

A High-Volume Specialist Palliative Care Unit and Team May Reduce In-Hospital End-of-Life Care Costs

THOMAS J. SMITH, M.D., PATRICK COYNE, R.N., M.S.N., BRIAN CASSEL, Ph.D.,
LYNNE PENBERTHY, M.D., ALISON HOPSON, R.N., M.S.N.,
and MARY ANN HAGER, R.N., M.S.N.

ABSTRACT

Background: Current end-of-life hospital care can be of poor quality and high cost. High volume and/or specialist care, and standardized care with clinical practice guidelines, has improved outcomes and costs in other areas of cancer care.

Methods: The objective of this study was to measure the impact of the palliative care unit (PCU) on the cost of care. The PCU is a dedicated 11-bed inpatient (PCU) staffed by a high-volume specialist team using standardized care. We compared daily charges and costs of the days prior to PCU transfer to the stay in the PCU, for patients who died in the first 6 months after the PCU opened May 2000. We performed a case-control study by matching 38 PCU patients by diagnosis and age to contemporary patients who died outside the PCU cared for by other medical or surgical teams, to adjust for potential differences in the patients or goals of care.

Results: The unit admitted 237 patients from May to December 2000. Fifty-two percent had cancer followed by vascular events, immunodeficiency, or organ failure. For the 123 patients with both non-PCU and PCU days, daily charges and costs were reduced by 66% overall and 74% in "other" (medications, diagnostics, etc.) after transfer to the PCU ($p < 0.0001$ for all). Comparing the 38 contemporary control patients who died outside the PCU to similar patients who died in the PCU, daily charges were 59% lower ($\$5,304 \pm 5,850$ to $\$2,172 \pm 2,250$, $p = 0.005$), direct costs 56% lower ($\$1,441 \pm 1,438$ to $\$632 \pm 690$, $p = 0.004$), and total costs 57% lower ($\$2,538 \pm 2,918$ to $\$1,095 \pm 1,153$, $p = 0.009$).

Conclusions: Appropriate standardized care of medically complex terminally ill patients in a high-volume, specialized unit may significantly lower cost. These results should be confirmed in a randomized study but such studies are difficult to perform.

INTRODUCTION

END-OF-LIFE CARE suffers from lack of quality care and high cost. The Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments (SUPPORT) showed that half

of all hospitalized conscious patients died with unrelieved pain.¹ The other serious problem is the cost, with one eighth of Medicare total expenditures going to patients in their last month of life.^{2,3} Hospice saves an insignificant amount of cost at the end of life.^{4,5} In SUPPORT, one third of fam-

Virginia Commonwealth University Massey Cancer Center, and Medical College of Virginia Hospitals, Richmond, Virginia.

ilies were bankrupted by end-of-life care; the poorest were most financially stressed and being poor was associated with fewer choices in end-of-life care.⁶ Medical expenditures are again increasing at near double-digit annual rates⁷ so the situation is likely to worsen.

There is an important strong relationship between high volume and specialization of care, and the quality of care.^{8,9} Clinical practice guidelines and standardized care can often improve care and make it less expensive.¹⁰

We started an inpatient Palliative Care Unit (PCU) staffed by a high-volume experienced specialist team¹¹ using standard protocols to improve end-of-life care. This study addresses the cost of care for patients who died in our hospital during the first 6 months of PCU operation.

METHODS

The Thomas Palliative Care Unit

The Thomas PCU opened in May 2000 as a hospital-based 11-bed inpatient unit, geographically separate from oncology, with its own nursing and administrative staff. We developed palliative care guidelines for the most common conditions such as pain, dyspnea, delirium, etc., available on request. In some cases, these were modeled after the American Society of Clinical Oncology Symptom Management Curriculum.¹² For the physician, writing "Use palliative care unit standing orders," could activate this order set. While cost was not a primary consideration in these guidelines, we had a strong consciousness of cost because our institution provides 60% of the indigent care in the state of Virginia, and one of the explicit goals of the PCU was to serve the medically underserved.

Referrals to the unit come from all over the hospital including the intensive care units (ICU) and general medicine, gynecology, neurology, and surgery. In addition, we signed contracts with local hospice providers to hospitalize those with hospice benefits. To avoid duplication of services, we did not start an outpatient hospice program.

The high-volume specialist care team

Two members of the team (P.C. and T.S.) provided most of the care during this phase of operation, with assistance from other faculty oncologists, pulmonologists, and infectious disease

experts with an interest in palliative care. Both have had extensive experience in palliative care.

Financial analysis of patients hospitalized on the PCU

The objective of this study was to measure the impact of the PCU on cost of care. We compared daily charges and costs of the days prior to PCU transfer to the stay in the PCU. Charges and costs per day are compared for ICUs, Intermediate Care Units ("step-down" or telemetry units), all non-PCU units, and routine units to the PCU.

We then performed a case-control study by matching PCU patients by diagnosis and age to contemporary patients who died outside the PCU, cared for by other medical or surgical teams. We found 38 cases and controls that had the same diagnosis and were within 5 years of age in the May to December 2000 time period. All the available control case charts or electronic records were reviewed by one study member (T.S.) to ensure that the clinical characteristics of the case, expected outcomes, and causes of death were similar.

Charges, costs, and demographic/clinical data were captured by the Massey Cancer Center Database, which records information on all cancer patients in order to maintain quality and track health care outcomes. All charges are recorded on a standard charge master code. Costs are estimated using detailed internal cost accounting. Means \pm standard deviations are shown. All *t* tests are two-tailed. The study was approved by the Institutional Review Board, with waiver for informed consent (all the cases and controls were deceased, and the only information collected was done in the routine care of patients).

Quality of care was not directly measured, because there are no proven outcome indications for end-of-life care. We assessed the following process measures: recording of Visual Analogue Scale (VAS) pain scores, visitation by a chaplain, and discussion of hospice referral or hospice enrollment. Goal of therapy was not directly assessable, because few charts documented any sort of goal.

RESULTS

In the May to December period, 237 patients were admitted to the PCU. Approximately half had cancer followed by vascular events, acquired immune deficiency syndrome (AIDS), and organ

TABLE 1. PATIENT VARIABLES OF THE PCU STUDY POPULATION

<i>Variable</i>	<i>Frequency</i>	<i>Percentage</i>
Male	127	53.6%
Female	110	46.6%
Total	237	100%
Race		
Black	132	55.7%
White	94	39.7%
Unknown	9	3.8%
Asian	1	0.4%
Hispanic	1	0.4%
Total	237	100.0%
Diagnosis based on ICD-9 codes		
Cancer	123	51.9%
Lung	21	
Colon/rectum	10	
Breast	7	
Bone metastases	22	
Brain/spine	7	
Liver	5	
Not Cancers	114	48.1%
AIDS	11	9.6%
Hypovolemia	7	6.1%
Pneumonia, organism unspecified	5	4.4%
Acute Renal Failure	5	4.4%
Intracerebral hemorrhage	4	3.5%
Food/Vomit pneumonitis	3	2.6%
Convulsions	3	2.6%
Hepatic coma	3	2.6%
Not coded	3	2.6%
Congestive Heart Failure	3	2.6%
Subarachnoid Hemorrhage	3	2.6%
Acute cerebrovascular hemorrhage	3	2.6%

ICD = 9, International Statistical Classification of Diseases, 9th edition; AIDs, acquired immune deficiency syndrome; PCU, Palliative Care Unit.

T1 failure, as shown in Table 1. Of the PCU patients, 56% were African American, the same percentage as the rest of the hospital.

When the days prior to the PCU transfer were compared to the average PCU stay, for the 123 patients who had both PCU and non-PCU stays,

charges and costs per day were reduced by 66% overall and 74% in “other” (e.g. medications, diagnostics, etc.; $p < 0.0001$ for both charges and costs, comparing each type of unit to the PCU), as shown in Table 2. In addition, the variation in costs was reduced significantly.

T2

TABLE 2. CHARGES AND COSTS PER DAY BEFORE AND AFTER PCU TRANSFER

<i>Item</i>	<i>ICU</i> n = 494 d \$	<i>Routine</i> n = 736 d \$	<i>All non-PCU</i> n = 1417 d \$	<i>PCU</i> n = 831 d \$
Room charge	1754 ± 495	439 ± 31	991 ± 648	\$ 469 ± 175
Room cost	1168 ± 356	438 ± 57	748 ± 401	\$ 275 ± 103
Other charge	4270 ± 3078	1641 ± 2291	2580 ± 2795	\$ 709 ± 953
Other cost	1560 ± 1432	700 ± 1102	1004 ± 1259	\$ 285 ± 445
Total charge	6024 ± 3079	2130 ± 2293	3571 ± 3091	\$1178 ± 962
Total cost	2728 ± 1407	1137 ± 1096	1752 ± 1386	\$ 560 ± 448

Mean and standard deviation shown.

All transfer cases May 1 to December 30, 2000; 123 accounts.

ICU, intensive care unit; routine, standard hospital room; d, days; PCU, Palliative Care Unit.

We explored the costs for all patients before and after consultation and transfer. In general, the consultation was done 8–12 hours before actual transfer. We discussed goals of treatment with the patient and family, and carefully scrutinized each order and removed those items not directly needed for comfort. We did not automatically stop antibiotics, fluids, etc., unless the family or patient requested or agreed; over time, many chose to forego such interventions. Figure 1 shows that charges and costs decreased substantially around the time of the consultation (typically 8–12 hours before the transfer time, which is shown as the vertical line).

F1

We next performed a case-control study to compensate for the difference in treatment goals that might have existed between PCU and non-PCU patients. We compared the charges and costs for the hospitalization for patients who died in the PCU to those who died in the hospital outside the PCU during the same period. We found 57 patients who matched by diagnosis, and 38

who matched for diagnosis and age within 5 years as shown in Table 3. The patient groups were nearly identical in age, gender, diagnosis, and type of treatments given.

T3

Charges were reduced from $\$5,304 \pm 5,850$ to $\$2,172 \pm 2,250$ ($p = 0.005$), direct costs from $\$1,441 \pm 1,438$ to $\$632 \pm 690$ ($p = 0.004$), and total costs from $\$2,538 \pm 2,918$ to $\$1,095 \pm 1,153$ ($p = 0.009$) as shown in Table 4. These are conservative estimates, because we included the non-PCU (more costly) segment of the stay in the PCU patients, which raised the average charges and costs of the PCU cohort.

T4

Although we have not formally measured it, patient and family satisfaction remains high. We regularly receive thank you notes from patients and families, had an outstanding response to our first annual memorial service, and have been recognized as one of the innovators in palliative care.¹¹

We studied some process indicators for care of the 38 patients compared to their controls. For in-

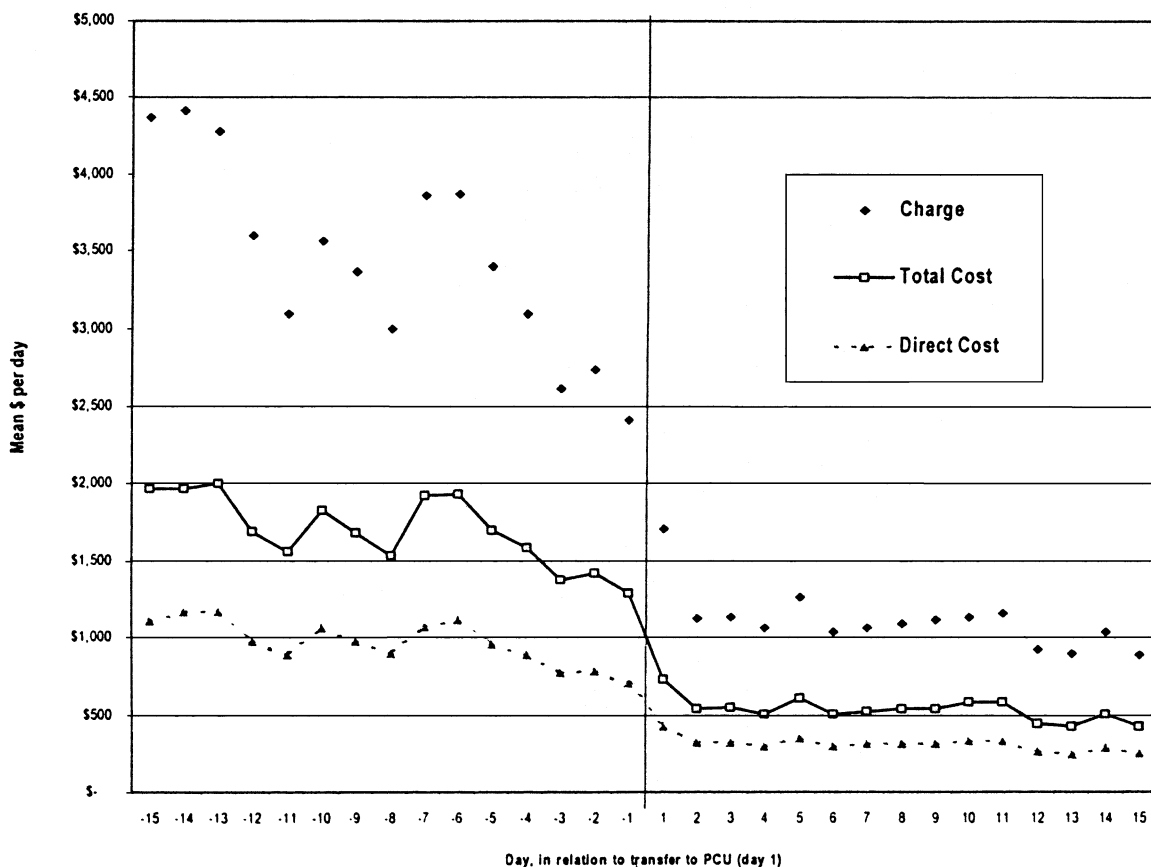


FIG. 1. Mean charge, total cost, and direct cost per day, prior to and after transfer to Palliative Care Unit (PCU). May 1, 2000 to December 30, 2000; 123 accounts represented. Number of cases per day ranges from 11 (for 15th day in PCU) to 123 (for 1st day in PCU). Hospital claims only. The vertical line is the day of transfer.

TABLE 3. COMPARISON OF PCU AND CONTROL SUBJECTS

<i>Characteristic</i>	<i>PCU</i>	<i>Control</i>	<i>p value</i>
Number	38	38	
Age (years)	57.5 ± 13.9	56.6 ± 13.7	NS
Race	60.5% black	57.9% black	NS
Gender	42.1% female	42.1% female	NS
Diagnosis			
Cancer			NS
Lung	8 (21%)	8 (21%)	
Breast	3 (8%)	3 (8%)	
Colon	3 (8%)	3 (8%)	
Prostate	3 (8%)	3 (8%)	
Other cancers	13 (34%)	13 (34%)	
AIDS	8 (21%)	8 (21%)	NS
Care type			
ICU stay (days)	1.53 ± 5.41	3.58 ± 8.82	NS
Radiation	2 (5%)	2 (5%)	NS
Surgery	8 (21%)	13 (34%)	NS

PCU, Palliative Care Unit; AIDS, acquired immune deficiency syndrome; ICU, intensive care unit.

stance, all PCU patients had pain scores measured, compared to two thirds of non-PCU patients, and all PCU patients had chaplain visits offered compared to one third of the non-PCU patients. In all but one of the control cases, death was predictable from the admission history and physical, yet only one had a hospice discussion, and none had enrollment in hospice (the patient died while waiting for a hospice bed at a local Veterans' Administration Medical Center). There were substantial opportunities to reduce the care in nearly every case, such as stopping oxygen unless dyspnea was present (minimum \$125 charge per day); stopping megestrol acetate (\$12 per day for 800-mg suspension), omeprazole (\$3 or more per day) or other proton pump inhibitors, intravenous fluids, etc.

DISCUSSION

Appropriate care of medically complex terminally ill patients in a high-volume, specialized unit appears to significantly lower cost. Our daily

charges and costs of dying patients decreased substantially by the use of standardized procedures delivered by specialists in a high-volume setting.

Others have found similar results with attempts to improve end-of-life care, although no center has reported results for in-hospital end-of-life care. A randomized clinical trial of a nurse coordinator for terminally ill patients in England did not change disease outcomes but total costs were reduced from £8814 to £4414 for cost savings of 41%.^{13,14} The savings came from decreased hospital days and a shift to outpatient care.

The City of Hope National Medical Center designed a three-part program to prevent unnecessary hospitalizations for pain control. Pain admissions decreased from 4.4% to 3.0% with a cost savings of \$1,666 per day that equaled \$2,719,245.¹⁵ It is important to change the type of care, or choose the type of care to which this model is applied, or costs may simply be shifted from one source to another with only minor net savings.¹⁶⁻¹⁸

TABLE 4. DAILY CHARGES, DIRECT COSTS, AND TOTAL COSTS OF CONTROLS AND CASES, n = 38

	<i>Control, non-PCU</i>	<i>PCU</i>	<i>p value</i>
Charges	\$5,304 ± 5,850	\$2,172 ± 2,250	0.005
Direct costs	\$1,441 ± 1,438	\$ 632 ± 690	0.004
Total costs	\$2,538 ± 2,918	\$1,095 ± 1,153	0.0009

PCU, Palliative Care Unit.

Bruera¹⁹ implemented a Regional Palliative Care Program to increase access of terminally ill patients to palliative care, and to decrease in-hospital deaths and lengthy admissions. Deaths in acute care facilities declined from 84%–55%; the number of dying patients receiving palliative care increased from 23%–71%, and cost savings were estimated at \$1,700,000 Canadian. Our group developed a the Rural Cancer Outreach Program (RCOP) between two rural hospitals and the Medical College of Virginia's (MCV) Massey Cancer Center to bring state-of-the-art cancer care to medically underserved rural patients.²⁰ Improvements were noted in pain control as measured by morphine use, which increased 700% the first 2 years and has been sustained. The cost for each RCOP patient admitted to MCV decreased by more than 40%, compared to only a 2% decrease for all other cancer patients consistent with increased coordination among providers.²¹

There are some obvious shortcomings to this study. First, it was not a randomized controlled trial because it was not ethical to randomize to "best care by experts using state of the art standardized algorithms in a dedicated unit" to regular hospital care. The rapid acceptance of the unit now prevents an in-hospital randomization. Second, at least some of the savings can be attributed to the change in goals of care. That is, once people are clearly identified as dying, much of the costly intervention is stopped. However, in our consultation we often found evidence of intensive and expensive interventions (multiple methods of pain control, expensive antibiotics, total parenteral nutrition or tube feedings, oxygen use, planned diagnostic tests such as magnetic resonance or computer tomography scans, etc.) when it was quite clear that the patient and family were accepting death. Those patients who were not transferred generally kept these interventions. The most likely reason is that the attending medical care team did not know how to change care patterns. A curriculum to teach the skills of defining goals of care and switching from active treatment to palliative care is now available.²² Last, the costs in the rest of the hospital could be inflated, but our costs are midrange in our insurance market.

We addressed some of these issues with the case-control study of patients who died without the benefit of the PCU team—and showed that costs were reduced by nearly 60%. We cannot be sure that the patients in the case-control group

were completely similar because this was not a randomized trial. However, we did review the charts and found no difference in demographics, disease status, predictability of death, type of intervention, etc. In addition, our PCU group for this study included the more expensive non-PCU portion of their costs, before transfer and standardization of care. Had we excluded the care and cost prior to PCU stay, the differences between the two groups would be even more striking.

In summary, appropriate standardized care of medically complex terminally ill patients in a high-volume, specialized unit appears to lower cost significantly. This is supported by other studies of coordinated care, regional programs, and standardization of palliative and cancer care. If these findings are confirmed by other studies, particularly randomized controlled trials, the cost savings would be significant.

ACKNOWLEDGMENTS

We are indebted to the Thomas Hospice Foundation and many individual members for continued essential support, the excellent staff of the Thomas Palliative Care Unit, and Karen G. Scott for expert manuscript preparation.

Supported in part by an unrestricted research grant from the Jessie Ball duPont Fund, Jacksonville, Florida, the Thomas Hospice Foundation, Richmond, Virginia, a grant from the Office of Cancer Communications, National Cancer Institute (RFP CO 94388-63) (T.J.S.), and the Project on Death in America Faculty Scholars Program, Open Society, New York (T.J.S., P.C.).

REFERENCES

1. SUPPORT Principal Investigators: A controlled trial to improve care for seriously ill hospitalized patients. The study to understand prognoses and preferences for outcomes and risks of treatments (SUPPORT). *JAMA* 1995;274:1591–1598.
2. Lubitz JD, Riley GF: Trends in Medicare payments in the last year of life. *N Engl J Med* 1993;328:1092–1096.
3. Riley GF, Potosky AL, Lubitz JD, Kesler LG: Medicare payments from diagnosis to death for elderly cancer patients by stage at diagnosis. *Med Care* 1995;33:828–841.
4. Emanuel EJ, Emanuel LL: The economics of dying. The illusion of cost savings at the end of life. *N Engl J Med* 1994;330:540–544.

5. Payne S, Coyne P, Smith TJ: The health economics of palliative care: We can afford to die well but it will require coordinated care with someone in charge. *Oncology* 2002;16:801–808.
6. Covinsky KE, Landefeld CS, Teno J, Connors AF, Jr., Dawson N, Younger S, et al.: Is economic hardship on the families of the seriously ill associated with patient and surrogate care preferences? SUPPORT Investigators. *Arch Intern Med* 1996;156:1737–1741.
7. Blumenthal D: Controlling health care expenditures. *N Engl J Med* 2001;344:766–769.
8. Hewitt M, Simone JV: Ensuring Quality Cancer Care. National Cancer Policy Board, Institute of Medicine and Commission on Life Sciences, National Research Council. Washington, D.C.: National Academy Press, 1999.
9. Hillner BE, Smith T J, Desch CE: Assessing the quality of cancer care in the United States: The quality of cancer care. Does the literature support the rhetoric? *J Clin Oncol* 2000;
10. Smith TJ, Hillner BE: Ensuring quality cancer care by the use of clinical practice guidelines and critical pathways. *J Clin Oncol* 2001;19:2886–2897.
11. Lyckholm LJ, Coyne P, Smith T: Palliative care program—Medical College of Virginia Campus of Virginia Commonwealth University. The Robert Wood Johnson Foundation/Milbank Memorial Fund, In: Pioneer Programs in Palliative Care: Nine Case Studies. New York: 2000;93–113.
- AU1 → 12. Smith T, von Roehn J, von Gunten C, Loprinzi C: ASCO Curriculum: Optimizing cancer care—The importance of symptom management. In: Smith T, von Roehn J, von Gunten C, Loprinzi C (eds): Kendall/Hunt Publishing Company; 2001:
13. Addington-Hall JM, MacDonald LD, Anderson HR, Chamberlain J, Freeling P, Bland JM, Raftery J: Randomized controlled trial of effects of coordinating care for terminally ill cancer patients. *BMJ* 1992; 305:1317–1322.
14. Raftery JP, Addington-Hall JM, MacDonald LD, Anderson HR, Bland JM, Chamberlain J, Freeling P: A randomized controlled trial of the cost-effectiveness of a district co-ordinating service for terminally ill cancer patients. *Palliat Med* 1996;10:151–161.
15. Grant M, Ferrell BR, Rivera LM, Lee J: Unscheduled readmissions for uncontrolled symptoms. *Nurs Clin North Am* 1995;30:673–682.
16. Shepperd S, Harwood D, Jenkinson C, Gray A, Vessey M, Morgan P: Randomised controlled trial comparing hospital at home care with inpatient hospital care. I: months follow up of health outcomes. *BMJ* 1998; 316:1786–1791.
17. Shepperd S, Harwood D, Gray A, Vessey M, Morgan P: Randomised controlled trial comparing hospital at home care with inpatient hospital care. II: Cost minimisation analysis. *BMJ* 1998;316:1791–1796.
18. Richards SH, Coast J, Gunnell DJ, Peters TJ, Pounford J, Darlow MA: Randomised controlled trial comparing effectiveness and acceptability of an early discharge, hospital at home scheme with acute hospital care. *BMJ* 1998;316:1796–1801.
19. Bruera E, Neumann C, Gagnon B, Brenneis C, Quan H, Hanson J: The impact of a regional palliative care program on the cost of palliative care delivery. *J Palliat Med* 1999;3:181–186.
20. Desch CE, Smith TJ, Briendel CA, Simonson CJ, Kane N: Cancer treatment in rural areas. *Hosp Health Svcs Admin* 1992;37:449–463.
21. Desch CE, Grasso K, McCue M, Buonaiuto D, Grasso K, Johantgen MK, Shaw JE, Smith TJ: A rural cancer outreach program lowers patient care costs and benefits both the rural hospitals and sponsoring academic medical center. *The J Rural Health* 1999;15:157–167.
22. Abrams J: ASCO Curriculum: The Importance of Symptom Management—Care Without Chemotherapy. In: Smith T, von Roehn J, von Gunten C, Loprinzi C (eds): Kendall/Hunt Publishing Company; 2001.

AU2

Address reprint requests to:

Thomas J. Smith
Virginia Commonwealth University
Division of Hematology/Oncology
MCV Box 980230
Richmond, VA 23298-0230

E-mail: tsmith@hsu.vcu.edu

SMITH

AU1

Provide title of book, page range, city/state for 12

AU2

Provide title of book, page range, city/state for publisher in ref. 22