with ISCHEMIA trial criteria) had a minimal association with the proportion of patients with PCIs classified as appropriate, maybe appropriate, and rarely appropriate.

Discussion | In a national registry of patients undergoing nonacute PCI, we found that approximately 1 in 6 patients were asymptomatic at the time of PCI. If the AUC were modified to incorporate randomized clinical trials, such as COURAGE[5] and the recent ISCHEMIA trial,[2] and considered these PCIs to be rarely appropriate for SIHD, the rates of rarely appropriate PCI may be nearly 7-fold higher compared with current AUC ratings. Given that we were unable to assess whether optimal antianginal therapy had failed before PCI in the current or modified AUC, the proportion of patients with PCIs classified as rarely appropriate with either AUC could be even higher than we estimate. As PCIs in patients with SIHD are estimated to cost $2.8 billion annually[6] and are associated with risks for bleeding, infection, and death, these findings underscore the importance of updating clinical guidelines and AUC to be consistent with the robust evidence base.

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Expansion of Private Equity Involvement in Women's Health Care

An influx of private equity involvement in women's health care has garnered attention and scrutiny.[1] Over the past decade, private equity firms have increasingly invested in or acquired hospitals, physician practices, laboratories, and biomedical device companies. Private equity firms use capital from corporations or wealthy individuals to invest in and acquire organizations and generally sell their holdings within 3 to 7 years.[2] Proponents argue that they produce economic value by increasing operational efficiency while maintaining or improving the quality of care. Critics fear that the need to quickly achieve high returns on investments may conflict with the quality and safety of care or exacerbate health inequities.[3] Recent evidence shows growing acquisitions of physician groups across specialties between 2013 and 2016,[4] which is aligned with larger trends in the corporatization of medicine.[5] Despite the growth and geographic breadth of private equity involvement in health care, to our knowledge, relatively little empirical research exists, especially in women's health.

Related article page 1428 and Invited Commentary page 1545

Supplemental content

We document formerly non–private equity women's health care companies, including physician networks, practices, and fertility clinics, that gained a private equity affiliation between 2010 and 2019. This evidence aims to inform discussions about the clinical and societal implications of private equity in women's health.

Methods | Using market reports and multiple methods of verification, we identified organizations (ie, target companies) specializing in women's health that transitioned from non–private equity to private equity–affiliated between 2010 and 2019.

Table. Women's Health Organizations With Private Equity Affiliation From 2010 to 2019

Equity investor[a]	Buyer[a]	Target company[a] (description)	Year of completion	Offices at the time of affiliation	Clinicians at time of affiliation[b]	Current offices[c]	Current clinicians[b,c]	Current location(s)
Ares Private Equity Group	Ares Private Equity Group	Unified Physician Management (OB/GYN)	2013	NA[d]	375[e]	540	1700[e]	12 States[f]
Audax	Audax	Women's Health Care Group of PA (OB/GYN)	2017	45	120[e]	NA[g]	NA[g]	Pennsylvania
Audax	Audax	Regional Women's Health Group (OB/GYN)	2017	65	165	NA[g]	NA[g]	New Jersey
Audax	Axia Women's Health	OB/GYN of Indiana (OB/GYN)	2019	9	45[b]	120[e,g]	300[g]	Indiana
Deerfield Management Company	Deerfield Management Company	Advantia Health (OB/GYN)	2016	10	12	48	200[e]	Washington DC, Illinois, Maryland, Missouri, and Virginia
Lee Equity Partners	Prelude Fertility	Advanced Fertility Center of Chicago (fertility)	2018	3	3	3	3	Illinois
Lindsay Goldberg	Lindsay Goldberg	Women's Care Florida (OB/GYN)	2017	71	230	100[e]	360	Florida
Lindsay Goldberg	Women's Care Enterprises	London Women's Care (OB/GYN)	2019	1	29	1	28	Kentucky
Lindsay Goldberg	Women's Care Enterprises	North Florida Ob-Gyn (OB/GYN)	2019	38	70[e]	37	70[e]	Florida
Lindsay Goldberg	Women's Care Enterprises	Palm Beach Obstetrics & Gynecology (OB/GYN)	2019	3	8	3	9	Florida
Regal Healthcare Capital Partners	Regal Healthcare Capital Partners	Extend Fertility (fertility)	2019	1	5	1	5	New York
Sagard Capital Partners	Sagard Capital Partners	IntegraMed America (fertility)	2012	130	NA[d]	153	180	32 States[h]
Summit Partners	DuPage Medical Group	La Grange Women's Clinic (OB/GYN)	2016	2	6	1	4	Illinois
Summit Partners	DuPage Medical Group	Southwest Women's Healthcare Associates (OB/GYN)	2016	2	3	2	3	Illinois
Summit Partners	DuPage Medical Group	Glenwood Medical Corp. (OB/GYN)	2017	1	2	1	4	Illinois
Summit Partners	Summit Partners	Ob Hospitalist Group (OB/GYN)	2010	120[e,i]	600	180[e,i]	700[e]	32 States[j]
Sverica Capital Management	Women's Health USA	Arizona OBGYN Affiliates (OB/GYN)	2018	10	52	11	50	Arizona
Sverica Capital Management	Women's Health USA	Central Texas OB/GYN Associates (OB/GYN)	2018	NA[d]	NA[d]	9	56	Texas
Sverica Capital Management LLC	Women's Health USA	Institute for Women's Health (OB/GYN)	2019	8	30	8	29	Texas
Sverica Capital Management	Women's Health USA	Women's Health Connecticut (OB/GYN)	2019	80	250[e]	91	240	Connecticut
TA Associates	TA Associates	CCRM (fertility)	2015	NA[d]	NA[d]	23	34	9 States[k]
Webster Equity Partners	Webster Equity Partners	Santa Monica Fertility (fertility)	2019	1	3	2	3	California and Florida
WindRose Health Investors	Ovation Fertility	Institute for Reproductive Health (fertility)	2018	3	5	4	7	Ohio and Kentucky
WindRose Health Investors	Ovation Fertility	Midwest Fertility Specialists (fertility)	2018	2	6	2	4	Indiana
Totals				605	2019	1340	3989	38 States

Abbreviations: NA, not applicable; OB/GYN, obstetrics/gynecology.

[a] *Equity investor* refers to the private equity firm involved with the affiliation. *Buyer* refers to the company/subsidiary within the equity investor portfolio that is directly making the affiliation. When no buyer exists, the name of the equity investor is used. Target companies are the organizations specializing in women's health that transitioned from non–private equity to private equity–affiliated between 2010 and 2019.

[b] Clinicians include physicians, nurse practitioners, nurse midwives, and physician assistants.

[c] We identified current offices and clinicians as of March 1, 2020.

[d] Information could not be found in publicly available sources.

[e] Numbers of offices or clinicians listed as over or nearly a certain value on publicly available sources have been rounded to that value.

[f] Arizona, Washington D.C., Florida, Georgia, Maryland, Minnesota, North Carolina, New Jersey, New York, Texas, Virginia, and Washington.

[g] Organization was fully incorporated into Axia Women's Health; number indicates total count of consolidated offices/clinicians.

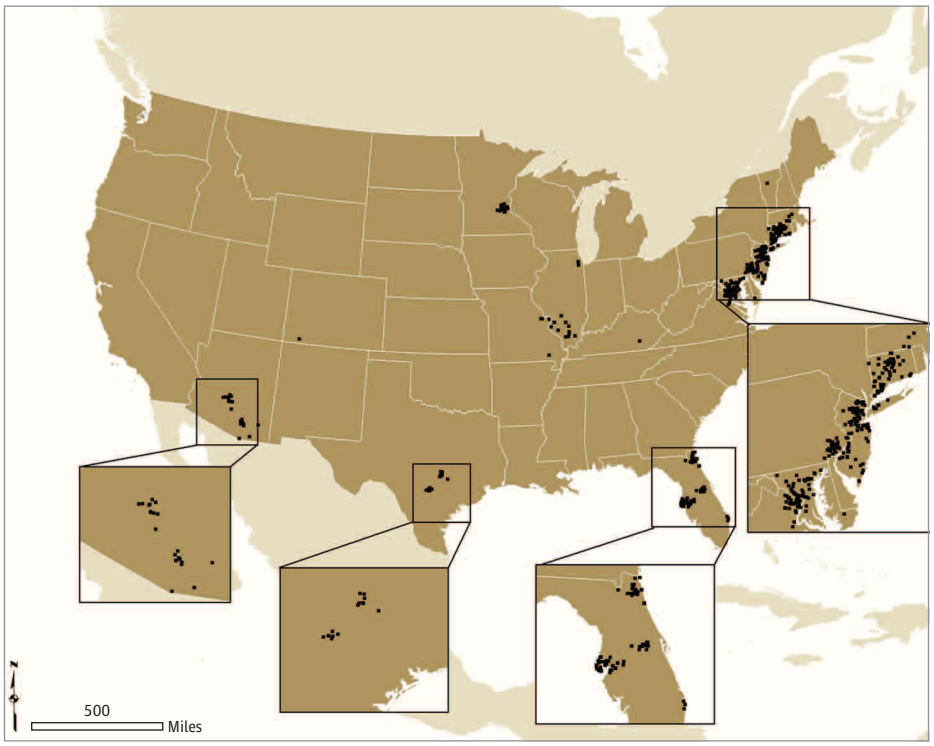
[h] Publicly identifiable locations include Alabama, California, Florida, Georgia, Idaho, Illinois, Maryland, Missouri, Mississippi, North Carolina, Nevada, New York, Pennsylvania, South Carolina, Texas, Utah, Virginia, and Washington.

[i] Shows number of hospitals where affiliated clinicians practice.

[j] Alaska, Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Maryland, Michigan, Missouri, Mississippi, North Carolina, Nebraska, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, and Wisconsin.

[k] California, Colorado, Georgia, Massachusetts, Maryland, Minnesota, New York, Texas, and Virginia.

Figure. Private Equity–Affiliated Obstetrics/Gynecology (OB/GYN) Offices in 2020



We mapped 533 OB/GYN offices in 2020, excluding the 180 hospitals contracted with Ob Hospitalist Group and 439 offices without identifiable locations. No mapped offices were located in Alaska or Hawaii.

Affiliations included direct acquisitions, recapitalizations, and undisclosed financial partnerships, with targets providing clinical obstetrics/gynecology (OB/GYN) or fertility services. We describe the method of identifying affiliations and inclusion criteria in eTable in the Supplement. This study was exempt from institutional board review because it did not involve human participants nor was any of the publicly available data used directly or indirectly based on human participant information.

We assessed whether OB/GYN offices are located in urban or rural areas by the zip code rural-urban commuting areas geographic taxonomy, version 3.10 (US Department of Agriculture). This mapping uses the 2010 Census work commuting data to classify zip codes from 1 (metropolitan) to 10 (rural) using the size and direction of primary commuting flows. We assessed average median household income using the zip codes for these offices.

Results | We found 24 target companies that gained private equity affiliation between 2010 and 2019 (**Table**). Acquisitions accelerated over the period studied, with 17 occurring between 2017 and 2019. In total, we found 605 offices and 2019 clinicians (ie, physicians, nurse practitioners, nurse midwives, and physician assistants) at the time of affiliation. As of 2020, we identified 1340 offices and 3989 clinicians.

We found 17 target companies that were OB/GYN practices or networks and 7 target companies that provided fertility services. We located and mapped 533 (39.8%) of the 1340 offices of the 17 OB/GYN target companies in 2020. We excluded 180 hospitals contracted with the Ob Hospitalist Group (13.4%) and 439 offices (32.8%) without identifiable locations (**Figure**). Of the 533 offices, 240 (45.0%) were located in the Northeast, 229 (43.0%) in the South, 29 (5.5%) in the West, and 34 (6.4%) in the Midwest. Using the zip codes of these offices, we found that the average median (SE) household income was $76 107 ($1470) and the rural-urban commuting area score was 1.19 (0.04), which corresponds to a highly metropolitan area. Overall, 520 (97.6%) of these offices accepted Medicare and 453 (85.0%) accepted at least 1 form of Medicaid. Private insurance was accepted at all of these offices.

Discussion | There has been a substantial increase in private equity affiliations in women's health care since 2017. Private equity–affiliated OB/GYN offices are located in urban locations, with an average 2017 median household income 24% higher than the 2017 national average of $61 372.[6] They generally accept Medicare, Medicaid, and private insurance. Several private equity firms have affiliations with multiple target companies, suggesting that these firms may have growing influence in women's health.

Our analysis does not represent the totality of private equity investment in the women's health sector. Target companies affiliated with private equity before 2010 whose affiliation was not publicly reported or who did not primarily provide OB/GYN or fertility services were excluded.

How the incentives of private equity firms interact with the clinical mission of women's health is a critical area of inquiry. Future debate about private equity in women's health will likely be shaped by the associations between economic incentives and quality of care, elective or cosmetic procedures, and access to reproductive health services, especially among low-income, LGBTQIA, and other disadvantaged populations.

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Invited Commentary

Private Equity, Women's Health, and the Corporate Transformation of American Medicine

In this issue of *JAMA Internal Medicine*, Bruch and colleagues[1] inform us that during the past decade, private equity firms have acquired or invested in large numbers of obstetrician-gynecologist medical groups. Most of these acquisitions and investments occurred during the past 3 years. Given the difficulty of identifying such acquisitions and investments, it is likely that their true number is even larger than Bruch and colleagues report, despite the labor-intensive methods the authors employed to identify them.

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The article by Bruch and colleagues[1] adds another specialty to the list of physician specialty areas—notably dermatology and ophthalmology—for which recent articles have described private equity activity.[2-4] We can anticipate that additional reports of growing private equity acquisitions in other specialties (eg, gastroenterology) will soon follow. Articles to date are similar in 3 ways. First, they report rapidly increasing private equity acquisitions in a given specialty. Second, they report a similar private equity *modus operandi* across specialties: acquire a relatively large platform practice (called *target companies* by Bruch and colleagues[1]) in a given geographic area, then acquire smaller practices in that area and group them into the same organization as the platform practice; use debt to finance the acquisitions and assign that debt to the acquired practices; find ways to increase net revenue from the agglomerated practices; and sell the agglomerated practices within 3 to 5 years for considerably more than the price paid by the private equity company. Third, the articles, with 1 controversial exception,[5] lack data on the performance—in quality and cost of care, or in physician or patient satisfaction, of private equity-owned practices.

In the absence of data, conceptual arguments can be made for and against private equity acquisition of medical practices. Private equity advocates argue that the firms bring much-needed capital that enables practices to invest in better information technology and to grow by adding physicians and/or acquiring practices. They argue that private equity firms bring management expertise to help with this growth, to make the business side of the practice operate more smoothly and relieve physicians of the burden of running the business, and to deal with regulatory demands and standardize patient safety processes. They also claim that private equity firms give physicians more autonomy than other potential purchasers of practices (notably, hospitals and health insurance companies), that they are better at managing practices than other purchasers, and that they make it possible for physicians to diversify their assets (by investing the money they are paid for their practice instead of having all of it tied up in the practice).

Opponents of private equity argue that the intense pressure on firms to generate returns for their investors (private equity firms generally project a return of 20% annually averaged across the 3 to 5 years before a practice is sold) is not compatible with putting patients' interests first and not compatible with physician professionalism and its commitment to put patients' interests first. They also argue that it is an intolerable burden for practices to pay off the loans that private equity firms used to acquire them and that private equity claims for skill in managing practices are exaggerated. Opponents do not necessarily see a benefit to practices merging or being acquired and point out that as a private equity firm acquires market share in a community, it may be able to demand higher payment rates from health insurers, which may be good for the physicians but not for their patients.

Does private equity acquisition of practices—in women's health or other specialties—help or harm patients? Most likely the answer is that it depends. Research data to answer this question are urgently needed and will likely start appearing soon. Over time, research will give a reasonable estimate of the average effect of private equity acquisitions on the cost of care and quality of care—to the extent that quality can be measured. But it is

likely that in private equity acquisition of physician practices, as in other areas of life, there are good actors and bad actors, and competent and not-so-competent firms. It remains to be seen whether physicians, patients, or health insurers will be able to discriminate among them. But that has always been true as well for practices owned by physicians or hospitals.

Attitudes toward private equity are likely shaped by attitudes toward physician professionalism and toward the corporate transformation of American medicine. This transformation has been occurring for decades[6] and has been accelerating in recent years, as Bruch and colleagues[1] point out. For better or for worse, the United States is moving from a system based on small, independent physician practices to physicians being employed by large corporations (including hospital systems, health insurers, and private equity firms), from small, independent community hospitals to multihospital systems (including hospitals owned by private equity firms),[7] and from small, not-for-profit health insurers to a small number of very large national and regional insurers.

Conceptually, the advantages and disadvantages of corporate medical care parallel those described above for private equity. Corporate medical care lacks the human scale and flexibility of small physician practices and may lack the close, ongoing relationships among physicians, patients, and staff sometimes present in these practices.

On the other hand, neither patients nor anyone outside of the practice really knows what goes on in a small practice. Neither patients nor anyone else are likely to realize if a small practice is delivering inferior care (the practice's physicians may not realize it either), and/or that the practice's physicians place profit over patients. The large number of physicians and staff involved in corporations that employ physicians are likely better equipped to identify and do something about physicians who consistently deliver poor care. Corporations also have the capital to invest in executives whose job is to improve the care the corporate practices provide and in systematic processes to improve quality. Corporate medical practices are more likely to score well on the limited measures of quality of care that are currently in use; it is not known whether they provide better quality than independent practices in the numerous important areas of quality, such as accurate diagnosis, that are difficult or impossible to measure. Finally, the economic power of large corporate organizations in medical care can translate into political power, which can help preserve or enhance their economic power. This was recently evident when national physician staffing companies that employ physicians in anesthesia, emergency medicine, neonatology, radiology, and other hospital-based specialties used their financial might to block surprise billing legislation in Congress.[8]

Physicians in independent practices in the United States face a medical environment that is complex and rapidly changing with a high level of uncertainty about the future. Competition from hospital, private equity, and insurer-employed physicians is rapidly increasing, as are the pressures on practices from increased use of information technologies and increased rewards and penalties by health insurers and Medicare based on measures of physician performance. The coronavirus disease 2019 pandemic has further increased financial pressure and uncertainty. Given these conditions, it is not surprising that many physicians are seeking shelter from the storm by selling their practices to corporate entities. The article by Bruch and colleagues[1] is one more indication that there is an urgent need for data on the effect of these entities on physicians and their patients.

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The Exclusion of Older Persons From Vaccine and Treatment Trials for Coronavirus Disease 2019—Missing the Target

Older adults are at greatest risk of severe disease and death due to coronavirus disease 2019 (COVID-19). Globally, persons older than 65 years comprise 9% of the population,[1] yet account for 30% to 40% of cases and more than 80% of deaths.[2]

Supplemental content

Unfortunately, there is a long history of exclusion of older adults from clinical trials. In response, the National Institutes of Health instituted the Inclusion Across the Lifespan policy, requiring the inclusion of older adults in clinical trials.[3] Thus, we reviewed all COVID-19 treatment and vaccine trials on http://www.clinicaltrials.gov to evaluate their risk for exclusion of older adults (≥65 years).