

The Use of Complementary and Alternative Medical Providers by Insured Cancer Patients in Washington State

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BACKGROUND. Insurance coverage of complementary and alternative medicine (CAM) is expanding. However, to the authors' knowledge, little is known concerning CAM utilization among cancer patients under the insurance model of financing. In this study, the authors evaluated CAM provider utilization by cancer patients in a state that requires the inclusion of alternative practitioners in private, commercial insurance products.

METHODS. An analysis was carried out of year 2000 claims data from two large Washington State insurance companies.

RESULTS. Of 357,709 claimants, 7915 claimants (2.3%) had a cancer diagnosis. Among cancer patients, 7.1% had a claim for naturopathy, acupuncture, or massage; and 11.6% had a claim for chiropractic during the study year. The use of naturopathy (odds ratio [OR], 2.0; $P < 0.001$) and acupuncture (OR, 1.4; $P < 0.001$) were more common, and the use of chiropractic was less common (OR, 0.9; $P < 0.001$) for cancer patients compared with those without cancer. No significant differences were noted in the use of massage between the two groups. Except in 2 individuals (0.03%), cancer patients also had at least 1 conventional provider claim during the year. Factors associated with nonchiropractic alternative provider use were female gender, the presence of metastatic cancer, hematologic malignancy, and the use of chemotherapy. Increased use of naturopathic physicians accounted for much of this trend. Musculoskeletal pain was the most common diagnosis at the CAM provider visit. Billed amounts for alternative services were $< 2\%$ of the overall medical bills for cancer patients.

CONCLUSIONS. A substantial number of insured cancer patients will use alternative providers if they are given the choice. The cost of this treatment is modest compared with conventional care charges. For individuals with cancer, CAM providers do not appear to be replacing conventional providers but instead are integrated into overall care. *Cancer* 2004;100:1522-30.

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I ncreasing use of complementary and alternative medicine (CAM) has been documented in the general population.¹ CAM utilization reportedly is even more common among individuals with cancer.^{2,3} A 2002 Western Washington State survey of patients with breast, colon, or prostate cancer found that 70.2% of respondents used CAM, and 16.6% had seen a CAM provider during the previous 12 months.⁴ Reasons that individuals may use CAM have been summarized previously.^{5,6} In breast cancer survivors, CAM use was a measure of greater psychological distress.⁷ Other evaluations have found that CAM

users also are high consumers of conventional care.⁸ To our knowledge the role of CAM providers in cancer care is not well documented, particularly with regard to which conditions these practitioners treat, whether CAM care is alternative or adjunctive to conventional care, and how much CAM provider services cost.

Most prior studies of CAM provider utilization by cancer patients have used survey methodology or patient self-report. These types of studies have important limitations. Nonparticipation rates can be significant.⁹ Survey data may be limited by patient recall; this underreporting increases with time and with the number of ambulatory visits.^{10,11} Furthermore, issues of sample size have restricted the ability to assess trends in smaller population groups, such as cancer patients, a population comprised of individuals with a heterogeneous group of diagnoses with and without metastatic disease. Only a very large sample could evaluate the utilization of providers by specific diagnoses, metastatic disease, and concomitant conventional therapies.

Insurance coverage of alternative medicine also is growing, thereby expanding options for third-party payment for CAM services.¹² Coverage issues surrounding CAM provider care and cancer likely will become more significant over time. The number of cancer patients is expected to double by the year 2050,¹³ and the baby-boom generation is more likely to use CAM than previous age cohorts.¹⁴ Cooper et al. predict that the number of CAM practitioners will double from 60,000 in 1995 to 120,000 in 2005.¹⁵

Advances in scientific evidence also will modify the use of specific CAM treatments and insurance coverage. For example, meta-analyses of clinical trials have shown that acupuncture is effective for nausea and emesis associated with chemotherapy.¹⁶ Acupuncture also generally is accepted as an option for pain management.^{17,18} Chiropractic, the most common form of CAM in general use in the U.S., is considered safe in most circumstances.^{1,8,19,20} However, reports individuals with bony metastases who developed paraplegia after spinal manipulative therapy may lead to restricted use of this modality among a subset of cancer patients.²¹

The presence or absence of health insurance has confounded attempts to assess independent factors associated with CAM utilization inasmuch as coverage varies by state, health plan, and the presence or absence of a CAM benefit. Because provider-based CAM treatments often are more expensive than self-administered treatments, their utilization is likely to be affected by insurance coverage. Moreover, previous CAM utilization studies frequently lump CAM provider groups together, obscuring the frequency of use

for a specific modality. For example, nationwide, chiropractic is more likely to be covered by insurance than any other CAM treatment, and this will bias results when disparate CAM services are combined in analysis.²²

To address previous study limitations, create a new method for the assessment of CAM provider utilization, and explore the effect of third-party coverage, we secured claims data from 2 of the largest insurance companies in Washington State representing approximately 41% of the total state insured population in the year 2000. Claims data exhibit high congruence with medical records data compared with patient surveys, both telephone and mail.^{23,24} Furthermore, research utilizing insurance claims does not involve patient or physician participation directly and, thus, is not subject to many of the nonparticipation problems associated with surveys. Because of its recent adoption of the Every Category of Provider (ECOP) law,²⁵ Washington State offers a unique venue to investigate CAM usage through insurance financing. The ECOP law requires that every category of licensed provider be included in private health insurance if their scope of practice encompasses medical conditions that the policy covers. Currently, chiropractors, naturopathic physicians, massage practitioners, and acupuncturists are licensed CAM providers in Washington State.

This article describes the use of individual, provider-based CAM services for naturopathic physicians, massage practitioners, chiropractors, and acupuncturists. We compared the use of these providers among individuals with cancer with use among individuals without cancer. In addition, we evaluated how factors such as urban location, gender, cancer diagnosis, metastatic disease, conventional cancer treatment, and secondary medical conditions affect the use of specific CAM providers. Finally, we estimated billed amounts for treatment of cancer patients by CAM provider type and compared these costs with the costs of non-CAM users.

MATERIALS AND METHODS

Study Population and Insurance Coverage

The current study was limited to Washington State enrollees in health insurance plans directly regulated by the ECOP law in the year 2000. This excluded Medicare, Medicaid, state-supplemental programs, and self-insured plans that are exempt from state regulation under the Employee Retirement and Income Security Act (ERISA). Because most adults age ≥ 65 years use Medicare, we limited our study sample to adults ages 18–64 years. So that our findings would be similar geographically to a previously published study of CAM use among Washington State cancer patients,⁴

we further restricted our study to enrollees who resided in the 13 Western Washington counties in the National Cancer Institute Surveillance Epidemiology and End Results-Puget Sound (SEER-PS) catchment area.²⁶

Of the estimated 5,894,000 individuals living in Washington State in the year 2000, 3,719,000 individuals (63%) were adults ages 18–64 years, of whom 3,270,000 individuals (88%) had some form of health care coverage.²⁷ Among these insured, 1,240,000 individuals (38%) were covered by the 2 companies that participated in this study. Of these, 851,000 individuals (69%) lived in 1 of the 13 counties of the SEER-PS catchment area. The analysis presented here was limited to those nonelderly adults who had both continuous enrollment and complete claims information for the year 2000. This group (346,428 individuals) represented approximately 41% of the total age group and geographically appropriate enrollees who were covered by our 2 participating carriers.

All insurance company products evaluated in the current study provided comprehensive medical coverage and used copayments, coinsurance, deductibles, and/or benefit limits to control utilization. Insurance products generally were categorized as health maintenance organization (HMO), point of service organization (POS), preferred provider organization (PPO), or indemnity/traditional fee for service. Because chiropractic coverage had been mandated by an earlier law in 1983,²⁸ both companies managed this service through self-referral, typically with a 10-visit annual limit. One company covered naturopathic medicine, acupuncture, massage (NAM) provider services either by allowing primary care providers to refer to these specialties (HMO product) or by permitting self-referral (POS, PPO, indemnity products) with the exception of massage, which was not covered in non-HMO products. Standard rates of coinsurance (ranging from 5% to 20%) and deductibles (ranging from \$0 to \$25) applied for this company. The other company provided access to a credentialed network of NAM providers either through self-referral (naturopathic physicians) or physician referral (acupuncturists, massage practitioners). This NAM benefit required a 50% coinsurance payment with a maximum allowable annual charge of \$1000.

Data Base

Enrollment data included a unique enrollee identification code, birth year, gender, residence zip code, product line, contract number, ERISA status, and month of active enrollment. The claims data contained a unique enrollee identification code, claim number, service date, service location, International

Classification of Disease-ninth edition (ICD-9) codes,²⁹ Current Procedural Terminology (CPT) codes,³⁰ Healthcare Common Procedural Coding System (HCPCS) codes,³¹ line-item charges, and provider type (including specific codes for acupuncture, naturopathic medicine, massage, and chiropractic practitioners). Plan/contract information maintained in the final enrollment file reflected enrollees' plan/contract in December 2000.

From our enrollment data, we generated variables for age and county of residence. We combined ICD-9 codes from our claims data base into Expanded Diagnosis Clusters (EDCs) using the Adjusted Clinical Groups software (version 5).³² We applied the Washington State Department of Health Cancer Registry ICD-9 codes³³ to identify cancer patients in the claims data base. The most common cancers were chosen for our analysis; these were bladder cancer, breast cancer, colorectal cancer, gynecologic cancer, hematologic cancer, lung cancer, prostate cancer, and skin cancer. Fields also were created to identify metastatic cancer using ICD-9 codes, and CPT/HCPCS codes were used to identify conventional cancer treatment type (surgery, radiation, chemotherapy). Finally, claimants were considered CAM users if they submitted at least one CAM provider claim in the year 2000. Definitions of cancer and procedures are listed in Table 1.

Statistical Analysis

Statistical analyses were conducted using Stata statistical analysis software (version 7; StataCorp, College Station, TX).³⁴ Data from the two companies were combined for the analysis. The companies' enrollees were similar in terms of gender, age, and geographic distribution. There were differences in the mix of products offered by the two companies (HMO, PPO, etc.), but subsequent analysis suggested few significant differences in cancer patients' use of CAM providers between the companies. Simple frequencies were generated for EDCs on claims by provider type, including acupuncturists, massage practitioners, naturopathic physicians, chiropractors, other providers (all other service claims excluding pharmacy), and total providers (CAM and other providers). Mean billed amounts for CAM and conventional services were calculated for cancer patients who used CAM (presented by individual alternative provider type as well as by NAM and CAM groupings) and for cancer patients who used conventional care without CAM services. Conventional services were defined as both inpatient and outpatient services submitted by a conventional provider, excluding pharmacy.

Logistic regression was used to examine the likelihood of a CAM provider claim for all nonelderly

TABLE 1
Definitions of Cancer and Procedures

Diagnosis defined by the presence of these ICD-9 Codes	
Cancer ^a	140–172.9, 174–208.9
Bladder cancer	188–188.9
Breast cancer	174–174.9
Colorectal cancer	153–154.1, 159.0
Gynecologic cancers (defined as cervical, endometrial, or ovarian)	180–180.9, 182–182.1, 182.8, 183.0–183.9
Hematologic cancer (defined as Hodgkin lymphoma, leukemia, or non-Hodgkin lymphoma)	201–201.9, 204–208.9, 200–200.8, 202–202.2, 202.8–202.9
Lung cancer	162.2–162.9
Prostate cancer	185
Skin cancer	172–172.9
Metastatic cancer defined by the presence of these ICD-9 codes	
Cancer, metastatic	196–198.89
Procedures defined by the presence of these CPT/HCPCS codes	
Chemotherapy	36640, 36823, 51720, 96400, 96405, 96406, 96408, 96410, 96412, 96414, 96420, 96422, 96423, 96425, 96440, 96445, 96450, 96520, 96530, 96542, 96545, 96549, 99555
Radiation	76370, 76950, 77300, 77336, 77370, 77399, 77401, 77402, 77403, 77404, 77406, 77407, 77408, 77409, 77411, 77412, 77413, 77414, 77416, 77427, 77431, 77432, 77470, 77761, 77776, 77789, 77790, 92974, D5983, D5984, D5985
Surgery (hysterectomy, laparotomy, mastectomy, nephrectomy, pneumonostomy, resection, or thoracotomy)	19140, 19160, 19162, 19180, 19182, 19200, 19220, 19240, 21015, 21045, 21081, 21557, 21630, 21632, 21700, 21705, 21935, 22818, 22819, 23077, 23195, 23200, 23210, 23220, 23221, 23222, 23440, 24077, 24149, 24150, 24151, 24152, 24153, 24155, 24352, 25077, 25119, 25170, 25240, 25830, 26117, 26250, 26255, 26260, 26261, 26262, 27049, 27075, 27076, 27077, 27078, 27079, 27122, 27329, 27365, 27615, 27645, 27646, 27647, 27888, 28046, 28126, 28153, 28171, 28173, 28175, 28293, 28340, 28341, 29825, 29862, 29875, 30140, 30520, 31240, 32035, 32095, 32100, 32110, 32120, 32124, 32140, 32141, 32150, 32151, 32160, 32200, 32201, 32442, 32486, 32500, 32501, 32520, 32522, 32525, 32657, 32659, 32900, 33025, 33120, 33130, 33140, 33141, 33200, 33236, 33237, 33238, 33243, 33245, 33246, 33415, 33476, 33478, 33542, 33545, 33684, 33732, 39560, 39561, 40530, 41150, 41153, 41155, 42120, 42842, 42844, 42845, 42892, 42894, 43107, 43108, 43112, 43113, 43117, 43118, 43121, 43605, 43860, 43865, 44050, 44120, 44121, 44125, 44126, 44127, 44128, 44144, 44202, 44203, 44625, 44626, 44660, 44661, 45111, 45126, 45190, 45550, 47015, 47120, 47122, 47125, 47130, 48005, 49000, 49002, 49220, 49255, 50220, 50225, 50230, 50234, 50236, 50240, 50300, 50320, 50340, 50360, 50365, 50545, 50546, 50547, 50548, 51050, 51597, 51800, 51925, 52234, 52235, 52240, 52277, 52300, 52301, 52305, 52347, 52355, 52400, 52500, 52601, 52612, 52614, 52620, 52630, 52640, 52648, 55150, 58150, 58152, 58180, 58200, 58210, 58240, 58260, 58262, 58263, 58267, 58270, 58275, 58280, 58285, 58550, 58560, 58563, 58920, 58950, 58951, 58952, 58953, 58954, 58960, 59135, 59136, 59525, 61583, 61591, 61597, 61600, 61601, 61605, 61606, 61607, 61608, 61615, 61616, 63081, 63082, 63085, 63086, 63087, 63088, 63090, 63091, 63300, 63301, 63302, 63303, 63304, 63305, 63306, 63307, 63308, 65285, 65775, 67311, 67312, 67314, 67316, 67903, 67904, 67908, 69535, D5934, D5935, D7490

ICD-9: International Classification of Diseases, 9th Revision; HCPCS: Healthcare Common Procedure Coding System.

^a The current study deviated from the Washington State Cancer Registry definition by excluding 173 other malignant neoplasms of the skin.

adults who had submitted a claim for any medical service over the year. The odds ratios (ORs) were adjusted simultaneously for gender, age group (18–40 years or 41–64 years), county of residence, and a cancer dummy variable. Logistic regression was used again to examine the likelihood of a CAM provider claim by cancer patients using explanatory dummy variables for the cancer type, the presence or absence of metastatic disease, and the type(s) of conventional cancer treatment received. ORs were adjusted for all explanatory variables. A separate analysis was conducted for men and women due to differences in use

patterns and gender-specific types of cancer. Multiple tests of significance were handled by means of Bonferroni adjustments. Unless otherwise indicated, a *P* value < 0.001 was considered to indicate statistical significance. All *P* values were two-sided.

RESULTS

Study Population Characteristics

Table 2 summarizes the study population’s enrollment data. Of the 441,841 study-eligible enrollees, 78.4% had claims during the year 2000. Individuals with claims were more likely to be female and slightly

TABLE 2
Characteristics of the Study Population: Adults Ages 18–64 Years with Private Commercial Coverage in Western Washington State

Characteristic	Enrollees without claims	Enrollees with claims ^a
Total enrollees		
No.	95,413	346,428
Percent	21.6	78.4
Female gender (%)	35.3	56.6
Median age (yrs)	40	43
County of residence (%) ^b		
King	46.1	47.8
Pierce	14.6	18.2
Other	39.3	34.0
Product type (%)		
Health maintenance organization	13.6	17.4
Preferred provider organization	37.8	42.9
Point-of-service organization	29.1	33.3
Indemnity/traditional fee for service	19.5	6.4

^a Enrollees were excluded if they could not be assigned to a single plan/Employee Retirement and Income Security Act designation (0.36%), if they had incomplete claims data for the 2000 calendar year (15.45%), or if their claims were paid by another insurance carrier through coordination of benefits (2.75%).

^b King and Pierce Counties are the most urban counties in the state and are located next to each other on the Puget Sound. Other counties are generally more rural than King and Pierce counties.

older compared with individuals without claims. The most urban county in Washington, King County (which includes Seattle), was the residence of nearly 50% of the claimants. Products that were covered by the two companies most commonly were PPO or POS products, with traditional HMO and indemnity insurance accounting for a smaller proportion of these carriers' business.

Use of Alternative Medicine

Table 3 describes CAM provider use for the study population with claims. Of the 346,428 individuals with claims in the year 2000, 2.3% had a cancer diagnosis. Women with and without cancer were more likely to see a CAM provider compared with men. This was especially true for NAM use, because men were less than half as likely to use NAM providers compared with women (OR, 0.4; $P < 0.001$). Relative to the rest of Western Washington, King County residents were found to have significantly less chiropractic use and significantly more NAM use. Older adults (ages 41–64 years) were more likely to see a CAM provider compared with younger adults (ages 18–40 years). This was due largely to the slightly higher chiropractic utilization in the older group. Individuals with cancer were more likely to use NAM providers (OR, 1.5; $P < 0.001$) and were less likely to use chiropractic (OR,

0.9; $P < 0.001$) compared with individuals who did not have cancer. The use of naturopathic physicians (OR, 2.0; $P < 0.001$) and the use of acupuncturists (OR, 1.4; $P < 0.001$) were significantly more common among individuals with cancer, whereas the use of massage did not differ significantly between cancer and non-cancer groups (OR, 1.1; $P < 0.066$).

Table 4 shows CAM provider utilization for male and female cancer patients stratified by the diagnosis of metastasis, cancer type, and conventional cancer treatment(s) used for the year 2000. Among individuals with metastatic cancer, 11.5% of women (OR, 2.0; $P < 0.001$) and 6.5% of men (OR, 3.4; $P < 0.005$) used a naturopathic physician. Men with hematologic malignancies (OR, 3.5; $P < 0.005$) also were more likely to seek naturopathic care, as were individuals of either gender receiving chemotherapy (males: OR, 2.8; $P < 0.005$; females: OR, 2.2; $P < 0.001$). There were no cancer types that predicted increased utilization of NAM for women. The use of these providers was much greater for men with hematologic malignancies (OR, 3.6; $P < 0.001$). Chiropractic utilization was substantial (men, 9.9%; women, 12.5%), although use decreased with the diagnosis of metastatic disease. The use of massage did not increase with metastatic disease for either gender, nor was massage associated with the utilization of a specific conventional cancer treatment. Moreover, cancer patients receiving radiation or undergoing surgery did not show increased use of any provider-based CAM service. Finally, only two cancer patients with chiropractic claims did not have claims for conventional services in the year 2000. All cancer patients who used NAM providers also had at least one claim for conventional care.

Table 5 shows the mean billed amounts of conventional and complementary services for cancer patients. CAM provider charges were modest (range, \$383–603 total annual charges per person). This represented $\leq 2.1\%$ of the total charges for the year 2000. CAM users with cancer had significantly higher billed amounts than patients with cancer who used conventional care alone.

The most common diagnoses assigned to cancer patients by CAM providers were for musculoskeletal pain (EDCs for musculoskeletal signs and symptoms; acute sprains and strains; cervical pain syndromes; low back pain; and bursitis, synovitis, and tenosynovitis). These represented 67% of the diagnoses by massage practitioners, 65% of the diagnoses by chiropractors, 80% of the diagnoses by acupuncturists, but only 19% of the diagnoses from naturopathic physicians as proportions of all assigned diagnoses. Naturopathic physicians assigned a variety of other diagnoses, including cancer itself (19.8%), menopause (6.2%), fa-

TABLE 3
Claimant Characteristics and Complementary and Alternative Medicine Provider Use for Adults Ages 18–64 Years with Private Commercial Coverage in Western Washington State: Percentages and Odds Ratios^a

Characteristic	No.	Chiropractor		Naturopath		Acupuncturist		Massage practitioner		CAM ^b		NAM ^c	
		%	Adj OR	%	Adj OR	%	Adj OR	%	Adj OR	%	Adj OR	%	Adj OR
All	346,428	12.3	—	2.1	—	1.1	—	2.3	—	15.2	—	4.7	—
Gender													
Male	150,472	11.6	0.9	1.2	0.4	0.7	0.5	1.3	0.4	13.4	0.8	2.8	0.4
Female	195,956	12.8	1.0	2.7	1.0	1.4	1.0	3.1	1.0	16.6	1.0	6.1	1.0
Age (yrs)													
18–40	150,161	11.2	0.8	2.1	1.0	0.9	0.7	2.3	1.0	14.1	0.9	4.5	0.9
41–64	196,266	13.1	1.0	2.1	1.0	1.3	1.0	2.3	1.0	16.1	1.0	4.8	1.0
County of residence													
King	165,481	9.5	1.0	2.6	1.0	1.5	1.0	2.2	1.0	13.1	1.0	5.3	1.0
Pierce	63,130	15.1	1.7	1.1	0.4	0.5	0.3	2.1	0.9	16.9	1.3	3.4	0.6
Other	117,817	14.7	1.6	1.8	0.7	0.9	0.6	2.5	1.2	17.3	1.4	4.5	0.9
Cancer													
No	338,513	12.3	1.0	2.0	1.0	1.1	1.0	2.3	1.0	15.2	1.0	4.6	1.0
Yes	7915	11.6	0.9	4.0	1.9	1.7	1.4	2.7	1.1	16.6	1.0	7.1	1.5

CAM: complementary and alternative medicine; NAM: naturopathic, acupuncture, and massage providers; Adj OR: adjusted odds ratio.

^a Due in part to the large number of observations, all Odds Ratios were statistically significant at the $P < 0.001$ level except for the effect of age on the use of naturopaths ($P = 0.936$); the effects of age ($P = 0.707$), Pierce County residency ($P = 0.042$), and cancer ($P = 0.066$) on the use of massage; and the effect of cancer on the use of complementary & alternative medicine ($P = 0.153$). Odds Ratios were adjusted for gender, age group, county of residence, and a cancer dummy variable.

^b Complementary & alternative medicine includes chiropractic, naturopathic, acupuncture, and massage providers.

^c NAM includes naturopathic, acupuncture, and massage providers.

tigue (4.1%), thyroid disorders (3.4%), anemia (2.7%), and headache (2.6%).

DISCUSSION

Due to our large study population, we were able to expand on the findings of Patterson et al. from our SEER-PS region and compare them with individuals without cancer. Overall, 15.2% of nonelderly insured adults in our study had at least 1 CAM provider claim in the year 2000. Chiropractors were the most commonly used CAM practitioners and were seen by 12.3% of claimants. Compared with individuals without cancer, patients with cancer were less likely to see a chiropractor, equally likely to use a massage practitioner, and more likely to see a naturopathic physician or an acupuncturist. The median bill for CAM services to insurance was \leq \$600 and represented only 2% of the overall amount that was billed for all medical care. Finally, cancer patients used CAM providers in conjunction with, rather than as an alternative to, conventional care.

The current study data indicate that individuals with cancer were nearly twice as likely to seek care from a naturopathic physician as individuals without cancer. Predictors of naturopathic utilization, i.e., chemotherapy and metastasis, suggest that individuals who seek these services do so because of heightened

illness. Thus, their higher cost would be expected. Our finding of significant naturopathic physician use also may be a regional phenomenon, because two of the four naturopathic medical schools in the U.S. are located in the Pacific Northwest. Although the licensure of naturopathic physicians does not allow them to treat cancer patients without referral from an oncologist, naturopathic physicians are trained to provide adjunctive complementary therapies.

Utilization of massage therapy was 2.7% and 2.3% for claimants with and without cancer, respectively, falling within the low rates of use reported previously.^{1,4,8,35} This low utilization was surprising given the abundance of licensed massage practitioners in Washington State along with recent scientific evidence of massage efficacy for conditions that are common in patients with cancer (e.g., pain syndromes, lymphedema).¹⁷ Several reasons may explain this finding: Both companies imposed utilization management strategies, which may have constrained massage use within insurance financing. In addition, until recently, massage therapists were taught that cancer was a contraindication because of concerns that the disease could be disseminated through the lymph and circulatory systems during massage.³⁶ We are unaware of any medical evidence to support this perspective. Moreover, some massage therapy is provided by volunteers

TABLE 4
Complimentary and Alternative Medicine Provider Use by Male and Female Cancer Patients Ages 18–64 Years with Private Commercial Coverage in Western Washington State: Percentages and Odds Ratios^a

Characteristic	No.	Chiropractor		Naturopath		Acupuncturist		Massage practitioner		CAM ^b		NAM ^c	
		%	Adj OR	%	Adj OR	%	Adj OR	%	Adj OR	%	Adj OR	%	Adj OR
A. Males													
All cancer	2869	9.9	—	2.2	—	1.0	—	1.3	—	12.8	—	4.1	—
Nonmetastasis	2577	10.1	1.0	1.7	1.0	0.9	1.0	1.2	1.0	12.4	1.0	3.4	1.0
Metastasis	292	8.2	0.7	6.5	3.4 ^d	2.7	2.0	2.1	1.5	16.4	1.1	9.9	2.4 ^d
Colorectal	229	9.2	1.0	2.2	1.0	1.3	1.0	1.3	1.0	12.7	1.0	4.4	1.0
Lung	130	9.2	0.9	2.3	0.6	2.3	2.6	0.8	0.6	14.6	1.0	5.4	1.1
Prostate	782	10.1	0.9	2.3	2.1	1.3	3.7	0.5	0.5	12.4	1.1	3.8	2.0
Skin	253	10.7	1.0	1.6	1.4	0.8	2.3	2.4	2.5	13.8	1.2	4.7	2.4
Bladder	194	7.2	0.6	1.0	1.0	1.5	3.1	0.0	—	9.3	0.7	2.6	1.2
Hematologic	450	8.2	0.7	4.7	3.5 ^d	1.8	4.8 ^d	2.4	2.5	14.2	1.2	7.6	3.6 ^e
Other	1163	10.3	1.0	2.4	1.1	1.2	2.1	1.6	1.6	13.7	1.1	4.6	1.5
None	2271	9.9	1.0	1.6	1.0	0.9	1.0	1.3	1.0	12.2	1.0	3.4	1.0
Chemotherapy	318	10.1	1.1	6.9	2.8 ^d	1.9	0.8	1.6	1.0	17.6	1.4	8.8	1.6
Radiation	266	11.7	1.3	4.5	1.1	2.6	1.8	1.5	1.1	18.0	1.4	7.9	1.3
Surgery	181	11.0	1.3	1.1	0.4	1.7	1.1	0.6	0.5	13.3	1.1	3.3	0.6
B. Females													
All cancer	5046	12.5	—	5.1	—	2.0	—	3.6	—	18.8	—	8.8	—
Nonmetastasis	4426	12.8	1.0	4.2	1.0	1.8	1.0	3.5	1.0	18.3	1.0	8.0	1.0
Metastasis	620	11.0	0.9	11.5	2.0 ^e	3.5	1.2	3.7	1.0	21.9	1.1	14.0	1.3
Colorectal	247	15.0	1.0	7.7	1.0	2.4	1.0	2.8	1.0	21.1	1.0	8.9	1.0
Lung	161	11.2	0.8	6.8	1.1	1.2	0.5	1.9	0.5	16.1	0.8	8.1	0.8
Breast	2475	11.6	0.8	5.9	1.6	2.5	2.0	3.5	1.0	19.1	1.1	9.8	1.5
Skin	311	15.1	1.0	4.2	1.4	1.0	0.8	5.5	1.6	19.0	1.1	8.4	1.4
Bladder	84	9.5	0.6	3.6	0.8	0.0	—	1.2	0.3	13.1	0.7	4.8	0.6
Hematologic	403	12.9	0.9	5.7	1.7	1.5	1.1	4.2	1.2	19.6	1.1	10.4	1.7
Gynecologic	572	11.2	0.7	5.2	1.3	3.0	2.3	2.6	0.7	18.2	1.0	9.1	1.3
Other	1479	13.1	0.9	5.7	1.1	2.2	1.3	3.7	1.0	20.0	1.1	9.3	1.2
None	3810	13.0	1.0	3.9	1.0	1.8	1.0	3.5	1.0	18.3	1.0	7.8	1.0
Chemotherapy	615	10.6	0.9	12.0	2.1 ^e	4.2	2.2	4.4	1.5	22.9	1.3	15.6	1.8 ^d
Radiation	506	10.1	0.8	8.1	1.0	2.8	0.9	3.2	0.8	19.2	0.9	11.1	0.9
Surgery	666	11.9	1.1	7.8	1.1	2.4	0.8	3.5	1.0	19.8	1.0	10.8	1.0

CAM: complementary and alternative medicine; NAM: naturopathic, acupuncture, and massage providers; Adj OR: adjusted odds ratio.

^a Odds ratios were adjusted for all explanatory variables.

^b Complementary and alternative medicine includes chiropractic, naturopathic, acupuncture and massage providers.

^c NAM includes naturopathic, acupuncture and massage providers.

^d Statistically significant odds ratio ($P < 0.005$).

^e Statistically significant odds ratio ($P < 0.001$).

as end-of-life care, and/or hospice billing may bundle massage within general care services. These factors may contribute to decreased utilization or the appearance of decreased utilization in situations in which billing and reimbursement for a provided service may not occur.

The use of chiropractic was greater than that reported in most previously published surveys of individuals with and without cancer.^{1,8,35,37} By disaggregating CAM provider services, we demonstrated that chiropractic utilization patterns were different from other forms of CAM. Although chiropractic utilization did not increase among individuals with cancer, the

use of this service still was substantial, ranging from 7.2% for men with bladder cancer to 15.1% for women with skin cancer. Furthermore, chiropractic decreased with metastasis, whereas NAM provider use increased, suggesting a possible shift in care priorities with metastatic disease. The overall lower chiropractic utilization among claimants with cancer relative to those without cancer suggests that the frequency of spinal manipulation may not be relevant to cancer treatment. Rather, the use of chiropractors by cancer patients likely is correlated with the background use in an insured population. Finally, utilization of chiropractic in the largest urban county was proportion-

TABLE 5
Mean Billed Amount per Cancer Patient by Provider Type for Adults Ages 18–64 Years with Private Commercial Coverage in Western Washington State

Provider type	Total no. ^a	Mean billed amount for CAM provider type	Mean total billed amount (inpatient plus outpatient)	Mean total billed amount for provider type as a percentage of mean total billed amount
Naturopathic physician	318	\$413	\$40,728	1.0%
Acupuncturist	133	\$488	\$37,196	1.3%
Massage practitioner	217	\$603	\$28,143	2.1%
Chiropractor	917	\$383	\$19,810	1.9%
NAM	560	\$584	\$35,183	1.7%
CAM ^b	1315	\$515	\$25,362	2.0%
Conventional provider only ^c	6598	NA	\$19,588	NA

CAM: complementary and alternative medicine; NAM: naturopathic, acupuncture, and massage providers; NA: not available.

^a Figures exclude two patients who had no conventional outpatient visits.

^b Complementary and alternative medicine includes chiropractic, naturopathic, acupuncture, and massage providers.

^c Includes all non-Complementary and alternative medicine providers, including physicians, nurse practitioners, and other allied health providers (e.g., physical therapists).

ately less than in some smaller population centers, a phenomenon described previously as attributable to provider distribution.³⁸ Combining chiropractic with other forms of CAM would obscure these important trends.

The current study has several limitations. Due to the Health Insurance Portability and Accountability Act of 1996 and other confidentiality concerns, the supplied claims data were deidentified. This prohibits linkage to established cancer registries, limiting verification of cancer status and duration of disease. Although metastatic illness is a measure of severity, there are no ICD codes that specify the time from diagnosis. Thus, our large population of cancer patients is more heterogeneous compared with the populations studied previously. The absence of the Medicare population may have altered results, although the elderly are not the predominant users of alternative treatment in the U.S.¹⁴ In addition, in the current study, we were unable to evaluate the use of a variety of other services and products that often are considered CAM. Over-the-counter remedies, herbal treatments, spiritual practitioners, and other unlicensed providers cannot be measured using this method, because there is no requirement for their reimbursement though health financing. Furthermore, not all individuals who are eligible for insurance reimbursement of CAM provider services submit claims, and not all CAM providers accept insurance. Therefore, our findings must be considered a minimum estimate of utilization under the insurance model for care. Regional differences and provider access also partly explain the variation between our data and national surveys. Finally, it is important to recognize that these results only

apply to individuals with insurance coverage. We did not evaluate the effect of differing companies and benefit structures on utilization. Although our sample represents two of the largest companies in Washington State, sampling bias may limit the degree to which our findings may be generalized across insured populations.

Washington State has required coverage for chiropractic providers for nearly 20 years. The requirements for coverage of other alternative providers are relatively new. Thus, CAM provider utilization may increase substantially in subsequent years. Patient and conventional provider awareness of CAM will grow as greater inclusion of CAM providers in health-care financing mechanisms increase demand. The use of insurance data allows efficient, unbiased longitudinal studies of trends in CAM provider use that can generate valuable information regarding interdisciplinary cancer care.

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