

Venture capital funding of dermatology companies founded by women: a unique set of challenges

Keywords: gender disparities, health services research, innovation, venture capital

To the Editor:

Venture capital (VC) investments are important for research and innovation in dermatology, with over \$9 billion US dollars invested into the dermatology space 2011–2021.¹ Companies founded by women versus men typically received less VC funding and lower investor valuations,² however, leadership trends based on gender and valuations of VC-funded dermatology companies have not been studied.

We conducted a cross-sectional analysis of dermatology-related VC investments from January 1, 2017 to January 1, 2022 within the Pitchbook database. Pitchbook is a private capital market data provider with investment information, including funding raised in each fundraising round, which is available publicly or with institutional access. Company profiles were identified for leader or founder gender. Companies were stratified into those with a woman founder/current leader classified as “woman-led” and all others “man-led.” Univariable analyses were performed using Microsoft Excel (Microsoft, Seattle, WA) and SAS Software (SAS Studio Release 3.8, Cary, NC).

Eighty-five unique companies brought dermatologic products to market through VC financing during this 5-year period, of which 23 (27.1%) were woman-led (Table 1). Woman leadership increased over the study period (Fig. 1A), with 17.4% of companies founded before 2010 being woman-led, whereas 30.4% founded after 2018 being woman-led. A greater proportion of woman-led versus man-led companies focused on cosmetics and cancer, whereas man-led versus woman-led companies focused on drug discovery, general services/technologies, psoriasis/atopic dermatitis, and surgery/wound healing (both $P = .0001$; Fig. 1B; Table 1). Companies led by women versus men, on average, had lower valuations (\$115.2 vs. \$331.9 million US dollars, $P < .0001$) and received less investor financing (US \$30.5 vs. 41.0 million, $P = .0078$) despite having similar total number of investors (5.8 vs. 6.5, $P > .05$) (Fig. 1C). Woman-led companies had lower total unique groups of patents than man-led companies (0.96 vs. 4.6, $P = .0067$).

Our study showed that a majority of dermatology-focused VC companies were man-led with a trend toward a greater proportion of woman-led companies over time. Woman-led companies were more often cosmetic/oncology-focused with lower investor perceived value than man-led companies. The increase in woman-led dermatology-focused VC companies might be a direct result of the growing number of women becoming

board-certified dermatologists. In a cross-sectional analysis of the 2020 Centers for Medicare and Medicaid Services database, representation of woman dermatologists increased 6.9%–48.9%, 1970–2017.³ In a 2005–2020 retrospective analysis of 311 pharmaceutical acquisitions of \geq \$10 million, companies producing orphan-designated lead drugs (typical of drug discovery companies) versus those producing nonorphan-designated lead drugs (typical of cosmetics companies), on average, had greater shareholder returns (46% vs. 12%, $P < .001$).⁴ Therefore, differences in valuations of companies may be sector-driven.

Limitations include sample size and possible coding errors based on the accuracy of published leadership. Our method of filtering leadership did not capture women-led companies replaced by men at acquisition, a useful question for future studies in this space.

In conclusion, woman-led versus male-led VC-funded companies are more often cosmetic/oncology-focused and have lower valuations, with a positive trend toward a greater proportion of woman-led companies. Studies investigating perceived barriers to bringing innovations from bench to bedside amongst woman founders may shed light on these observed disparities.

Conflicts of interest

S.R.L. has served as a consultant for Ortho-Dermatologics, Moberg Pharmaceuticals, and BelleTorus Corporation. The other authors have no conflicts of interest to disclose.

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Study approval

N/A

What is known about this subject in regard to women and their families?

- Women considerably contribute to new technologies and companies within dermatology, however, disparities may be present in the sectors women start companies in and their funding from venture capital firms.

What is new from this article as messages for women and their families?

- It is important to continue to push women toward careers in innovative technologies within science and dermatology as a whole and ensure all subdisciplines within STEM are promoted equally to women.

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Table 1**Characteristics of male versus female-founded companies founded between 2010 and present**

Company overview	Man-led (n = 62) (72.9%)	Woman-led (n = 23) (27.1%)	P
Year founded			.0001
Founded before 2010	15 (24.2%)	4 (17.4%)	
2010–2013	13 (21.0%)	3 (13.0%)	
2014–2017	27 (43.6%)	9 (39.1%)	
2018–Present	7 (11.3%)	7 (30.4%)	
Industry focus area			.0001
Cancer	6 (9.7%)	4 (17.4%)	
Cosmetics	10 (16.1%)	7 (30.4%)	
General drug discovery	12 (19.4%)	4 (17.4%)	
General services or technologies	12 (19.4%)	1 (4.4%)	
Psoriasis/atopic dermatitis/inflammatory disease	14 (22.6%)	5 (21.7%)	
Surgery or wound healing	8 (12.9%)	2 (8.7%)	
Primary product type			.0016
Consumer services	13 (21.0%)	1 (4.4%)	
Systemic medication	16 (25.8%)	8 (34.8%)	
Technology	16 (25.8%)	9 (39.1%)	
Topical medication	17 (27.4%)	5 (21.7%)	
State			.1397
California	19 (30.7%)	4 (17.4%)	
Massachusetts	7 (11.3%)	4 (17.4%)	
Texas	3 (4.8%)	2 (8.7%)	
Illinois	1 (1.6%)	2 (8.7%)	
Other	51 (82.3%)	15 (65.2%)	
Last deal type			.8237
Accelerator/incubator	1 (2.9%)	1 (7.1%)	
Buyout/local purchase order	1 (2.9%)	0 (0)	
Early Stage VC	8 (22.9%)	4 (28.6%)	
IPO	7 (20.0%)	1 (7.1%)	
Later stage VC	14 (42.9%)	4 (28.9%)	
Merger/acquisition	1 (2.9%)	0 (0)	
Reverse manage	1 (2.9%)	1 (7.1%)	
Reverse merger	0 (0)	1 (7.1%)	
Seed round	1 (2.9%)	2 (14.3%)	
Ownership status			
Acquired	2 (3.2%)	1 (4.4%)	
Out of business	2 (3.2%)	0 (0)	
Privately held	38 (61.3%)	20 (87.0%)	
Publicly held	12 (19.4%)	2 (8.7%)	
Deal type			.3549
Accelerator/incubator	14 (22.6%)	6 (26.1%)	
Angel (individual)	8 (12.9%)	2 (8.7%)	
Capitalization	0 (0)	1 (4.4%)	
Debt—General	3 (4.8%)	0 (0)	
Early stage VC	19 (30.7%)	6 (26.1%)	
Grant	7 (11.3%)	4 (17.4%)	
Later stage VC	2 (3.2%)	1 (4.4%)	
Seed round	8 (12.9%)	3 (13.0%)	
Spin-off	1 (1.6%)	0 (0)	
Number of active investors	5.8	6.55	.6649
Financing size	41	30.5	.608
Number of patents	22.1	4.8	.0483
Total patent families	4.6	1.0	.0067
Active patents	0.6	2.0	.0457
Last valuation (\$ million USD)	331.9	115.2	.3015
Twitter size multiple	50	40	.15555
Growth rate percent (annual)	0.5	0.3	.6936
Size multiple	41.3	3.0	.021
Employees	209.3	27	.1451

VC, venture capital. Bolded values are any values < 0.05.

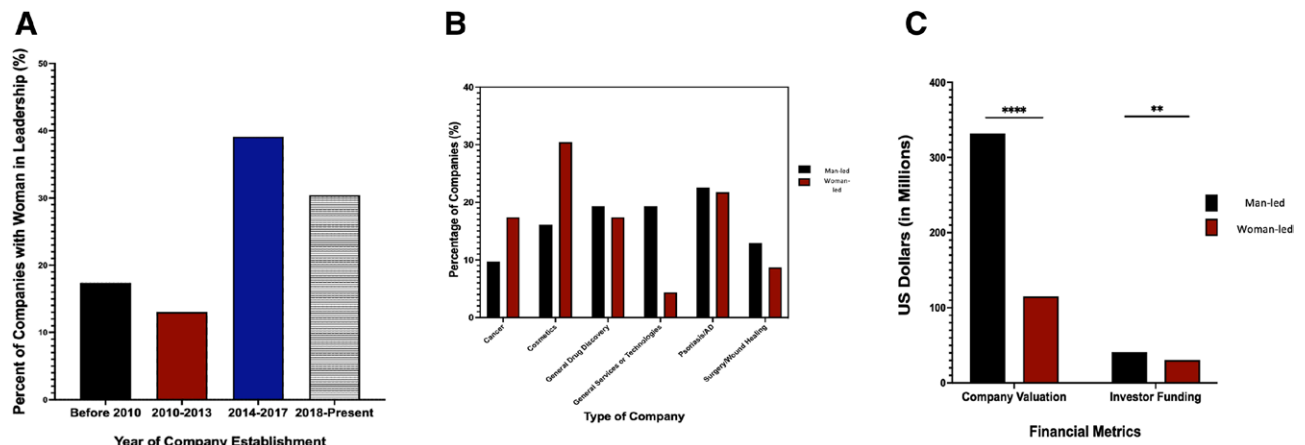


Fig. 1. (A) Distribution of number of companies with female leadership between 2010 and present and (B) stratified by company industry focus area. (C) Valuation versus amount invested by venture capitals in male versus female-founded companies.

Author contributions

AD, VN, CW, and SL were responsible for ideation. AD, JM, NK, SA, and RB completed primary data collection and data analysis. AD and SL completed manuscript writing and creation of figures. All authors participated in final review and editing of manuscript.

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Amar D. Desai, MPH^a

Jacquelyn M. Roth, BA^a

Nilesh Kodali, BS^a

Simona Alomary, BA^a

Rahul Bhatia, BA^b

Vinod E. Nambudiri, MD, MBA, EdM^c

Cindy Wassef, MD^d

Shari R. Lipner, MD, PhD^{e,*}

^a Department of Dermatology, Rutgers New Jersey Medical School, Newark, New Jersey

^b Departments of Economics and Political Science, Columbia University, New York City, New York

^c Department of Dermatology, Brigham and Women's Hospital, Boston, Massachusetts

^d Department of Dermatology, Rutgers Robert Wood Johnson Medical School, Somerset, New Jersey

^e Department of Dermatology, Weill Cornell Medicine, New York City, New York

* Corresponding author.

E-mail address: shl9032@med.cornell.edu (S. R. Lipner).