



Future considerations for clinical dermatology in the setting of 21st century American policy reform: Corporatization and the rise of private equity in dermatology

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Within the past 2 decades, for-profit financial groups have become increasingly involved in health care. Outlier dermatology practices with high volumes of well-reimbursed procedures are attractive to consolidation backed by private equity. With fewer choices for independent or group private practice, junior dermatologists are increasingly seeking employment without ownership in private equity-backed corporate groups whose primary fiscal responsibility lies with their investors. Medicare's response to corporatization and consolidation has already changed the practice of dermatopathology. Dermatologists should be aware of this history, given the ability of corporations and private equity groups to shape the present and future of our field. (J Am Acad Dermatol 2019;81:287-96.)

Key words: consolidation; corporatization; dermatology; dermatopathology; outlier practice patterns; private equity; venture capital.

During the past decade, venture capital (VC) and private equity (PE) have fueled the consolidation and corporatization of dermatology. PE is composed of pooled funds from investors that directly invest in established private companies or engage in buyouts of public companies. VC is a subset of PE that invests in start-ups with strong growth potential. PE is attracted to dermatology because of an aging population; expanded insurance coverage; the scarcity of dermatologists; and profitable medical, surgical, and cosmetic procedures.¹ Dermatology generated \$12.7 billion in revenue in 2015 and is projected to generate \$16.3 billion by 2020.² Furthermore, the

Abbreviations used:

ADCS:	Advanced Dermatology and Cosmetic Surgery
CEO:	chief executive officer
CPOM:	corporate practice of medicine
CMS:	Centers for Medicare and Medicaid Services
EBITDA:	earnings before interest, taxes, depreciation, and amortization
PE:	private equity
VC:	venture capital

dermatology market is highly fragmented, which has attracted some dermatologists to team up with PE as consolidators. This relationship may be inherently

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challenging given that PE's primary accountability is to investors.

THE DERMATOLOGY-INDUSTRIAL COMPLEX

The American Medical Association created the corporate practice of medicine (CPOM) doctrine in 1847; the doctrine "prohibits corporations from practicing medicine or employing a physician to provide professional medical services." The CPOM doctrine was created because of (1) commercialization of the practice of medicine, (2) difficulty aligning a corporation's obligation to its shareholders and an employed physician's obligation to his or her patients, and (3) the possibility of a corporation interfering with an employed physician's independent medical judgment.⁵ Although many states followed suit and enacted laws prohibiting CPOM,⁴ there are broad exceptions. This has allowed some to successfully navigate around CPOM laws and structure relationships with physicians through employment, ownership, or practice management agreements. More than 3 decades ago, Arnold S. Relman, a longtime editor of the *New England Journal of Medicine* and health system critic, warned of a "new medical-industrial complex" and a "large and growing network of private corporations engaged in the business of supplying health care services to patients for a profit," which lends itself to the phenomenon of "cream skimming," which is the overprovision of services to low-severity patients.^{5,6} Although many facets of medicine have undergone consolidation and corporatization, dermatology remained below the radar of investors and relatively independent until the end of the 20th century.

CHANGING LANDSCAPE OF DERMATOLOGY

Generational differences in the practice of medicine and economic pressures may have helped fuel consolidation. Baby Boomers have *lived to work* and are worrying about retirement, whereas Gen Xers *work to live* and Generation Y/Millennials desire a work-life blend.⁷ Ehrlich et al found that 44% of dermatologists were in solo practice in 2005 compared with 35% in 2014. Solo practice dermatologists were likely to be 50 years of age or older, whereas dermatology group, multispecialty group, or academic dermatologists were likely to be 49 years of age or younger.⁸ This dichotomy enabled the corporate structure to insert itself between the generations. Company models revolved around acquiring independent dermatology practices and pathology laboratories of retiring physicians or opening new offices. Many were given equity in

the larger company. Recent dermatology graduates, many who had accrued student loans and desired a stable salary, were hired to replace acquired, retiring dermatologists and secure longevity of these companies. Younger recruits may also be enticed with shares of equity (albeit smaller) at the time of signing or after working for the company for a set number of years. Employment of physician extenders in dermatology also steadily increased across all practice models from 28% in 2005 to 46% in 2014, with 34% of solo practitioners employing a physician assistant compared with 54% of dermatologists in group practices.⁸

ECONOMIES OF SCALE IN DERMATOLOGY

Consolidation into large groups can theoretically take advantage of economies of scale by centralizing services such as billing, marketing, information technology, scheduling and call centers, regional managers for multiple offices, electronic health records, and Mohs surgery and dermatopathology. The in-office ancillary services exemption of the Stark law allows physicians to legally self-refer to an entity in which the physician has a financial relationship. Initially envisioned to enhance collaboration and patient convenience, this exemption allows many dermatology practice models, including corporate dermatology groups, to legally refer all biopsy specimens and Mohs cases to themselves. This potentially encourages overutilization of these referral services to generate more revenue.⁹ Large groups can take advantage of group purchasing contracts and are able to negotiate better insurance reimbursements. Some groups have even negotiated for all the patients seeking dermatology services from managed care companies for lower-than-market rates in exchange for relative exclusivity. Over time, some consolidators realized that they could expand more quickly and maximize profits by partnering with PE.

THE RISE OF PE IN DERMATOLOGY

PE did not become mainstream until the leveraged buyout boom of financially troubled companies in the 1980s.¹⁰ This was followed by the cyclic nature of the leveraged buyout bust of 1990-1992, boom in the late 1990s, crash in the early 2000s, boom of 2003-2007, and another bust in 2008. Physician practice management groups, including PhyCor, Innovative Clinical Solutions (previously called PhyMatrix), and ProMedCo, also suffered financially and filed Chapter 11 bankruptcies during the early 2000s.¹¹⁻¹⁴ Presently, PE has attracted capital from high-net worth individuals because the stock market may be overvalued, hedge funds are

offering mixed results, and interest rates are near all-time lows. PE has steep fees—they take up to 1.5% to 2% of the assets under management and 20% of profits above a certain threshold known as the “hurdle rate,” which is the expected return for their investors.¹⁵ Bain & Company summarized the ultimate goal of PE as follows: “All PE firms want to create value as quickly as possible—to grow revenue and take out cost—and a strong playbook helps to accomplish that.”¹⁶ Value is increased by purchasing businesses, adding debt, minimizing taxes, and cutting costs with an end game of extracting large fees.¹⁷ Historically, PE has consolidated other fields of medicine, including but not limited to, primary care, orthopedics, ophthalmology, anesthesiology, emergency medicine, gastroenterology, urology, obstetrics and gynecology, addiction treatment, pain management, nephrology, and dentistry.^{18,19}

The first known entry of PE into dermatology was Vicente Capital Partners, LLC, which invested in US Dermatology Medical Management, Inc (Arlington, TX) in October 2009; the company became insolvent and sold its practices to independent dermatologists near the end of 2011. Since then, there have been numerous other entries of PE into dermatology, with 33 known PE-backed dermatology groups, 2 of which are now defunct (Supplemental Table I^{1,20-59}; available at <http://www.jaad.org>). Twenty five of these 33 PE-backed groups were newly formed or acquired in 2015 or thereafter. Models may revolve around acquisition of “platform practices,” followed by addition acquisitions.^{60,61} Late-career dermatologists may be enticed to sell to PE with compensation taxed at capital gains rates. Upon acquisition, collections are typically split as 40% for the employed dermatologist and 40% for overhead, leaving 20% as profit for the PE firm.

In their quest to increase productivity, some PE-backed groups enlist general dermatologists and Mohs micrographic surgeons to work in more than 1 office and, on occasion, in multiple distant states. To capture pathology fees, dermatopathology specimens may be referred to distant regional laboratories that are owned by the entity.¹¹ Companies may also employ nondermatologist physicians to deliver dermatologic care.^{26,62,63} This strategy is not consistent across or limited to PE-backed groups and has been seen in other practice settings. Ancillary revenue streams include dermatologic procedures performed on nursing home patients, as can be seen with Bedside Dermatology in Michigan, which is owned by Advanced Dermatology and Cosmetic Surgery (ADCS), and OnSite Dermatology.^{24,33} Physician extenders employed by Bedside Dermatology performed high rates of intralesional

injections, with averages ranging from at least 5.8 to 17.68 injections per Medicare patient in 2015 and, on average, 75% of the treated patients had a diagnosis of Alzheimer disease (Table I^{57,64}).^{65,66}

PE-backed practices, like other dermatology practice models, may employ physician extenders on a larger scale, given their lower compensations than that received by dermatologists (Supplemental Table I). Physician extenders may be leveraged to the maximum extent allowable by state law with varying degrees of supervision. This generates larger profits for the company with minimal financial gain and increased risk for the employed supervising physician. Interestingly, physician extenders may be conveniently listed under the doctor or physician category on a company's web page, which misleads prospective patients.^{26,67,68} PE-backed practices may also have their own physician assistant and nurse practitioner “fellowship” training programs.^{65,69} Even though 2 separate studies have shown that physician extenders have a significantly higher number needed to biopsy compared to dermatologists for skin cancers, this may not be a concern for their employers, as a higher number needed to biopsy translates to greater revenue.^{70,71}

PE firms may also benefit financially by having residency or fellowship programs associated with their offices (Supplemental Table I).^{20-23,27-30} ADCS-owned practices across central Florida serve as the majority of participating clinical sites for a dermatology residency program sponsored by the Kansas City University of Medicine and Biosciences—Graduate Medical Education Consortium (Kansas City, MO).²⁰ Accredited by the Accreditation Council for Graduate Medical Education in 2016, this program provides residents with a yearly compensation in the form of a stipend of \$10,000 and an optional loan of \$30,000. If residents decide to take the loan, which matures at graduation, they can pay it back in its entirety or sign an ADCS employment contract with a restrictive covenant.

The practices of several influential dermatology leaders have been acquired by PE firms, creating potential conflicts of interest on a regional or national scale (Supplemental Table I).^{69,72-74} Additionally, influential leaders may have an immediate family member who serves as a director of an actively investing PE firm.^{75,76} Interestingly, the Dermatology Practice Support Alliance, Inc, was founded by the chief executive officer (CEO) of West Dermatology as a corporation in May 2016 and represents a coalition of the largest dermatology management companies, many of which are PE-backed (Table II).^{46,47} Dermatology Practice Support Alliance, Inc companies have acquired offices from each other to optimize consolidation in

Table I. High outliers in intralesional injections per traditional Medicare patient in 2015

Title	City	State	Provider type	Total Medicare payment in 2015	Percentage of patients with Alzheimer disease	Mean intralesional injections per patient in 2015*	No. of standard deviations from the mean†
MD	Farmington Hills	MI	Dermatology	\$26,884	N/A‡	18.1	20.1
NP§	Wyandotte	MI	Nurse practitioner	\$210,628	75	17.7	19.7
MD	Bronx	NY	Dermatology	\$127,950	5	14.5	16.1
PA-C§	Warren	MI	Physician assistant	\$270,023	75	13.6	15.1
NP	New York	NY	Nurse practitioner	\$29,019	4	13.1	14.5
PA-C§	Clinton Township	MI	Physician assistant	\$290,660	75	13.0	14.4
MD	Troy	MI	Dermatology	\$97,839	9	12.5	13.8
MD	New York	NY	Dermatology	\$51,665	N/A‡	11.2	12.4
PA-C	West Bloomfield	MI	Physician assistant	\$30,864	10	11.2	12.4
PA-C	Detroit	MI	Physician assistant	\$23,601	N/A‡	10.6	11.7
MD	Baltimore	MD	Dermatology	\$156,998	3	10.1	11.1
MD	Detroit	MI	Dermatology	\$313,055	10	10.0	11
MD	Southfield	MI	Dermatology	\$65,413	8	9.3	10.2
DO	Flint	MI	Dermatology	\$92,856	8	9.1	10
DO	Howell	MI	Dermatology	\$197,881	7	8.5	9.3
MD	Carolina	PR	Dermatology	\$181,369	14	7.7	8.4
MD	New York	NY	Dermatology	\$45,191	N/A‡	7.6	8.3
MD	Greenville	MS	Dermatology	\$816,554	7	7.2	7.9
MD	New York	NY	Dermatology	\$34,973	5	7.1	7.8
MD	Philadelphia	PA	Dermatology	\$3233	0	7.1	7.8
PA-C	Howell	MI	Physician assistant	\$122,605	7	6.5	7.1
MD	New York	NY	Dermatology	\$29,107	5	5.9	6.4
PA-C§	Wayne	MI	Physician assistant	\$84,635	75	5.8	6.3
MD	Delray Beach	FL	Dermatology	\$229,306	12	5.6	6.1
FNP	Kenner	LA	Nurse practitioner	\$32,141	N/A‡	5.0	5.4

Data derived from Physician Compare (accessed November 15, 2015 and January 14, 2018)⁵⁷ and 2015 Medicare Part B physician payment data participant user file.⁶⁴

CPT, Current Procedural Terminology; DO, doctor of osteopathic medicine; FNP, family nurse practitioner; MD, medical doctor; N/A, not available; NP, nurse practitioner; PA-C, certified physician assistant; PE, private equity.

*CPT Codes (11900 + [11901*8]) divided by the total number of unique Medicare Part B beneficiaries seen in 2015; calculation is an underestimate, as it assumes that CPT 11900 indicates injection of only 1 lesion and CPT 11901 indicates injection of only 8 lesions; actual number of lesions injected may be higher.

†Mean = 0.19, median = 0.04, standard deviation = 0.89, n = 4138.

‡Data not available from the Centers for Medicare and Medicaid Services.

§PE-backed physician extender billing independently for intralesional injections, with 75% of Medicare patients having a diagnosis of Alzheimer disease.

their respective geographic markets (Supplemental Table D). The CEO of West Dermatology was previously CEO of Pacific Pulmonary Services, which agreed to pay \$11.4 million to settle government allegations of violating the False Claims Act during his leadership.⁴⁸

CONSOLIDATION OF OUTLIERS BY PE

High outlier practice patterns may be harmful to patients and increase health care costs. As we have already discussed, both individual and corporate dermatology practices have learned to take advantage of exemptions to self-referral or Stark laws by opening laboratories to process their own pathology specimens. Table III^{57,64,77-80} is derived from the 2015 Medicare Part B physician payment data set and

shows the link between biopsies, pathologic examination of tissue, group size, and the presence of an employed pathologist in a group.⁶⁴ Data are provided at the level of the provider and are sorted by mean number of biopsies per patient.

The most striking finding in this analysis is that the majority of providers in the top 25 either billed code 88305 themselves, were part of a corporation that employed a pathologist, or both (19 of 25). The driving force behind these practice patterns appears to be the additional financial benefit to the individual or corporation from self-referred pathology fees. The majority of providers in the top 25 (14 of 25) were also in groups of 1 or 2 providers. Although physicians in small groups can practice outside the scrutiny of their peers,⁸¹ 6 of these

Table II. Corporate dermatology groups in the Dermatology Practice Support Alliance

Board of directors and officers
Advanced Dermatology and Cosmetic Surgery
Anne Arundel Dermatology
DermOne Dermatology (dissolved in 2018)
Forefront Dermatology
Integrated Dermatology Group
Riverchase Dermatology and Cosmetic Surgery
Schweiger Dermatology Group
Skin and Cancer Associates and Center for Cosmetic Enhancement
The Dermatology Group
U.S. Dermatology Partners
West Dermatology

Annual franchise tax report requested from the State of Delaware Division of Corporations, which includes a publicly available document of directors and officers of which a majority are nonphysicians; members may include other corporate dermatology groups. Incorporated on May 9, 2016, and report filed on April 14, 2017, by the chief executive officer of West Dermatology. Principal place of business is located at 18831 Von Karman Ave, Suite 300, Irvine, CA 92612.⁴⁶

extreme outliers practiced in groups of 10 or more and 5 were in large PE-backed practices as of 2018. The fact that 5 of the 30 currently PE-backed practices are represented in the top 25 suggests that PE firms may overlook billing practices and focus more on profitability than on due diligence when consolidating practices. Further research is needed to examine utilization of health care resources by PE-backed practices. Notably, 1 of the dermatologists on this list has been sentenced to 3 years in prison after pleading guilty to Medicare fraud as part of a *qui tam* lawsuit brought on by another dermatologist whose PE-backed practice also owns an outlier practice on this list.⁷⁷⁻⁸⁰ While some outliers are sentenced to prison, others are rewarded financially for their aberrant practice patterns (Table III).

THE END GAME OF PE IN DERMATOLOGY

Dermatology-specific models traditionally revolve around quickly acquiring or opening new practices with the goal of selling to another entity in 3 to 7 years.⁸² In 2015, the average PE holding period for all North America— and Europe-based portfolio companies was 5.6 years.⁸³ For dermatology-specific PE investments, holding periods are shorter with some PE firms exiting within 2 to 3 years (Supplemental Table I). Purchase offers are typically 3 to 5 times earnings before interest, taxes, depreciation and amortization (EBITDA) for solo practices, 5 to 7 times EBITDA for small dermatology groups, and

more than 13 times EBITDA for large, integrated, multisite groups.⁸² In February 2016, Forefront Dermatology commanded more than 13 times EBITDA with its \$450 million purchase by the Ontario Municipal Employees Retirement System.⁸⁴ Presently, PE has \$1 trillion in committed capital awaiting deployment, which may lead to overvaluations and diminishing returns for investors.^{85,86}

The future of PE's relationship with dermatology depends on reimbursement. In 2014, the global payment for Current Procedural Terminology code 88305 was cut by 33%; a 7% reduction followed in 2017.^{87,88} Before the Centers for Medicare and Medicaid Services cuts, Caris Life Sciences, Inc, sold its anatomic pathology division to Miraca Life Holdings, Inc, for \$725 million in 2011.⁸⁹ Miraca Life Holdings, Inc, sold this division to Avista Capital Partners in 2017 for \$175.6 million, which was 24.2% of its initial purchase price (Table IV^{90,91}).^{92,93} After "cream skimming" an annualized return on its investment, a PE firm can still benefit if they have to sell the corporation at a loss by offsetting capital gains from another investment. On the other hand, shares given to dermatologists translate to financial gains only if they are liquidated at an opportune time.

Ultimately, PE's exit strategy involves selling its company to another PE firm, a larger health care conglomerate, the public via an initial public offering, or an insurance company. If UnitedHealth Group's Optum completes its acquisition of DaVita Medical Group, which acquired some of its physicians from a PE firm (Summit Partners) in 2012, there will be at least 42 board-certified dermatologists employed by a publicly traded insurance company.⁹⁴⁻⁹⁶ Upon acquiring dermatologists, insurance companies may attempt to further narrow their networks and restrict patient access to only their employed dermatologists.

CONCLUSION

Medicare has not been able to find a way to pay physicians on the basis of the quality of care that they provide. The Medicare Payment Advisory Commission voted in January of 2018 to dissolve the Merit-Based Incentive Payments System program and replace it with yet another alternative model.⁹⁷ This leaves group size as the main way to negotiate better reimbursements from insurers, especially cost-cutting Medicare Advantage plans. This incentivizes consolidation, and overleveraging of extenders; it may also provide shelter for high-cost outliers and spur creative ways to subvert the Stark Law to further increase profits. When PE is enlisted to participate in the complex relationship between physicians and insurers, quality of care may suffer and value-based

Table III. High outliers in skin biopsies per traditional Medicare patient in 2015

Title	City	State	Provider type	Total Medicare payment in 2015	Mean biopsies per patient in 2015*	No. of standard deviations from the mean [†]	Pathologic examination of tissue (88305) [‡]	No. of group practice members in 2015	Entity had other pathologist in 2015?
DO	Boynton Beach	FL	Dermatology	\$902,150	11.4	22.8	7839	1	No
MD [§]	Newport Beach	CA	Dermatology	\$495,601	10.3	20.5	91	25	Yes
MD	Chester	NJ	Dermatology	\$1,262,309	9.1	18	8071	1	No
MD	Coral Gables	FL	Dermatology	\$815,483	8.3	16.3	4322	1	No
MD	Denver	CO	Dermatology	\$965,323	7.5	14.6	3483	1	No
MD	Philadelphia	PA	Dermatology	\$403,030	7.4	14.4	0	3	Yes
MD	Beverly Hills	CA	Dermatology	\$445,124	6.9	13.4	1696	1	No
MD [§]	Lake Worth	FL	Dermatology	\$1,046,053	6.5	12.5	0	15	Yes
MD	Hollis Hills	NY	Dermatology	\$534,016	6.1	11.7	0	2	No
MD	Glendora	CA	Dermatology	\$1,225,860	5.6	10.7	4158	1	Na
PA-C	Port Richey	FL	Physician Assistant	\$533,273	5.5	10.5	0	2	No
MD [§]	Delray Beach	FL	Dermatology	\$1,858,077	5.5	10.5	10,006	123	Yes
MD	Memphis	TN	General Practice	\$689,819	5.5	10.5	0	1	No
MD	West Long Branch	NJ	Dermatology	\$1,093,604	5.3	10	4288	1	No
DO	Port Saint Lucie	FL	Radiation Oncology	\$1,263,047	5.1	9.6	3159	1	No
DO	Great Barrington	MA	Dermatology	\$1,145,777	5.1	9.6	0	1	No
MD	Florham Park	NJ	Dermatology	\$2,517,455	4.8	9	4138	4	Yes
MD	Victorville	CA	Dermatology	\$995,327	4.7	8.8	5101	3	No
MD	Huntington Beach	CA	Dermatology	\$1,128,493	4.6	8.6	5194	5	No
MD	Wayne	PA	Dermatology	\$353,526	4.4	8.2	0	7	No
MD	Tallahassee	FL	Dermatology	\$551,207	4.3	8	0	11	Yes
MD [§]	Boca Raton	FL	Dermatology	\$262,980	4.2	7.8	0	1	No
MD	Boca Raton	FL	Dermatology	\$358,028	4.1	7.5	0	18	Yes
MD	Media	PA	Dermatology	\$493,595	4.0	7.3	1183	2	No
MD [§]	Aventura	FL	Dermatology	\$304,176	4.0	7.3	0	50	Yes

Data derived from Physician Compare (accessed November 15, 2015 and January 14, 2018)⁵⁷ and 2015 Medicare Part B physician payment data participant user file⁶⁴ limited to providers seeing at least 100 unique patients in 2015.

DO, Doctor of osteopathic medicine; MD, medical doctor; PA-C, certified physician assistant.

*Current Procedural Terminology codes (11100, 11101, 11300-11313, 11755 [nail]; 40490 [lip]; 67810 [eyelid]; and 69100 [ear]) divided by the total number of unique Medicare Part B beneficiaries seen in 2015.

[†]Mean = 0.48, median = 0.39, standard deviation = 0.48, n = 16024.

[‡]Number of times provider billed code 88305 in 2015, which may reflect a charge for the professional or technical component or the global fee.

[§]Provider in a private equity-backed dermatology practice in 2018.

^{||}Pled guilty to federal charges of health care fraud and obstruction of a criminal health care investigation.⁷⁷⁻⁸⁰

Table IV. Major corporate laboratories with dermatopathology services

Laboratory*	Estimated No. of offices*	Locations*	Estimated No. of dermatopathologists*	PE and comments*†
Aurora Diagnostics (founded in 2006 by GSO Capital Partners and Summit Partners)	16	AL, AZ, FL, MA, MI, MN, NV, NJ, NY, NC, OH, SC, TX, VA	54	Australia's Sonic Healthcare agreed to acquire Aurora Diagnostics for \$540 million (December 2018) Entered into 5-y credit facility of \$220 million with Cerberus Business Finance (July 2014) and added \$40 million delayed draw term loan (April 2015) to fund laboratory acquisitions Withdrew plans for initial public offering (June 2012) Filed for \$150 million initial public offering (April 2010) KRG Capital Partners (2009 [current]) Summit Partners (2006 [current]) GSO Capital Partners (hedge fund, 2006-2009)
DermPath Lab of Central States (DLCS) (founded in 1984; part of large dermatology entity called Dermatologists of Central States ⁹⁰)	2	MI, OH	7	Sheridan Capital Partners (May 2017)
Inform Diagnostics (Miraca Life Sciences [2012-2017], Caris Diagnostics [2006-2012], and Pathology Partners [1996-2006])	3	AZ, MA, TX	29	Avista Capital Partners (2017)
Laboratory Corporation of America Holdings (LabCorp; Dianon Pathology) (founded in 1978 as National Health Laboratories, owned by Revlon Health Care Group; merged with Roche Biomedical Laboratories in 1995 to become LabCorp)	5	CA, CT, FL, NC, TX	15	Publicly trades on the New York Stock Exchange Shore Capital Partners invested in ClearPath Diagnostics (September 2011); sold to LabCorp (October 2016)
ProPath Services, LLC (founded in 1966; became a corporation in 2002)	1	TX	7	No known PE
Quest Diagnostics (Ameripath; DermPath Diagnostics) (founded in 1967 as Metropolitan Pathology Laboratory; became a corporation in 1996)	14	AZ, FL, GA, IN, NY, OH, PA, TX, WI	72	Publicly trades on the New York Stock Exchange Oroco Capital (date unknown) Ameripath formerly venture capital-backed by CHL Medical Partners (date unknown) and PE-backed by Welsh Carson Anderson & Stowe (2003-2007); sold to Quest Diagnostics in an all cash transaction at \$2 billion valuation (April 2007) ⁹¹

This table does not include dermatopathology services offered by corporations primarily focused on clinical dermatology.

PE, Private equity.

*Estimates reflect locations employing fellowship-trained dermatopathologists (data acquired from publicly available corporate laboratory websites) as of October 2018.

†PE partnerships from publicly available corporate laboratory websites, The PE Hub Network,⁵⁸ and Internet search queries.

care may be destroyed.^{11,65} In response to growing concerns from the medical community, the American Medical Association recently passed a resolution to examine the effects on the health care marketplace of corporate investors, including PE firms, acquiring a majority and/or controlling interest in entities that manage physician practices.^{98,99} Ultimately, the solutions to PE's exploration of our field will be the elusive quality-based payments that do not incentivize consolidation or large cuts in common dermatology procedure codes and subsequent loss of interest by PE.

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Supplemental Table I. Summary of consolidation, corporatization, and venture capital/private equity in dermatology

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
Advanced Dermatology and Cosmetic Surgery (ADCS) (1989)	169	AZ, CO, FL, GA, MD, MI, NV, OH, PA, RI, SC, VA, WY	171	156	30 ²⁰⁻²³	NXT Capital funded Audax Private Equity's acquisition (February 2012) Majority stake sold to Harvest Partners for \$600 million (May 2016) ADCS owns Bedside Dermatology, ²⁴ Ameriderm (2009), and Ameriderm Research (2009); Ameriderm is a coding, collection, and billing service for dermatologists ²⁵ As per ADCS website, estimated number of offices decreased from 203 in May 2018 to 169 in October 2018. ²⁶ Additionally, TX no longer listed as a location Waud Capital Partners (October 2017)
Adult & Pediatric Dermatology, PC (APDerm) (1992)	11	MA, NH	20	8		
Anne Arundel Dermatology (1980)	36	MD, TN, VA	62	41		New Mainstream Capital (June 2015) Sought new buyer (November 2017) New Mainstream Capital recapitalized; Pantheon acquired minority stake; New Mainstream Capital remains as lead and control investor (January 2018)
California Skin Institute (CSI) (2007)	31	CA	49	14		Goldman Sachs (May 2017) CSI consists of CSI Medical Group and CSI Management. Goldman Sachs is a subordinated lender to CSI Management. The loan is convertible into equity securities of CSI Management upon the occurrence of certain future events. Upon full conversion of this debt, Goldman Sachs would be a minority equity investor
Dermatologists of Central States (DOCS) (2017)	41	IN, MI, OH	36	28	6 ²⁷	Sheridan Capital Partners (May 2017) CEO of DOCS is also CEO of DermPath Lab of Central States (DLCS)

Continued

Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
Dermatology Medical Partners (DMP) (2015)	N/A	FL, GA, TX	N/A	N/A		Tyree & D'Angelo Partners (December 2015) Acquired practices within DMP network retain their names
Dermatology Specialists (2006) Rebranded from Gulf Coast Dermatology Group	24	AL, FL, GA, MS	12	18		Cressey & Company recapitalized in August 2013 and exited in May 2015 Dermatology Solutions Group is the management services organization of Dermatology Specialists FBI conducted a search (December 2014) Gemini Investors (July 2017)
DermCare Management (2016)	17	South FL	34	11	22 ^{21,28,29}	
DermOne Dermatology (1986)	23	NJ, NC, TX, VA	24	15	6 ^{30,31}	Westwind Investors (February 2012) Accredited Dermatology in NJ was acquired by DermOne Dermatology (2012) DermOne Dermatology dissolved (2018) NJ offices sold to Schweiger Dermatology Group (March 2018), VA office acquired by Forefront Dermatology (2018), and patient medical records transferred to U.S. Dermatology Partners (March 2018) CI Capital Partners (June 2016)
Epiphany Dermatology (2014)	35	AZ, CO, IA, MO, NM, OK, TX	32	32		

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Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
Forefront Dermatology (2001)	134	AL, DC, FL, IL, IN, IA, KY, MD, MI, MN, MO, NC, OH, PA, VA, WI	134	91		Varsity Healthcare Partners (May 2014) Goldman Sachs (May 2014) OMERS Private Equity (Canadian pension fund for government employees) purchased for \$450 million; more than 13 times EBITDA (February 2016) BMO Harris Bank lent \$195 million in first lien credit (February 2016) Canadian PE firm Penfund invested \$47 million of second lien debt and equity (February 2016) The CEO of Forefront Dermatology is also an operating partner at Shore Capital Partners, a Chicago-based PE firm focused exclusively on microcap (publicly traded) health care investments
Formerly Dermatology Associates of Manitowoc, Dermatology Associates of Wisconsin						An office in MO and one in WI have closed ³²
Golden State Dermatology (2015)	6	CA	9	10		Pouschine Cook Capital Management + Yukon Partners (February 2015)
Integrated Dermatology Group (IDG) (2006)	-100	AZ, CA, CO, CT, DC, FL, ID, IL, IN, IA, LA, MD, MA, MI, NV, NJ, NM, NY, NC, OH, PA, TN, UT, VA, WA	-64	-73		No PE (founders are 2 brothers) Some practices within IDG network retain their names Same founders started OnSite Dermatology (2005), US Path Labs (2004), and eDerm Systems (2006), ³³⁻³⁵ ; OnSite Dermatology has locations in 13 states (CA, CO, DC, DE, FL, MD, NC, NH, NJ, PA, TX, VA, and WA) and provides mobile dermatology care to seniors living in independent retirement, assisted, and skilled nursing communities The same founders previously resigned their positions as officers and directors of Response USA, Inc, a supplier of personal response systems and monitoring services; Response USA, Inc, filed for voluntary Chapter 11 bankruptcy (August 2001) ³⁶⁻³⁸

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Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
NavaDerm (2018)	5	NJ, NY	22	2		BelHealth Investment Partners (July 2018) The executive vice president of business development and recruiting of NavaDerm is currently CEO of Dermatology Authority, which provides recruiting services for dermatology practices
Northeast Dermatology Associates (NEDA) (1999)	21	ME, MA, NH	31	11		NEDA explored sale (May 2017) Ontario Teacher's Pension Plan (September 2017) Century Equity Partners (September 2017) PhyNet Dermatology is the management services organization of NEDA Reportedly fetched 13 times EBITDA The CEO of PhyNet Dermatology was previously president and CEO of OrthAlliance, Inc, a dental services organization acquired by publicly traded Orthodontic Centers of America, Inc (OCA), in 2001; Dallas federal court ruled that OrthAlliance, Inc, was practicing dentistry without a license and declared its management contracts "illegal in their entirety" (March 2003); OCA filed for Chapter 11 bankruptcy protection (March 2006) and exited Chapter 11 bankruptcy (January 2007) ³⁹⁻⁴¹
Pinnacle Dermatology (2004)	23	IL, IN, MI	23	22		Chicago Pacific Founders (March 2017)
Platinum Dermatology Partners (2016)	32	AZ, TX	52	24		Sterling Partners (May 2016)

Continued

Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
QualDerm Partners (QDP) (2014)	34	GA, NC, OH, PA, SC, TN, VA	47	28		Raised \$31.88 million in capital from investors including funds from Cressey & Company + Apple Tree Partners (February 2016) Granite Growth Health Partners (date unknown) ACMS presidents are "platform practice" for QDP
Riverchase Dermatology and Cosmetic Surgery (2000)	37	FL	42	33		Prairie Capital (December 2012) GTCR (October 2016)
Sanova Dermatology (2012)	12	LA, TX	19	7		Ampersand Capital (2017) Spindletop Capital (May 2018) An AAD board member is employed by Sanova Dermatology
Select Dermatology (2017)	1	TX	1	2		Welsh, Carson, Anderson & Stowe (2017) Riata Capital Group (2017)
Schweiger Dermatology Group (2010)	45	NJ, NY, PA	68	63		SV Life Sciences led \$12.4 million Series A financing (January 2015) Square 1 Bank provided \$8 million in debt financing (December 2015) LLR Partners led \$35 million investment (April 2016) Triangle Capital closed \$20 million unitranche debt investment (June 2017) LNK Partners invests \$100 million (May 2018) Gemini Investors (March 2017)
Skin & Beauty Center (2006)	6	CA	12	3		

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Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
Skin and Cancer Associates (SCA) and Center for Cosmetic Enhancement (CCE) (1970)	27	FL	39	N/A (see comments)	21 ^{21,22,28}	Susquehanna Private Capital (April 2018) Advanced Dermatology Management is the management services organization of SCA SCA/CCE comprises 80 dermatologists, nurse practitioners, and physician assistants The CEO of SCA is a board-certified radiologist and was previously vice president of PE-backed Sheridan Healthcare Radiology Services The director of Susquehanna Private Capital is brother of 2 influential dermatologists Susquehanna Growth Equity, LLC is lead investor of HMP Global, which produces the magazine <i>The Dermatologist</i> ⁴²
Sona Dermatology Med Spa (1997)	18	AR, NC, TN, TX, VA	11	3		Initially owned by Carousel Capital Partners along with current CEO and Chief Financial Officer
Summit Dermatology Partners (2018)	4	IN	3	4		Pharos Capital Group, LLC (January 2016) Alpine Investors (2018)

Continued

Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
The Dermatology Group (TDG) (1992)	24	CT, NJ, NY, PA	37	13		The Riverside Company (January 2016) Tricenna is the management services organization of TDG; some practices within the Tricenna network retain their names An AAD board member is chief medical officer at Tricenna A past chief administrative officer of TDG is currently CEO of Illinois Dermatology Institute (currently independent with an estimated 15 offices, 25 MDs/DOs, and 11 physician extenders) and president of Grand Cru Physician Advisors, which consults in health care finance, management, mergers and acquisitions, and practice management
TruDerm (2017)	2	TX	1	1		Leon Capital Group (date unknown)
United Derm Partners (2016)	21	CA, ID, NV, OR, TX	35	21		Frazier Healthcare Partners (December 2016) The CEO of United Derm Partners was previously executive vice president and chief operating officer of PE-backed DSI Renal (formed as Dialysis Newco, Inc), which filed for voluntary Chapter 7 bankruptcy and sold to DaVita, Inc (February 2011) ⁴³
United Skin Specialists (2015)	9	IL, MN, MO	16	8		Tonka Bay Equity Partners (September 2015) Clearwater Equity Group (2015) A past president of ASDS and former board member of AAD serves on board of directors of United Skin Specialists
U.S. Dermatology Medical Management, Inc (2009)	6	CA, HI, TX	N/A	N/A		Vicente Capital Partners, LLC (October 2009) U.S. Dermatology Medical Management, Inc became insolvent and sold its practices to independent dermatologists near the end of 2011

Continued

Supplemental Table I. Cont'd

Group (year founded)*	Estimated No. of offices [†]	Known locations [†]	Estimated No. of physicians ^{†‡}	Estimated No. of physician extenders [†]	Estimated No. of ACGME-approved trainees	PE and comments ^{§ ¶}
U.S. Dermatology Partners (USDP) (1996) Formerly Dermatology Associates, Dermatology Associates of Tyler	87	AZ, CO, KS, LA, MD, MO, OK, TX, VA	160	52		Candescent Partners, Eagle Private Capital, and Harbert Mezzanine Partners (January 2013) Brookside Mezzanine Partners (May 2014) ARBY Partners secured a majority stake for >\$300 million (May 2016) USDP is doing business as Oliver Street Dermatology Holdings, LLC ⁴⁴ ; Oliver Street Dermatology Holdings, LLC 5.01(a) is registered with the Texas Medical Board as a nonprofit health organization Considering a sale (February 2018) ⁴⁵ Sold to Gryphon Investors (June 2018) Enhanced Equity Funds (December 2014) A past president of ASDS serves as California medical director for West Dermatology AAD and ASDS board members are employed by West Dermatology The CEO of West Dermatology was previously CEO of Pacific Pulmonary Services (PPS) and established a CEO-led industry coalition, the Council for Quality Respiratory Care, which lobbied for their interests; the FBI raided PPS (February 2012); PPS agreed to pay \$11.4 million to resolve allegations of violating the False Claims Act and for a cross-referral kickback scheme (April 2017); PPS laid off 170 employees (May 2017) ⁴⁶⁻⁵⁴
Water's Edge Dermatology (1998)	34	FL	34	24		
West Dermatology (1962)	34	AZ, CA, NV	44	43		

AAD, American Academy of Dermatology; ABD, American Board of Dermatology; ACMS, American College of Mohs Surgery; ACGME, Accreditation Council for Graduate Medical Education; ASDS, American Society of Dermatologic Surgery; CEO, chief executive officer; DO, doctor of osteopathic medicine; EBITDA, earnings before interest, taxes, depreciation and amortization; FBI, Federal Bureau of Investigation; MD, medical doctor; N/A, not available; PE, private equity.

*Estimates acquired from publicly available practice websites, state corporations divisions, Bloomberg,⁵⁵ and Crunchbase.⁵⁶

[†]Estimates acquired from publicly available practice websites (October 2018), the January 2018 issue of Dermatology World,¹ and Physician Compare (accessed October 24, 2018).⁵⁷

[‡]Includes primarily dermatologists—both ABD-certified and non-ABD-certified—as of October 2018.

[§]PE partnerships from publicly available practice websites, the PE Hub Network,⁵⁸ Becker's Hospital Review,⁵⁹ Bloomberg,⁵⁵ and Internet search queries.

^{||}PE deals in dermatology may include secondary buyouts, recapitalizations, management buyouts, corporate divestitures, platform practices with add-on acquisitions, and/or leveraged buyouts.

[¶]Work experience acquired from publicly available websites.