

The impact of provider consolidation on outpatient prescription drug-based cancer care spending

RESEARCH IN BRIEF

Many policymakers (including state attorney general offices, Medicaid program directors, insurance commissioners) worry about the effects of medical provider consolidation on spending levels and trends.

Medical provider consolidation's impact on spending is an empirical question. On the one hand, consolidation may lead to the identification and dissemination of best practices and reductions in the use of unnecessary care, resulting in reduced spending. Alternatively, consolidation may allow outpatient practices and/or hospitals to gain bargaining power in negotiations with insurers, pushing up prices and/or changing the mix of treatments provided to patients, leading to increased spending.

The hypothesized effects of medical provider consolidation on spending are likely disease-specific and dependent on the ability of local medical providers to control treatment use and associated prices. For example, drug-based cancer care is an area of medicine where providers have significant control over treatment selection and face financial incentives to choose resource intensive care.

The Health Care Cost Institute (HCCI) claims data is an indispensable resource for empirical evaluations of the effect of medical provider consolidation on disease-specific spending.

This project examines whether specialty medical provider consolidation increases per person spending among commercially insured patients using HCCI claims data in 2008 through 2013. We use HCCI claims linked to nationwide data on medical provider consolidation measured using the IMS Health SK&A provider survey. We use longitudinal data with market-level random effects to examine changes in inflation adjusted cancer-specific "chemotherapy" related spending in markets with increasing concentration of vertically integrated oncology practices accounting for secular trends in treatment-specific spending.

We find stakeholder concerns regarding the impact of provider consolidation on outpatient spending are warranted:

- We find statistically significant increases in consolidation among outpatient oncology providers and hospitals and/or health systems. These changes largely occurred in 2010 and 2011.
- Increased medical provider consolidation with hospitals and/or health systems results in increased spending on outpatient prescription drug-based cancer treatment.
- These results appear to be driven in part by increases in the prices charged for treatment (including facility fees that hospital outpatient departments are able to charge payers).

AUTHORS

RM Conti
MB Landrum
M Jacobson

- Future work will investigate the extent to which the mix of treatments provided to cancer patients changes with increased provider consolidation.

INTRODUCTION

Understanding determinants of medical spending is a critical focus of health policy research. Armed with credible evidence on spending determinants, national, state and local area stakeholders can anticipate the intended and unintended consequences of policies aimed at improving the efficiency and/or quality of medical care provided to patients. A focus on the determinants of aggregate spending is not enough to help these and other stakeholders formulate effective policy. It is the disease-specific components of spending - use of available treatments and corresponding prices - that are key components of policies aimed at improving medical care access and quality while mitigating spending levels and trends.

Many local, state and federal stakeholders have worried about the effects of medical provider consolidation on spending levels and trends. Many medical providers have recently merged and/or affiliated with hospitals and/or health systems. The effects of these activities are a priori ambiguous: Consolidation among medical providers may lead to economies of scale, particularly in the identification and dissemination of best practices and reductions in the use of unnecessary care, resulting in reduced spending. Alternatively, consolidation may allow outpatient practices and/or hospitals to gain bargaining power in negotiations with certain insurers, pushing up prices and/or changing the mix of treatments provided to patients and leading to increased spending.

Consequently, state and federal attorney general offices charged with assessing the consumer implications of local area provider consolidation require empirical assessments. State Medicaid Directors, insurance

commissioners and payers more generally also require empirical assessments since the hypothesized impacts of consolidation may have important impacts on spending and access among all constituents.

The potential effects of medical provider consolidation on spending are likely disease-specific. They are also likely dependent on local area demand for and supply of medical care, including the ability of medical providers and insurers to control treatment use and associated prices. The potential pricing and use impacts of medical consolidation will largely impact care among the commercially insured population, but may have important spillovers to state Medicaid beneficiaries and Medicare beneficiaries over time.

The Health Care Cost Institute (HCCI) claims data is a unique and indispensable resource for such empirical evaluations. The data contains member enrollment file and physician medical, outpatient medical, inpatient medical claims. It can be used to measure patient diagnosis-specific, treatment-specific, and provider/market-specific measures of spending by year and over time.

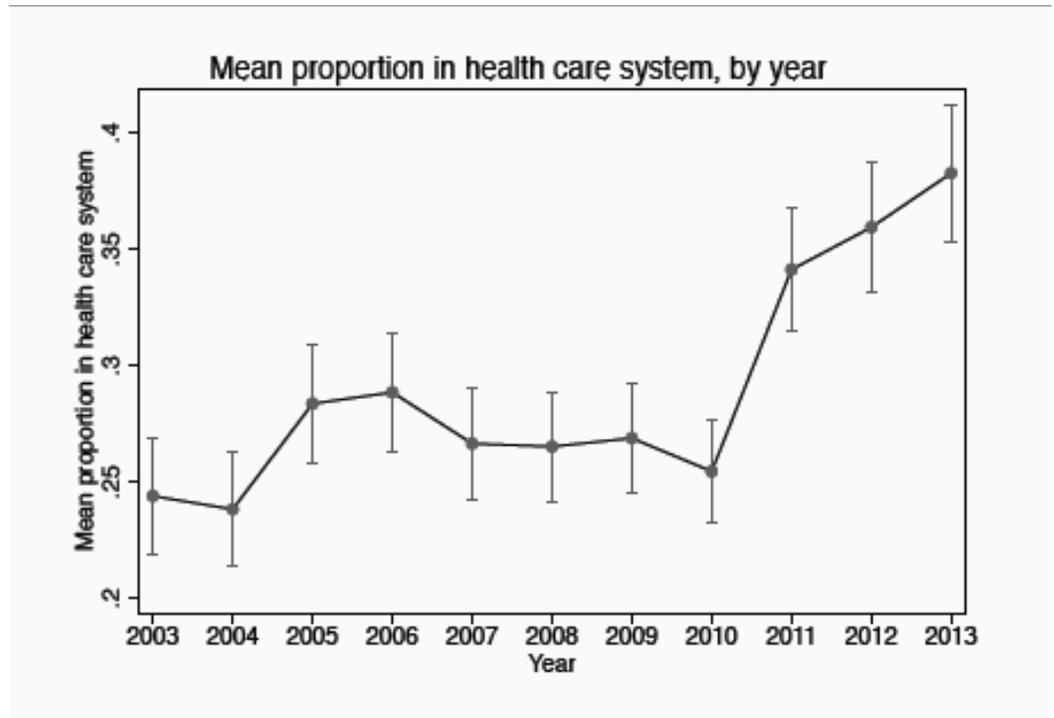
PROJECT SUMMARY

This project examines whether medical provider consolidation increases per person spending among commercially insured patients using HCCI claims data. Specifically we use HCCI claims linked to nationwide data on medical provider consolidation measured using IMS Health's SK&A provider survey data. We use longitudinal data with market-level random effects to examine changes in inflation adjusted treatment-specific spending in markets with increasing concentration of vertically integrated oncology practices accounting for secular trends in treatment-specific spending.

We focus on consolidation in the supply of outpatient prescription-drug based cancer care. We select this focus for the following

FIGURE 1

Mean proportion of outpatient oncology providers reporting vertical consolidation in local markets 2003 through 2013



rationales: Cancer is the second leading cause of national deaths and spending on cancer treatment (notably prescription-drug based treatment, “chemotherapy”) appears to be outpacing spending on all other diseases. Use of these services is largely under the discretion of medical providers. Many providers face significant financial incentives to use high priced prescription drugs. Prices of these services are also under medical providers’ discretion since care covered under patients’ medical insurance benefits is largely paid via fee for service contracts.

Consolidation between outpatient providers and hospitals has been of specific concern, since such affiliations can generate significant revenue off the difference between acquisition costs and reimbursement for infused and injected drugs covered under patients’ outpatient medical benefits as well as revenue off the dispensing of anticancer drugs dispensed by pharmacies and covered under patients’ pharmacy benefits. More details on the study rationale, methods and limitations can be found in the **Technical Appendix**.

TABLE 1

Mean proportion of outpatient oncology providers reporting vertical consolidation in local markets by year 2008 through 2013

<i>Vertical consolidation</i>			
proportion of providers reporting in "health system" and/or affiliated with hospital			
n=356	mean	standard deviation	
average over all years:	23.75	24.94	
2009	16.5	22.2	
2010	14.65	19.4	
2011	26.2	26.4	
2012	29.3	27.2	
2013	32.1	29.5	

TABLE 2

Mean per person inflation adjusted spending (2014 USD) by treatment type overall and by year.

n=356	Chemotherapy administration including facility fees		Physician administered Chemotherapy		Pharmacy dispensed chemotherapy		Evaluation and Management	
	mean	standard deviation	mean	standard deviation	mean	standard deviation	mean	standard deviation
average over all years:	2204.84	1672.72	8970.224	8760.24	4367.16	3646.88	190.22	173.32
2009	2219.5	1984	8542.42	9070	3118.4	2835.2	186.3	179.8
2010	2081.9	1399	7819	7475	2945.1	2443.2	183.2	177.6
2011	2204	1675	8658	8284.2	3699	3215	194.6	182
2012	2217.2	2078.6	9604	9415	4950.8	3674	189	166.2
2013	2301.6	1227	10227.7	9557	7122.5	6067	198	161

TABLE 3

Mean per person inflation adjusted prices (2014 USD) by treatment type overall and by year.

n=356	Chemotherapy administration including facility fees		Physician administered Chemotherapy		Pharmacy dispensed chemotherapy		Evaluation and Management	
	mean	standard deviation	mean	standard deviation	mean	standard deviation	mean	standard deviation
average over all years:	222.38	392.62	876.36	648.8	1410.9	1014.6	69.3	52.6
2009	237.9	354.4	887.8	720	1050.5	850	72	59
2010	216.1	133.4	826	595	1032	783	67	51
2011	221.1	126.4	846	597	1242	943	73	71
2012	216.5	1234	883	588	1632	1063	66	43
2013	220.3	114.9	939	744	2098	1434	68.5	39

PROJECT RESULTS

The project's results are the following:

- There were 356 cancer-care “markets” defined by the U.S. Census Bureau’s Core Based Statistical Areas (CBSAs) in our sample. This constitutes the unit of analysis for all statistical tests.
- We observe significant increases in consolidation between outpatient oncology practices and hospitals and/or health systems (vertical consolidation) in local markets between 2003 and 2013 (Figure 1).
- We find notable increases in consolidation among outpatient oncology providers and hospitals and/or health systems starting in 2011 (Figure 1, Table 1).
- There is significant skew between local markets in logged inflation adjusted spending and prices on selected drug-based cancer treatments in 2008-2013 among commercially insured patients (note the average and standard deviation of inflation adjusted spending and prices overall years reported in Table 2, Table 3).
- We also observe increases in mean per person inflation adjusted spending and prices on selected drug-based cancer treatment during these years overall markets (Table 2, Table 3). These increases appear to concentrate in physician-administered chemotherapy, pharmacy dispensed chemotherapy, and chemotherapy “administration” that includes facility fees hospitals charge payers. We observe limited increases in inflation adjusted per person spending and prices

TABLE 4

Random effects model estimation results predicting the causal effect of outpatient oncology provider vertical consolidation on inflation adjusted per person spending and price.

	Log mean inflation adjusted spending per person					Log mean inflation adjusted price					
	estimated coefficient	standard deviation	p-value	CI		estimated coefficient	standard deviation	p-value	CI		
n=356											
yr											
	2010	0.012	0.035	0.74	-0.057	0.08	-0.03	0.03	0.366	-0.08	0.03
	2011	0.06	0.05	0.19	-0.03	0.15	0.003	0.04	0.922	-0.07	0.07
	2012	0.17	0.05	0.001	0.072	0.27	0.075	0.038	0.055	-0.002	0.15
	2013	0.29	0.05	0.0001	0.18	0.39	0.15	0.04	0.001	0.07	0.23
proportion health system		0.34	0.12	0.004	0.11	0.57	0.23	0.09	0.01	0.05	0.41
treatment type:											
Physician administered chemotherapy		3.4	0.07	0.0001	2.3	2.5	2.3	0.05	0.0001	2.2	2.4
Pharmacy dispensed chemotherapy		2.86	0.05	0.0001	2.76	2.95	2.7	0.05	0.0001	2.65	2.82
Chemotherapy administration including facility fees		2.4	0.04	0.0001	2.3	2.5	1.12	0.03	0.0001	1.06	1.2
Constant		4.69	0.05	0.0001	4.6	4.8	3.9	0.04	0.0001	3.85	4

TABLE 5

Random effects model estimation results predicting the lagged one year causal effect of outpatient oncology provider vertical consolidation on inflation adjusted per person spending and price.

	Log mean inflation adjusted spending per person					Log mean inflation adjusted price					
	estimated coefficient	standard deviation	p-value	CI		estimated coefficient	standard deviation	p-value	CI		
n=356											
yr											
	2010	0.005	0.04	0.889	-0.0635	0.07	-0.03	0.028	0.29	-0.085	0.025
	2011	0.085	0.04	0.05	-0.001	0.17	0.02	0.035	0.535	-0.047	0.09
	2012	0.16	0.05	0.002	0.06	0.26	0.067	0.039	0.087	-0.009	0.14
	2013	0.27	0.05	0.0001	0.16	0.37	0.14	0.04	0.0001	0.06	0.22
proportion health system		0.143	0.11	0.197	-0.08	0.36	0.09	0.09	0.334	-0.095	0.28
proportion health system lagged one year		0.36	0.15	0.017	0.06	0.66	0.24	0.12	0.047	0.003	0.47
treatment type:											
Physician administered chemotherapy		3.4	0.07	0.0001	2.3	2.49	2.3	0.05	0.0001	2.2	2.4
Pharmacy dispensed chemotherapy		2.86	0.05	0.0001	2.76	2.96	2.7	0.05	0.0001	2.65	2.83
Chemotherapy administration including facility fees		2.4	0.04	0.0001	2.32	2.49	1.13	0.03	1.06	1.2	-1.06
Constant		4.67	0.05	0.0001	4.6	4.77	3.9	0.04	0.0001	3.83	3.98
sigma_u		0.59					0.37				
sigma_e		1.1					0.91				
rho		0.22					0.14				

- of office visits to evaluate and manage the treatment of cancer patients (“Evaluation and Management”).
- Increased vertical provider consolidation results in statistically significant increased inflation adjusted spending and prices on outpatient prescription drug-based cancer treatment (all outcome p-values > 0.001) (Table 4).
- A one percentage point increase in the proportion of medical providers affiliated with hospitals and/or health systems is associated with a 34 percent increase in average per person annual spending per person and a 23 percent increase in average per person price of treatment. Comparing the magnitude of the spending and price effects, we believe spending results are in part driven by price increases (Table 4).

- Investigating the timing of this effect in more detail, we find statistically significant increases in per person spending and prices for prescription-drug based cancer treatment to occur with a one-year lag (Table 5).
- The main challenge to the causal attribution of our analytic results is that certain types of providers attract more complex patients. The results reported above are robust to analytic adjustments for this threat to the validity of our claims.
- The results are also robust to adjustments for cancer type and patient level demographic characteristics (CBSA-year averages of patient population size, age distribution and sex).
- Finally, the results are robust to HCCI claims-based measures of patient insurance type, specifically the inclusion of two separate indicator variables for coverage by Medicare Advantage and high deductible health plan (results available by request from study authors).

POLICY IMPLICATIONS

Stakeholder concerns regarding the impact of provider consolidation on outpatient specialty care spending are warranted. Our results suggest increased vertical provider consolidation results in increased inflation adjusted per person spending on outpatient prescription drug-based cancer treatment. These results appear to be driven in part by changes in the prices charged for treatment (including facility fees that hospital outpatient departments are able to charge payers). Future work will investigate the extent to the types of treatments provided to cancer patients' changes with increased provider consolidation.

PROJECT TECHNICAL APPENDIX

Project Motivation

Many local, state and federal stakeholders have worried about the effects of medical provider consolidation on spending levels and trends. Medical providers have increasingly merged and/or affiliated amongst themselves (horizontal consolidation) and with hospitals and health systems (vertical consolidation) in many state and local markets.^{1,2,3} The effects of these activities are a priori ambiguous:^{4,5} Consolidation among medical providers may lead to economies of scale, particularly in the identification and dissemination of best practices and reductions in the use of unnecessary care, resulting in reduced spending.⁶ Alternatively, consolidation may allow outpatient practices and/or hospitals to gain bargaining power in negotiations with certain insurers, pushing up prices and/or changing the mix of treatments provided to patients and leading to increased spending. The “price” effect of provider consolidation appears to dominate the “use” effect in recent empirical work.^{7,8}

The potential effects of medical provider consolidation on spending are likely disease-specific.⁹ They are also likely dependent on local area demand for and supply of medical care, including the ability of medical providers (and insurers) to control treatment use and associated prices. The potential spending impacts of medical consolidation will largely impact care among the commercially insured population, but may have important spillovers to state Medicaid beneficiaries and Medicare beneficiaries over time.

Consequently, state and federal attorney general offices charged with assessing the consumer implications of local area provider consolidation require disease-specific empirical assessments. State Medicaid Directors, insurance commissioners and payers more generally also require empirical assessments since the hypothesized impacts of consolidation may have important impacts on spending and access among all constituents.

Project Objectives

This project examines whether specialty medical provider consolidation increases per person outpatient cancer specific prices and spending among commercially insured patients using Health Care Cost Institute (HCCI) claims data. We link HCCI claims to nationwide data on medical provider characteristics and consolidation levels and trends. We describe patterns of oncology provider consolidation. We use longitudinal data with market-level random effects to examine changes in inflation adjusted treatment-specific spending in markets with increasing concentration of vertically integrated oncology practices accounting for secular trends in treatment-specific spending.

We focus on consolidation in the supply of outpatient prescription-drug based cancer care for the following rationales: Cancer is the second leading cause of national deaths¹⁰ and spending on cancer treatment (notably prescription-drug based treatment) appears to be outpacing spending on all other diseases. Use of these services is largely under the discretion of medical providers. Many providers face significant financial incentives to use high priced prescription drugs. They can generate significant practice revenue off the difference between acquisition costs and reimbursement for infused and injected drugs covered under outpatient medical benefits and the charging of “facility fees” to insurers on top of fees for the care provided.^{11,12,13,14,15,16} Prices of these services are also under medical providers’ discretion since care covered under patients’ medical insurance benefits is largely paid via fee for service contracts. The trade literature suggests outpatient oncology practices have increasingly consolidated with hospitals and/or health systems (vertical consolidation).^{17,18,19}

Empirical approach

Our empirical strategy takes advantage of recent consolidation in outpatient oncology care to examine market changes in inflation adjusted spending. We use longitudinal data with market-level random effects to examine

changes in inflation adjusted treatment-specific spending in markets with increasing concentration of vertically integrated oncology practices accounting for secular trends in treatment-specific spending.

Data

We use national data collected by 2003-2013 SK&A Office-based Physician and Hospital Database to measure outpatient oncology provider consolidation, and employ the 2010 U.S. Census Bureau defined “local” geographical unit of analysis called a “Core Based Statistical Area” (CBSA).²⁰ The advantages of this unit of analysis are that it encompasses urban and rural areas. There are 929 CBSAs in the U.S. including Puerto Rico.

We use 2008-2012 Health Care Cost Institute (HCCI) “Data Set #2” member enrollment file and physician medical, outpatient medical, inpatient medical claims to measure CBSA level inflation adjusted prices and spending on outpatient cancer-specific chemotherapy.

Construction of provider consolidation measures: We construct a measure of consolidation between outpatient oncology practices and hospital and/or health systems (vertical consolidation) in each CBSA from a provider specific self reported SK&A indicator for year-oncology practice hospital and/or health system ownership weighted by patient counts.

Cancer-specific, outpatient service identification: We define cancer cases in the HCCI claims using the Surveillance, Epidemiology and End Results (SEER) criteria and exclude patients who exclusively receive inpatient treatment. Specifically, we use the HCCI claims data to identify person-year level ICD-9 codes describing primary sites of cancer origin. We limit cancer-specific treatments among these patients to those which list the same ICD-9 code at least two outpatient claims on different dates within 28 days or for at least one outpatient claim and one or more inpatient claims within 365 days for the same person identifier. We then link claims corresponding

to these inclusion criteria to the HCCI enrollment file. We further limit our patient-year sample to those continuously enrolled in same unique plan identifier for 12 months or longer, including persons enrolled in commercial Medicare Advantage plans and high deductible health plans.

Among this sample, we identify annual inflation adjusted per person spending and prices by year for a set of specific CPT codes: (1) Evaluation and management office visits; (2) Infused or injected chemotherapy and other highly complex drug or highly complex biologic agent *administration* covered under the payer's medical benefit, including facility code fees; (3) Chemotherapy specified by HCPCS/Jcodes, including miscellaneous chemotherapy codes covered under the payer's medical benefit only; (4) Chemotherapy and supportive care covered under the payer's pharmacy benefits specified by American hospital formulary classification codes (10:00 Antineoplastic Agents) and (5) A combination of (1)-(4) care components. These measures are averaged within CBSA.

We link HCCI claims to SK&A at the CBSA level.

All data management and analyses was performed using SAS 9.3 (Cary, NC) and Stata 12.3. All descriptive statistics and final results were generated in the NORC Enclave and exported in a manner consistent with HCCI/NORC protocols.

STUDY RESULTS

There are 356 CBSAs in our sample, comprising 38 percent of all national CBSAs.

We observe a significant increase in consolidation between outpatient oncology practices and hospitals and/or health systems (vertical consolidation) in local markets between 2003 and 2014. We find notable increases in vertical consolidation among outpatient oncology

providers and health systems largely occurred between 2010 and 2011.

In the cross-section, markets with more vertically consolidated providers spend statistically significantly more on outpatient drug-based treatment compared to markets with less vertically consolidated provider groups (p-value \leq 0.01). This result appears to be driven by two factors: Providers in more vertically consolidated markets charge higher prices (p-value = 0.001). Providers in more vertically consolidated markets also use more intensive care (more combination prescription-drug based treatment, more expensive, patent protected prescription drugs) and charge larger facility fees on top of fees directly related to care provision (all outcome p-values \leq 0.01).

Increased vertical provider consolidation results in statistically significant increased inflation adjusted spending on outpatient prescription drug-based cancer treatment (all outcome p-values $>$ 0.10). The spending result appears to be driven in part by increased prices across chemotherapy and administration components among increasingly consolidated local markets (all outcome p-values \leq 0.01).

The main challenge to the validity of our causal claims in this analysis is that certain types of providers attract more complex patients. To correct for this, we use a technique described in previous literature on hospital and provider consolidation. Specifically, we construct an alternative eligible cohort measure of cancer treatment based on a standard Hotelling problem solution that breaks the endogeneity of observed provider-patient matches using the HCCI data. To do this, we implement the following steps: First, for each provider of outpatient oncology services in the HCCI claims, we observe their zip code and the zip code of their patient's searching cancer treatment of interest in the study (as defined above). From this, we map all provider-patient zip

code combinations and assign maximum driving distances using Google drive software available for web-based download. Second, we assign maximum driving distance cutoff values, k , a patient would be willing to travel to “usually” see a physician for cancer treatment based on the actual observed driving distances.

We reran the analyses using only the claims of patients accessing a physician within the median (12.7 miles), mean (55.71 miles, standard deviation 195 miles) and 75 percentile (27.6 miles) driving distance. The results described above are robust to this approach (results available by request from study authors) – we find coefficient magnitudes to be reduced by approximately 10 percent, but the statistical significance of the estimates effects to remain within standard magnitudes (all outcome p-values =/ $<$ 0.01).

These results are also robust to adjustments for cancer type and patient level demographic characteristics (CBSA-year averages of patient population size, age distribution and sex) (results available by request from study authors).

Finally, the results are robust to HCCI claims-based measures of patient insurance type, specifically the inclusion of two separate indicator variables for coverage by Medicare Advantage and high deductible health plan (results available by request from study authors). Again, we find coefficient magnitudes to be reduced by approximately 10 percent, but the statistical significance of the estimates effects to remain within standard magnitudes (all outcome p-values =/ $<$ 0.01).

PROJECT LIMITATIONS

We acknowledge several limitations with the results we present.

First, we present population weighted results for CBSAs based on patient counts. Alternatively, in future work we plan to limit

the sample of CBSAs to those with a population less than 3 million in 2008, since it is likely that in CBSAs with more than 3 million there is multiple provider “markets” and the HHI of that CBSA may be mismeasured.

Second, it is unknown whether the preliminary results are robust to different market-level definitions. Our team is currently checking the robustness of our results to the alternative definition of markets using primary care service areas (PCSAs) and hospital service areas (HSAs). Primary care service areas (PCSAs) reflect Medicare patient travel to primary care providers. Hospital service areas (HSAs) are local health care markets for hospital care. An HSA is a collection of ZIP codes whose residents receive most of their hospitalizations from the hospitals in that area.

Third, provider groups may have limited ability to alter pricing or spending on outpatient cancer care if insurers exert strong supply side limits on provider revenue generation, price setting and/or use discretion.^{21,22,23} Our team is in the middle of linking the study cohort to data from HealthLeaders-Interstudy© which provides comprehensive information on enrollment of public and private health insurers plans at the county-year level. This will allow us to create concentration measures of insurance firms by county-year and rerun the analyses.²⁴

Fourth, future work is needed to understand whether increased spending among vertically concentrated providers is associated with improved quality of care and/or access to care for patients suffering from cancers and insured by commercial payers, state Medicaid programs and federal Medicare programs.²⁵ If quality of and/or access to cancer care are improved in local areas undergoing provider consolidation, spending and price increases may be warranted.

Finally, it is unknown whether these results are generalizable to care consolidation in the outpatient treatment of other specific diseases. The results of this work in combination

with previously published studies of other medical specialties (cardiologists, orthopedics, primary care) suggest consolidation may have differential effects on spending and prices among medical provision depending upon demand and supply-side features of care and existing payment policies.²⁶

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Conti has received generous feedback on the conduct of this study from Foster Gesten (Medical Director, Office of Quality and Patient Safety, New York State Department of Health), David Cutler (Harvard University) and Peter Bach (Memorial Sloan Kettering Cancer Center), HCCI research staff (Amanda Frost), participants of the NASPH annual conference (October 2015, Dallas Texas) and a NASPH webinar cohosted by HCCI (December 2015). Conti has also presented preliminary results of this project to the University of Chicago Cancer Outcomes Research Workgroup (January 2016) and has accepted invitations to present this work to The University of Michigan RWJ Scholars program in April 2016 and the University of Kansas Economics Department Fall 2016. To further disseminate the conduct and findings of this project to academic audiences, study design and results will be presented at Northwestern University Kellogg School of Business Health Care Markets conference Chicago, IL April 2016 and ASHecon, Philadelphia, PA June 2016.

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