

The Cost of Comfort: Economics of Pain Management in Oncology

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TALKING POINTS

Physicians

Pharmacy

Formulary

Cancer Nurses

- The effective treatment of pain is becoming increasingly important to patients and family caregivers.
- The unnecessary complications and high cost of polypharmacy warrant the development and prescription of single agents to treat cancer pain.
- Failure to respond to cancer pain results in costs such as hospital readmissions and other expenses.
- Applying state-of-the-art knowledge in pain management can yield pain relief in a manner that is also consistent with the most efficient use of resources.

Abstract

Cancer pain is a very common symptom associated with all phases of the illness from diagnosis through end of life care. Major advances in pain management have created many treatment options and these entail significant economic implications. This article reviews a framework for evaluating costs associated with pain management. It also discusses important implications for both clinicians and administrators in providing optimum pain relief within the context of the most cost-effective care.

Introduction

Pain is one of the most common problems in cancer care and one of the most costly in terms of the health care system and the patient experiencing it. The guidelines for the treatment of cancer pain published in 1994 by the Agency for Health Care Policy and Research (AHCPR) estimate that approximately 50% to 60% of patients undergoing active treatment for cancer and as many as 80% to 90% of those with advanced disease will experience moderate to severe pain.¹ Virtually all patients with cancer will experience significant pain during the course of their illness. Advances in cancer care, such as chemotherapy, stem cell transplants, and multimodality treatment, have extended survival of cancer patients, yet they have also extended the amount of

time that cancer patients experience pain.²

Pain is an unfortunate companion for patients throughout the cancer experience. Pain is a common symptom presenting even before diagnosis. It is often the symptom that triggers the initial visit to the physician, which leads to cancer diagnosis. Pain is a common companion during active treatment, with acute pain often experienced during chemotherapy or radiation therapy. Many pain syndromes, such as postmastectomy or postthoracotomy syndromes, may not even present until months or years after the initial treatment. Pain is very common during advanced disease and unfortunately is expected in end of life care.¹ Throughout the cancer trajectory, the costs of pain management include both direct and indirect costs, costs to patients and family caregivers, and enormous costs to the health care system.³

Major advances in pain management and palliative care over the past decade have contributed greatly to our understanding of pain and to its treatment. Advances in the treatment of neuropathic pain using adjuvant medications, treatment of bone pain with radiation and bisphosphonates, and evolving knowledge of the role of anesthetics and other invasive treatments have advanced care, yet they have also made cost issues a very important element of overall cancer economics.^{2,4,6}

Cancer centers will be increasingly challenged to address cancer pain management for many reasons. Improved pain management and palliative care are more often being recognized as essential elements of comprehensive cancer programs, and pain management is being evaluated as an essential program component by many accrediting bodies.⁷ Increased consumer demand for adequate pain management has escalated in recent years due to professional and public focus on end of life care. Cancer pain is increasingly in the media with recent programs on major networks emphasizing the problem of pain and informing the public that pain can be relieved. There is heightened consumer expectation for pain management and, parallel to that, an increased liability for providers who fail to meet this emerging standard of pain-related care.

Costs Associated With Pain Management

Evaluating the costs of pain treatment is a complex and multidimensional task. In 1994, the Cancer Pain Panel of the AHCPR developed a framework to assist with evaluating potential costs associated with pain management (Table 1).³ Such costs include, but clearly are not limited to, those associated with oral medications. The current standard of pain management emphasizes not only using opioid anal-

Table 1. FRAMEWORK FOR COST ANALYSIS RELATED TO PAIN

1. Costs associated with oral medications (NSAIDs, opioids, adjuvant medications)
2. Costs associated with parenteral analgesics (IV or SC medications)
3. Costs associated with spinal analgesics
4. Personnel costs (eg, nursing time, pain teams)
5. Costs of surgical procedures
6. Costs of anesthetic procedures
7. Costs of radiation therapy
8. Costs of unrelieved pain at home
9. Costs of nondrug interventions (physical and cognitive methods)
10. Cost savings by various care settings
11. Costs associated with morbidity
12. Costs to justify services (eg inpatient admission)
13. Reimbursement biases
14. Indirect costs to patients and families
15. Legal risks for pain treatment/undertreatment

NSAID=nonsteroidal anti-inflammatory drugs.
Adapted with permission from Ferrell BR, Griffith H.³
Ferrell B. *ONE*. Vol 1, No 9, 2000.

gesics but also combining nonsteroidal anti-inflammatory drugs (NSAIDs) and adjuvant medications such as antidepressants or anticonvulsants for neuropathic pain. Parenteral analgesics, eg, continuous morphine infusions for severe pain or for those who cannot swallow oral medications, also generate significant costs. There are costs associated with the use of spinal analgesics, and the number of epidural and intrathecal infusions used to treat pain has increased, particularly for those patients requiring escalating doses or with intolerable side effects related to high-dose oral analgesics.

An additional cost consideration is personnel. Cancer centers are increasingly facing both staff limitations and pain management that involves significant staff time, such as requiring nurses to administer oral medicines every 3 to 4 hours around the clock. Cancer centers must also address personnel costs associated with specialty pain services, pain clinical specialists, or consulting physicians.

There are also many costs associated with multimodality treatment of pain management including costs of surgical procedures, anesthetic procedures, and radiation therapy.^{9,12} At the City of Hope National Medical Center, one of our areas of research is the costs associated with unrelieved pain at home. As administrators ask the question, "What will it cost for us to improve pain management services?" they are also challenged to address "What is it currently costing us for not providing the most effective pain management?"

Use of nondrug interventions including physical modalities (heat, cold, massage,

etc) and cognitive methods (relaxation, imagery, counseling) can also be costly. Increased consumer interest in complementary medicine extend to pain management and will be a program consideration of the future. The costs of various care settings have certainly become a major factor in cancer care as program directors and clinicians have considered the cost efficiency of different settings such as home care, outpatient clinic, or inpatient care.^{13,14} The same considerations applied in designing the best setting for chemotherapy or radiation therapy are applicable to determining the setting most appropriate for pain management treatments.

Additional costs are those that might be associated with morbidity from pain treatments, eg, placement of an epidural catheter, infection, or opioid-related side effects. Another important element to consider are costs that are in fact incurred to justify services. For example, in the past, physicians have often admitted patients with uncontrolled pain to the hospital. Further, many felt compelled to initiate invasive treatment, such as parenteral infusions, to justify the hospital admission rather than use less invasive modalities, such as oral medication, to avoid having the admission denied based on lack of patient acuity or need for skilled care.

In pain management, unfortunately, there are very serious reimbursement biases. The most obvious is that oral analgesics are not reimbursed on an outpatient basis whereas far more costly invasive modalities may be reimbursed by Medicare

or other payors. Costs in pain management are not limited to healthcare providers; they clearly significantly impact patients and their family caregivers.¹⁵

And finally, as standards of care related to pain improve, there will be significant legal risks for those who undertreat pain or who fail to apply pain treatments appropriately. The legal community has sharply increased its interest in pain management as an area of patient care to be scrutinized. Clearly, this list of cost considerations exemplifies the importance of clinicians and administrators evaluating current practices and designing a comprehensive approach to assess current pain management practices not only from the clinical view of effective care but also from the cost perspective.

Examples of Costs Associated With Effective Pain Treatment

Previously, the choice of pain management was based on a few standards of care and was largely a choice of individual physicians. Through quality improvement activities, significant attention has been focused in recent years on evaluating pain management practices. Table 2 presents data collected by City of Hope researchers to evaluate patient-controlled analgesia (PCA) in a group of cancer patients who were receiving pain medicine through a PCA device. The standard of care would suggest that parenteral infusion of opioids using PCA should be reserved for those patients whose pain cannot be managed using less costly, less invasive oral analgesics. A chart audit of the 136 patients studied revealed that, prior to initiating PCA, only 48% of the patients had ever been given a trial of oral morphine; 14% of the patients had never tried anything beyond acetaminophen with codeine; and 38% of the patients had moved directly from other mild/moderate analgesics such as oxycodone or NSAIDs directly to intravenous morphine. This study also demonstrated that once patients were moved to the parenteral route, the amount of medication administered increased significantly. Because this study was retrospective, the rationale for this increase could not be "teased out." Yet it clearly demonstrates a significant

Table 2. CHART AUDIT RESULTS

Prior Oral Analgesics Used in Patients (N=136) Advanced to PCA		
Morphine	48%	
Acetaminophen with codeine	14%	
Other mild/moderate analgesics (Oxycodone, NSAIDs, acetaminophen, propoxyphene)	38%	
Equianalgesic Doses OmEq/24 hours		
While on oral medication	248 mg	OmEq
While on parenteral medications	1428 mg	OmEq
Associated Procedures Required to Initiate Parenteral Medications		
Venous access device	7%	
Central line placement	12%	
Peripheral infusion line placement	46%	
Parenteral Route Initiation Due to Side Effects N=61 (45% of Total N of 136)		
	N	%
Nausea	22	36%
Constipation	21	34%
Sedation	9	15%
Confusion	6	10%
Other	3	5%
Order for Parenteral Analgesics Written by		
Oncologist	81%	
Other (anesthesia/neurology)	19%	

PCA=patient-controlled analgesia; OmEq=oral morphine equivalents.
Adapted with permission from Ferrell BR, Rhiner M.¹⁴
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Table 3. ESTIMATED CHARGES FOR PCA MORPHINE PER MONTH* (N=9 SITES)

Pump rental	\$31.47/day
Other (medications, cassette refills, pharmacy refill charges, tubing, and supplies)	+ \$122.68/day
Total direct charges	\$154.15/Day
TOTAL DIRECT CHARGES	\$4624.50/Month

*Based on charges determined using a standard of 180-mg IV morphine administered on an outpatient basis using a PCA pump. Costs calculated in 1993. Charges related to initiating vascular access devices, central lines, home visits, or family expenses not included. Reprinted with permission from Ferrell BR, Rhiner M.¹⁴
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Table 4. MOST COMMON REASONS FOR UNSCHEDULED READMISSIONS TO A CANCER CENTER (N=1351)*

Reason	N	%
Fever	200	14.8
Sepsis	152	11.3
Uncontrolled pain	103	7.6
Dehydration	79	5.8
Pneumonia	73	5.4
Neutropenia	55	4.1
Nausea and vomiting	45	3.3
Small bowel obstruction	40	2.9
Other infections	29	2.1
Respiratory distress	28	2.0

*Data from October 1992 through September 1993. Reprinted with permission from Grant M, Ferrell BR, Rivera LM, Lee J.¹⁷
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Table 5. COMPARISON OF ADMISSION COSTS FOR UNCONTROLLED PAIN USING ALL HOSPITAL ADMISSIONS

Year	Total Hospital Admissions	N/% of Admissions for Uncontrolled Pain	Average Length of Stay (days)	Cost (\$)
1989-1990	5772	255/4.4	12.0	5,097,960
1992-1993	4066	121/3.0*	11.8	2,378,715
Cost decrease				2,719,245

*Of 121 admissions, 103 were unscheduled readmissions and 18 were new admissions. Reprinted with permission from Grant M, Ferrell BR, Rivera LM, Lee J.¹⁷
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increase in the amount of medication likely in the extent of such side effects as sedation and constipation.

The data also demonstrate that, once a patient is transferred from the oral route of analgesia to parenteral, other significant costs are incurred. For example, the decision to move a patient from oral to parenteral medications required placement of a peripheral infusion line in 46%, a venous access device in 7%, and a central line in 12% of the patients in this study. The data further demonstrate that parenteral analgesia was often initiated due to side effects such as nausea, constipation, and sedation, and that aggressive treatment of side effects is important to maintain the least invasive and least costly pain management.

Very importantly, we found that 81% of the time, the patient's oncologist was responsible for transferring the patient from oral to parenteral administration. This indicates that even a relatively simple issue in pain management, such as conversion from oral to parenteral analgesics, has a great potential for overuse and significant associated costs. Table 3 presents an estimate of the costs associated with the nine sites participating in this study. Total direct charges of PCA morphine per month were \$4,624; this did not include charges related to initiating venous access devices, central lines, home care visits, or family expenses—all of which can be considerable. Complete data and discussion of this issue have been previously reported.¹⁶

Another significant area of costs associated with pain management—unscheduled hospital admissions—has also been investigated at the City of Hope National Medical Center. Beginning in 1991, Grant and Ferrell evaluated reasons for unscheduled cancer center readmissions. In the 1991 initial analysis, pain was the second most common reason for an unscheduled hospital admission, second only to fever. This same analysis also estimated that the costs of uncontrolled pain admissions were over \$5 million.

In 1994, after implementing very aggressive quality improvement efforts in pain management, we carried out another evaluation. As shown in Table 4, pain was

Table 6. THE HIGH COST OF POLYPHARMACY

Inappropriate pain regimen in an 81-year-old man with metastatic prostate cancer

Date	Medication Ordered
1/7/98	Acetaminophen with codeine 1 or 2 tablets every 3-4 hours prn
1/13/98	Hydrocodone 1 or 2 tablets every 3-4 hrs prn
1/17/98	Long-acting oxycodone 40 mg bid
1/24/98	Fentanyl patch 50 mcg every 2-3 days

Preferred Pain Regimen

- Long-acting morphine 100 mg bid
- Immediate-release morphine 20 mg prn for breakthrough pain

Costs of Polypharmacy

- Medication costs
- Poor pain relief
- Increased potential for side effects and morbidity
- Poor patient compliance

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Table 7. WHEN MORE IS LESS: USE OF AGGRESSIVE PAIN TREATMENT

Case Example	Cost Implication
<p>Radiation Therapy A 52-year-old woman with metastatic breast cancer has developed severe right femur and rib pain. She had been receiving rapidly escalating doses of oral opioids, now being converted to an IV infusion necessitating significant costs for home care and home infusion services (about \$7,000 per month). A radiation therapy consult suggests a course of palliative radiation to the targeted sites.</p>	<p>A short course of outpatient high-dose palliative radiation results in significant decrease in pain; parenteral opioids discontinued and oral opioids and NSAIDs initiated.</p>
<p>Epidural Analgesia A 60-year-old man with prostate cancer has developed escalating pain necessitating >4,000 mg oral morphine per day. This relieves pain but creates intolerable side effects, including constipation and extreme sedation, causing him to be unable to work. Costs of oral analgesics and laxatives are extreme but more important is loss of income and potential loss of health insurance. Placement of an epidural catheter is recommended. The patient is estimated to have 1 to 2 years of life remaining.</p>	<p>Initial costs of placing the epidural are anticipated to be offset by longer-term benefit of reduced medication costs and indirect benefits to the patient.</p>
<p>Pain Consultation A 71-year-old man with lymphoma had a stem cell transplant; he has developed several types of pain including chronic abdominal postradiation pain, postherpetic neuralgia, and chemotherapy-induced peripheral neuropathy. He has been managed by his hematologist but pain relief has been minimal with three hospitalizations and almost weekly clinic visits for uncontrolled pain over the past 3 months. He is on several oral medications and a transdermal patch and is now hospitalized again to receive IV morphine.</p>	<p>The patient is seen by the pain service while hospitalized for initial consultation. A relatively simple regimen is recommended—including oral oxycodone, an NSAID, and an adjuvant medication for nerve pain. After discharge, the pain service sees the patient twice for dose titration and then his hematologist resumes his care.</p>
<p>Surgical Intervention A 90-year-old woman with colon cancer has been cared for at home by her family with only mild pain and stable disease. The patient develops a sacral wound, which becomes excruciatingly painful. Over 1 month, her care has become complex and costly including home care, wound dressings, pain medications, and intense family burden.</p>	<p>With surgical closure of the wound, pain is resolved and wound care eliminated. Family burden is greatly reduced.</p>

NSAID=nonsteroidal anti-inflammatory drugs. Ferrell B. *ONE*. Vol 1, No 9, 2000.

now the third most common reason for readmission, with fever and sepsis more common. Table 5 presents a cost analysis comparing the initial 1989-1990 data and the 1992-1993 reevaluation. As admissions

for uncontrolled pain decreased from 255 to 121 per year, costs for these admissions decreased by \$2.7 million for the year.¹⁷

Many costs associated with pain management are very complex and require

extensive analysis by pharmacists, pain clinicians, and administration. However, some costs present fairly simple problems that can be relatively easily remedied by applying existing standards of pain treatment. Table 6 illustrates a very common problem, the high cost of polypharmacy. In many other aspects of cancer care, clinicians have long known that there is no reason to give a patient several different medications if one medication would provide the same effectiveness at a greatly reduced cost. For example, the use of one antiemetic agent instead of three or four is not only less expensive, but also generally leads to far greater patient compliance and fewer complications.

Inappropriate pain regimens involving several medications are common. In the example given in Table 6, an elderly gentleman was experiencing pain and being treated by his oncologist with acetaminophen with codeine. When his pain worsened, he was prescribed hydrocodone along with his acetaminophen with codeine. When his pain increased, the physician, who was uncomfortable using morphine and who was also aware of the patient's reluctance to do so, began a regimen of bid oxycodone while continuing the two short-acting analgesics. When the patient presented to the clinic for the sixth time within the month for uncontrolled pain, the physician added a fentanyl patch.

The patient became confused and began applying his fentanyl patch twice a day rather than every 2 to 3 days. He was using oxycodone for breakthrough pain and was still adding the two short-acting analgesics when he experienced episodes of untreated pain. A preferable regimen would be to determine a single equianalgesic dose based on the patient's past pain regimen; in this case it would be bid morphine sulfate, a long-acting morphine product. The patient was also given short-acting morphine to be used as needed for breakthrough pain, which is the standard for any patient receiving a long-acting analgesic. In this case, the costs for polypharmacy included those for the medications themselves, poor pain relief, increased potential for side effects, and poor patient compliance.

Use of Aggressive Pain Treatment

In the field of cancer care economics, clinicians and program administrators have learned that often "more is less." Applying aggressive, state of the art cancer care often initially is costly yet it may result in overall diminished costs of care.¹⁸⁻²² As advances in pain management continue, program administrators will be required to work closely with clinicians to evaluate the most appropriate use of aggressive pain modalities. In many

instances, more costly modalities will in fact provide the most effective care and at a reduced cost. Table 7 includes four patient examples of what would be considered relatively expensive modalities that, when applied appropriately, actually decrease costs.

Cost to Patients and Family Caregivers

Many studies of cancer care have demonstrated that costs to the health care system are often matched or even

surpassed by costs incurred by patients and their family caregivers, and pain management is no exception. Data in Table 8 are derived from a recently concluded National Cancer Institute-funded project involving teaching pain education to patients and family caregivers at home.¹⁵ The data illustrate that there are many costs associated with pain management to patients and the family caregivers. In many instances, severe pain is the turning point in illness; it marks the time when a patient becomes far more dependent on family caregivers. Uncontrolled pain creates significant burdens on both patients and their family caregivers. It often causes a family member to stop working even as out-of-pocket expenses are increasing.¹⁵

Table 8. CAREGIVER FINANCES SURVEY

Family Caregivers of Cancer Patients with Pain (N = 231)
Over the Past 3 Months:

Income	
Change in caregiver income	33%
Change in patient income	27%
Cancer-related expenses	
Increase in insurance premiums	4.8%
Mean increase per month (range)	\$93 (\$16-\$260)
Exceeded benefit limits since diagnosis	4%
Out of pocket expenses	
	Mean
Doctor bills	\$312
Hospital bills	\$302
Medical supplies	\$213
Rx medications	\$203
ER/urgent care	\$263
Other	\$332
Expenses specific to pain	\$188
Total (range)	\$536 (\$0-\$4000)
Travel expenses	
66% had expenses for travel	
42% had pain-related travel expenses	
Mean cost based on \$0.31/mile \$127	
Miles driven: range 1-5000; mean 409	
Over the counter medications	
56% had out of pocket expenses	
Mean \$77; range \$1.37-\$600	
Related to pain: 20%	
Alternative pain relief	
18% incurred out of pocket expense	
Mean cost: \$283	
Common methods (eg, herbs, massage, cat's claw, bee cream, teas, vitamins)	
Paid-for household chores because of pain	32%
mean cost	18%
	\$386; range \$20-\$6000
Illness caused caregiver to:	
Use savings	21%
Sell property	4%
Sacrifice other things	58%
Take a second job	3%
Apply for unemployment	5%
Borrow money	16%
Not pay bills	9%
Declare bankruptcy	2%
Change lifestyle	37%
Caregiver lost wages	23% yes
Was pain a factor?	21% yes
	29% no
	47% N/A
Time devoted to caregiving/day: mean 747 minutes; range 0-1440 minutes	
Time devoted to pain management: mean 194 minutes; range 0-1440 minutes	

Adapted from Ferrell BR, Grant, Borneman T, Juarez G, ter Veer A.¹⁵ Ferrell B. *ONE*. Vol 1, No 9, 2000.

Use of Specialty Services

Another major challenge for cancer programs in the near future will be evaluation of existing services to meet the needs of patients for pain management and palliative care. To provide comprehensive care, cancer centers will need to address important issues such as the provision of pain specialty services, the role of palliative care consultation teams, and the implementation of hospice programs.²³⁻²⁹ Some key resources that may be of help to cancer centers in addressing these concerns are included in the Appendix. Another major impetus for considering such issues is the new standard of pain management now being implemented by the Joint Commission for Accreditation of Healthcare Organizations.⁷

Summary

The problem of pain is increasingly moving to the forefront of professional and public attention and has become a high priority for accrediting bodies. It is a topic of increasing interest to the legal community as undertreatment of pain has emerged as a common focus of liability.³⁰⁻³² Just as cancer programs have worked in recent years to design the most comprehensive yet cost-effective treatment centers, every program will be challenged again to advance standards of pain management within realistic cost limitations. ♦

APPENDIX: RESOURCES

City of Hope Pain/Palliative Care Resource Center
Nursing Research and Education
1500 East Duarte Road
Duarte, CA 91010
Ph: (626) 301-8346
Fax: (626) 301-8941
Web site: <http://prc.coh.org>
(This resource center includes more than 300 materials to assist with improving pain management and end-of-life care. More than 200 materials are available on the Web site.)

Center to Advance Palliative Care in Hospitals and Health Systems
Contact: G. Robert D'Antuono, Deputy Director
Mount Sinai School of Medicine
Box 1070
New York, NY 10029
Phone: (212) 241-7885
Fax: (212) 860-9737
E-mail: robert.dantuono@mssm.edu
Web site: <http://www.capcmssm.org>

American Academy of Hospice and Palliative Medicine (AAHPM)
11250 Roger Bacon Drive, Suite 8
Reston, VA 20190-5202
Ph: (703) 787-7718
Fax: (703) 435-4390
Web site: <http://www.aahpm.org>
E-mail: ashpm@aahpm.org

Americans for Better Care of the Dying (ABCD)
2175 K Street, NW #810
Washington, DC 20037
Ph: (202) 530-9864
Web site: <http://www.abcd-caring.org>

American Pain Foundation
111 South Calvert Street, Suite 2700
Baltimore, MD 21202
Web site: <http://www.painfoundation.org>
E-mail: ampainfoun@aol.com

American Pain Society (APS)
4700 W. Lake Avenue
Glenview, IL 60025
Ph: (847) 375-4715
Fax: (847) 375-4777

American Society of Pain Management Nurses (ASPMN)
7794 Grow Drive
Pensacola, FL 32514-7072
Ph: (850) 473-0233
Fax: (850) 484-8762
Web site: <http://www.aspmn.org>
E-mail: ASPMN@puetzamc.com

Lipman AG, Tyler LS, Jackson KC, eds. *Evidence-Based Symptom Control in Palliative Care: Systematic Reviews and Validated Clinical Practice Guidelines for 15 Common Problems in Patients with Life Limiting Disease*. Binghamton, NY: Haworth Press, 2000.
(This new text provides cost data and evidence for selection of treatments for pain and other symptoms.)

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