

By Joseph Dov Bruch, Canyon Foot, Yashaswini Singh, Zirui Song, Daniel Polsky, and Jane M. Zhu

Workforce Composition In Private Equity–Acquired Versus Non–Private Equity–Acquired Physician Practices

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ABSTRACT Despite growth in private equity (PE) acquisitions of physician practices in the US, little is known about how changes in ownership influence workforce composition. Using clinician-level data linked to practice acquisition information, we estimated changes in clinician workforce composition in PE-acquired practice sites relative to non-PE-acquired independent practice sites for dermatology, ophthalmology, and gastroenterology specialties. We calculated a clinician replacement ratio (cumulative number of entering clinicians during 2014–19 divided by the cumulative number of exiting clinicians) across 213 PE-acquired practices and 995 matched non-PE-acquired practices. Using a difference-in-differences approach, we also examined practice-level changes in yearly clinician counts at PE-acquired practices before and after acquisition compared with non-PE-acquired controls. In aggregate and across the study period, the clinician replacement ratio was higher for PE-acquired practices compared with non-PE-acquired controls (1.75 versus 1.37), as well as within each specialty and clinician type (physician versus advanced practice provider). Relative to non-PE-acquired control practices, we also found significant yearly increases in the number of advanced practice providers at PE-acquired practices after acquisition. Taken together, these findings suggest differential changes in workforce composition at PE-acquired practices, especially a shift toward advanced practice providers for care delivery.

Joseph Dov Bruch, University of Chicago, Chicago, Illinois.

Canyon Foot, Oregon Health & Science University, Portland, Oregon.

Yashaswini Singh, Johns Hopkins University, Baltimore, Maryland.

Zirui Song, Harvard University, Boston, Massachusetts.

Daniel Polsky, Johns Hopkins University.

Jane M. Zhu (zhujan@ohsu.edu), Oregon Health & Science University.

Private equity (PE) acquisitions of physician practices are increasingly prevalent in the US. During the period 2013–16, PE firms acquired more than 1,400 medical practice sites, comprising 5,714 physicians.¹ Investment has accelerated since then in women’s health,^{2,3} dermatology,^{4,5} ophthalmology,⁶ gastroenterology,⁷ and radiology,⁸ among other specialties. Clinicians may sell their practices to PE because of a growing need for capital amid greater market competition, long-term practice and financial uncertainty, and the high purchase prices offered.⁹ The structure of a PE deal may allow

physician-owners to retain equity and benefit financially from future transactions while introducing management and administrative efficiencies.⁸ However, there is also concern that PE ownership structures and their associated financial incentives may reduce clinicians’ autonomy or contribute to operational changes that affect longer-term job satisfaction and retention.⁸ Despite this emerging trend of PE investment in health care, little is known about its effects on physician practices—and specifically on workforce composition over time.

The potential effects of PE acquisitions on the clinician workforce have important implications

for the clinician labor market and for downstream outcomes such as quality of care and health care spending. Workforce composition is a key concern for health care organizations because of high replacement costs related to recruitment, as well as indirect costs related to access for patients and the continuity and quality of care.^{10,11} Moreover, a more stable workforce is associated with better health outcomes for patients, improved quality metrics, and reduced resource use.^{12–15} Across specialties and health care markets, studies suggest that rapid changes are taking place in the clinician workforce for a range of reasons. First, physician burnout and low professional satisfaction are leading many physicians to exit the profession altogether.¹⁶ Second, physicians are increasingly leaving independent practice environments for hospitals and health systems. Just during the period 2016–18 alone, large hospitals and health systems acquired more than 8,000 practices, and the number of physicians employed by hospitals increased by 14,000.¹⁷ Third, and perhaps least understood, larger physician networks and financial firms are consolidating medical practices, potentially leading to higher rates of turnover across practices and to dramatic changes in practice composition,¹⁸ with physicians increasingly affiliated with larger entities over time.¹⁹

PE firms are a pronounced driver of practice consolidation and may have unique effects on workforce composition by changing organization, management, and financial incentives. These firms are financial institutions that raise money from investors to acquire and then sell companies for sizable profits over three-to-seven-year time frames.^{20–24} PE firms can build substantial market share within an existing, fragmented market by purchasing a “platform practice” and then acquiring smaller practices and related services (for example, laboratories) within the market.⁹ Once a platform practice becomes the dominant actor within a market, it can use its market power to increase commercial payment rates and shape payer mix, service use, and referrals.⁹ Platform practices may also streamline administrative costs and centralize billing, scheduling, and revenue cycle management—services that may have previously been siloed across independent practices.⁹

During an acquisition, a PE firm may take 60–80 percent ownership of a practice and pay physician-owners a sizable lump sum for their share of the practice.^{9,21} After the acquisition, physicians typically become employed at the practice by the PE firm or its platform practice subsidiary and receive salaries. For junior physicians within the practice, who might not have any equity or share of the company, the PE ac-

quisition may change their future ownership opportunities and potentially alter performance incentives, practice conditions, career prospects, and job satisfaction.^{25–27} Moreover, there is growing concern from physicians that PE firms may hire advanced practice providers, who may be less costly to employ, to replace physician staff members.^{20,28}

In this article we provide the first estimate of clinician composition changes in PE-acquired practice sites across several medical specialties. Unlike other studies on PE, which examined a single sector or specialty, we focused on dermatology, ophthalmology, and gastroenterology because they have the highest PE penetration among office-based medical and surgical subspecialties.²⁹ PE also has a distinct business model for profit generation within this set of high-volume procedural specialties.^{1,30}

Study Data And Methods

DATA SOURCES We combined several data sources to identify providers affiliated with PE-acquired versus independent practice sites that were not acquired by PE (hereafter referred to as “non-PE-acquired practices”). Practice sites were defined as single locations where one or more clinicians practiced medicine in an outpatient (office-based) setting. First, to identify PE acquisitions across dermatology, ophthalmology, and gastroenterology specialties, we used proprietary data from Pitchbook Inc., which provides transactional data on mergers and acquisitions in the health care sector. We included PE acquisitions from the period 2016–18. We then manually verified and expanded this list, using a combination of press releases, industry reports on mergers and acquisitions, and physician practice websites.

Acquisition data were then linked to the IQVIA OneKey data set, which provides independently verified provider-level information (for example, age, location, specialty, and clinician credentials) and practice-level information (including ownership and corporate affiliations) on 9.7 million health professionals in the US.³¹ One advantage of this data set is that it lists distinct office sites belonging to a particular practice name, allowing for precise locations of practices. We used probabilistic matching to link exact practice names, street locations, and cities in the OneKey data set to reported acquisitions, as well as nonexact records of practice names, street locations, and ownership entity (that is, acquirer name and corporate parent name) in the OneKey data set to reported acquisitions. The percentages of Pitchbook acquisitions that were linked to OneKey data were 64 percent in

The longer-term implications for workforce size and composition at PE-acquired practice sites are unclear.

2016, 63 percent in 2017, and 70 percent in 2018. For the remaining unmatched Pitchbook deals and deals that we found from other sources, we used internet searches to verify practice locations and potential name changes and manually matched acquisitions to the OneKey data. Non-PE-acquired practice sites included all independent entities that were not identified as PE acquired, corporate owned, or hospital or health system affiliated.

We linked IQVIA data to the 2014–19 Medicare Physician and Other Practitioners data set (formerly the Provider Utilization and Payment Data: Physician and Other Supplier public use files) to evaluate practice workforce turnover and composition over time. These Medicare files contain annual provider-level information on services and procedures provided to fee-for-service Medicare Part B beneficiaries, with the following identifying information: provider name, a single affiliated address, specialty, and National Provider Identifier. Organization name is not available.³²

Using both PE-acquired and non-PE-acquired practice sites in the OneKey data set, we linked practice sites in our data set to the Medicare files via a sequential process: first by limiting the Medicare specialties to specialties of interest, then by exact-matching National Provider Identifiers in the OneKey data set directly to the 2019 Medicare file, and finally by matching on the street addresses of office locations in the OneKey data set with those in the Medicare file. We then used this index year of National Provider Identifiers to match to prior years of the Medicare data files (2014–18). We also included data on physicians and advanced practice providers who were not in the OneKey data in 2019 but were found in other years of the Medicare data to be affiliated with the practice sites of interest in the OneKey data set (based on address, specialty, and the presence of other National Provider Identifiers in those practice sites).

ANALYSIS To form our comparison group, we matched PE-acquired practices to non-PE-acquired practices on specialty and hospital-referral region. We then used nearest neighbor matching on total physicians during the year of acquisition to generate up to eight controls per PE-acquired practice. In total, we found 995 independent practice matches for 213 (of 250) PE-acquired practices.

We examined workforce change in three different ways. First, using methods consistent with previous work on clinician composition changes,¹⁹ we calculated the clinician replacement ratio for PE-acquired versus non-PE-acquired ownership types. This ratio was defined as the cumulative number of entering clinicians during 2014–19 divided by the cumulative number of exiting clinicians during this period. A clinician replacement ratio greater than 1 suggests more entering than exiting clinicians. We stratified these calculations by specialty, by clinician type (physicians versus advanced practice providers), and by physician age. Because advanced practice providers were not consistently present in the OneKey data set and therefore did not have age information, we restricted age-related analyses to physicians only.

Second, we estimated whether practice-level entrants and exits differentially changed the total number of clinicians at PE-acquired versus non-PE-acquired practices during the study period. We performed a two-way linear fixed effects difference-in-differences regression at the practice level to evaluate yearly changes in the total counts of physicians and advanced practice providers. We lined up all practices and their outcome data at event time 0, or the year of acquisition, and included up to three years before PE acquisition and up to three years after acquisition. Because of the limited number of years available, practices acquired in 2016 had only two years of preacquisition data, and practices acquired in 2017 and 2018 had only two years and one year of postacquisition data, respectively. We removed the year of acquisition from all analyses. Year and practice fixed effects were included in the regression, and standard errors were clustered at the practice level. We weighted non-PE-acquired practices by the number of controls per corresponding PE-acquired practice: Non-PE-acquired practices were assigned a weight from 0.125 (eight non-PE-acquired practices per PE-acquired practice) to 1 (one non-PE-acquired practice per PE-acquired practice).

Third, we examined the probability of a clinician entering and exiting a PE-acquired versus non-PE-acquired practice. We defined exiters as clinicians who were observed to be in a given practice in 2014 but were not present at that

same practice in 2019. We defined entrants as clinicians that were in a practice in 2019 but had not been in that same practice in 2014. We modeled the probability of entry and exit for both physicians and advanced practice providers.

All analyses were conducted using R, version 4.0.5. This study was deemed exempt by the Institutional Review Board at Oregon Health & Science University.

LIMITATIONS This study had several limitations. First, although we used a comprehensive methodology to identify PE acquisitions, some acquisitions may be missing from our initial sample, given the reliance on manual validation of publicly reported transactions. This approach may have underestimated acquisitions of smaller practice sites.

Second, we relied on linkages between our practice-level PE acquisition data with longitudinal, clinician-level data using Medicare files. Despite a relatively high match rate (68 percent) between the OneKey and Medicare files, there were nonetheless clinicians who were unobserved in either the Medicare files or the OneKey files, which may have biased our results toward the null. We did not find evidence that this match rate was systematically lower for PE-acquired versus non-PE-acquired practice sites. Moreover, we relied on OneKey data to identify all practice locations, but it is possible that there were inaccuracies in how affiliations were identified.

Third, the Medicare Physician and Other Practitioners data are limited to billing clinicians who see Medicare Part B beneficiaries, and it is possible that advanced practice providers may be undercounted in these Medicare data if they bill exclusively under a physician.³³ Although they make up an important ancillary workforce in ophthalmology, optometrists were not included in our final analysis because of the small numbers of optometrists from the Medicare Physician and Other Practitioners data set that matched to the PE-acquired ophthalmology practices in our sample.

Fourth, a clinician could change practice sites in the Medicare data set but still be employed within the same parent practice group after an acquisition. In the event of incomplete parent ownership data, it is possible for clinicians to be incorrectly identified as exiting in these cases.

Finally, our study did not estimate a causal effect of PE acquisition on workforce composition, despite its comparison to a plausible counterfactual of non-PE-acquired practices. Our estimates also may have been underpowered because of the large number of parameters estimated and the limited number of PE observations identified during our study period.

Study Results

Our final analytic sample included a total of 1,208 practice sites, including 691 in dermatology (1,735 clinicians), 166 in gastroenterology (741 clinicians), and 351 in ophthalmology (748 clinicians) (exhibit 1). Clinicians at PE-acquired sites were distributed across the US but were most concentrated within the South. Across these three specialties, our PE sample included 422 dermatology clinicians at 112 practice sites, 259 gastroenterology clinicians at 45 practice sites, and 211 ophthalmology clinicians at 56 practice sites.

In aggregate across the entire study period, PE-acquired practices had a higher clinician replacement ratio than did non-PE-acquired independent practices (1.75 versus 1.37). This was also the case within each specialty: In dermatology, entering clinicians replaced exiting clinicians at a ratio of 1.71 in PE-acquired practices versus 1.28 in non-PE-acquired practices; in gastroenterology, at a ratio of 2.18 versus 1.93; and in ophthalmology, at a ratio of 1.40 versus 0.98 (exhibit 2).

Entering physicians replaced exiting physicians at ratios of 1.50 and 1.14 in PE-acquired versus non-PE-acquired practices, respectively. Within the youngest physician age group (that is, younger than age forty), the replacement ratio in PE-acquired practices was 2.97, compared with 2.83 in non-PE-acquired practices. Replacement ratios were higher for younger physicians than for older physicians in both PE-acquired and non-PE-acquired practices (1.70 versus 1.29 for physicians ages 40–60 and 0.50 versus 0.38 for those older than age 60) (exhibit 2).

The replacement ratio for advanced practice providers was 2.51 in PE-acquired practices compared with 1.66 in non-PE-acquired practices (exhibit 2). Entering clinicians replaced exiting clinicians at higher rates in PE-acquired compared with non-PE-acquired practices for both physicians and advanced practice providers across specialties (exhibit 3).

Exhibit 4 shows practice-level difference-in-differences estimates for changes in yearly counts of clinicians at PE-acquired practices relative to non-PE-acquired practices from pre- to postacquisition. Although we did not observe statistically significant changes for total physician counts, total counts of advanced practice providers per year increased at PE-acquired practices relative to non-PE-acquired practices (0.15; 95% confidence interval: 0.05, 0.25; $p = 0.004$). We found no evidence of diverging pre trends (see online appendix exhibits A1 and A2).³⁴

Finally, at the individual clinician level, we found that the probability of both entering and exiting a practice was higher for physicians at

EXHIBIT 1
Sample characteristics of office-based clinicians at private equity (PE)-acquired and non-PE-acquired practices in the US, 2014-19

Physician and practice characteristics	PE-acquired		Non-PE-acquired		Sample total	
	Clinicians	Practice sites	Clinicians	Practice sites	Clinicians	Practice sites
Total no.	892	213	2,332	995	3,224	1,208
No. of physicians	702**	— ^a	1,735	— ^a	2,437	— ^a
Women physicians as % of total physicians	27.5*	— ^a	32.7	— ^a	23.6	— ^a
Mean age of physicians, years	51****	— ^a	55	— ^a	— ^a	— ^a
No. of advanced practice providers	190**	— ^a	597	— ^a	787	— ^a
Geography, no.						
Midwest	145	40	342	151	487	191
Northeast	115	33	414	201	529	234
South	474	115	1,297	520	1,771	635
West	158	25	279	123	437	148
Specialty, no.						
Dermatology	422	112	1,313	579	1,735	691
Gastroenterology	259	45	482	121	741	166
Ophthalmology	211	56	537	295	748	351

SOURCE Authors' analysis of data from the IQVIA OneKey data set (2019) and 2014-19 Medicare Physician and Other Practitioners by Provider data for dermatology, gastroenterology, and ophthalmology. **NOTES** Data on age and gender were only available for physicians. Age was calculated based on 2019 data (clinician age in 2019). We ran a two-sample t-test on age and chi-square tests on the proportion of physicians and the proportion of women physicians for PE-acquired and non-PE-acquired practices. ^aNot applicable. * $p < 0.10$ ** $p < 0.05$ **** $p < 0.001$

PE-acquired practices compared with physicians at non-PE-acquired independent practices. The estimated difference of entry for physicians was 15.74 percentage points (95% CI: 10.79, 20.69; $p < 0.001$). The estimated difference of exit was 6.00 percentage points (95% CI: 1.91, 10.07; $p = 0.004$) (appendix exhibit A3).³⁴ For advanced practice providers, the probability of

entering was higher at PE-acquired practices compared with non-PE-acquired practices, but this difference was not statistically significant (9.57 percentage points; 95% CI: -2.50, 21.63; $p = 0.12$). We did not find evidence of differential probabilities of advanced practice providers exiting in PE-acquired practices compared with non-PE-acquired practices (-4.48 percentage

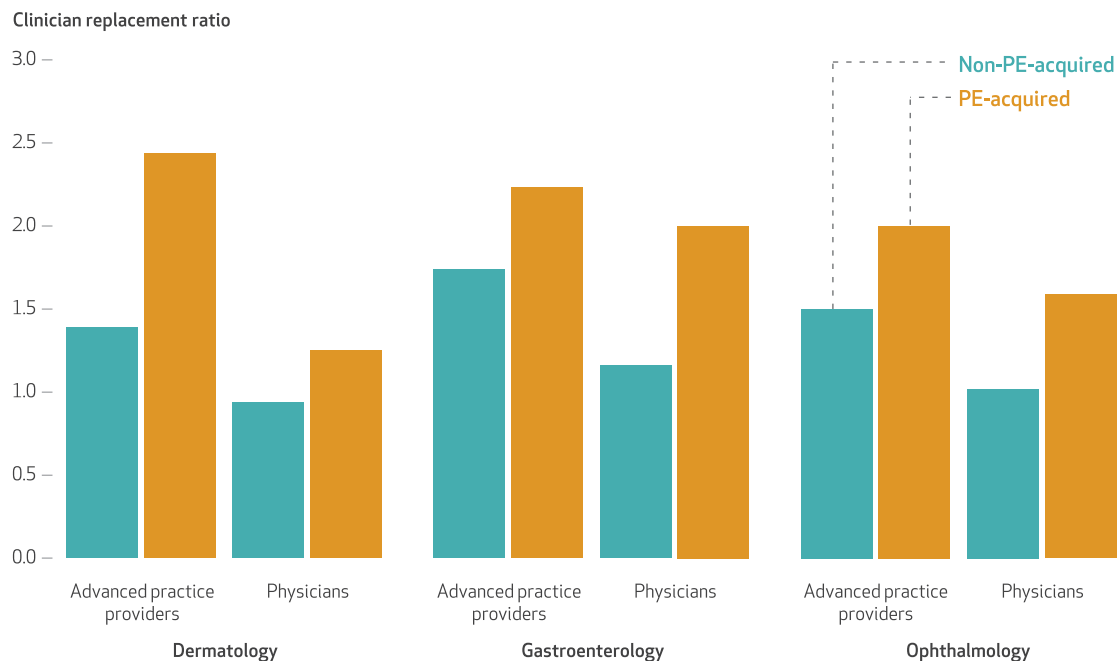
EXHIBIT 2
Clinician replacement ratios in private equity (PE)-acquired and non-PE-acquired practices in the US, by specialty, clinician type, and age group, 2014-19

	Total clinicians, no.				Total entrants, no.				Clinician replacement ratio	
	2014		2019		PE		Non-PE		PE	Non-PE
	PE	Non-PE	PE	Non-PE	PE	Non-PE	PE	Non-PE		
Overall	581	1,745	716	1,909	313	596	178	432	1.75	1.37
Specialty										
Dermatology	258	989	326	1,062	163	332	95	259	1.71	1.28
Gastroenterology	168	292	219	384	94	190	43	98	2.18	1.93
Ophthalmology	155	464	171	463	56	74	40	75	1.40	0.98
Clinician type										
Physician	503	1,467	569	1,503	200	273	133	238	1.50	1.14
Advanced practice provider	78	278	147	406	113	323	45	194	2.51	1.66
Age group, years										
Younger than 40	85	197	99	137	116	139	39	49	2.97	2.83
40-60	297	879	316	860	63	100	37	77	1.70	1.29
Older than 60	83	315	139	417	14	23	28	59	0.50	0.38

SOURCE Authors' analysis of 2014-19 Medicare Physician and Other Practitioners by Provider data for dermatology, gastroenterology, and ophthalmology. **NOTES** The clinician replacement ratio is defined as the cumulative number of entering clinicians during the period 2014-19 divided by the cumulative number of exiting clinicians and is calculated at the ownership level. There were 3,224 unique clinicians across the study time frame. Total clinicians in 2014 and 2019 refer to clinicians only in these specific years. Data on ages were available for physicians only.

EXHIBIT 3

Clinician replacement ratios for advanced practice providers and physicians in private equity (PE)-acquired and non-PE-acquired practices in the US, by specialty, 2014-19



SOURCE Authors' analysis of 2014-19 Medicare Physician and Other Practitioners by Provider data for PE-acquired and non-PE-acquired practices for dermatology, gastroenterology, and ophthalmology. **NOTE** The clinician replacement ratio is defined in the exhibit 2 notes.

points; 95% CI: -18.73, 9.77; $p = 0.54$) (appendix exhibit A3).³⁴

Discussion

Using a novel data set of PE acquisitions linked to longitudinal clinician-level data, we found higher clinician replacement ratios at PE-acquired practice sites compared with non-PE-acquired sites across specialties and clinician types during the study period, 2014-19. In a difference-in-differences analysis at the practice level, we found a statistically significant increase

in yearly total counts of advanced practice providers at PE-acquired practices relative to non-PE-acquired practices but no statistically significant changes in total physician counts per practice.

An important element of workforce compositional changes is whether PE-acquired practices are able to attract new clinicians. Across the study period, these practices hired physicians at a higher rate than the rate at which physicians departed. This higher replacement ratio may reflect PE's selection of acquisition targets to facilitate practice growth, which in turn requires

EXHIBIT 4

Change in yearly clinician counts in private equity (PE)-acquired practices relative to non-PE-acquired practices in the US, 2014-19

	PE-acquired		Non-PE-acquired		Difference in differences, adjusted	95% CI
	Unadjusted, pre period	Unadjusted, post period	Unadjusted, pre period	Unadjusted, post period		
Total counts, physicians	2.78	2.88	1.59	1.62	0.09	-0.05, 0.24
Total counts, advanced practice providers	0.51	0.72	0.37	0.38	0.15**	0.05, 0.25

SOURCE Authors' analysis of 2014-19 Medicare Physician and Other Practitioners by Provider data for dermatology, gastroenterology, and ophthalmology. **NOTES** Difference-in-differences analyses measure changes in yearly counts of clinicians at PE-acquired practices compared with non-PE-acquired practices from pre to post acquisition and were conducted at the practice level. Unadjusted outcomes for pre periods were calculated using annual data up to 3 years before acquisition. Unadjusted outcomes for post periods were calculated using annual data up to 3 years postacquisition. ** $p < 0.05$

There may be substantial generational differences in how PE is viewed by clinicians.

more clinicians. The ability of PE-acquired practices to attract new clinicians may depend on underlying financial incentives associated with acquisition. For example, PE firms often buy physician partners out of their shares of the practice while recruiting younger physicians as salaried employees with cash, stock, or minor ownership incentives.⁹ Our results suggest that similar to non-PE-acquired practices, PE-acquired practices have higher replacement ratios among younger physicians than among older physicians, pointing to some degree of shared natural evolution of the physician workforce.

Another element of workforce composition is whether the individual clinicians exiting a given PE-acquired practice are the same ones who entered the practice, which may reflect some degree of workforce dissatisfaction. At the clinician level, we found that the probability of physicians both entering and exiting a practice was higher at PE-acquired practices than at non-PE-acquired practices, suggesting a degree of workforce turnover. It is possible that other yet-unstudied changes could influence the retention of clinicians in PE-acquired practices, including changes to service mix or patient composition, administration, and management, as well as broader trends affecting physician burnout, including overall stress, high work demands, and lack of personal time.^{16,35}

Our findings of changes in workforce composition also may reflect targeted PE investment strategies, including expanding the use of advanced practice providers to replace or complement current staffing structures. There is broad evidence that physician practices, regardless of ownership, are increasingly employing advanced practice providers in response to physician supply shortages, payment reform, and delivery models focused on team-based care, as well

as downward price pressures from payers.³⁶ Our finding of an increase in advanced practice providers associated with PE-acquired practice sites is consistent with those of recent studies in dermatology that find similar changes.⁵ Although PE may turn toward advanced practice and other ancillary providers to promote care delivery, we were unable to observe the effects that this workforce composition change may have on quality of or access to care.

The longer-term implications for workforce size and composition at PE-acquired practice sites are unclear. Physicians who are more drawn to salaried employment arrangements without administrative duties may prefer a PE-acquired practice.⁹ In a qualitative study of ophthalmologists and health care investors by Eloise May O'Donnell and colleagues, some interviewees cited PE investment as a source of financial stability in an increasingly competitive health care market, with greater clinical autonomy compared with hospital or health system ownership.⁹ However, there may be substantial generational differences in how PE is viewed by clinicians. Limited studies suggest concerns among medical trainees and early-career physicians about the prospect of future acquisition by corporate entities, with many holding negative perceptions of PE's influence on the quality of care, long-term earnings, and physician autonomy.^{37,38} Further research is needed to understand how PE acquisition affects workforce composition and retention over time, particularly as acquired practices face second and subsequent sales.

Conclusion

During the past decade, PE firms have invested significantly in health care, with major transactions across a range of health care operators. These operators include health systems,³⁹⁻⁴¹ nursing homes;⁴²⁻⁴⁶ hospice agencies;⁴⁷ physician management companies;⁴⁸ ambulatory surgical centers;⁴⁹ and, perhaps most prominently, medical practices.^{1,50} However, the effects of PE investment on the clinician workforce remain understudied. Given the descriptive nature of these analyses, however, we were unable to ascertain whether our results were causally related to PE ownership or a result of endogenous characteristics of PE-acquired practices. Although these findings should be considered preliminary in nature, they raise important questions about the implications of PE ownership on the clinical workforce, particularly as PE investment accelerates across medical specialties. ■

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Value-Based Insurance Design Health, and the International Foundation of Employee Benefit Plans outside this work; and providing consultation in legal cases. Daniel Polsky reported receiving personal fees from Extend Health outside this work. Zhu reported receiving grants from the NIH outside this work.

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