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The US Oncology Network, and McKesson Specialty Health, The Woodlands, TX; Texas Oncology, Dallas, TX; and Aetna, Hartford, CT

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Three-Year Results of a Medicare Advantage Cancer Management Program

J. Russell Hoverman, Marcus A. Neubauer, Melissa Jameson, Jad E. Hayes, Kathryn J. Eagye, Mitra Abdollahpour, Wendy J. Haydon, Maria Sipala, Amy Supraner, Michael A. Kolodziej, and Diana K. Verrilli

QUESTION ASKED: Can a practice-based program that incorporates evidence-based clinical treatment pathways, an oncology certified nurse call program, and an introduction to advance care planning, all of which are supported by a collaborative payer sponsor, reduce costs associated with treating Medicare-age patients while improving the quality of care provided to patients?

SUMMARY ANSWER: A practice-based program for Medicare-age patients supported by a collaborative payer sponsor can effectively reduce costs while maintaining high levels of patient satisfaction by encouraging physician adherence to evidence-based treatment pathways.

WHAT WE DID: During a 3-year period, physician adherence to treatment pathways was monitored and encouraged by using feedback reporting and financial incentives. During the same time period, nurses assessed patient symptoms and quality of life and introduced advance care planning via telephone.

WHAT WE FOUND: Cumulative savings for medications were \$3,033,248 when the study

group (n = 509) was compared with the matched control group (n = 900); savings continued to increase over time. Inpatient savings also increased over time; cumulative savings on inpatient stays in the study group compared with the control group were \$464,376 for solid tumors, but inpatient costs for hematologic cancers were \$227,897 greater. Costs for emergency room visits were \$24,736 less in the study group than in the control group.

BIAS, CONFOUNDING FACTOR(S), DRAWBACKS: Cost factors associated with different malignancies (solid tumor v hematologic malignancy) can have a large impact on the results depending on the case mix.

REAL-LIFE IMPLICATIONS: Physician adherence to clinical treatment pathways and nurse intervention via telephone can improve patient care while reducing costs in Medicare-age patients who tend to be frailer, have more comorbidities, and are more likely to benefit from support services provided by oncology nurses. In this Medicare-age population, reduction in drug spending represents the best opportunity to reduce overall costs. **JOP**

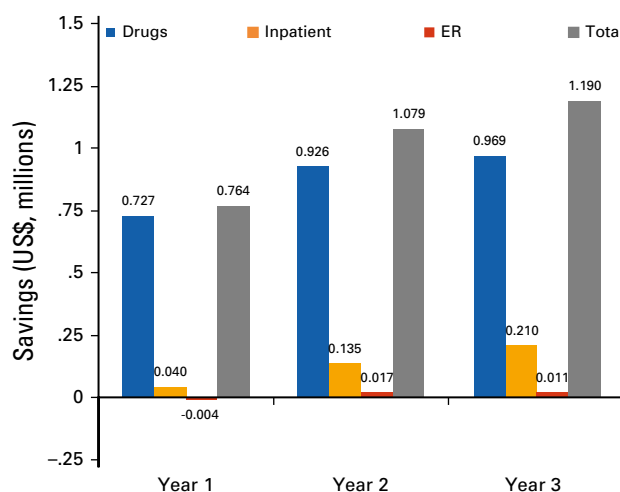


Fig. Savings with the program by year for drug, inpatient, emergency room, and total costs for each year during the 3-year study period.

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ASSOCIATED CONTENT



Appendix available online

Abstract

Purpose

Reform of cancer care delivery seeks to control costs while improving quality. Texas Oncology collaborated with Aetna to conduct a payer-sponsored program that used evidence-based treatment pathways, a disease management call center, and an introduction to advance care planning to improve patient care and reduce total costs.

Methods

From June 1, 2013, to May 31, 2016, 746 Medicare Advantage patients with nine common cancer diagnoses were enrolled. Patients electing for patient support services were telephoned by oncology nurses who assessed symptoms and quality of life and introduced advance care planning. Shared cost savings were determined by comparing the costs of drugs, hospitalization, and emergency room use for 509 eligible patients in the study group with a matched cohort of 900 Medicare Advantage patients treated by non-Texas Oncology providers. Physician adherence to treatment pathways and performance and quality metrics were evaluated.

Results

During the 3 years of the study, the cumulative cost savings were \$3,033,248, and savings continued to increase each year. Drug cost savings per patient per treatment month were \$1,874 (95% CI, \$1,373 to \$2,376; $P < .001$) after adjusting for age, diagnosis, and study year. Solid tumors contributed most of the savings; hematologic cancers showed little savings. For years 1, 2, and 3, adherence to treatment pathways was 81%, 84%, and 90%, patient satisfaction with patient support services was 94%, 93%, and 94%, and hospice enrollment was 55%, 57%, and 64%, respectively.

Conclusion

A practice-based program supported by a payer sponsor can reduce costs while maintaining high adherence to treatment pathways and patient satisfaction in older patients.

INTRODUCTION

American health care providers, payers, and patients are struggling with the cost of cancer care. The cost of cancer care reached \$124 billion in 2010 and is projected to

increase by 27% to \$157 billion in 2020.¹ Patients are experiencing increasing financial burdens in the form of increased health insurance premiums and out-of-pocket expenses. Medical expenses are



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now the leading cause of personal bankruptcy in the United States.² Drug costs, hospital care costs, and poor end-of-life management inflate the price of care without a demonstrable improvement in outcomes.³

Retrospective studies aimed at mitigating this crisis have shown that physician-developed, evidence-based clinical pathways can reduce the costs associated with chemotherapy.^{4,5} In addition, work by Sprandio⁶ established that the application of a patient-centered medical home in a population of patients with cancer could reduce emergency room (ER) and inpatient health care use. On the basis of this evidence, The US Oncology Network developed a model, Innovent Oncology, to improve the value of care. This program consists of three components: physician adherence to evidence-based clinical pathways (Value Pathways powered by NCCN), patient support services (PSS), and introduction to advance care planning (ACP).⁷ The pathways, which were developed by McKesson Specialty Health and The US Oncology Network in conjunction with the National Comprehensive Cancer Network (NCCN), include treatment regimens for which cost is considered after evaluating outcomes and toxicity. PSS is an oncology certified nurse call program in which a nurse calls patients who are candidates for chemotherapy shortly after the first day of chemotherapy and follows up with them via periodic phone calls throughout their treatment. During these calls, nurses provide patients with general education, systematically assess symptoms, and refer the patient directly to the clinic when more care is needed. Nurses also support patients who would like to receive ACP, including help to complete advance directives.

Before this study, Texas Oncology and Aetna collaborated to deliver a similar program to Aetna's commercial population in Texas. From June 1, 2010, to April 30, 2012, this program achieved substantial reductions in hospital inpatient days and associated costs.^{3,7} Cancer, however, has a higher prevalence in older patients who are more frail and have more metastatic disease and comorbidities. Older adult patients with cancer also have greater needs for social support services,^{8,9} and cancer is a significant cost driver for Medicare.¹⁰ In addition, more expensive drug treatments have become available in the years since the completion of the previous program. Consequently, we evaluated the impact of this program in a second pilot in a Medicare Advantage population in Texas. Herein we report the 3-year results of the study.

METHODS

Patient Cohort

Medicare Advantage patients insured by Aetna who initiated treatment with intravenous chemotherapy between June 1, 2013, and May 31, 2016, were eligible to participate in the program. Patients were enrolled if they were treated at Texas Oncology facilities during the study period, were insured by Aetna with a Medicare Advantage product, were older than age 18 years, and were diagnosed with a cancer type for which there is an established clinical treatment pathway (Value Pathway powered by NCCN).

Patients with all cancer diagnoses were enrolled, but the cost analysis included only those diseases for which at least 20 patients were treated during the 3-year period. Enrollees were excluded from the cost analysis if they enrolled in the final month of the program or if they also received chemotherapy from a non-Texas Oncology provider. Any patient who asked to not participate in PSS calls or to discontinue them remained in the study group and was included in the cost analysis; however, these patients were not included in the analysis of quality metrics for PSS.

A control population matched for age and diagnosis, which Aetna identified by using claims data, consisted of patients who were older than age 18 years, were insured by Aetna with a Medicare Advantage product, initiated chemotherapy with a provider in Texas other than Texas Oncology during the study period, did not also receive treatment at Texas Oncology at any time during the study period, and did not initiate treatment during the final month of the study.

Shared Cost Savings

Shared savings were based on three areas of claims expenditures: drug costs, number of ER visits, and number of inpatient days. These costs and use data were obtained from Aetna's administrative claims database. Drug costs included the costs of intravenous chemotherapy agents and supportive care medications, as well as some specified oral chemotherapy agents that were identifiable in claims data by using codes from the Healthcare Common Procedure Coding System. Drug costs were based on average sales price drug pricing. A fixed-fee schedule was used to normalize costs between cohorts. Members with drug costs above the 95th percentile were capped at the 95th percentile. No drugs were excluded from the study. Drug costs were calculated on a per-member-per-treatment-month basis for comparison between cohorts to

account for different time under treatment between patients, where “treatment month” is each month between the first and last date of chemotherapy for a member. Costs in the control cohort were weighted during the cost analysis to reflect the patients’ ages and diagnoses in the study cohort. The end point of shared savings represents the difference in cost or use between the two cohorts.

Costs for ER use and hospitalization were standardized by applying average accounting costs experienced by Aetna for patients in both groups per ER use or inpatient hospital day to the rate of use observed in the study; members who had inpatient days greater than the 95th percentile were capped at the 95th percentile. Because of our efforts to reduce avoidable hospital admissions and associated costs, only admissions meeting contractually established criteria based on the primary International Classification of Diseases, Ninth Revision (ICD-9) or ICD-10 code for the primary diagnosis were included; other non-cancer-related criteria for hospitalization, such as trauma, were excluded. The difference in cost between the matched control and study populations represents savings gained. A statistical comparison is reported for those meeting evaluation criteria for a shared-savings payment.

Performance and Quality Metrics

Performance metrics were established to determine eligibility for a shared-savings payment. Before the study was initiated, a schedule of increasing target thresholds to qualify for payment for each year was determined. Performance metrics included physician adherence to the clinical pathways, documented reasons for exceptions to the use of the treatment pathways, hospice use, and patient satisfaction.

Pathway adherence was defined as the proportion of all regimens given to patients in the study group during the study period that were categorized as on-pathway. Target thresholds for on-pathway regimens were 78%, 81%, and 83% in years 1, 2, and 3, respectively. A physician could elect to prescribe an off-pathway regimen but was expected to provide the rationale for the exception in the electronic medical record. A performance metric was established to promote such documentation. Thresholds for the proportion of off-pathway regimens for which an exception was documented were 70%, 75%, and 80% in program years 1, 2, and 3, respectively. Hospice use was calculated as the proportion of study group patients who died during the study period who had documentation of hospice enrollment before they died. Hospice enrollment was determined by reviewing medical records for all patients who

died during the study period. The hospice metrics were mutually agreed upon and were based on documented practice data and published Quality Oncology Practice Initiative reports.^{11,12} Target thresholds for hospice enrollment in years 1, 2, and 3 were 50%, 55%, and 60%, respectively; however, these data may not include patients whose death was not known to the provider or the payer.

Data on adherence to pathways, documentation of exception data, and hospice enrollment data were obtained from iKnowMed, a proprietary oncology electronic medical record from McKesson Specialty Health, and reported to Aetna. Patient satisfaction was measured by a mailed questionnaire that assessed satisfaction with PSS on a scale of 1 to 7; surveys were not mailed to patients who did not elect to receive PSS. The study population was not compared with the control population for these performance and quality metrics.

Additional quality metrics that were established for monitoring purposes and were candidates for future paid performance metrics included pain assessment at each eligible PSS call, the percentage of PSS patients who were introduced to ACP, and the percentage of PSS patients who participated in at least one ACP counseling session. These data were obtained from iKnowMed; however, they were not collected from patients who did not elect to receive PSS.

Statistical Analysis

Linear regression models that assessed total drug costs per member per treated month, inpatient day rate, and ER visit rate controlling for sex, age group, cancer diagnosis, and year of the study were used to compare the study population to the control population (SAS v 9.4; SAS Institute, Cary, NC).

RESULTS

During the 3 years of the program, 746 patients were enrolled in the Innovent Oncology program at Texas Oncology (Appendix Fig A1, online only). Adherence to the treatment pathways and evaluable performance and quality metrics (documented exceptions to the use of off-pathway drugs and use of hospice) are reported for this group. Of the 746 enrolled patients, 625 opted to participate in PSS; performance and quality metrics were measured for all of these participants. Inclusion criteria for the cost analysis to determine the shared savings payment were met by 509 patients. The control population for the cost analyses included 900 patients. Of the nine cancer types included in the analysis, breast cancer was the most common diagnosis (Table 1).

Table 1. Age and Cancer Type of Patients Enrolled in the Control and Study Group Cohorts

Cancer Type	Control Group (n = 900)		Study Group (n = 509)	
	No.	%	No.	%
Breast	223	25	144	28
Colorectal	147	16	73	14
Lung	224	25	129	25
Lymphoma	83	9	37	7
Multiple myeloma	87	10	55	11
Other solid tumor cancers	135	15	71	15

Cost Comparison

Total costs (ie, normalized inpatient and ER costs, and drug costs per fixed-drug fee schedule) during all 3 years of the study were \$44,350,471. Drug costs, inpatient costs, and ER costs represented 71.7%, 25.8%, and 2.5% of total measured costs, respectively.

Compared with the control group, the cumulative savings for drug spending across all 3 years was \$2,622,760 for all qualifying cancer diagnoses in the study group (Fig 1A). Weighted drug costs for chemotherapy and supportive care were 21.4% lower in the study group compared with the control group. Drug savings in the study increased during the study from year to year (Fig 1B). Solid tumor diagnoses—primarily breast, colorectal, and lung cancers—contributed most of the drug savings, whereas hematologic cancers showed comparatively little drug savings (Fig 1C). Statistical analyses using linear regression showed a significant difference in drug costs per member per treatment month in the study group compared with the control group. Patients in the study group saved \$1,874 in drug costs per member per treated month (95% CI, \$1,373 to \$2,376; *P* < .001) compared with the patients in the control group (adjusted *R*² = 17.5%).

Cumulative inpatient savings of \$385,752 were reported for the study group compared with the control group (Fig 1A), representing an overall reduction of 5.3%. Inpatient savings also increased year to year (Fig 1B). Differences in inpatient savings in solid tumors and hematologic cancers between groups are shown in Fig 1C. During these 3 years, inpatient savings for solid tumors were \$363,996 relative to the control group, whereas inpatient savings for hematologic cancers were \$21,756 relative to the control group (Fig 1C). Inpatient savings for hematologic

cancers were more variable between years of the program than those for solid tumors. Higher inpatient costs in the study group than in the control group in the first year of the study were substantially driven by patients with lung and colorectal cancer. A linear regression analysis of the inpatient day rate (number of days of inpatient stay/treatment months) did not show a significant difference between the study group and control group, although the model had little predictive power (adjusted *R*² = 1.2%). Overall, the study group saved 3.5% on ER visits. Linear regression did not find significant differences in the rate of ER visits between the study and control groups.

Performance and Quality Metrics

The program met or exceeded the goals for each of the categories studied: adherence to pathways, documentation of off-pathway drug use, hospice enrollment, and patient satisfaction. As shown in Table 2, patient satisfaction exceeded the pre-established goal in each of the 3 years. Physician adherence to treatment pathways was high in all 3 years, with more than 80% of patients being treated on pathway. Documentation of off-pathway drug use was consistently high. The escalating targets for hospice enrollment were met each study year. Exploratory quality metrics, including pain assessment at each eligible call, introduction to ACP, and participation in at least one ACP counseling session, were followed to identify elements of the program thought to be associated with appropriate patient care. These exploratory metrics also showed high levels of participation although no performance thresholds were set. Notably, by the third year, 80% of PSS patients had a formal values assessment and took documented steps toward completion of ACP.

DISCUSSION

This provider-initiated program addressed three critical cost drivers associated with the treatment of patients with cancer: cancer drug therapies, avoidable inpatient stays and ER visits, and aggressive treatment at the end of life. This study examines a collaboration between a large national payer and a large medical oncology group in which a Medicare Advantage population with common malignancies is managed to address these three major cost drivers.

Retrospective studies have demonstrated potential savings when a rigorous treatment pathways algorithm is used, suggesting that one approach to ensuring evidence-based use of these therapies is the adoption of a clinical pathways program. This study reinforces the savings potential for a pathways program in which compliance is high. In this study, reductions

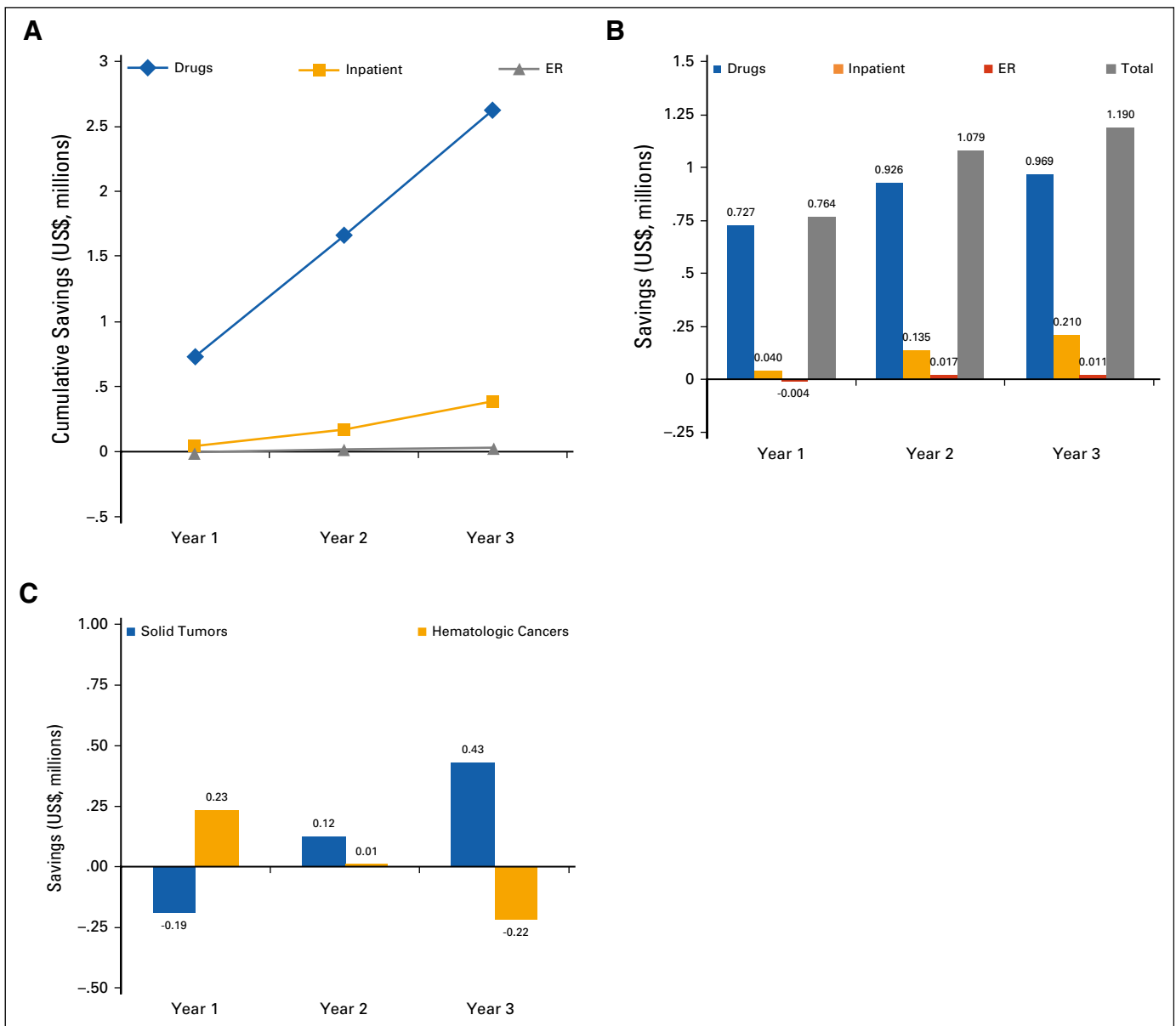


Fig 1. (A) Cumulative savings with the program for drug, inpatient, and emergency room (ER) costs for each year during the 3-year study period. (B) Savings with the program by year for drug, inpatient, emergency room, and total costs for each year during the 3-year study period. (C) Inpatient savings with the program by cancer diagnosis and by year.

in drug costs contribute substantially to the cost savings, differing greatly from the previous Aetna experience and the United Healthcare Episode of Care study¹³ in which savings were predominantly the result of a reduction in hospitalizations. This study validates the importance of pathways in treating our elderly population with cancer as a mechanism of cost reduction without compromising the quality of care we provide. This finding has implications for both the Oncology

Care Model¹⁴ and the pathways framework suggested by ASCO as the basis for value-based contracting.¹⁵

Avoiding ER visits and inpatient stays are frequently cited as areas in which quality may be improved and savings realized. In 2011, Kolodziej et al³ reported the results of a Milliman study noting that the average total hospital admissions per year were approximately one per chemotherapy patient with 0.4 admissions per year being attributed to chemotherapy-related

Table 2. Performance Measures, Quality Metrics, and Exploratory Quality Metrics Evaluating the Effectiveness of the Program

Metric	Year 1 Goal (%)	Year 1 (%)	Year 2 Goal (%)	Year 2 (%)	Year 3 Goal (%)	Year 3 (%)
Pathway adherence	78	81	81	84	83	90
Documentation of off-pathway drug use	70	63	75	41	80	84
Hospice enrollment*	50	55	55	57	60	64
Patient satisfaction	80	94	85	93	90	94
Percentage of 625 PSS patients who participated in						
Introduction to ACP	NA	90	NA	100	NA	95
ACP counseling	NA	60	NA	72	NA	80
Percentage of eligible calls in which patient's pain was assessed†	NA	91	NA	100	NA	99

Abbreviations: ACP, advance care planning; NA, not applicable; PSS, patient support services.

*Percentage of patients enrolled in hospice who died during the program.

†Eligible calls include pretreatment, post-treatment follow-up, and discharge calls.

toxicity. By using these metrics as a benchmark, Sprandio¹⁶ was able to institute an oncology patient-centered medical home and reduce ER visits by 50% and inpatient use by 16%. In a previous publication describing the Texas Oncology/Aetna program for a commercial population of patients with breast, colon, or lung cancer, hospital days were reduced by 41%.⁷ In this study, PSS with patient education and aggressive management of symptoms was associated with a reduction in ER use of 12.8% and inpatient hospital days by 5.1%. Before this study, little was known about the relative contribution of telephonic case management services. One study suggested that such patient outreach had stand-alone value. When United Healthcare implemented a telephonic service similar to the PSS program for patients with cancer, they achieved 10% savings if patients participated in the payer-initiated, telephonic, case management program.¹⁷ The PSS program used here differed because it was directly integrated into the oncology practice.

This study has several limitations. We were not able to compare patients in the study and control groups for various metrics. For example, staging data were not available for the control population. Aetna also did not have access to hospice data for the control group because the only notation in the claims database was discontinuation of coverage, which could be death or a change in plan coverage. This gap in information made it necessary to review medical records for the study group population. In addition, we could measure costs only while the patient was being treated and could not measure the appropriateness of treatment in the control population.

Inadequate discussions with patients about goals of therapy at the end of life, coupled with suboptimal management of symptoms, contribute to costly end-of-life care. These costs are predominantly related to hospitalization.¹⁸ In this study, PSS provided the structure to introduce discussions regarding ACP. As part of the program, a values assessment was used to introduce ACP. A recent study indicates that this process leads to more advance directives and lower rates of death in the hospital.¹⁹ Because of small numbers, the specific impact of this process on end-of-life outcomes remains uncertain, but the progressive improvement in the ability of the PSS nurses to deliver this assessment and progress to advance directives was encouraging.

In this study, hematologic cancers in the study group were responsible for increased costs compared with the control group. Costs associated with the management of solid tumors are different from those associated with hematologic malignancies; the total cost of care for hematologic malignancies is more than twice that for solid tumors,²⁰ possibly as a result of fewer and later hospice admissions for hematologic diseases.^{19,21} This observation highlights a number of the challenges with claims-based practice comparisons: because staging information is not known, the control group may not be strictly comparable, individual diseases in small numbers may skew the results, and case severity and risk may not be comparable. These pilots, therefore, require large numbers of participants for the results to be reliable and to minimize the effects of outliers. One approach may be to limit programs to diagnoses such as breast, colorectal, and lung cancers, which

are the most commonly diagnosed and treated diseases at many typical oncology practices. In our study, focusing the shared savings calculation on only breast, colon, and lung cancers (the three diseases with the largest number of enrolled patients) demonstrated substantial savings, including reduction in inpatient days and inpatient spending.

During the past few years, efforts have been made to transform the dominant payment system into one that rewards physicians for prudent and value-based services (value) rather than the number of services provided (volume). The program described here is a delivery model that identifies a road map for this transformation. It promotes clinical activities that result in improved quality of care and patient satisfaction, as well as in cost savings. These services, including ACP, aggressive outpatient disease management, and value-driven drug regimen choices, are patient-centric. Importantly, these services are initiated and controlled by physicians. Our study shows that cost savings and the development of superior patient care can coexist, with total savings exceeding \$3 million compared with the control group and 94% of patients reporting satisfaction by year 3 of the study.

These activities can be personnel-intensive at the practice level and administratively intensive for both physicians and payers. Success is dependent on the dedication of both the payer and provider teams. These programs will not succeed without a healthy collaboration with frequent data sharing, feedback, and incentives that reward value over volume. **JOP**

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Authors' Disclosures of Potential Conflicts of Interest

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Three-Year Results of a Medicare Advantage Cancer Management Program

The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the subject matter of this manuscript. For more information about ASCO's conflict of interest policy, please refer to www.asco.org/rwc or ascopubs.org/jop/site/ifc/journal-policies.html.

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Appendix

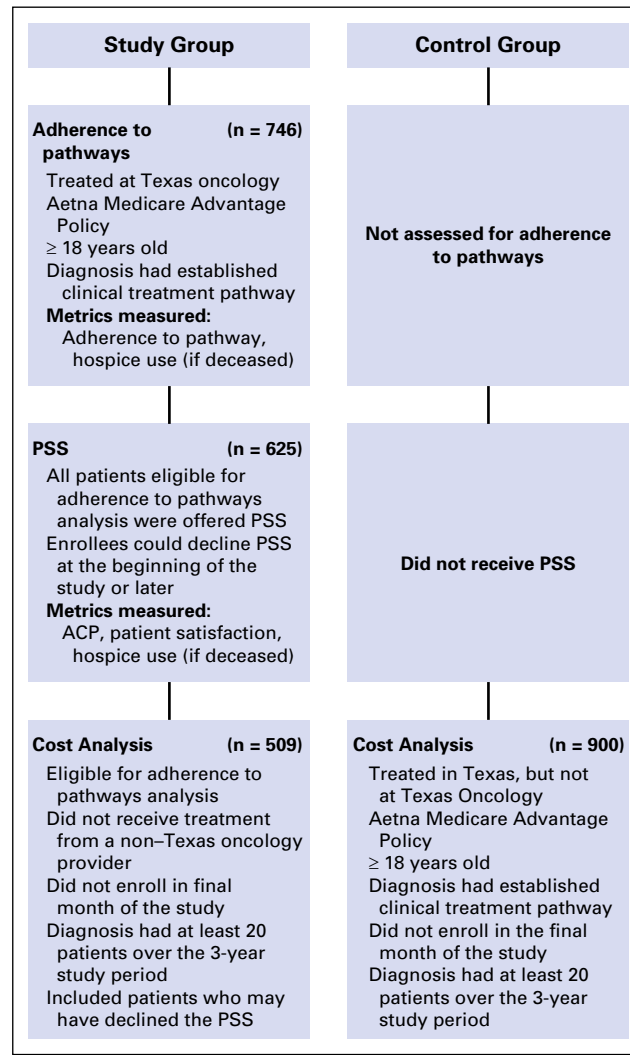


Fig A1. Patients included in the study analyses. ACP, advance care planning; PSS, patient support services.