Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Supplementary Methods

Direct vs. Total Costs

All Medicare Part A and Part B expenditures are included in the OCM baseline cost calculations. These include costs associated with the hospital inpatient setting, skilled nursing facilities (SNF), outpatient hospital care, provider services, Durable Medical Equipment, Prosthetics, Orthotics, and Supplies (DMEPOS), Home Health Agency (HHA) services, and hospice claims. Some Part D (self-administered therapies, such as oral drugs) expenditures are included, namely the Low-Income Cost Sharing Subsidy (LICS) cost and 80% of the Gross Drug Cost above the Catastrophic (GDCA) threshold.[1]

Strikingly, these costs are wide-spread and encompass care across a broad range of environments. For instance, any surgery, related or unrelated to cancer, is included. Thus, in the evaluation and assessment for payouts, all unrelated care in the above noted settings is included. Direct expenditures, however, are only services for which physicians at participating practices directly manage and are reimbursed. These services, such as the chemotherapy, supportive drugs, evaluation and management services, and so on entail the care whose costs and outcomes are fully controlled by program participants. Direct care and expenditures alone encompass the outcomes considered in this analysis.

[1] RTI. "OCM Performance-Based Payment Methodology". (2016).

Regression Specifications

Our participation specifications use provider-by-month observations from before OCM launch and are specified as follows:

$$\begin{aligned} OCM_j = \; & \alpha + x\,Medicare_{it} + n\,Private_{it} + \iota\,Medicaid_{it} + \phi\,MA_{it} + \\ & \kappa\,Breast_{it} + \lambda\,Genitourinary_{it} + \zeta\,Lymphatic_{it} + \eta\,Lung_{it} + \\ & \delta\,Colon_{it} + \omega\,Prostate_{it} + \theta\,Respiratory_{it} + \mu\,Digestive_{it} + \varepsilon_{ijt}{}^{2} \end{aligned} \quad [1]$$

$$\begin{aligned} OCM_j = \; & \alpha + x\,Age_{it} + n\,Sex_{it} + \iota\,Chemo_{it} + \phi\,Number\ Patients_{it} + \\ & \kappa\,Number\ Medicare\ Patients_{it} + \lambda\,Number\ Physicians_{jt} + \varepsilon_{ijt}{}^{3} \end{aligned} \quad [2]$$

Our difference-in-differences specification uses provider-by-month observations from before and after OCM launch and is specified as follows:

$$\begin{aligned} Y_{ijt} = \; & \alpha + \beta\,OCM_j * Post_t + \omega\,OCM_j + \tau_t + \mu_i + n\,Sex_{it} + x\,Age_{it} + \zeta\,Age^2{}_{it} + \iota\,Chemo_{it} + \\ & \phi\,Number\ Patients_{it} + \kappa\,Number\ Medicare\ Patients_{it} + \lambda\,Number\ Physicians_{jt} + \varepsilon_{ijt}{}^{4} \end{aligned} \quad [3]$$

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[2] Monthly physician-level means are estimated by *x* for mean share of patients who are on Medicare, *n* for mean share of patients who are on Private, ι for mean share of patients who are on Medicaid, ϕ for mean share of patients who are on MA, κ for mean share of patients who have Breast cancer, λ for mean share of patients who have Genitourinary cancer, ζ for mean share of patients who have Lymphatic cancer, η for mean share of patients who have Lung cancer, δ for mean share of patients who have Colon cancer, ω for mean share of patients who have Prostate cancer, θ for mean share of patients who have Respiratory cancer, and μ for mean share of patients who have Digestive cancer, while ε_{ijt} is the error term. Standard errors are clustered at the practice-level.

[3] Where i is physician, j is practice, and t is month. Monthly physician-level means are estimated by *x* for mean patient age, *n* for percent female patients, ι for percent chemo-treated, ϕ for total number of patients managed, κ for total number Medicare patients managed, and λ for total number of physicians at a given practice for a given month, while ε_{ijt} is the error term. Standard errors are clustered at the practice-level since each observation is presumed to be serially-correlated within the practice clusters given that the policy varies at the practice-level.

[4] Y_{ijt} is the outcome of interest, β estimates the marginal correlation of participating in the OCM in the post period, ω estimate the mean association of being in a practice that participates in the OCM, τ_t is a vector of month fixed effects (these are collinear with an indicator for Post which is accordingly excluded), μ_i is a vector of physician fixed effects (these are not collinear with OCM), several monthly physician-level means are estimated by *n* for percent female patients, *x* for mean patient age, ζ for mean patient age squared, ι for percent chemo-treated, ϕ for total number of patients managed, and κ for total number Medicare patients managed, λ for total number of physicians at a given practice for a given month, and ε_{ijt} is the error term. Standard errors are clustered at the practice-level. Physicians working at a given practice share a common electronic medical record system, have the same clinical and non-clinical support staff, and generally are unlikely to be independent of each other. As noted, doctors are not uniquely aligned to specific practices. For instance, within breast cancer, 11 doctors had seen breast cancer patients at practices in and out of OCM. Thus, OCM is included to account for OCM fixed effects.

Our triple differences robustness check specification adds in the degree of Medicare exposure. Accordingly, the estimate on $OCM_j * Post_t * Medicare_{it}$ provides potential insights into whether the overall OCM treatment correlations are driven by degree of interaction with Medicare patients. This equation is specified as follows:

$$\begin{aligned} Y_{ijt} = \; & \alpha + \eta\, OCM_j * Post_t * Medicare_{it} + \pi\, OCM_j * Medicare_{it} + \chi\, Post * Medicare_{it} \\ & + \beta\, OCM_j * Post_t + u\, Medicare_{it} + \omega\, OCM_j + \tau_t + \mu_i + n\, Sex_{it} + \zeta\, Age_{it} + z\, Age^2_{it} \\ & + \iota\, Chemo_{it} + \phi\, Number\ Patients_{it} + \kappa\, Number\ Medicare\ Patients_{it} \\ & + \lambda\, Number\ Physicians_{jt} + \varepsilon_{ijt}^{5} \end{aligned} \qquad [4]$$

We wanted the ability to assess alternative explanations for our results. One alternative explanation includes the availability of in-office oral chemotherapy dispensing (IOD), which correlates with OCM and could disproportionately incentivize oral therapy use that launched in some indications in the post-period. Only eight practices can dispense and about 2/3^{rds} of physician-by-month observations with dispense capabilities are in OCM. Dispensing practices might generally be more inclined to adopt oral therapies since they are reimbursed for them while non-dispensing practices refer the drug script to an outside pharmacy.

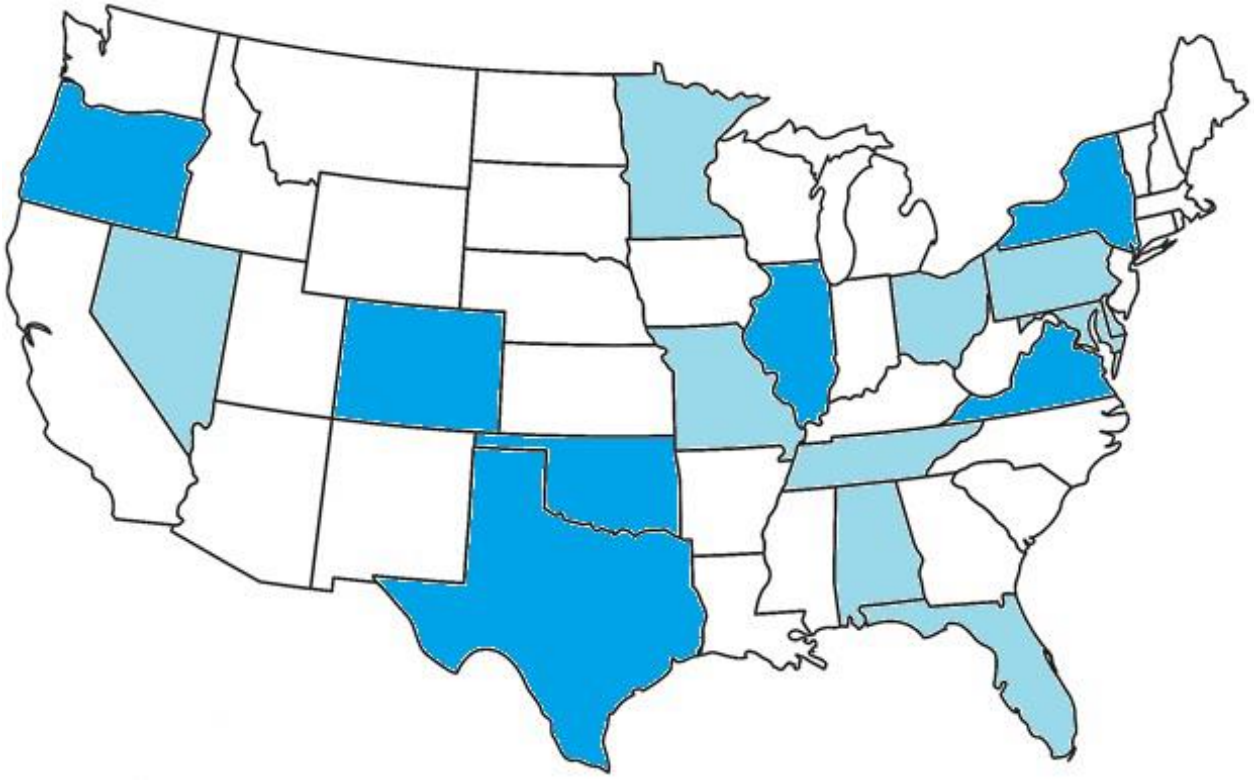
Thus, the higher correlation between IOD and OCM practices could drive the observed correlation attributed to OCM in the other models. To disentangle these potential correlations and attribute them to either OCM or being a practice that can dispense, we specified a falsification check as above in equation #4 but with an indicator for IOD rather than for Medicare exposure. Specifically, this is:

$$\begin{aligned} Y_{ijt} = \; & \alpha + \eta\, OCM_j * Post_t * IOD_j + c\, OCM_j * IOD_j + \chi\, Post * IOD_j \\ & + \beta\, OCM_j * Post_t + \omega\, OCM_j + u\, IOD_j + \tau_t + \mu_i + n\, Sex_{it} + x\, Age_{it} + \zeta\, Age^2_{it} \\ & + \iota\, Chemo_{it} + \phi\, Number\ Patients_{it} + \kappa\, Number\ Medicare\ Patients_{it} \\ & + \lambda\, Number\ Physicians_{jt} + \varepsilon_{ijt} \end{aligned} \qquad [5]$$

[5] Where, in addition to variables already described in equation #3, η is the estimate on the triple interaction term between OCM, Post, and Medicare exposure, π is the estimate on the OCM * Medicare exposure interaction, χ is estimate on the Post * Medicare exposure interaction, and *u* is the estimate on the Medicare exposure term.

We reserved this equation for estimates that are statistically significant for drug administrations as the outcome. The estimate on the OCM * Post * IOD triple interaction would then provide the marginal association of being an OCM dispensing practice versus being an OCM non-dispensing practice. Further the estimate on the IOD * Post term for the administrations outcome provides insights into whether the mean drug treatment intensity decision estimates, as derived in equations #3 and #4 above, is in part mis-attributed to being an OCM practice and is actually explained by being an IOD practice during the rise of relevant oral substitutes instead.

eFigure. Treatment and Control Practices Map



Notes: States with treatment practices are in dark blue while states with control practices are in light blue. There are multiple practices within each state, but there are no states with both a treatment and control practice. The inclusion of clinician fixed effects largely captures any time-invariant differences by practices and states since treatment and control practices do not overlap by state. One large outlier practice was excluded from this study due to distinctly unique pre-period patterns.

eTable 1. Triple Differences Estimates for Difference-in-Differences Estimates That Were Not Statistically Significant

	E&M		Hydration				Drug Admin.			Drug Costs[c]	
	Lung (1)	Prostate (2)	Breast (3)	Lung (4)	Colon (5)	Prostate (6)	Breast (7)	Lung (8)	Colon (9)	Breast (10)	Colon (11)
Mean (SD)	1.23 (1.01)	1.04 (1.67)	0.051 (0.051)	0.105 (0.389)	0.117 (0.48)	0.039 (0.28)	1.52 (1.79)	2.18 (2.44)	3.70 (4.16)	$4,131 (2,996)	$4,667 (4,105)
N	11,135	9,045	11,869	11,135	8,592	9,045	11,869	11,135	8,592	8,733	6,065
OCM * Post * Medicare[b]	-0.09	-1.95	-0.03	-0.08	0.42	-0.41[d]	0.48	1.17	2.22	-$1,934	-$1,029
(95% CI)[a]	(-1.16 to 0.98)	(-4.78 to 0.89)	(-0.20 to 0.14)	(-0.39 to 0.23)	(-0.13 to 0.97)	(-0.83 to 0.01)	(-0.68 to 1.64)	(-0.28 to 2.61)	(-1.22 to 5.66)	(-5,042 to 1,173)	(-6,698 to 4,640)
P value	0.86	0.17	0.72	0.62	0.13	0.06	0.40	0.11	0.20	0.21	0.71
Estimate / Mean	-7.6%	-188%	-58.4%	-73.4%	+356%	-1,030%	+31.6%	+53.7%	+60.0%	-46.8%	-22.0%

[a] Confidence intervals are calculated using standard errors that are clustered on practice.
[b] Estimates are based on going from 0% to 100% Medicare share.
[c] Costs are in monthly mean terms.
[d] $P < 0.10$

eTable 2. Triple Differences Estimates for Prostate Cancer In-Office Oral Chemotherapy Dispensing Practices

	Drug Admin. (1)	Drug Costs[b] (2)	Overall Costs[b] (3)
Mean (SD)	1.20 (1.76)	$3,083 (5,335)	$2,089 (4,004)
N	9,045	6,111	9,045
OCM * Post * IOD (95% CI)[a]	0.10 (-0.25, 0.44)	-$902 (-2,074, 269)	-$1,096[c] (-1,736, -456)
P value	0.57	0.13	0.002
Estimate / Mean	+8.2%	-29.3%	-52.5%

[a] Confidence intervals are calculated using standard errors that are clustered on practice.
[b] Costs are in monthly mean terms.
[c] P < 0.01