
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

SCHEDULE 13D

UNDER THE SECURITIES EXCHANGE ACT OF 1934
(Amendment No. 2)*

AXCELLA HEALTH INC.

(Name of Issuer)

Common Stock, \$0.001 par value per share
(Title of Class of Securities)

05454B105
(CUSIP Number)

Noubar B. Afeyan, Ph.D.
Flagship Pioneering
55 Cambridge Parkway, Suite 800E
Cambridge, MA 02142
(617) 868-1888

(Name, Address and Telephone Number of Person Authorized to Receive Notices and Communications)

March 16, 2022
(Date of Event Which Requires Filing of Statement on Schedule 13D)

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), checking the following box.

* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter disclosures provided in a prior cover page.

The information required on the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

(1)	Name of Reporting Persons: Flagship VentureLabs IV, LLC	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): WC	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 2,035,830
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 2,035,830
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 2,035,830	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 3.9%	
(14)	Type of Reporting Person (See Instructions): OO	

(1)	Name of Reporting Persons: Flagship Ventures Fund IV, L.P.	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): WC	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 10,636,233
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 10,636,233
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 10,636,233	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 20.5%	
(14)	Type of Reporting Person (See Instructions): PN	

(1)	Name of Reporting Persons: Flagship Ventures Fund IV-Rx, L.P.	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): WC	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 2,004,657
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 2,004,657
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 2,004,657	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 3.9%	
(14)	Type of Reporting Person (See Instructions): PN	

(1)	Name of Reporting Persons: Flagship Ventures Fund IV General Partner LLC	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): AF	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 12,640,890
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 12,640,890
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 12,640,890	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 24.4%	
(14)	Type of Reporting Person (See Instructions): OO	

(1)	Name of Reporting Persons: Flagship Ventures Fund 2007, L.P.	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): WC	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 1,761,029
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 1,761,029
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 1,761,029	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 3.4%	
(14)	Type of Reporting Person (See Instructions): PN	

(1)	Name of Reporting Persons: Flagship Ventures 2007 General Partner LLC	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): AF	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 1,761,029
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 1,761,029
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 1,761,029	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 3.4%	
(14)	Type of Reporting Person (See Instructions): OO	

(1)	Name of Reporting Persons: Flagship Ventures Opportunities Fund I, L.P.	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): WC	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 4,465,866
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 4,465,866
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 4,465,866	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 8.6%	
(14)	Type of Reporting Person (See Instructions): PN	

(1)	Name of Reporting Persons: Flagship Ventures Opportunities Fund I General Partner LLC	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): AF	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 4,465,866
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 4,465,866
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 4,465,866	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 8.6%	
(14)	Type of Reporting Person (See Instructions): OO	

(1)	Name of Reporting Persons: Noubar B. Afeyan, Ph.D.	
(2)	Check the Appropriate Box if a Member of a Group (See Instructions): (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
(3)	SEC Use Only:	
(4)	Source of Funds (See Instructions): AF	
(5)	Check Box if Disclosure of Legal Proceedings is Required Pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
(6)	Citizenship or Place of Organization: United States of America	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	(7)	Sole Voting Power 0
	(8)	Shared Voting Power 18,867,785
	(9)	Sole Dispositive Power 0
	(10)	Shared Dispositive Power 18,867,785
(11)	Aggregate Amount Beneficially Owned by Each Reporting Person: 18,867,785	
(12)	Check Box if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions): <input type="checkbox"/>	
(13)	Percent of Class Represented by Amount in Row (11): 36.4%	
(14)	Type of Reporting Person (See Instructions): IN	

ITEM 1. SECURITY AND ISSUER

This Amendment No. 2 (this “Amendment”) amends and supplements the Schedule 13D (the “Schedule 13D”) filed by the Reporting Persons (as defined below) on May 23, 2019, as amended, with respect to the common stock, \$0.001 par value per share (“Common Stock”), of Axcella Health Inc. (the “Issuer” or the “Company”). Except as specifically provided herein, this Amendment does not modify any of the information previously reported in the Schedule 13D.

ITEM 4. PURPOSE OF TRANSACTION

Item 4 is hereby amended to include the following:

On March 16, 2022, pursuant to a Securities Purchase Agreement by and among the Issuer and the purchasers named therein (the “Purchase Agreement”), Flagship Ventures Fund IV, L.P. (“Flagship Fund IV”), Flagship Ventures Fund IV-Rx, L.P. (“Flagship Fund IV-Rx”) and Flagship Ventures Opportunities Fund I, L.P. (“Flagship Opportunities I”) purchased an additional 3,791,623 shares, 947,905 shares and 1,579,843 shares, respectively, of the Issuer’s Common Stock in a registered direct offering (the “March 2022 Offering”) at the price per share of \$1.91.

ITEM 5. INTEREST IN SECURITIES OF THE ISSUER

Item 5(a)-(c) is hereby amended and restated as follows:

(a)-(b) The information set forth in rows 7 through 13 of the cover pages to this Schedule 13D is incorporated by reference. The percentage set forth in row 13 is based on 51,777,957 outstanding shares of Common Stock immediately following the March 2022 Offering, as reported in the Issuer’s prospectus supplement on Form 424(b)(5) filed with the Securities and Exchange Commission on March 16, 2022.

Flagship VentureLabs IV, LLC (“VentureLabs IV” and together with Flagship Fund IV and Flagship Fund IV-Rx, the “Flagship IV Funds”), Flagship Fund IV and Flagship Fund IV-Rx directly hold 2,035,830 shares, 8,600,403 shares and 2,004,657 shares of Common Stock, respectively. Flagship Fund IV, as the manager of VentureLabs IV, may be deemed to beneficially own the shares directly held by VentureLabs IV. Flagship Ventures Fund IV General Partner LLC (“Flagship Fund IV GP”), as the general partner of the Flagship Fund IV Funds, may be deemed to beneficially own the shares directly held by the Flagship Fund IV Funds.

Flagship Ventures Fund 2007, L.P. (“Flagship Fund 2007”) directly holds 1,761,029 shares of Common Stock. Flagship Ventures 2007 General Partner LLC (“Flagship 2007 GP”), as the general partner of Flagship Fund 2007, may be deemed to beneficially own the shares directly held by Flagship Fund 2007.

Flagship Opportunities I directly holds 4,465,866 shares of Common Stock. Flagship Ventures Opportunities Fund I General Partner LLC (“Flagship Opportunities GP”), as the general partner of Flagship Opportunities I, may be deemed to beneficially own the shares directly held by Flagship Opportunities I.

Noubar B. Afeyan, Ph.D., as the sole manager of Flagship Fund IV GP, Flagship Fund 2007 GP and Flagship Opportunities GP, may be deemed to beneficially own the shares directly held by the Flagship IV Funds, Flagship Fund 2007 and Flagship Opportunities I.

(c) On March 16, 2022, Flagship Fund IV, Flagship Fund IV-Rx and Flagship Opportunities I purchased an additional 3,791,623 shares, 947,905 shares and 1,579,843 shares, respectively, of the Issuer’s Common Stock in connection with the Issuer’s March 2022 Offering. The purchase price was \$1.91 per share.

ITEM 6. CONTRACTS, ARRANGEMENTS, UNDERSTANDINGS OR RELATIONSHIPS WITH RESPECT TO SECURITIES OF THE ISSUER

Item 6 is hereby amended to include the following:

Purchase Agreement

The Purchase Agreement contains customary representations, warranties, and agreements by the Company, and customary indemnification and other obligations of the Company and the Purchasers. Pursuant to the terms of the Purchase Agreement, the Company has also agreed to certain restrictions on the issuance and sale of its securities until 60 days following the date of the Purchase Agreement, subject to certain exceptions. Also, pursuant to the terms of the Purchase Agreement, the Purchasers have certain rights to participate in subsequent issuances of the Company's securities during the 6 month period following the date of the Purchase Agreement, subject to certain exceptions.

The foregoing summary of the Purchase Agreement is qualified in its entirety by the full text of the Purchase Agreement, the form of which is filed herewith as Exhibit 99.2 and incorporated by reference into this Item 6.

ITEM 7. MATERIAL TO BE FILED AS EXHIBITS

Exhibit 99.1 Joint Filing Agreement (filed herewith).

Exhibit 99.2 Form of Securities Purchase Agreement dated as of March 16, 2022 by and among the Issuer and the purchasers thereto (incorporated by reference to Exhibit 10.1 of the Issuer's Current Report on Form 8-K filed with the Securities and Exchange Commission on March 16, 2022).

SIGNATURE

After reasonable inquiry and to the best of its knowledge and belief, the undersigned certifies that the information set forth in this Statement is true, complete and correct.

Dated: March 18, 2022

FLAGSHIP VENTURELABS IV, LLC

By: Flagship Ventures Fund IV, L.P.

By: Flagship Ventures Fund IV General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND IV, L.P.

By: Flagship Ventures Fund IV General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND IV-Rx, L.P.

By: Flagship Ventures Fund IV General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND IV GENERAL PARTNER
LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND 2007, L.P.

By: Flagship Ventures 2007 General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES 2007 GENERAL PARTNER LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES OPPORTUNITIES FUND I, L.P.

By: Flagship Ventures Opportunities Fund I General
Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES OPPORTUNITIES FUND I
GENERAL PARTNER LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

/s/ Noubar B. Afeyan, Ph.D.

NOUBAR B. AFEYAN, PH.D.

CUSIP No. 05454B105

JOINT FILING AGREEMENT

The persons below hereby agree that the Schedule 13D to which this agreement is attached as an exhibit, as well as all future amendments to such Schedule 13D, shall be filed jointly on behalf of each of them. This agreement is intended to satisfy the requirements of Rule 13d-1(k)(1)(iii) under the Securities Exchange Act of 1934.

Dated: March 18, 2022

FLAGSHIP VENTURELABS IV, LLC

By: Flagship Ventures Fund IV, L.P.

By: Flagship Ventures Fund IV General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND IV, L.P.

By: Flagship Ventures Fund IV General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND IV-Rx, L.P.

By: Flagship Ventures Fund IV General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND IV GENERAL PARTNER
LLCBy: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES FUND 2007, L.P.

By: Flagship Ventures 2007 General Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES 2007 GENERAL PARTNER LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES OPPORTUNITIES FUND I, L.P.

By: Flagship Ventures Opportunities Fund I General
Partner LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

FLAGSHIP VENTURES OPPORTUNITIES FUND I
GENERAL PARTNER LLC

By: /s/ Noubar B. Afeyan, Ph.D.

Name: Noubar B. Afeyan, Ph.D.

Title: Manager

/s/ Noubar B. Afeyan, Ph.D.

NOUBAR B. AFEYAN, PH.D.