries

Country	Hospital contrast	Outcome			
		High burnout	Job dissatisfaction	Low confidence in discharge readiness	Low-unit quality
USA (2006)	Mixed vs. poor	0.75 (0.71–0.78)***	0.65 (0.62–0.68)***	0.74 (0.70–0.78)***	0.59 (0.56–0.63)***
	Better vs. poor	0.56 (0.51–0.61)***	0.42 (0.38–0.46)***	0.55 (0.49–0.61)***	0.35 (0.31–0.40)***
China (2009)	Mixed vs. poor	0.85 (0.77–0.93)***	0.70 (0.64–0.77)***	0.85 (0.78–0.93)***	0.82 (0.74–0.91)***
	Better vs. poor	0.72 (0.59–0.87)***	0.49 (0.41–0.59)***	0.73 (0.61–0.87)***	0.67 (0.55–0.83)***
South Korea (2008)	Mixed vs. poor	0.82 (0.73–0.92)***	0.58 (0.48–0.70)***	0.66 (0.55–0.78)***	0.50 (0.38–0.65)***
	Better vs. poor	0.67 (0.53–0.84)***	0.33 (0.23–0.49)***	0.43 (0.30–0.61)***	0.25 (0.15–0.43)***
Thailand (2007)	Mixed vs. poor	0.97 (0.90–1.05)	1.00 (0.83–1.20)	0.85 (0.75–0.95)**	0.91 (0.78–1.06)
	Better vs. poor	0.94 (0.80–1.11)	1.00 (0.69–1.44)	0.72 (0.57–0.91)**	0.82 (0.60–1.12)
Japan (2006)	Mixed vs. poor	0.94 (0.78–1.15)	0.85 (0.71–1.01)+	0.85 (0.69–1.05)	0.78 (0.66–0.93)**
	Better vs. poor	0.89 (0.60–1.31)	0.72 (0.51–1.02)+	0.72 (0.47–1.11)	0.62 (0.44–0.86)**
New Zealand (2004)	Mixed vs. poor	0.82 (0.73–0.92)***	0.83 (0.75–0.91)***	0.90 (0.80–1.01)+	0.80 (0.63–1.03)+
	Better vs. poor	0.67 (0.53–0.85)***	0.68 (0.56–0.83)***	0.81 (0.65–1.01)+	0.64 (0.39–1.06)+
UK (1999)	Mixed vs. poor	0.82 (0.74–0.90)***	0.81 (0.75–0.88)***	0.90 (0.82–1.00)*	0.74 (0.65–0.85)***
	Better vs. poor	0.67 (0.55–0.82)***	0.66 (0.56–0.77)***	0.82 (0.67–1.00)*	0.55 (0.42–0.72)***
Canada (1999)	Mixed vs. poor	0.75 (0.71–0.79)***	0.78 (0.72–0.83)***	0.79 (0.73–0.87)***	0.67 (0.62–0.73)***
	Better vs. poor	0.56 (0.50–0.63)***	0.60 (0.52–0.69)***	0.63 (0.53–0.75)***	0.45 (0.39–0.53)***
Germany (1999)	Mixed vs. poor	0.73 (0.61–0.88)***	0.69 (0.58–0.81)***	0.78 (0.59–1.04)+	0.72 (0.58–0.89)**
	Better vs. poor	0.54 (0.38–0.77)***	0.47 (0.34–0.66)***	0.61 (0.34–1.07)+	0.52 (0.34–0.79)**

Notes: Calculated from robust models controlling for nurse characteristics and clustering of nurses within hospitals. Nurse characteristics are nurse specialty, staff nurse title, degree holder, years of experience in nursing, part-time status, non-permanent status (except in Japan), and gender.

+ $P < 0.10$ , \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

pronounced in South Korea and China as in the non-Asian countries, and sometimes more pronounced.

## Discussion

Our paper provides a snapshot of the organizational context and quality of hospital care in nine countries, including four countries in Asia. In most of the countries studied, a third or more of hospital nurses were dissatisfied with their jobs. Nurse burnout is high in almost all countries with over a third or more of bedside care nurses scoring in the high burnout range. Besides presenting challenges for nurse retention, high burnout rates results in risks to patient safety and care quality [26], and high nurse burnout has been found to be associated with lower patient satisfaction with care [12, 13]. How well nurses are faring in their jobs has been found to be a barometer of how well patients in those same hospitals are faring [27]. In all countries, more than 1 in 10 nurses report that care is either fair or poor, and in 3 of 4 Asian countries studied, nurses' ratings of fair/poor care are much more frequent. Almost half or more than half of nurses in all countries except Germany are concerned about their patients' ability to care for themselves following discharge, a measure that suggests the possibility of other quality deficits.

We found considerable variability in the quality of the work environment across the nine countries and within each country, as measured by all five of the subscales. The low average values and the ranges in values across hospitals that in most countries fail to exceed 3.0 (which would indicate a majority of nurses believing that dimension of the work environment to be present) indicate that many of these elements were not present in most or all of the hospitals in many of the countries. In each country, between 26 and 44% of hospitals were judged by nurses to have poor work environments.

Hospitals with consistently better work environments had lower burnout, lower likelihoods of having nurses who were dissatisfied with their jobs and who thought that the quality of care on their unit was only fair or poor and higher likelihoods of having nurses report that their patients were ready for discharge. This was true across virtually all of the countries despite different health-care systems and cultures.

Our findings also point to specific areas that hospital leaders and policy-makers can target in efforts to preserve the nurse workforce and improve quality and safety of care, namely improved staffing, better nurse and physician relations, more involvement of nurses in hospital decisions and greater managerial support of those who provide clinical care at the bedside. Results here indicate that given the current state of mediocrity in hospital work environments internationally, increased attention to improving work environments might be associated with substantial gains in

stabilizing the global nurse workforce while also improving quality of hospital care throughout the world.

## Acknowledgements

The authors thank the many investigators who made this paper possible, especially Timothy Cheney, Carole Estabrooks, Judith Shamian, Anne Marie Rafferty, Reinhard Busse, Wanida Wanant, Heather Clarke and Jennifer Hunt.

## Funding

This research was supported in part by the National Institute of Nursing Research, National Institutes of Health [grant numbers R01NR04513, P30NR05043] the University of Pennsylvania School of Nursing Office of Global Affairs; the China Medical Board; the National Research Foundation of Korea (NRF) grant funded by the Korea government (MEST) [grant number 2009-0068921]; the University of Auckland's staff fund; Rho Pi Chapter, Thailand, Sigma Theta Tau International; Nurses' Association of Thailand; the International Research Grant (principal investigator Masako Kanai-Pak) by Pfizer Health Research Foundation.

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