

nursing and used financial reports, special surveys, and AHA data to construct measures of inpatient nurse staffing (RNs, licensed practical nurses, and aides). Three samples were analyzed: 799 hospitals in 11 states (more than five million discharge abstracts), 253 California hospitals, and national Medicare discharge data (more than 12 million discharge abstracts). Of the 14 outcomes potentially sensitive to nursing that were analyzed, both nurse staffing levels and mix of personnel, particularly RNs, were found to be strongly and consistently associated with five patient outcomes in medical patients: urinary tract infections, pneumonia, shock, upper gastrointestinal bleeding, and length of hospital stay. One patient outcome, failure to rescue (defined as mortality given that the patient experienced one of five complications—shock, sepsis, pneumonia, upper gastrointestinal bleeding, and deep vein thrombosis/pulmonary embolus), was associated with nurse staffing among patients hospitalized for major surgery. Higher RN staffing was associated with a 3%–12% reduction in adverse outcomes, and higher staffing at all levels of nursing was associated with a 2%–25% reduction in adverse patient outcomes.

With respect to the oncology nursing workforce, anecdotal reports suggest that the current shortage is affecting oncology as severely as other highly specialized nursing areas. A 30% vacancy rate for RNs was reported in oncology inpatient settings (Fromer, 2001); In late 2000, Erickson (2000) stated that little or no shortage in oncology outpatient settings was observed. Satryan (2001) reported that the shift in cancer care from dedicated oncology units to general medical and surgical areas of the hospital will result in patients with cancer no longer having the “benefit of certified oncology nurses to administer their chemotherapy or other treatment modalities, nor would they have a dedicated multidisciplinary team approach to their care” (p. 22). She worries that the loss of the clinical nurse specialist role in many settings and the shift of oncology RNs from dedicated oncology units to mixed units (i.e., units where oncology and other patients are treated) would have a negative impact on the quality of care provided to patients with cancer and their families. These changes to mixed units could affect the safety of cancer care, psychosocial care, teaching of patients and families, and counseling regarding survivorship.

Purpose

Concerns about nursing shortages, the apparent decline in dedicated oncology nursing units, and the potential for lower quality of care prompted the Oncology Nursing Society (ONS) to develop a study to examine these issues. The project, funded by the ONS Foundation Center for Leadership, Information and Research, was designed to assess a variety of questions about the nursing shortage, its impact on quality of care, staffing levels, and what is being done to cope with short staffing. A team of researchers, educators, and oncology RNs from inpatient and outpatient settings developed a survey instrument to gather information from oncology RNs and nurse executives to provide data to answer the following questions.

1. How do oncology RNs and nurse executives describe the work environment in settings in which patients with cancer are being treated?
2. How do oncology RNs and nurse executives perceive the adequacy of nurse staffing?

3. What are the actual levels of budgeted and filled staff positions in settings in which oncology nurses work?
4. What short-term remedies are being used to cope with staffing shortfalls, and how do oncology RNs and nurse executives perceive the impact on the quality of patient care?

Because a large amount of data was collected to address each of these questions, the results of the study are reported in two parts. Part one, discussed here, presents findings that relate to the first two questions concerning the work environment and

Table 1. Characteristics of Oncology RNs and Nurse Executives

Characteristics	Oncology RNs (N = 494)		Nurse Executives (N = 342)	
	n	%	n	%
Gender				
Male	19	4	17	5
Female	474	96	154	94
Age (years)				
18–24	7	1	0	0
25–34	133	27	14	4
35–44	172	35	81	23
45–54	154	31	186	54
55–64	25	5	49	14
> 64	1	0	2	1
Facility type				
Acute-care hospital	275	56	307	91
Outpatient clinic	78	16	3	1
Hospital-based outpatient clinic	46	10	22	6
Private office	51	11	0	0
Other ^a	34	7	6	2
Comprehensive cancer center				
Yes	163	36	41	21
No	293	64	156	79
Ownership				
For profit	207	44	44	13
Not for profit	267	56	298	87
Type of patients treated				
Adults only	410	84	261	77
Pediatric only	6	1	9	3
Both adult and pediatric	71	15	68	20
Region				
Northeast	120	24	65	19
North central	113	23	114	33
South	180	36	121	35
West	77	16	44	13

^a < 9% grouped as other

Note. Numbers and percents may not equal total because of rounding and because not all RNs and nurse executives responded to all questions.

perceptions of the adequacy of RN staffing in oncology settings. Part two, to be published in the January/February 2002 issue of the *Oncology Nursing Forum*, focuses on actual and budgeted staffing in oncology, responses used to deal with short staffing, the impact of short staffing on quality of care, and issues relating to standards for oncology RN staffing.

Methods

During summer 2000, a survey was mailed to RNs specializing in the care of patients with cancer, oncologists, and nurse executives employed in inpatient acute-care hospitals, hospital-based outpatient departments, and freestanding ambulatory facilities. A random sample of 1,250 full- and part-time RNs—certified and not certified in oncology nursing—was drawn from the ONS membership directory. Nonresponders were sent a reminder postcard and two additional mailings of the survey. A total of 494 RNs completed the questionnaire for a response rate of 40%.

The nurse executives included in the study were drawn from a sample of 600 regional cancer centers (nonfreestanding) listed in the AHA database and from 600 freestanding ambulatory centers providing outpatient and oncology services drawn from AHA and each of the 35 National Cancer Institute-designated comprehensive cancer centers. Nonresponders received three additional mailings of the survey instrument, one reminder postcard, and two rounds of follow-up telephone calls. A \$5 donation was made to the American Cancer Society for each completed survey. Because nurse executives were asked to provide detailed staffing data, their survey tool was twice the length of those administered to nurses and oncologists. This likely explains the smaller number of respondents (342) and the lower final adjusted response rate of 29%.

The final group included in the study was oncologists. A random sample of 1,250 oncologists who were listed as board certified in oncology and who designated oncology as either their primary or secondary specialty was drawn from the American Medical Association physician database. Because the focus of this article is on nurses' perceptions, the responses of physicians are not discussed here (see Buerhaus, Donelan, DesRoches, Lamkin, & Mallory, 2001).

The survey included questions applicable to nurses, nurse executives, and oncologists across the three samples but was modified to reflect the special issues and unique perspectives of each group of professionals. Thus, the survey included questions aimed at assessing views about the nursing profession, oncology nurse staffing, quality of care responses, responses employed to care for patients under short staffing circumstances, financial support offered to nurses, compensation, and demographic information.

Results

Description of Sample

Table 1 presents general characteristics of oncology nurses and nurse executives who responded to the survey. Among nurses specializing in oncology, all of whom are RNs, the vast majority are women, white, over the age of 35, and provide care to adults. Although slightly more than half of the RNs work in acute-care, not-for-profit hospitals, a large number also work in for-profit facilities. Only 11% reported having a certificate or degree as an advanced practice nurse, defined in

the survey as nurse practitioner, certified nurse midwife, certified registered nurse anesthetist, or clinical nurse specialist. When compared to demographic data of ONS members and to the preliminary results of the 2000 National Sample Survey of the Population of Registered Nurses (NSSRN), the sample of oncology RNs in this study was quite similar on most characteristics. Notable exceptions were that the oncology RNs who provided data for this study were slightly younger on average than RNs in NSSRN and that more oncology RNs reported working in outpatient and ambulatory settings (37%) than reported in NSSRN (9%).

With respect to the nurse executives who responded to the survey, almost all were RNs, women, white, older (over the age of 45 years) than oncology RNs, and involved in treating adults with cancer in not-for-profit acute-care ambulatory facilities.

Because one of the aims of the study was to compare the perceptions of oncology RNs who work in inpatient settings

Table 2. Characteristics of Oncology RNs by Inpatient and Outpatient Setting

Characteristic	Inpatient (n = 278) %	Outpatient (n = 185) %
Age (years)		
18–24	3	0
25–34	30	24
35–44	33	37
45–55	28	35
> 55	7	3
Years in practice		
0–10	62	48
11–20	23	23
21–30	11	25
> 30	4	4
Employment status		
Full-time (30+ hours)	89	89
Part-time (1–29 hours)	11	11
Change in hourly wages during past year		
Increased	74	70
Decreased	2	4
Stayed the same	24	26
Annual income		
< \$25,000	4	9
\$25,001–\$49,999	70	75
\$50,000–\$74,999	26	14
\$75,000–\$99,999	0	2
Highest nursing education		
Associate	40	41
Diploma	9	16
Baccalaureate	44	35
Master's	7	8
Doctorate	0	0
Advanced practice nursing certificate or degree		
Yes	8	14
No	92	86

Table 3. Inpatient RNs', Outpatient RNs', and Nurse Executives' Perceptions of the Oncology Work Environment

Characteristics of the Workplace Environment	Inpatient (n = 278) %	Outpatient (n = 185) %	Nurse Executives (n = 347) %
During the past year, have you observed shorter hospital stays for patients in general?			
Yes	85	88	87
No	16	12	13
What impact has this had on the overall quality of care for patients in general?			
Improved care	4	3	7
No impact	18	18	40
Harmed care	79	79	53
During the past year, have you observed shorter hospital stays for patients with cancer?			
Yes	71	78	66
No	29	22	35
What impact has this had on the overall quality of care for patients with cancer?			
Improved care	0	3	0
No impact	11	16	43
Harmed care	89	82	57

to those in outpatient settings, Table 2 displays characteristics of RNs employed in both settings.

Of the 494 RNs who provided data for the study, 463 indicated that they worked in inpatient or outpatient settings. The majority (60%) worked in inpatient settings, and 40% worked in outpatient settings. In this study, the inpatient setting included acute-care hospitals; outpatient settings were comprised of outpatient clinics, hospital-based outpatient clinics, private physicians' offices, and freestanding clinics. The remaining 31 RN responses came from nurses who worked in long-term care hospitals, nursing homes, and home care and were excluded from this analysis.

The data show that outpatient RNs are older and have practiced nursing for more years than their inpatient colleagues. On average, both groups work approximately the same number of hours per week and very similar proportions work on a full- and part-time basis. Although not reported in Table 2, nearly all (97%) outpatient RNs worked on the day shift, compared to about two-thirds (64%) of inpatient nurses. The majority of both groups had received an increase in hourly wages during the prior year and reported annual earnings of \$25,000–\$49,999. Twice as many inpatient RNs, however, earned \$50,000–\$74,999. Although equal proportions of RNs in both settings have an associate degree in nursing as their highest nursing education, considerably more (44%) RNs in inpatient settings have a baccalaureate degree than outpatient RNs (35%). The vast majority of oncology RNs do not have an advanced practice nursing certificate or degree, but of those who do, more work in outpatient settings.

Perceptions of the Oncology Workplace Environment

The first question the study sought to answer concerned how oncology RNs and nurse executives describe the work environment in which patients with cancer are treated. Results are shown that compare perceptions between inpatient and

Table 4. Perceptions of Workplace Environment by RNs Who Work in Inpatient or Outpatient Settings

Characteristics of the Workplace Environment	Inpatient (n = 278) %	Outpatient (n = 185) %
Amount of staff		
Increased	11	29
Decreased	70	40
Stayed the same	20	31
Acuity of patients with cancer		
Increased	79	74
Decreased	1	1
Stayed the same	19	25
Patient with cancer census		
Increased	49	74
Decreased	13	7
Stayed the same	38	8
Amount of paperwork		
Increased	74	71
Decreased	1	3
Stayed the same	25	27
RNs delegation of tasks to non-RNs		
Increased	35	33
Decreased	10	9
Stayed the same	55	59
In the past year, how has the physician delegating tasks to RNs changed in the unit at the facility where you work?		
Increased	43	66
Decreased	1	1
Stayed the same	55	34

outpatient RNs and between inpatient oncology RNs who work in dedicated cancer units and those who work on mixed units.

Clear majorities of oncology RNs in inpatient and outpatient settings, as well as nurse executives, believe that hospital length of stay had decreased during the prior year for patients in general and patients with cancer (see Table 3). Of the three groups, however, nurse executives were less likely to perceive that the length of stay had decreased for patients with cancer. When asked about the impact of shorter stays on patients in general and patients with cancer specifically, strong majorities of inpatient and outpatient RNs felt that quality of care had been harmed. Although more nurse executives agreed with this assessment than did not, once again a much smaller percentage of nurse executives believed that decreasing length of stay resulted in lowering the quality of care of patients with cancer.

Irrespective of work setting, a majority of oncology RNs perceived that both the acuity of patients with cancer and the amount of paperwork RNs performed had increased over the prior year (see Table 4). Considerably more outpatient oncology RNs, however, reported an increase in the number of patients and in staff during the prior year. Moreover, many more inpatient RNs (70%) than outpatient RNs (40%) perceived that the amount of staff had decreased over the same period. Although roughly equal proportions of both groups reported that the number of tasks delegated by RNs to non-RNs stayed approximately the same, far more outpatient RNs said that tasks delegated by physicians to RNs had increased during the previous year.

As Table 5 shows, roughly two-thirds of RNs in inpatient and outpatient settings alike said that they did not receive a salary increase or bonus for obtaining oncology nursing certification. Also, more than 70% of RNs in both settings reported receiving an increase in hourly wages during the prior year.

When many of these descriptions of the workplace environment were examined from the perspective of RNs who worked on dedicated oncology versus mixed patient units, several similarities and differences become apparent. Equally large percentages of RNs in dedicated and mixed units believed that the acuity of patients with cancer had increased, and a little more than half of the RNs in both units reported

Table 5. Economic Support for Inpatient and Outpatient RNs

Survey Question	Inpatient (n = 278) %	Outpatient (n = 185) %
Do nurses where you work receive a salary increase or bonus for obtaining oncology nursing certification?		
Yes	31	36
No	68	62
Did your hourly rate of pay change in the past year?		
Increased	74	70
Decreased	2	4
Stayed the same	24	26

that the number of tasks delegated by physicians to RNs had increased (see Table 6); however, more oncology RNs working on mixed units compared to RNs who work on dedicated units said that staffing had decreased, the amount of paperwork had increased, and the number of tasks delegated by RNs to non-RNs had increased. Also, considerably more oncology RNs on dedicated units said that the number of patients had increased over the prior year.

Adequacy of Nurse Staffing

The study also sought to determine how oncology RNs and nurse executives perceived the adequacy of nurse staffing. Regardless of setting, more than 8 of 10 oncology RNs and nurse executives felt that too few RNs and oncology RNs are providing care in the United States (see Table 7). Furthermore, strong majorities of all three groups, particularly nurse executives (98%), agreed that too few RNs would be available in the United States 10 years from now. Although the majority of all respondents reported observing an inability to retain experienced RNs, inpatient RNs were more likely to perceive this difficulty than outpatient RNs. With regard to perceptions of the adequacy of nurse staffing, two-thirds of inpatient RNs

Table 6. Characteristics of Workplace Environment by Setting Where Oncology RNs Work

Perceptions of Workplace Environment	Dedicated Oncology Unit (n = 193) %	Mixed Unit (n = 297) %
Amount of Staff		
Increased	22	15
Decreased	49	65
Stayed the same	29	21
Acuity of Patients With Cancer		
Increased	77	78
Decreased	2	1
Stayed the same	22	21
Patient With Cancer Census		
Increased	69	55
Decreased	7	12
Stayed the same	24	33
Amount of Paperwork		
Increased	68	78
Decreased	3	1
Stayed the same	29	21
RNs Delegation of Tasks to Non-RNs		
Increased	29	37
Decreased	9	10
Stayed the same	62	53
In the past year, how has the physician delegating tasks to RNs changed in the unit at the facility where you work?		
Increased	53	52
Decreased	2	1
Stayed the same	46	47

believed staffing was less than adequate, whereas just under half of outpatient RNs believed staffing was less than adequate.

Finally, within the inpatient setting, clear majorities of RNs who work on both dedicated and mixed units believed that there are too few RNs in general and too few who specialize in oncology, though those on mixed units hold a more pessimistic assessment. In addition, RNs on mixed units are more likely to say that they have observed an inability to retain experienced RNs during the prior year and to believe staffing levels of RNs who specialize in the care of patients with cancer are less than adequate (see Table 8).

Discussion

Evidence from this survey of oncology RNs and nurse executives indicates that the workplace environment in which patients with cancer receive professional nursing care is experiencing many of the same pressures that are being felt by the nursing profession in general, with both nurses and patients being adversely affected. Although the stresses are occurring in all settings, data show that the perceptions of RNs vary according to the setting in which they work.

Almost all RNs surveyed perceived that hospital length of stay has decreased over the prior year for patients in general and for patients with cancer specifically, but nurse executives were not as likely to perceive that the quality of patient care for both types of patients had deteriorated as a result. This discrepancy suggests that nurse executives do not perceive the

same level of intensity of this problem and, therefore, may not be as willing to address it as RNs wish.

Chief among the characteristics that nearly all RNs in both settings agreed upon was an increase in patient acuity and paperwork. In outpatient settings, proportionately more RNs reported an increased number of patients and an increased number of tasks delegated to them by physicians but somewhat less trouble retaining experienced nurses. In contrast, far more inpatient RNs felt that staffing had decreased and that retaining staff was difficult. This may substantiate Satyran's (2001) concern that RNs specializing in cancer care are leaving the inpatient setting for outpatient venues. Although this reflects the direction of cancer care in general, the impact of this shift from inpatient to outpatient care needs to be addressed in relation to its overall impact on quality of care for inpatients who have the highest acuity and needs for nursing. Further, these findings suggest that efforts should be focused on measures to retain and reward inpatient nursing staff.

Results suggest RNs in dedicated oncology units perceive their workplace environment more positively than their colleagues who work on mixed patient units. Proportionately fewer RNs working in dedicated oncology units believed that staffing had decreased, the amount of paperwork had increased, and the number of tasks delegated by RNs to non-RNs had increased. This suggests that fostering the maintenance of existing oncology units or developing or reinstituting them where they do not exist may raise RN satisfaction and retention and promote the quality of patient care.

Table 7. Inpatient RNs', Outpatient RNs', and Nurse Executives' Perceptions of the Adequacy of Nurse Staffing

Perceptions of Nurse Staffing	Inpatient (n = 278) %	Outpatient (n = 185) %	Nurse Executives (n = 347) %
In general, when you think about the current number of RNs in the United States, do you think there are			
Too many	1	2	1
Too few	86	82	93
About the right amount	14	17	6
When you think about the current number of RNs who specialize in the care of patients with cancer in the United States, do you think there are			
Too many	0	0	0
Too few	92	83	90
About the right amount	8	17	10
When you think about the number of RNs in the United States 10 years from now, do you think there will be			
Too many	4	3	1
Too few	87	92	98
About the right amount	9	6	1
During the past year, have you observed an inability to retain experienced RNs?			
Yes	87	64	72
No	13	36	28
In the facility where you work, is the staffing level of RNs who specialize in the care of patients with cancer			
Less than adequate	64	48	N/A
Adequate	32	40	N/A
More than adequate	4	12	N/A

Table 8. RNs' Perceptions of the Adequacy of Nurse Staffing on Dedicated and Mixed Units

Characteristics of Nurse Staffing	Dedicated Oncology Unit (n = 193) %	Mixed Unit (n = 297) %
In general, when you think about the current number of RNs in the United States, do you think there are		
Too many	1	1
Too few	79	86
About the right amount	20	13
When you think about the current number of RNs who specialize in the care of patients with cancer in the United States, do you think there are		
Too many	0	0
Too few	80	93
About the right amount	20	7
When you think about the number of RNs in the United States 10 years from now, do you think there will be		
Too many	3	5
Too few	89	87
About the right amount	8	9
During the past year, have you observed an inability to retain experienced RNs?		
Yes	72	82
No	28	18
In the facility where you work, is the staffing level of RNs who specialize in the care of patients with cancer		
Less than adequate	45	66
Adequate	43	31
More than adequate	12	4

By far, the strongest area of agreement, both across workplace settings and among oncology RNs and nurse executives, concerned perceptions about the current and future number of RNs. Most respondents felt that in the United States, too few RNs are working and that the same will be true 10 years from now. Inpatient RNs, however, were more likely than those working in outpatient settings to report that staffing in their own settings was less than adequate. Moreover, RNs working on dedicated oncology units were more likely to report that staffing levels of RNs were adequate than were RNs working on mixed patient units.

Taken together, oncology RNs' and nurse executives' perceptions of the nursing workplace environment and their views of the current and future adequacy of RNs in the United States are of concern and need to be addressed. Although the questions and goals were different than those of Aiken et al. (2001), the results of this study support Aiken's assessment of how hospital nurses perceive working conditions. Rather than become discouraged by these findings, oncology RNs and nurse executives must focus their energy to find ways to use these study results to inform all interested parties (hospital executives, boards of trustees, physicians, consumers, and the media) about the situation in oncology nursing, particularly the policy-making community.

Study Limitations

All surveys are subject to sampling and nonsampling error. Consequently, results differ from what would be obtained had

the entire population of oncology RNs, oncologists, and nurse executives been interviewed. Additional possible sources of error include respondent bias, as the people who responded to the survey may be different from nonrespondents, the wording of some of the questions might not have been clear to some respondents, and the length of the survey and order of questions may have influenced how people responded. All responses that related to quality of care and nurses' report of adequate or inadequate staffing are perceptions of the people who responded and, thus, do not reflect the actual measurement of quality.

Because the sample was limited to those specializing in cancer care, an additional limitation of this study is that findings are not generalizable to the whole population of nurses, physicians, and nurse executives. Nevertheless, given the technical and complex nature of cancer, the oncology setting provides an important and relevant example of how changes in staffing can affect the quality of care patients receive.

Conclusion


This survey was designed to collect data on the oncology nursing workforce and the possible impact of changes in the workplace environment on the quality of care of patients with cancer. Additional research is needed to quantitatively study the impact of staffing ratios, staff mix, and changes in the workplace environment on quality of care. Studies should address inpatient and outpatient settings. Oncology care strongly reflects the direction of health care in general,

from the inpatient to the outpatient/ambulatory setting. Oncology RNs can become leaders in adding to the knowledge base, particularly with regard to the quality of care in ambulatory settings, where so much cancer care is provided. Multisite studies are needed to focus on outcomes and quality of care for patients in dedicated oncology and mixed patient units.

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This two-part report on the oncology nursing workforce concludes in the next issue of the *Oncology Nursing Forum*. Part two presents and discusses survey results pertaining to filled and budgeted staffing positions, short-term responses to cope with shortfalls in staffing, perceptions of the impact of responses on quality of care, and issues relating to standards for oncology RN staffing.