



HEALTH POLICY AND SYSTEMS

Nurse-Physician Relationships in Ambulatory Oncology Settings

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Key words

Physician-nurse relations, ambulatory care, oncology nursing

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Accepted June 23, 2012

doi: 10.1111/j.1547-5069.2012.01458.x

Abstract

Purpose: The purpose of this study was to explore nurses' perceptions of nurse-physician relationships in ambulatory oncology settings, which are linked to patient safety.

Design: This cross-sectional, descriptive study analyzed survey data collected in 2010 from oncology nurses employed in ambulatory settings. The sampling frame was the nurse licensure database in one state in the Southeastern United States. Nurses completed the Practice Environment Scale of the Nursing Work Index (PES-NWI), reported on the quality of care in their setting, and commented on factors that promoted or inhibited high-quality care delivery.

Methods: Data analysis used three study variables: empirically derived values from the PES-NWI, a scale of nurse-reported quality of care in their setting, and open-text comments about features in their workplace that promoted or hindered high-quality care. After categorizing open-text comments, analysis of variance was used to evaluate differences in PES-NWI subscales by comment category. Chi-square test statistics were calculated to examine differences in overall practice environment and quality of care by comment category.

Results: Nurses reported their relationships with physicians as generally favorable. Qualitative findings suggest two themes that influence how nurses characterize their working relationships with physicians: (a) physician behaviors and (b) structural factors. Both PES-NWI scores and quality of care were rated significantly higher by nurses who wrote favorably about physicians.

Conclusions: Favorable nurse-physician relationships in ambulatory settings may reflect positive workplaces and promote high-quality care.

Clinical Relevance: Consistent with findings from inpatient units, nurse-physician relationships are important to the quality of ambulatory oncology care. Systematic measurement and attention to reported deficits in these relationships may promote higher quality care.

Ambulatory oncology centers deliver the majority of cancer care in the United States, yet very little is known about their organization, which includes relationships between clinicians that are necessary for delivering patient care. Understanding how ambulatory care settings are organized is important because patient safety threats are heightened in ambulatory oncology, where nearly 20 million doses of potentially toxic chemotherapy are delivered annually. In the acute care setting, organizational factors have been linked to patient safety threats

and include the effect of nurse staffing on outcomes and the influence of interdisciplinary communication on outcomes (Friese, Lake, Aiken, Silber, & Sochalski, 2008; Manojlovich, Antonakos, & Ronis, 2009; Shekelle et al., 2011). Interdisciplinary communication, specifically communication between physicians and nurses, is relevant to the organization of care delivery since communication issues may be one of the primary obstacles to systemic and sustainable patient safety improvements (Leape & Berwick, 2005). The closely related concept of

interdisciplinary teamwork, which includes high-quality communication, has also been correlated with improved clinical performance in inpatient settings (Reid Ponte, Gross, Milliman-Richard, & Lacey, 2010).

The relationship between organization and nurse-physician relationships, defined as the teamwork, communication, and collaborative relationships desired by clinicians, is practically unknown in ambulatory care settings (Schmalenberg & Kramer, 2009). A key obstacle to improved patient safety, poor nurse-physician relationships may result in incorrect care, complications, and additional costly healthcare utilization. A clearer understanding of the challenges to nurse-physician relationships in ambulatory care settings can inform quality improvement efforts through the alignment of organizational structures and processes.

Hospital-based studies of nurse-physician relationships have occasionally involved multiple sites but focused on one specialty: intensive care, the operating room, or labor and delivery (Manojlovich, 2010). We did not find studies that examined nurse-physician relationships in multiple ambulatory care settings (oncology or otherwise), where practice dynamics may vary widely. Communication patterns, teamwork, and collaboration in ambulatory care might all be very distinct from hospital settings, but differences have not been explored. We took advantage of data obtained from a survey of nurses to better understand the structural configurations associated with nurse-physician relationships that may enhance performance in the high-volume, high-risk setting of ambulatory oncology. The purpose of this study was to explore nurses' perceptions of nurse-physician relationships in ambulatory oncology settings.

Methods

This study used a descriptive design to conduct a secondary analysis of both qualitative and quantitative data to address three research questions: (a) how do ambulatory care nurses characterize their working relationships with physicians, (b) how do nurses' characterizations of their working relationships with physicians influence their perceptions of their practice environment, and (c) do those characterizations correlate with perceived quality of care?

Data Source and Collection Procedures

The data from this study derive from the Practice Environments of Oncology Nurses Study, a survey of ambulatory oncology nurses (Friese, 2012; Friese, Himes-Ferris, Frasier, McCullagh, & Griggs, 2011). The survey methodology has been published previously (Friese, Lee,

O'Brien, & Crawford, 2010). Briefly, using a sampling frame from one Southeastern state's nursing licensure data, we invited 1,339 registered and licensed practical nurses who practiced oncology nursing outside of inpatient nursing units to complete a 12-page survey that queried them on the structure, process, and outcomes in their practice. Respondents received a \$2 up-front incentive, and a modified version of the Tailored Design Method was used (Dillman, 2007). Both open-text comments and two empirical measures were included in the questionnaire and are detailed below.

Qualitative Methods

Qualitative data came from open-text comments on the survey. Nurses were asked two questions: "What are the favorable aspects of your practice environment that enable you to deliver high-quality care?" and "What are the unfavorable aspects of your practice environment that diminish your ability to deliver high-quality care?" Open-text boxes allowed the input of 250 characters (approximately 40 words) for each question. Of the 417 survey respondents, 345 completed the Practice Environment Scale of the Nursing Work Index (PES-NWI) survey so that we were able to compare quantitative results from the PES-NWI with qualitative open-text comments about favorable and unfavorable aspects of the practice environment. We entered comments into a Microsoft Excel (Microsoft, Seattle, WA, USA) spreadsheet. Two reviewers (C.F. and M.M.) independently identified comments that described favorable and unfavorable nurse-physician relationships. Second, the reviewers conducted independent thematic analysis of nurse perceptions of their relationships with physicians and developed themes from both sets of comments. We used a consensus approach over three meetings to resolve discrepancies in both identification and thematic development. The following procedures were used to increase trustworthiness of the qualitative findings, a concept used to assess rigor of qualitative research: credibility was strengthened by deriving research questions from findings obtained in prior focus groups and cognitive interviews; transferability was supported through the multisite sampling approach and reminders and incentives to increase the response rate; confirmability of findings was assured through independent comment coding coupled with triangulation of previously validated empirical measures (Shenton & Dixon, 2004).

Quantitative Methods

The PES-NWI was used to measure nurse perceptions of their practice environments. The PES-NWI is a 31-item

instrument and consists of five subscales: nurse participation in hospital affairs; nursing foundations for quality care; nurse manager ability, leadership, and support of nurses; staffing and resource adequacy; and collegial nurse-physician relations (Lake, 2002). While the original tool uses a 4-point Likert scale (*strongly agree* to *strongly disagree*), this survey added a fifth neutral point. Items within each subscale were summed and averaged. Construct validity has been established (Lake, 2002). Researchers have scored the PES-NWI in two primary ways. An overall score is achieved by taking the mean of the five subscale scores, which gives equal weight to each subscale. Using this method, reliabilities of 0.93 and 0.95 have been reported when the PES-NWI was used in acute care settings (Manojlovich, 2005; Manojlovich et al., 2009). In another method, scores on the PES-NWI can be collapsed into three categories and characterized as favorable, unfavorable, and mixed work environments, based on the number of subscales that meet or exceed the midpoint value (Lake & Frieze, 2006). We used both methods of calculating PES-NWI scores to yield as much information as possible, given the paucity of information on the relationship between nurse-physician relationships and ambulatory care work environments. In a previous analysis of data from the same survey sample, reliability of the PES-NWI subscales ranged from 0.80 to 0.90 (Frieze, 2012).

Finally, perceived quality of care was measured using a scale reported by previous researchers (Aiken et al., 2001). Nurses were asked to rate the overall quality of care provided by the facility on a 4-point Likert scale, where 1 = poor, 2 = fair, 3 = good, and 4 = excellent.

Results

Qualitative Findings

To answer the first research question, "How do ambulatory care nurses characterize their working relationships with physicians?" we analyzed open-text comments provided by the nurses. After surveys with missing items on the PES-NWI were excluded, a total of 345 surveys were available for analysis. Of these, 214 respondents made no open-text comments (62%), 126 provided favorable comments (36.5%), and 31 (8.9%) provided unfavorable comments about their working relationships with physicians. Six respondents provided both favorable and unfavorable comments, which precluded us from discrete categorization of their responses. These observations were removed from analysis. Initial independent coding yielded 90% agreement for favorable comments and 77% agreement for unfavorable comments, but we were able to achieve 100% agreement after one consensus meeting.

After initial coding, six distinct themes emerged from the favorable comments: (a) accessibility and availability of physicians, (b) physician characteristics (i.e., caring, compassionate, providing high-quality care), (c) good communication and relationships, (d) physician support of nurses, (e) teamwork, and (f) respect-autonomy-trust of nurses. Unfavorable comments were grouped into five distinct themes initially: (a) physician schedules too busy and too idiosyncratic, (b) lack of accessibility, (c) poor communication, (d) lack of trust-value-support of nurses, and (e) poor physician performance (related to either behaviors or operational issues).

After initial coding (as described above) was completed, we identified 11 additional comments (5 favorable and 6 unfavorable) that did not correspond to a distinct theme, but reflected issues pertaining to organizational structure. Examples included comments about policy implementation, financial aspects of care delivery, practice size, and degree of specialization. For example, one respondent stated, "We also have six other specialty clinics (e.g., cardiology...). It can be overwhelming when 3–4 different specialties are there at the same time."

This identification of a theme pertaining to organizational structure led to a third coding iteration and reconsideration of the existing themes. We recognized that the six favorable and five unfavorable themes could be distilled further into four summative themes: favorable structure, favorable behavior, unfavorable structure, and unfavorable behavior. **Table 1** shows the four summative themes separated by structure and behavior, with exemplar comments for favorable and unfavorable reports. These comments were transcribed verbatim.

Quantitative Findings

In general, nurses reported favorable perceptions of their practice environment and excellent perceived quality of care. The mean values (and standard deviations) for the five PES-NWI subscales were as follows: Nursing foundations for quality of care: 3.87 (0.57); Nursing participation in practice affairs: 3.18 (0.79); Nurse manager ability, leadership, and support: 3.56 (0.91); Staffing and resource adequacy: 3.51 (0.78); and Collegial nurse-physician relations: 4.03 (0.75). As we included a fifth neutral category to the PES-NWI, the theoretical midpoint for subscales in this study is 3.0. While nurses endorsed the presence of professional practice environment elements in their settings, a notable subset of nurses did report unfavorable perceptions across all the subscales. Of the subscales, nurse participation in practice affairs was scored the lowest. The majority (74.2%) of those surveyed reported excellent overall perceived quality of care

Table 1. Examples of Nurse Comments by Thematic Categories

	Theme	Favorable comment example	Unfavorable comment example
Structure	Accessibility and availability of physicians	"I always have an oncologist with me at all times." "MDs readily available for consult."	"Lack of availability of appointments on physician's schedules, resulting in increased time away from patient care to focus on scheduling."
	Physician schedules	"MD in dept all day and patients can be seen daily if necessary."	"Physicians are not held accountable to adhere to patient appointments. They just say 'you will treat this patient' even though all appt's are booked or infusion room too busy to take that day. Also MDs often delay entering orders for chemo."
Behavior	Communication and relationships	"Excellent communication between nursing, physician extenders & physicians."	"Difficult to get answers for pts. from a few of the doctors."
	Support	"Support from management & physicians."	"Lack of support from management supporting nurses against physicians."
	Teamwork	"Teamwork, collegial environment between all levels of staff."	"Provider 'feels' intimidated and looks upon you as if you're trying to be the doctor."
	Respect, autonomy, and trust of nurses	"Independence and respect from physicians/physician extenders that I am knowledgeable and a valued member of the health care team."	"Lack of trust in the knowledge of the nurses by the physicians to assist in decision making over patient's needs (i.e., anti-emetics, treatment for side effects)."
	Physician characteristics	"Conscientious, caring physicians."	"Doctors who are rude or difficult."
	Physician performance	"The physician I work with provides excellent patient care and is thorough."	"Uncaring behavior from some medical personnel."

provided by the facility, followed by 21.2% as good and 1.15% as fair.

Combined Qualitative and Quantitative Findings

Qualitative and quantitative methods were combined to answer the second research question, "How do nurses' characterizations of their working relationships with physicians influence their perceptions of the practice environment?" Analysis of variance (ANOVA) was used to examine differences in PES-NWI subscales by the three comment types (favorable comment, unfavorable comment, no comment recorded). Of the PES-NWI subscales, staffing adequacy (ANOVA $F = 3.46$, 2 degrees of freedom [df], $p = .03$) and collegial nurse-physician relationships (ANOVA $F = 12.40$, 2 df, $p < .001$) differed significantly by comment type so that nurses who reported better staffing adequacy and collegial nurse-physician relationships also commented favorably on physicians. In post hoc analyses using Gabriel's test, differences between the means for staffing and resource adequacy did not differ significantly. However, the differences in the collegial nurse-physician relationship subscale were significant across all three comment categories. Across all PES-NWI subscales, the highest mean scores came from nurses who provided favorable comments about their relationships with physicians while the lowest came from nurses

who provided unfavorable comments. Nurses who did not provide open-text comments had PES-NWI subscale scores that fell between these two extremes. **Figure 1** depicts these results.

To explore the relationship between comments and the practice environment further, PES-NWI responses were collapsed into unfavorable, mixed, or favorable nurse perceptions of their practice environment, as described previously (Lake & Frieze, 2006). The chi-square test that examined the relationship between comment types (favorable, unfavorable, and no comment recorded) and categorized practice environments was significant ($\chi^2 = 15.17$, 4 df, $p < .01$), providing construct validity of the PES-NWI in ambulatory care settings. Specifically, a higher proportion of nurses (73.3%) who wrote favorable comments about physicians also reported favorable practice environments, compared with nurses who wrote no comments about physicians (62.2% reported a favorable environment). The results were nearly identical when we excluded the nurse-physician relations subscale from the PES-NWI classification.

To provide more insight into the relationship between PES-NWI responses and qualitative open-text comments, PES-NWI subscales were examined by the four summative themes gleaned from the qualitative data. Differences were examined using t tests in the five PES-NWI subscales by the endorsement or nonendorsement of

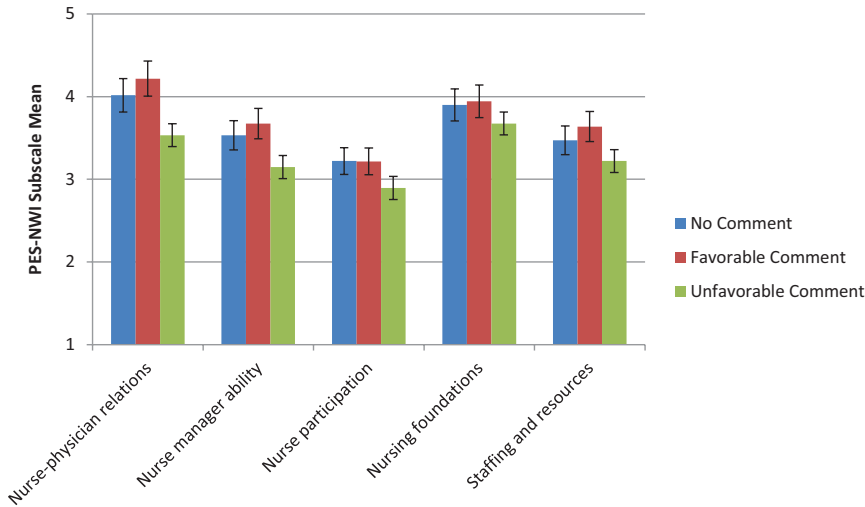


Figure 1. Practice Environment Scale of the Nursing Work Index (PES-NWI) subscales by type of comment regarding physicians. Bars denote standard errors.

Table 2. Practice Environments of Ambulatory Oncology Nurses by Summative Themes

	Favorable Structure			Favorable Behavior			Unfavorable Structure			Unfavorable Behavior		
	Yes	No	t, p	Yes	No	t, p	Yes	No	t, p	Yes	No	t, p
<i>n</i>	35	293		70	258		16	312		10	318	
Staffing and resource adequacy	3.46	3.5	0.25, .79	3.69	3.44	-2.43, .02	3.28	3.51	1.12, .26	3.1	3.51	1.63, .11
Collegial nurse-physician relations	3.99	4.02	0.25, .81	4.26	3.95	-3.05, < .01	3.33	4.05	3.77, < .01	3.11	4.04	3.70, < .01
Nursing foundations for quality of care	3.71	3.86	1.47, .14	3.93	3.83	-1.27, .21	3.49	3.86	2.58, .01	3.57	3.86	1.50, .14
Nurse participation in practice affairs	3.08	3.18	0.68, .49	3.22	3.15	-0.66, .51	2.89	3.18	1.36, .17	2.82	3.18	1.41, .16
Nurse manager ability, leadership, and support of nurses	3.58	3.55	-0.21, .83	3.68	3.52	-1.37, .17	3.38	3.56	0.80, .42	3.15	3.56	1.33, .18

favorable structures, favorable behaviors, unfavorable structures, or unfavorable behaviors. It is important to note that these four groups are not discrete categories, as individuals provided comments in multiple categories (although this sample did not report both favorably and unfavorably simultaneously). Hence, ANOVA procedures were not performed. The PES-NWI subscale scores did not differ significantly by endorsement or nonendorsement of favorable structural comments. Two subscale scores differed significantly by presence or absence of favorable behavior or unfavorable structure comments. Only the collegial nurse-physician relations subscale differed significantly between nurses who reported unfavorable behavior and nurses who did not report unfavor-

able behavior (mean of 3.11 vs. 4.04, respectively, $p < .01$). The nurse-physician relations subscale differed significantly across all summative themes except for favorable structure comments. **Table 2** displays these results.

Nurse respondents also provided ratings of their perceptions of the quality of care in their ambulatory care settings, which addressed the third research question, “Do characterizations (of nurse working relationships with physicians) correlate with perceived quality of care?” Chi-square tests examined quality of care reports (excellent, good, fair or poor) by favorable versus unfavorable physician comment. The findings revealed that a higher proportion of nurses who commented favorably on working relationships with physicians reported

excellent care (79.1%) than nurses who commented unfavorably (55.0%) ($\chi^2 = 6.05, 2 \text{ df}, p < .05$).

Discussion

Qualitative findings derived from open-text comments suggest two themes that influence how nurses characterize their working relationships with physicians; these two themes are represented by physician behaviors and structural factors. Physician behaviors have been cited in hospital-based research as a barrier to good relationships and good outcomes, but this study is among the first to document similar findings in ambulatory care (Rosenstein & O'Daniel, 2005). These findings have important implications for managers and clinicians who work in ambulatory oncology settings. Addressing the root causes of unfavorable nurse-physician relationships is a key strategy to improve practice environments and potentially minimize adverse patient events.

In a similar investigation of relationships among behavioral and structural factors and nurse and physician collaboration conducted in a hospital setting, researchers examined three categories: personal, organizational, and managerial factors (Alt-White, Charns, & Strayer, 1983). While the study did not query physicians, at least for nurse respondents organizational factors (use of a primary nursing model of care) and managerial factors (hospital climate, communication process) were significantly correlated with nurse perceptions of collaboration with physicians (Alt-White et al., 1983). In one of the few studies conducted in the oncology setting, one cancer institute reported stronger teamwork among clinical disciplines after implementation of a triad leadership model that included a nurse, physician, and healthcare administrator (Reid Ponte, Gross, Winer, Connaughton, & Hassinger, 2007). These findings, as well as those obtained in the current study, suggest that the organizational context in which collaboration occurs may be associated with nurse-physician relationships.

Nurses scored higher on PES-NWI subscales in our study than has been previously reported, largely due to the inclusion of a fifth category to enable respondents to endorse a neutral value for individual items, which increases the range in scores from 1 to 5, as opposed to 1 to 4 (Friese et al., 2008; Gardner, Thomas-Hawkins, & Fogg, 2007). Nurse-rated quality of care has been the most frequently measured outcome in studies that have used the PES-NWI (Warshawsky & Havens, 2011). Nurses' perceptions of their work environments are important indicators not only of perceived quality of care, as was found in our study, but also of actual patient outcomes. In stud-

ies that have examined relationships between PES-NWI scores and actual patient outcomes, reports of better practice environments have been associated with better patient outcomes (Aiken, Clarke, Sloane, Lake, & Cheney, 2008; Friese et al., 2008).

The combination of qualitative and quantitative data permits a clearer understanding of the relationship between organizational characteristics and nurse-physician relationships. Candid qualitative assessments provided by nurses correlated as hypothesized with quantitative appraisals of the nursing practice environment, as measured by the PES-NWI. The combined data suggest that good working relationships are a necessary ingredient for nurses' favorable assessments of the workplace. Nearly one-third of respondents reported favorable relationships with physicians, which is consistent with hospital-based research. In a prior study conducted in eight intensive care units, only a third of nurses rated the quality of collaboration and communication with physicians as high or very high (Thomas, Sexton, & Helmreich, 2003). Extant empirical measures used in this study correlate with free text comments provided by front-line nurses. Conversely, the free-text comments analyzed in this paper provide more detail as to how nurse-physician relationships may be evaluated in future studies.

The data reported are consistent with prior theory on healthcare organizations, specifically contingency theory (Scott, 1998). Contingency theory posits that organizations achieve optimal outcomes when their environments are aligned to support the work that is crucial to the organization's primary mission. The more aligned key elements of the organization's structure are with the operating context, the better the outcomes the organization will be able to achieve. Organizational theorists may characterize ambulatory care settings as less-complex than hospitals, but ambulatory care is very fragmented with wide variability in structure (Zinn & Mor, 1998). The current study contributes to this literature by elucidating current challenges for nurse and physician relationships in the ambulatory oncology setting, from which solutions may emerge to improve the quality of cancer care delivery.

Behaviors are associated strongly with the overall practice environment and with perceived quality of care. Explicit measurement of behaviors may bolster the ability to assess organizational performance. While rarely studied, behavioral issues have been cited as a contributor to suboptimal performance (Shortell et al., 1994). An international group of experts on patient safety convened by the Agency for Healthcare Research and Quality recommended the measurement of organizational context and teamwork in patient safety research, which suggests an inherent need to study behaviors (Shekelle et al., 2011).

Limitations

This study has several limitations. First, the response rate is below average across published studies with surveyed nurses. However, a previously published analysis of nonresponse from this sample suggested minimal demographic differences between responders and nonresponders (Friese, 2012). Missing data may skew results. However, the subscale with the highest degree of missing data—nurse participation in practice affairs—had only 7.2% of subjects with missing data. Few of the nurses reported negative relationships with physicians, as this was a voluntary question. The qualitative and quantitative data came from the same survey, which was not designed a priori for qualitative inquiry. The small number of licensed practical nurses in the sample prohibits meaningful comparisons between registered nurses and licensed practical nurses. Given the retrospective, observational nature of the study, a causal relationship between nurse-physician communication and quality of care cannot be assumed. As all data were obtained from nurses, physician perspectives were not captured in the survey, and it is possible their perceptions of their relationships with nurses would differ. Finally, given that the survey was limited to one relatively large state in the Southeast, the findings may not be generalizable to ambulatory oncology settings in other states. As we consider trustworthiness of the qualitative findings, we are unable to assess fully the dependability of the study, as it is unclear how reproducible the results would be in different contexts. These limitations are presented alongside one of the largest studies published to date that analyzed quantitative and qualitative data to evaluate quality of care issues in ambulatory oncology settings.

Conclusions and Implications

The findings of generally favorable nurse-physician relationships contrast with high nurse dissatisfaction with physicians observed in hospitals. Unfavorable nurse-physician relationships in ambulatory settings center on physician availability, practice structure, and interpersonal issues, which are ripe targets for intervention. Scheduling challenges identified by qualitative open-text comments are unique to ambulatory settings, and these challenges may hinder teamwork, communication, and collaboration. Attention to these environmental factors may strengthen practice environments and promote oncology provider retention to meet the anticipated increase in patient volume. Assessment and improvement of nurse-physician relationships in ambulatory oncology settings is one important strategy to improve the safety and quality of cancer care.

Acknowledgments

This research was supported in part by a Pathway to Independence award from the National Institute of Nursing Research, National Institutes of Health (R00 NR01570), and through a University of Michigan Comprehensive Cancer Center Support Grant (5 P30 CA46592). The authors report no conflicts of interest. Portions of these analyses will be presented at the 2012 Council for the Advancement of Nursing Society State of the Science Conference.

Clinical Resources

- Oncology Nursing Society, <http://ons.org>
- Quality and Safety Education for Nursing, <http://www.qsen.org>
- TeamSTEPPS, National Implementation, <http://teamstepps.ahrq.gov>

References

- Aiken, L. H., Clarke, S. P., Sloane, D. S., Lake, E. T., & Cheney, T. (2008). Effects of hospital care environment on patient mortality and nurse outcomes. *Journal of Nursing Administration, 39*(Suppl.), 45–51.
- Aiken, L. H., Clarke, S. P., Sloane, D. S., Sochalski, J. A., Busse, R., Clarke, H., Shamian, J. (2001). Nurses' reports on hospital care in five countries. *Health Affairs, 20*, 43–53.
- Alt-White, A. C., Charns, M., & Strayer, R. (1983). Personal, organizational and managerial factors related to nurse-physician collaboration. *Nursing Administration Quarterly, 8*, 8–18.
- Dillman, D. A. (2007). *Mail and Internet surveys: The tailored design method*. New York: Wiley and Sons.
- Friese, C. R. (2012). Practice environments of nurses employed in ambulatory oncology settings: Measure refinement. *Oncology Nursing Forum, 39*, 166–172.
- Friese, C. R., Himes-Ferris, L., Frasier, M. N., McCullagh, M. C., & Griggs, J. J. (2011, August 11). Structures and processes of care in ambulatory oncology settings and nurse-reported exposure to chemotherapy. *BMJ Quality & Safety* (Online First). doi:10.1136/bmjqs-2011-000178
- Friese, C. R., Lake, E. T., Aiken, L. H., Silber, J. H., & Sochalski, J. A. (2008). Hospital nurse practice environments and outcomes for surgical oncology patients. *Health Services Research, 43*, 1145–1163.
- Friese, C. R., Lee, C. S., O'Brien, S., & Crawford, S. C. (2010). *Multi-mode and method experiment in a study of nurses*. *Survey Practice*. Retrieved May 18, 2012, from <http://surveypractice.wordpress.com/2010/10/27/multi-mode-nurses-survey/>

- Gardner, J. K., Thomas-Hawkins, C., & Fogg, L. (2007). The relationships between nurses' perceptions of the hemodialysis unit work environment and nurse turnover, patient satisfaction, and hospitalizations. *Nephrology Nursing Journal, 34*, 271–282.
- Lake, E. T. (2002). Development of the practice environment scale of the nursing work index. *Research in Nursing & Health, 25*, 176–188.
- Lake, E. T., & Frieze, C. R. (2006). Variations in nursing practice environments: Relation to staffing and hospital characteristics. *Nursing Research, 55*, 1–9.
- Leape, L. L., & Berwick, D. M. (2005). Five years after to err is human: What have we learned? *Journal of the American Medical Association, 293*, 2384–2390.
- Manojlovich, M. (2005). Linking the practice environment to nurses' job satisfaction through nurse-physician communication. *Journal of Nursing Scholarship, 37*, 367–373.
- Manojlovich, M. (2010). Nurse/physician communication through a sensemaking lens: Shifting the paradigm to improve patient safety. *Medical Care, 48*, 941–946.
- Manojlovich, M., Antonakos, C. L., & Ronis, D. L. (2009). Intensive care units, communication between nurses and physicians, and patients' outcomes. *American Journal of Critical Care, 18*, 21–30.
- Reid Ponte, P., Gross, A. H., Milliman-Richard, Y. J., & Lacey, K. (2010). Interdisciplinary teamwork and collaboration: An essential element of a positive practice environment. *Annual Review of Nursing Research, 28*, 159–189.
- Reid Ponte, P., Gross, A. H., Winer, E., Connaughton, M. J., & Hassinger, J. (2007). Implementing an interdisciplinary governance model in a comprehensive cancer center. *Oncology Nursing Forum, 34*, 611–616.
- Rosenstein, A. H., & O'Daniel, M. (2005). Disruptive behavior and clinical outcomes: Perceptions of nurses and physicians. *American Journal of Nursing, 105*, 54–64.
- Schmalenberg, C., & Kramer, M. (2009). Nurse-physician relationships in hospitals: 20,000 nurses tell their story. *Critical Care Nurse, 29*, 74–83.
- Scott, W. R. (1998). *Organizations: Rational, natural, and open systems*. Upper Saddle River, NJ: Prentice-Hall.
- Shekelle, P. G., Pronovost, P. J., Wachter, R. M., Taylor, S. L., Dy, S. M., Foy, R., Walshe, K. (2011). Advancing the science of patient safety. *Annals of Internal Medicine, 154*, 693–696.
- Shenton, A. K., & Dixon, P. (2004). Debates and paradoxes surrounding the use of qualitative methods. *Education for Information, 22*, 1–12.
- Shortell, S. M., Zimmerman, J. E., Rousseau, D. M., Gillies, R. R., Wagner, D. P., Draper, E. A., Duffy, J. (1994). The performance of intensive care units: Does good management make a difference? *Medical Care, 32*, 508–525.
- Thomas, E. J., Sexton, J. B., & Helmreich, R. L. (2003). Discrepant attitudes about teamwork among critical care nurses and physicians. *Critical Care Medicine, 31*, 956–959.
- Warshawsky, N. E., & Havens, D. S. (2011). Global use of the practice environment scale of the nursing work index. *Nursing Research, 60*, 17–31.
- Zinn, J. S., & Mor, V. (1998). Organizational structure and the delivery of primary care to older Americans. *Health Services Research, 33*(2 Pt. II), 354–380.