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Reducing Cancer Costs Through Symptom Management and Triage Pathways

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QUESTION ASKED: Can cost savings achieved from the deployment of symptom management and triage pathways in a value-based oncology care setting be quantified?

SUMMARY ANSWER: In this study, we identified annualized cost savings of $3.85 million achieved through a program of symptom management and triage pathways deployed at two mid-sized community oncology medical group practices.

WHAT WE DID: Patient records generated through the symptom management and triage pathways system over a 6-month study period were screened to identify interventions that precluded what otherwise would have likely been unwarranted emergency room (ER) incidents. The approach was validated with an independent analysis using Medicare claims data from the Oncology Care Model (OCM) program in which both practices participate. Bootstrap simulations were used to test for statistical significance of the ER event rate changes before and after the launch of the program. Average event and annual total cost savings from avoided ER incidents and ER-related hospitalizations were then calculated.

WHAT WE FOUND: The symptom management and triage pathways systems at the two practices precluded what otherwise would have been an annualized 222 ER incidents with associated ER-related hospitalizations. This represents an estimated combined net annualized savings of $3.85 million. Although the ER rate reduction was not statistically significant, these findings are consistent with the observed reduction of ER event rates among a subset of OCM beneficiaries at the two practices. Q:1

CONFOUNDING FACTOR(S), DRAWBACKS: Certain limitations to the study are acknowledged. We have attempted to identify events that did not actually occur, although we are confident that the methodology used to identify the ER nonevents was rigorous and highly reliable. Our study consists of a small sample size exacerbated by evaluating small (6% to 7%) changes in ER visits over a short study period, thus limiting our ability to confirm statistical significance in the reduction in ER events. Limitations inherent in the OCM claims data did not allow for rigorous risk adjustments for patient comorbidities, which can potentially impact findings. We have relied on the findings of others to determine the cost ratio of commercial costs to Medicare costs for the same service, which could impact the accuracy of the total savings among commercial patients. Finally, we recognize that medical practices incur operating expenses in providing these services and pathways and that such expenses would be a deduction from any economic gain to the practices resulting from their programs.

REAL-LIFE IMPLICATIONS: To demonstrate the value in value-based care, reliable quantification of economic impacts is a critical component. In this study, we have developed a methodology and approach to quantify the economic impacts of symptom management and triage pathways, which may have broader application in the continuing pursuit of value-based care and in the negotiation of the alternative payment models associated with such care. JOP

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Abstract

Purpose

Value-based care infers care that is high quality at a comparatively low total cost. A key strategy for value-based oncology care is to avoid unnecessary emergency room (ER) visits and associated hospitalizations of patients receiving treatment for cancer. Early experience with this strategy showed that symptom management in patients with cancer can result in the reduction of ER events and hospitalizations. However, quantifying the actual savings achieved has been elusive. In this article, we present the impact of symptom management and triage pathways programs deployed at two midsize community oncology practices. We then quantify the actual dollar saving in their Medicare and commercial populations.

Methods

Symptom management records generated through the ER triage programs at the two practices were screened to identify avoided ER events. This approach was validated with an independent analysis using Medicare claim data from the Oncology Care Model program in which both practices participate. Bootstrap simulations were used to test for statistical significance of the ER event rate changes before and after the launch of the program. Average event and annual total cost savings from avoided ER incidents and ER-related hospitalizations were then calculated.

Results

Two hundred twenty-two avoided ER events were identified, for an estimated net annualized savings generated by the two practices of $3.85 million. Although the ER rate reduction was not statistically significant, these findings are consistent with the observed reduction of ER event rates among a subset of Oncology Care Model beneficiaries at the two practices.

Conclusion

ER events and associated hospitalizations can be avoided as well as quantified as a result of the deployment of a practice-level integrated platform that incorporates physician-scripted symptom management protocols and telephone triage pathways.

INTRODUCTION

High-value or value-based care refers to care that is high quality at a comparatively low total cost.[1] One of the key strategies for delivering oncology care at a relatively low total cost is to avoid unnecessary, unwarranted emergency room (ER) visits and associated hospitalizations of patients undergoing active treatment. This is achievable through deployment of proactive symptom management and triage pathway protocols.

Early experience with this strategy reported by others indicated that symptom

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management in patients with cancer does, in fact, result in the avoidance of unnecessary ER events and associated hospitalizations. The Oncology Patient-Centered Medical Home model of care reported a progressive decline in ER referrals per chemotherapy patient per year and a reduction in associated hospital admissions.[2] In a 3-year pilot study conducted by UnitedHealthcare, a cost reduction of $33 million over 3 years was attributed to a decrease in hospitalizations and radiation treatment.[3] In an Aetna-Texas oncology pilot study to test the impact of Oncology Medical Home, patients were reported as experiencing 40% fewer ER visits and 16.5% fewer inpatient admissions over the initial 18-month period of the pilot.[4] COME HOME (Community Oncology Medical Home), a Center for Medicare and Medicaid Innovation grant program, showed that the rate of hospital admissions was reduced by 12.5% and ER visits were reduced by 6.6%.[5,6] The Oncology Care Model (OCM) program of Center for Medicare and Medicaid Innovation, which was launched in July 2016, also seeks to further demonstrate this cost savings proposition for Medicare beneficiaries.[7] These previous studies demonstrate the opportunity to reduce costs of cancer care by focusing on high-cost ER and hospitalization events. However, quantifying the actual dollar amount of savings achieved has been elusive.

The objective of our study was to quantify both the impact and the savings derived from precluding unnecessary ER visits and hospitalizations through a system of symptom management and triage pathway programs deployed at two midsize community oncology practices. The basis of the study was data generated from the two practices over the course of a 6-month period (January 2017 through June 2017).

METHODS

Study Participants and the ER Triage Program

The Center for Cancer and Blood Disorders (CCBD) in Fort Worth, Texas and Northwest Medical Specialties (NWMS) in Tacoma, Washington were the participating study practices. There are 13 medical oncologists at CCBD and 10 at NWMS. Both practices are in the vanguard of value-based oncology care, and both are participants in OCM.

CCBD and NWMS have implemented a common technology solution, the symptom management and triage pathways platform of Navigating Cancer (Seattle, WA). The technology solution enables nurse triage staff to effectively resolve critical clinical issues and to preclude in many instances what would otherwise have been an unnecessary and avoidable trip to the ER. During the study period, nearly 5,000 patients were served by the platform, which generated over 10,000 care management event tickets.

Identifying the Avoided ER Events

To identify the ER events that were avoided, an evaluation was conducted of the patient communications originated and recorded in the Navigating Cancer symptom management and triage pathways system. The system documents the disposition of patient communications in the form of an electronic ticket.

One of the most frequently used ticket categories, the Symptom Ticket, is the tool for tracking clinical interventions in response to patient inquiries. Symptom Tickets ensure that symptoms are managed systematically and consistently across the practice in accordance with physician-vetted triage pathways. Symptom Tickets are designed to track staff response to adverse effect inquiries common to chemotherapy, such as nausea, vomiting, diarrhea, constipation, pain, rash, fever, fatigue, cough, trouble breathing, and swelling or lumps. We determined that the triggering event for an avoided ER event occurred in instances where a patient was routed to the practice for an assessment or intervention of a clinical condition.

To narrow the number of total tickets to a subset in which a response to a critical symptom inquiry had occurred, a keyword search of the "Notes" section of the tickets was conducted. Keywords included the following terms: chest pain, shortness of breath, can't control, emergency, fever, severe, too much, extreme, hospital, 911, hydrate, fluid, and infuse. The screened tickets were then individually reviewed by an oncology-certified nurse to determine whether the patient had been directed to come to the practice for a clinical assessment or intervention, thus precluding what would otherwise have been an ER event.

Medicare Claims Validation of Avoidable ER Events

As OCM participants, CCBD and NWMS receive from Centers for Medicaid and Medicare Services data that include all medical claims from the Medicare beneficiaries who received chemotherapy between 2012 and 2014 (1,499 patients at CCBD and 1,648 patients at NWMS) and from July 1, 2016, to June 30, 2017 (1,157 patients at CCBD and 722 patients at NWMS). More than 30% of the OCM patients at each site had been subjected to ER triage since the triage program started, validating the use of OCM data as an independent source to verify

the effect of ER triage program. Because the ER triage program was implemented on January 1, 2017, we used the last 6 months of 2016 as the prior study period to compare with the first 6 months in 2017. Case-mix effects and seasonal variations in ER visits, which could potentially bias the study, were evaluated using 3 full years of data (2012 to 2014). We used 2017 OCM claims to calculate avoidable ER events and the average Medicare ER and hospitalization costs to estimate the total savings of the program.

Quantifying the Costs of ER and Hospitalization Avoidance

Actual cost for an ER visit should include both the amount paid Q:5 by Medicare to the facility (usually 80%) and the coinsurance responsibility of the Medicare beneficiary (20% out of pocket or through supplemental insurance). To calculate the total cost of an ER visit, we extracted both Medicare payment and coinsurance payment from the OCM claims data and combined them.

Medicare ER claims data reflect only ER facility costs and do not include any of the other medical costs associated with an ER event, such as laboratory or ER physician professional services.[8] To calculate the total costs associated with an ER visit, we identified other ER-related services by matching Part B claims in the OCM data to ER facility claims by patient identification, service time, and place of service, and extracted the allowed payment from those claims to add to the ER facility costs. We also calculated the total costs associated with the hospitalization resulting from an ER visit. In addition, we used the OCM claims to identify the proportion of ER visits that led to a hospitalization to estimate the cost from avoided hospitalizations related to ER triage. Patients who avoid the ER but are redirected to the physician's office for care incur non-ER office visit costs. To address these office-based costs, we calculated an average office visit cost at each site and deducted the amount as an offset to the ER cost to preclude overestimation of savings.

To predict the cost and savings to commercial payers, we used the OCM-reported Medicare claims data with a multiple of Medicare cost. The multiple of Medicare that we applied was 1.75, which is the multiple identified in a 2016 study by America's Health Insurance Plans.[9]

Statistical Analysis

Comparable person-time units were created to account for the varying intervals that patients were active in the OCM program. For each OCM patient and in each phase of the study, we counted total cumulative days that the patient was in the program and ER events that occurred. We defined 6-month ER event rate as the total number of ER visits divided by the total number of days and then multiplied by 183 days.

We created the expected ER event rate and reference ER rates using the historical OCM data. The expected ER rate was calculated for each site using 2012 to 2015 Centers for Medicare and Medicaid Services claims data stratified by patient case mix including cancer types, sex, and age groups. We also stratified by quarter to account for the expected seasonal variations in ER visits. Reference ER event rates were also calculated for each site.

The actual case mix and seasonally adjusted ER event rate were calculated separately for the 6-month period before (July to December 2016) and after (January to June 2017) the launch of the symptom management and ER triage program. The actual ER event rate in each period is divided by the expected ER event rate and multiplied by the reference ER event rate.

To test for statistical significance of the ER event rate changes before and after the launch of program, we used bootstrap simulations because they make the least assumptions of the underlying distribution that describes the data. We ran 5,000 bootstrap simulations and calculated the ER event change in each simulation. To account for the intraclass correlation between ER visits for the same patient, we used patient-clustered sampling during the bootstrap simulations.

For a more stringent evaluation of the hypothesis of a reduction in ER rate, we used two-sided testing. We calculated 95% CIs of the ER event rate change by identifying the 2.5th Q:6 and 97.5th percentile of the rate difference from the bootstrap distribution. Two-sided *P* values were also calculated on the basis of bootstrap distribution. All statistical analyses were performed using SAS version 9.3 (SAS Institute, Cary, NC) and were conducted for each site separately.

RESULTS

ER Events Avoided Through Triage Program

A total of 10,417 tickets were generated at the two practices over the 6-month study period, of which 3,909 tickets (38%) were for responses related to symptoms that contained triggering keywords, thus subjecting them to additional evaluation. Of the 3,909 tickets, 284 were identified as critical events that could have resulted in an ER visit, of which 62 were directed to the ER and 222 were directed to the physician's office for

assessment. ER events were thus avoided for these 222 tickets that received office-based services as an alternative to using the ER. The numbers of avoided Medicare ER events were 45 events for CCBD and 59 events for NWMS (Table 1).

To verify that the projected effect on ER triage was consistent with the actual change in ER event rate before and after the program implementation, we conducted an independent claim-based analysis on the ER event rate using Medicare OCM data. Between July 1, 2016, and June 30, 2017, 1,157 and 722 unique OCM patients were identified, composing 1,351 and 841 6-month person-time units at CCBD and NWMS, respectively. At CCBD, 480 patients (41%) had at least one ER visit; among these patients, 113 patients (23%) had three or more ER visits, with the latter contributing to 49% of all ER visits. At NWMS, 248 patients (34%) had at least one ER visit, and 51 patients (21%) had three or more ER visits, contributing to 46% of total ER visits. There were no ER frequent users who disproportionately affected the ER visits. Compared with the 6-month period before the triage program started, the risk-adjusted ER event rate decreased in the first 6 months of program implementation from 73.0% to 65.8% (7.2% reduction) at CCBD and from 64.7% to 58.3% (6.4% reduction) at NWMS, equivalent to 50 avoided ER events at CCBD and 28 avoided ER events at NWMS over a 6-month period (Table 1). The simulation analysis suggested that the ER changes were directionally correct for reductions for both practices, with CCBD showing a 7.2% reduction and NWMS a 6.4% reduction. However, the two-sided P values from bootstrap simulation were not significant at the $P = .05$ level (CCBD, $P = .09$; NWMS, $P = .15$).

Analysis of the seasonal variations among ER event rate showed that the case mix–adjusted ER event rate is slightly lower (92%) from July to December compared with the rate from January to June. Because our study period is January to June, we estimated that the annual number of avoided ER visits through the triage program would be 426 (222 + [222 × 0.92]), 175 at CCBD and 251 at NWMS.

Average ER and ER-Related Hospitalization Costs

OCM claims data for CCBD and NWMS showed average ER facility costs per Medicare beneficiary of $574 and $671, respectively. The average beneficiary coinsurance costs was $223 and $380 for CCBD and NWMS, respectively. In addition, average Part B payments associated with the ER visit were $399

Table 1. ER Events Avoided Through 6-Month Triage Management and Verified in the OCM Data

Description	CCBD	NWMS
ER triage program		
No. of all tickets (6-month study period)	4,404	6,013
No. of tickets containing keywords	1,950	1,959
No. of tickets identified as critical incidents	125	159
No. of patients who went to ER	34	28
No. of patients brought to office for assessment or intervention (avoided ER)	91	131
No. of commercial patients	46	72
No. of Medicare patients	45	59
No. of Medicare OCM patients	18	20
OCM program		
No. of unique OCM patients	1,157	722
Total No. of person-time units (6 months)	1,351	841
Adjusted 6-month ER event rate before triage program started, %	73.0	64.7
Adjusted 6-month ER event rate after triage program started, %	65.8	58.3
ER incident rate reduction, % (95% CI)	7.2 (−3.5 to 18)	6.4 (−5.7 to 19)
No. of ER incidents avoided	50	28
Two-sided test P	.09	.15

Abbreviations: CCBD, Center for Cancer and Blood Disorders; ER, emergency room; NWMS, Northwest Medical Specialties; OCM, Oncology Care Model.

and $357 for CCBD and NWMS, respectively. Therefore, the average overall cost for an ER visit for a Medicare patient is $1,195 for CCBD and $1,408 for NWMS. After subtracting the additional cost of an office-based visit ($262 for CCBD and $141 for NWMS), the average net reduced costs from avoided ER visits were $933 for CCBD and $1,267 for NWMS. In addition, the Medicare claims data showed average hospitalization costs per beneficiary of $8,849 and $10,932 for CCBD and NWMS, respectively. After adding patient coinsurance obligation ($777 and $877 for CCBD and NWMS, respectively) and the associated professional costs ($1,758 and $1,353 for CCBD and NWMS, respectively), the average costs of an ER-related hospitalization for Medicare beneficiaries of CCBD and NWMS were $11,384 and $13,162, respectively (Table 2). With the application of 1.75 as the multiplier, we estimated the average avoided commercial ER costs are $1,632 for CCBD and $2,217 for NWMS and the average avoided commercial ER-related hospitalization costs are $19,921 for CCBD and $23,034 for NWMS.

T2

Estimation of Total Annual Avoided ER and ER-Related Hospitalization Savings

On the basis of the average ER cost for Medicare and commercial payers and the number of avoided ER events identified at each practice, we calculated the total annualized and seasonally adjusted savings from avoided ER events to be $223,854 for CCBD ($80,238 from Medicare and $143,616 from commercial) and $449,117 for NWMS ($143,171 from Medicare and $305,946 from commercial; Table 3).

T3

CCBD and NWMS experienced the similar ER-to-hospitalization conversion rate of 43%, and this rate did not change significantly before and after the launch of the symptom management program. Given each practice's avoided ER events and the ER-to-hospitalization conversion rate, we calculated the likely ER-related hospitalizations that were avoided as a result of ER triage (Table 3). The annualized reduced costs from avoided hospitalization are $1.18 million for CCBD and $2.0 million for NWMS. Our calculation of annual combined (ER and hospitalization) cost savings to all payers that resulted from proactive symptom management and use of triage pathways is $1.40 million at CCBD and $2.45 million at NWMS.

DISCUSSION

Achieving cost savings by avoiding unnecessary, unwarranted ER visits and associated hospitalizations among patients being treated for cancer has been demonstrated in several studies and continues to be tested in a broader context with the increased implementation of value-based care management. Proactive symptom management and triage pathways applications can be an important strategy for achieving this objective. Our study identified reduced ER events and associated hospitalizations as a result of the deployment of a practice-level symptom management and triage pathways program. For two midsize

Table 2. Average Avoided ER and Hospitalization Costs for Medicare and Commercial Payers

Description	CCBD	NWMS
ER		
ER Medicare facility payment, $	574	671
ER coinsurance and patient responsibility, $	223	380
Medicare Part B payment related to ER, $	399	357
Total ER cost, Medicare, $	1,195	1,408
Additional cost for ER alternate office visits, $	262	141
ER cost avoided, Medicare, $	933	1,267
Multiple of Medicare cost applied to commercial	1.75	1.75
ER cost avoided, commercial payers, $	1,632	2,217
Hospitalization		
Hospital Medicare facility payment, $	8,849	10,932
Hospital coinsurance and patient responsibility, $	777	877
Medicare Part B payment related to hospital stay, $	1,758	1,353
Total hospitalization cost, Medicare, $	11,384	13,162
Multiple of Medicare cost applied to commercial	1.75	1.75
Hospitalization cost, commercial payers, $	19,921	23,034

Abbreviations: CCBD, Center for Cancer and Blood Disorders; ER, emergency room; NWMS, Northwest Medical Specialties.

Table 3. Annualized and Seasonally Adjusted ER and Hospitalization Costs Avoided

Description	CCBD	NWMS
ER		
Medicare		
No. of Medicare ER events avoided	86	113
Per ER visit cost avoided, Medicare, $	933	1,267
Total avoided Medicare ER cost (per ER cost avoided Medicare × avoided ER events), $	80,238	143,171
Commercial		
No. of commercial ER events avoided	88	138
Per ER visit cost avoided, commercial, $	1,632	2,217
Total avoided commercial ER cost (per ER cost avoided commercial × avoided ER events), $	143,616	305,946
Total ER costs avoided, all payors, $	223,854	449,117
Hospitalization		
Medicare		
No. of Medicare hospitalizations avoided	37	49
Hospitalization cost, Medicare, $	11,384	13,162
Medicare hospital costs avoided, $	419,876	644,938
Commercial		
No. of commercial hospitalizations avoided	38	59
Hospitalization cost, commercial, $	19,921	23,034
Hospital costs avoided, commercial, $	756,998	1,359,006
Total hospitalization costs avoided, all payors, $	1,176,874	2,003,944
Total costs avoided (ER + hospital), $	1,400,728	2,453,061

Abbreviations: CCBD, Center for Cancer and Blood Disorders; ER, emergency room; NWMS, Northwest Medical Specialties.

oncology practices that have such programs in place, the resulting total annualized savings ranged from $1.4 million to $2.45 million.

Our projected ER avoidance through the triage data analysis was consistent with the independent claim-based analysis among the Medicare OCM subset of patients. At both sites, we observed a similar 6% to 7% ER event rate reduction over the first 6 months of the program implementation, suggesting the projected numbers from the ER triage program are reliable. The number of reduced ER events in OCM are actually larger than the numbers from the ER triage program, suggesting that other care improvement interventions through the OCM program have also contributed to the overall ER reductions.

Our results are also in alignment with the findings from other cancer management programs, including the Oncology Patient-Centered Medical Home,[2] Aetna's study,[4] and the COME HOME program.[5,6] The results reported in this study, together with the results of other studies that feature symptom management, all support the significant effect of such interventions in care improvement and cost savings.

When estimating the cost related to ER visits or avoided hospitalizations, most studies report only the facility cost that is paid by Medicare or the commercial payer, rather than the actual total cost, which should also include patient coinsurance and the professional services (eg, physician services, imaging, laboratory) that also occurred during the ER visit and hospital stay. Therefore, the cost related to ER visits and hospitalizations are usually significantly underestimated. In this study, we leveraged the detailed payment information from Medicare OCM claims data to calculate the average cost for each component, thus providing more accurate estimates for the total costs related to ER visits and hospitalization. Our calculation showed that patient's responsibility and professional service payment together can account for approximately 50% of ER cost and 20% of hospitalization cost. We recommend that these costs always be included in the financial analysis of medical costs.

We acknowledge certain limitations to the study. First, we have attempted to identify events that did not actually occur, although we are confident that the methodology used to identify the ER nonevents was rigorous and highly reliable. The

independent analysis of OCM claims data further verified the validity of this method. More methodological work is required when researching avoidable events to more definitively capture such outcomes. Second, our study consists of a small sample size exacerbated by evaluating small (6% to 7%) changes in ER visits during a short study period (6 months), thus limiting our ability to confirm statistical significance in the reduction in ER events. We used bootstrap simulation to determine 95% CIs and two-sided *P* values from the sample data, which is a more accurate method to evaluate the stability of our results rather than using standard tests that rely on the assumption of normality. Although our results are not statistically significant, even small reductions in ER visits can have a large financial impact to practices, as we demonstrated in the results, thus providing a strong indication for continuing investigation. We have now rolled the symptom management and triage pathways program out to practices of the Quality Cancer Care Alliance, an oncology-specific clinically integrated network. We intend to further evaluate cost savings generated from this expansion of the program and anticipate that additional study will demonstrate significant savings across multiple practices. Data limitations of the OCM data did not allow for rigorous risk adjustments for patient comorbidities, which can potentially affect findings. Third, we relied on the findings of others to determine the cost ratio of commercial-to-Medicare costs for the same service, which could affect the accuracy of the total savings among commercial patients, but it should not affect the major conclusions of this study. Finally, we recognize that medical practices incur operating expenses in providing their symptom management and triage pathways services and that those operating expenses would be a deduction to any economic gain to the practices resulting from their symptom management services. However, the purpose of our study was to identify and quantify savings in total cost of care and not to measure associated operating costs incurred in providing such services. Further research is warranted with regard to the revenue and expense relationships associated with providing such programs at the practice level.

In conclusion, our analysis has demonstrated that ER events and their associated hospitalization costs can be quantified and potentially mitigated as a result of the deployment of a practice-level symptom management and triage pathways program and that, for two midsize oncology practices that have such programs in place, the resulting potential annualized savings generated range from $1.40 million to $2.45 million. Avoiding unnecessary ER visits and associated hospitalizations of patients undergoing active chemotherapy treatment remains a key strategy for delivering high-quality, high-value oncology care at a relatively lower total cost, and we encourage continued research in this area. JOP

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Authors' Disclosures of Potential Conflicts of Interest

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Final approval of manuscript: All authors

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References

1. Blayney DW, Simon MK, Podtschaske B, et al: Critical lessons from high-value oncology practices. JAMA Oncol 4:164-171, 2018

2. Sprandio JD: Oncology patient-centered medical home and accountable cancer care. Commun Oncol 7:565-572, 2010

3. Newcomer LN, Gould B, Page RD, et al: Changing physician incentives for affordable, quality cancer care: Results of an episode payment model. J Oncol Pract 10: 322-326, 2014

4. Butcher L: How oncologists are bending the cancer cost curve. Oncol Times 35: 5-6, 2013

5. Snaghavi D, Patel K, Samuels K, et al: Transforming cancer care and the role of payment reform: Lessons from the New Mexico Cancer Center. https://www.brookings.edu/research/transforming-cancer-care-and-the-role-of-payment-reform/

6. Jenkins K: COME HOME program lowers costs for cancer patients. https://www.medscape.com/viewarticle/873737

7. Center for Medicare and Medicaid Innovation: Oncology Care Model (OCM) request for applications (RFA). https://innovation.cms.gov/Files/x/ocmrfa.pdf

8. Center for Medicare and Medicaid Innovation: Technical Reference Guide for OCM Practice Feedback Reports v3. Baltimore, MD, Centers for Medicare and Medicaid Services, 2017 Q:9

9. America's Health Insurance Plans: National Comparison of Commercial and Medicare Fee-For-Service Payments to Hospitals. https://www.ahip.org/national-comparisons-of-commercial-and-medicare-fee-for-service-payments-to-hospitals/

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Reducing Cancer Costs Through Symptom Management and Triage Pathways

Q:8 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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