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UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

SCHEDULE 13D/A

Under the Securities Exchange Act of 1934  
(Amendment No. 2)\*

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**ARS Pharmaceuticals, Inc.**

(Name of Issuer)

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**Common stock, \$0.0001 par value per share**

(Title of Class of Securities)

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**82835W 10 8**

(CUSIP Number)

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**RA Capital Management, L.P.  
200 Berkeley Street, 18th Floor  
Boston, MA 02116  
Attn: Peter Kolchinsky  
Telephone: 617.778.2500**

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

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**March 27, 2024**

(Date of Event Which Requires Filing of this Statement)

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), check the following box.

**Note:** Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See Rule 13d-7 for other parties to whom copies are to be sent.

\* 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).

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1. Names of Reporting Persons

**RA Capital Management, L.P.**

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2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

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3. SEC Use Only

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4. Source of Funds (See Instructions)

**AF**

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5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**Delaware**

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7. Sole Voting Power

**0**

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Number of  
Shares

8. Shared Voting Power

Beneficially  
Owned by  
Each

**10,860,977**

---

9. Sole Dispositive Power

Reporting  
Person With

**0**

---

10. Shared Dispositive Power

**10,860,977**

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11. Aggregate Amount Beneficially Owned by Each Reporting Person

**10,860,977**

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12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

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13. Percent of Class Represented by Amount in Row (11)

**11.3%**

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14. Type of Reporting Person (See Instructions)

**IA, PN**

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1. Names of Reporting Persons

**Peter Kolchinsky**

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2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

---

3. SEC Use Only

---

4. Source of Funds (See Instructions)

**AF**

---

5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

---

6. Citizenship or Place of Organization

**United States**

---

7. Sole Voting Power

**0**

---

Number of  
Shares  
Beneficially  
Owned by  
Each  
Reporting  
Person With

8. Shared Voting Power

**10,860,977**

---

9. Sole Dispositive Power.

**0**

---

10. Shared Dispositive Power

**10,860,977**

---

11. Aggregate Amount Beneficially Owned by Each Reporting Person

**10,860,977**

---

12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

---

13. Percent of Class Represented by Amount in Row (11)

**11.3%**

---

14. Type of Reporting Person (See Instructions)

**HC, IN**

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1. Names of Reporting Persons

**Rajeev Shah**

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2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

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3. SEC Use Only

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4. Source of Funds (See Instructions)

**AF**

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5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**United States**

---

7. Sole Voting Power

**0**

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Number of  
Shares  
Beneficially  
Owned by  
Each  
Reporting  
Person With

8. Shared Voting Power

**10,860,977**

---

9. Sole Dispositive Power

**0**

---

10. Shared Dispositive Power

**10,860,977**

---

11. Aggregate Amount Beneficially Owned by Each Reporting Person

**10,860,977**

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12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

---

13. Percent of Class Represented by Amount in Row (11)

**11.3%**

---

14. Type of Reporting Person (See Instructions)

**HC, IN**

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1. Names of Reporting Persons

**RA Capital Healthcare Fund, L.P.**

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2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

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3. SEC Use Only

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4. Source of Funds (See Instructions)

**WC**

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5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**Delaware**

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7. Sole Voting Power

**0**

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Number of  
Shares

8. Shared Voting Power

Beneficially  
Owned by  
Each

**9,958,073**

---

9. Sole Dispositive Power

Reporting  
Person With

**0**

---

10. Shared Dispositive Power

**9,958,073**

---

11. Aggregate Amount Beneficially Owned by Each Reporting Person

**9,958,073**

---

12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

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13. Percent of Class Represented by Amount in Row (11)

**10.3%**

---

14. Type of Reporting Person (See Instructions)

**PN**

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## Item 1. Security and Issuer

Item 1 of the Statement is hereby amended and supplemented as follows:

This Amendment No. 2 (this “Amendment No. 2” or this “Schedule 13D/A”) amends and supplements the statement on the Schedule 13D originally filed with the Securities and Exchange Commission (the “SEC”) on August 31, 2023 and amended on September 25, 2023 (the “Statement”), filed by RA Capital Management, L.P., Dr. Kolchinsky, Mr. Shah, and RA Capital Healthcare Fund, L.P. with respect to the common stock, \$0.0001 par value per share (the “Common Stock”), of ARS Pharmaceuticals, Inc., a Delaware corporation (the “Issuer”). Unless otherwise defined herein, capitalized terms used in this Amendment No. 2 shall have the meanings ascribed to them in the Statement. Unless amended or supplemented below, the information in the Statement remains unchanged.

## Item 2. Identity and Background

Item 2 of the Statement is hereby amended and restated in its entirety to read as follows:

- (a) This Schedule 13D/A is being filed on behalf of RA Capital Management, L.P. (“RA Capital”), Peter Kolchinsky, Rajeev Shah, and RA Capital Healthcare Fund, L.P. (the “Fund”). RA Capital, Dr. Kolchinsky, Mr. Shah and the Fund are collectively referred to herein as the “Reporting Persons.” The agreement among the Reporting Persons to file this Schedule 13D/A jointly in accordance with Rule 13d-1(k) of the Securities Exchange Act of 1934, as amended, is attached hereto as Exhibit 1.

The Reporting Persons ownership of the Issuer’s securities includes (i) 9,958,073 shares of Common Stock directly held by the Fund; and (ii) 902,904 shares of Common Stock directly held by the RA Capital Nexus Fund II, L.P. (the “Nexus Fund II”).

RA Capital Healthcare Fund GP, LLC is the general partner of the Fund and RA Capital Nexus Fund II GP, LLC is the general partner of the Nexus Fund II. The general partner of RA Capital is RA Capital Management GP, LLC, of which Dr. Kolchinsky and Mr. Shah are the controlling persons. RA Capital serves as investment adviser for each of the Fund and the Nexus Fund II and may be deemed a beneficial owner, for purposes of Section 13(d) of the Securities Exchange Act of 1934 (the “Act”), of any securities of the Issuer held by the Fund or the Nexus Fund II. Each of the Fund and the Nexus Fund II has delegated to RA Capital the sole power to vote and the sole power to dispose of all securities held in its portfolio, including the shares of the Issuer’s Common Stock reported herein. Because each of the Fund and the Nexus Fund II has divested itself of voting and investment power over the reported securities it holds and may not revoke that delegation on less than 61 days’ notice, each of the Fund and the Nexus Fund II disclaims beneficial ownership of the securities it holds for purposes of Section 13(d) of the Act and therefore disclaims any obligation to report ownership of the reported securities under Section 13(d) of the Act. As managers of RA Capital, Dr. Kolchinsky and Mr. Shah may be deemed beneficial owners, for purposes of Section 13(d) of the Act, of any securities of the Issuer beneficially owned by RA Capital. RA Capital, Dr. Kolchinsky, and Mr. Shah disclaim beneficial ownership of the securities reported in this Schedule 13D/A other than for the purpose of determining their obligations under Section 13(d) of the Act, and the filing of this Schedule 13D/A shall not be deemed an admission that either RA Capital, Dr. Kolchinsky, or Mr. Shah is the beneficial owner of such securities for any other purpose.

- (b) The address of the principal business office of each of the Reporting Persons is 200 Berkeley Street, 18th Floor, Boston, MA 02116.
- (c) The Fund is a private investment vehicle. RA Capital provides investment management services to the Fund and the Nexus Fund II. The principal occupation of each of Dr. Kolchinsky and Mr. Shah is investment management.
- (d) During the last five years, none of the Reporting Persons has been convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors).
- (e) During the last five years, none of the Reporting Persons has been a party to a civil proceeding of a judicial or administrative body of competent jurisdiction and as a result of such proceeding was or is subject to a judgment, decree of final order enjoining future violations of, or prohibiting or mandating activities subject to, federal or state securities laws or finding any violation with respect to such laws.
- (f) See Item 6 of the cover pages.
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**Item 3. Source and Amount of Funds or Other Consideration**

Item 3 of the Statement is hereby amended and supplemented as follows:

The Fund acquired additional securities of the Issuer in the transactions described in Schedule A of this Amendment No. 2 for an aggregate purchase price of \$13 million. The purchase was for cash and was funded by the working capital of the Fund.

**Item 5. Interest in Securities of the Issuer**

Item 5 of the Statement is hereby amended and restated in its entirety to read as follows:

- (a) The information set forth in rows 11 and 13 of the cover pages to this Schedule 13D/A is incorporated by reference. The percentage set forth in row 13 is based on 96,501,554 shares of Common Stock outstanding as of March 18, 2024, as reported in the Issuer's Annual Report on Form 10-K filed with the Securities and Exchange Commission on March 21, 2024.
  - (b) The information set forth in rows 7 through 10 of the cover pages to this Schedule 13D/A and Item 2 above is incorporated by reference.
  - (c) Schedule A sets forth all transactions with respect to the shares of Common Stock effected during the past sixty days by any Reporting Person and is incorporated herein by reference.
  - (d) No person (other than the Reporting Persons) is known to have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, the shares of Common Stock subject to this Schedule 13D/A.
  - (e) Not applicable.
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**SIGNATURES**

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

Dated: March 29, 2024

**RA CAPITAL MANAGEMENT, L.P.**

By: /s/ Peter Kolchinsky  
Name: Peter Kolchinsky  
Title: Authorized Signatory

**PETER KOLCHINSKY**

/s/ Peter Kolchinsky

**RAJEEV SHAH**

/s/ Rajeev Shah

**RA CAPITAL HEALTHCARE FUND, L.P.**

By: RA Capital Healthcare Fund GP, LLC  
Its: General Partner

By: /s/ Peter Kolchinsky  
Name: Peter Kolchinsky  
Title: Manager

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## SCHEDULE A

Transaction	Purchaser	Date	No. Shares	Price
Open Market Purchase	Fund	03/25/24	437,600	\$9.06(1)
Open Market Purchase	Fund	03/26/24	457,745	\$9.55(2)
Open Market Purchase	Fund	03/27/24	505,954	\$9.79(3)

- (1) These transactions were executed in multiple trades at prices ranging from \$8.89 to \$9.30 per share; the price reported above reflects the weighted average purchase price. The Reporting Persons hereby undertake, upon request, to provide full information to the staff of the Securities and Exchange Commission, the Issuer, or a security holder of the Issuer regarding the number of shares and prices at which these transactions, and all other transactions reported in this Schedule 13D/A, were effected.
- (2) These transactions were executed in multiple trades at prices ranging from \$9.25 to \$10.00 per share; the price reported above reflects the weighted average purchase price. The Reporting Persons hereby undertake, upon request, to provide full information to the staff of the Securities and Exchange Commission, the Issuer, or a security holder of the Issuer regarding the number of shares and prices at which these transactions, and all other transactions reported in this Schedule 13D/A, were effected.
- (3) These transactions were executed in multiple trades at prices ranging from \$9.75 to \$9.95 per share; the price reported above reflects the weighted average purchase price. The Reporting Persons hereby undertake, upon request, to provide full information to the staff of the Securities and Exchange Commission, the Issuer, or a security holder of the Issuer regarding the number of shares and prices at which these transactions, and all other transactions reported in this Schedule 13D/A, were effected.
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**JOINT FILING AGREEMENT**

This Joint Filing Agreement, dated as of March 29, 2024, is by and among RA Capital Management, L.P., Peter Kolchinsky, Rajeev Shah, and RA Capital Healthcare Fund, L.P. (the foregoing are collectively referred to herein as the “Filers”).

Each of the Filers may be required to file with the United States Securities and Exchange Commission a statement on Schedule 13G and/or 13D with respect to Common Stock, par value \$0.0001 per share of ARS Pharmaceuticals, Inc. beneficially owned by them from time to time.

Pursuant to and in accordance with Rule 13(d)(1)(k) promulgated under the Securities Exchange Act of 1934, as amended, the Filers hereby agree to file a single statement on Schedule 13G and/or 13D (and any amendments thereto) on behalf of each of such parties, and hereby further agree to file this Joint Filing Agreement as an exhibit to such statement, as required by such rule.

This Joint Filing Agreement may be terminated by any of the Filers upon one week’s prior written notice or such lesser period of notice as the Filers may mutually agree.

Executed and delivered as of the date first above written.

**RA CAPITAL MANAGEMENT, L.P.**

By: /s/ Peter Kolchinsky  
Name: Peter Kolchinsky  
Title: Authorized Signatory

**PETER KOLCHINSKY**

/s/ Peter Kolchinsky

**RAJEEV SHAH**

/s/ Rajeev Shah

**RA CAPITAL HEALTHCARE FUND, L.P.**

By: RA Capital Healthcare Fund GP, LLC  
Its: General Partner

By: /s/ Peter Kolchinsky  
Name: Peter Kolchinsky  
Title: Manager

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