



# **The Quarterly Rx: 2024 U.S. Biopharma Recap**

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# 2024 U.S. Biopharma Market Summary – Key Takeaways

2024 was a volatile year for the biopharma sector as investors navigated Fed policy, mixed clinical updates, and the outcome of the U.S. presidential election. However, the stage remains set in 2025 for the sector to continue its recovery



## *Job's Not Finished*

- Major U.S. biopharma indices ended the year flat following a volatile year dominated by macroeconomic noise
- The Fed initiated its highly anticipated easing cycle in Q3 while the U.S. presidential election was seen as a clearing event for the sector
- Investors currently anticipate two additional rates cuts in 2025, although concerns are growing of another Fed pivot if inflation does not cool
- Overall biopharma financing (privates, IPOs, secondaries) rebounded significantly in 2024, representing the most active year by proceeds raised since 2021; M&A activity, although robust, remained concentrated on the private side and on smaller transactions



## *IDK About RFK*

- Significant noise post U.S. presidential election in the wake of Trump's nominations for key healthcare positions, most notably Robert F. Kennedy as HHS Secretary and Dr. Marty Makary as FDA Commissioner
- Expected U.S. FTC leadership changes, with the nomination of Andrew Ferguson as FTC Chair, largely viewed a positive for biopharma M&A and M&A activity broadly
- The biopharma sector remains in "wait and see" mode to better understand the nominees' agendas and the potential impact on the sector



## *Life, Liberty and the Pursuit of the IPO*

- Total proceeds raised across private financing this year surpassed 2023 levels, totaling \$24.4 billion across 270 deals; notably, average deal size elevated at \$91 million and asset-first approach remained in vogue with 70% of Series B+ rounds for clinical-stage companies
- "Crossover" activity made a comeback in 2024, with 13 financings announced for a total proceeds of \$2.1 billion, as a reopening IPO market lured public investors back into private financings
- IPO activity received a shot in the arm with seven listings since September raising \$1.7 billion in total proceeds; while initial aftermarket performance was positive, 71% (5/7) are trading below issue price as recent clinical setbacks have increased investor jitters for the asset class



## *Speak Softly and Carry a Big Stick in the Public Markets*

- Secondary activity (FOs, PIPEs, RD) in 2024 surpassed total proceeds in 2021, with continued trend towards larger financings (median proceeds raised of \$88 million and 30% of secondaries raising more than \$200 million in proceeds)
- Q4 2024 proved to be a very busy clinical catalyst calendar, however with mixed results; nonetheless clinical catalysts continue to drive SMID-cap secondary activity with 8 of the top 10 movers raising equity off data and 45% of secondary activity this quarter catalyzed by clinical data
- Issuers increasingly leveraged confidential marketing in 2024, including sharing MNPI through NDAs, and utilized unique structures including milestone-based tranche financings to fund clinical programs



## *Make M&A Great Again*

- Alpine/Vertex was the largest M&A deal of the year at \$4.9 billion, making 2024 the first year since 2012 that the sector has not had a \$10b+ deal and the first year since before 2000 without a \$5b+ deal
- Private company acquisitions dominated the headlines in 2024 as dual-tracked M&A/financing processes became the norm, with 15 total deals announced for over \$500 million in total deal value
- While partnering volume increased in 2024 compared to 2023, total deal value and upfront payments decreased slightly, bringing in \$11.3 billion in upfront payments and \$187 billion in total deal value for licensors
- China became an important source for deal activity as the U.S. biopharma ecosystem looked towards the East for assets

## 2025 Predictions<sup>(1)</sup>

- Major Biotech Indices will Close Modestly Up**
- Increase in "Crossover" Mega-rounds**
- ~30 IPOs as 2025 Welcomes a Wave of High-Quality Private Companies**
- Additional VC NewCo Formation with In-Licensed China Assets**
- Meaningful Public Company M&A to Return Under New FTC Leadership**
- Given Big Pharma LOEs, Investor & Strategic Focus Will Remain on Larger Indications**



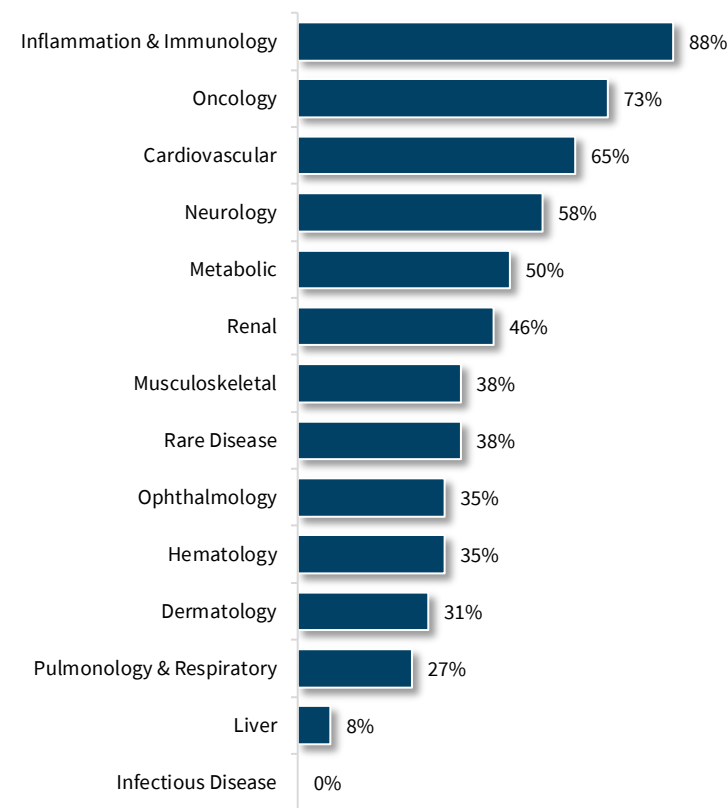
(1) Reflects views of William Blair Investment Banking and Equity Capital Markets teams.

# 2024 Year-End Investor Survey

The therapeutic area and modalities that dominated investor interest in 2024 are expected to remain in vogue in the new year; majority of investors expect the XBI to close modestly up in 2025

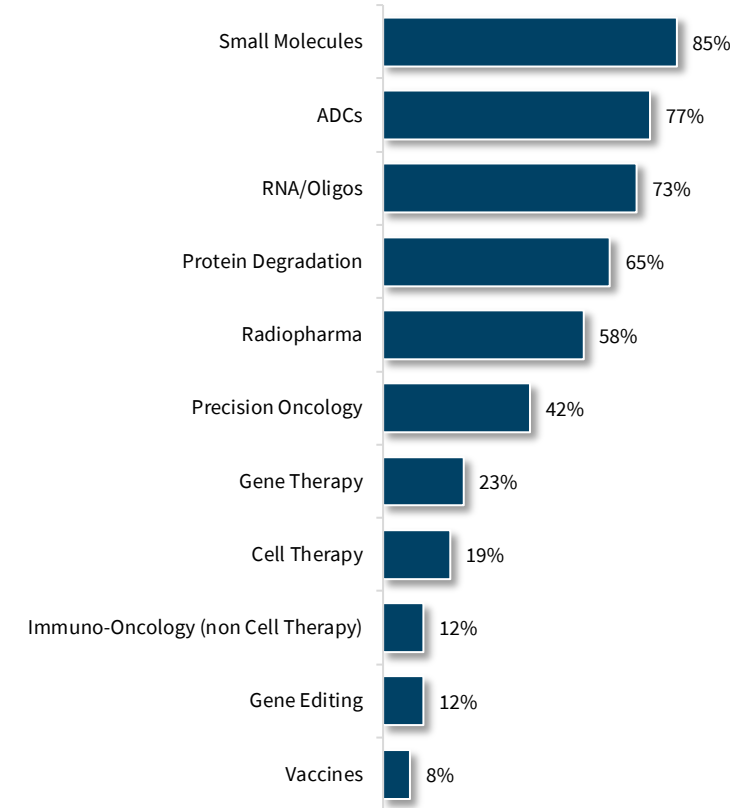
## I&I and Oncology Remain Most Favored Therapeutic Areas; Increased Interest in Cardio and Neuro Compared to Mid-Year

% of Respondents Indicating Interest in the Below Indications



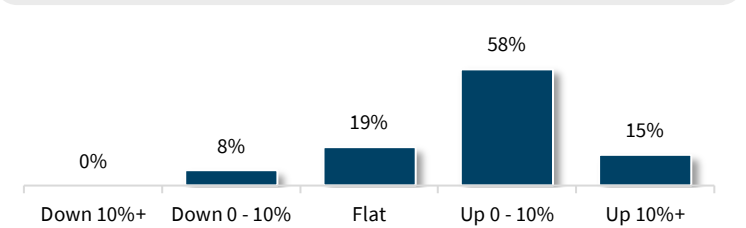
## Small Molecules are Favored Modality Despite IRA Headwinds; Greater Interest in Protein Degraders Compared to Mid-Year

% of Respondents Indicating Interest in the Below Modalities

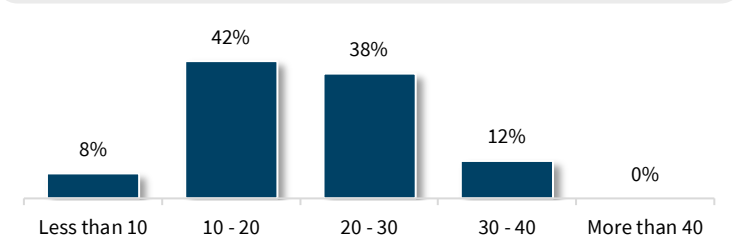


## Despite Market Headwinds to Close Out the Year, Investors Remain Optimistic for 2025

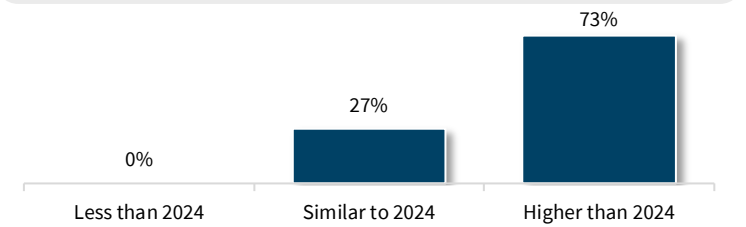
### Current Expectation for XBI Performance in 2025?



### How Many IPOs Do You Expect in 2025?



### What Are Your Expectations for Public M&A in 2025?

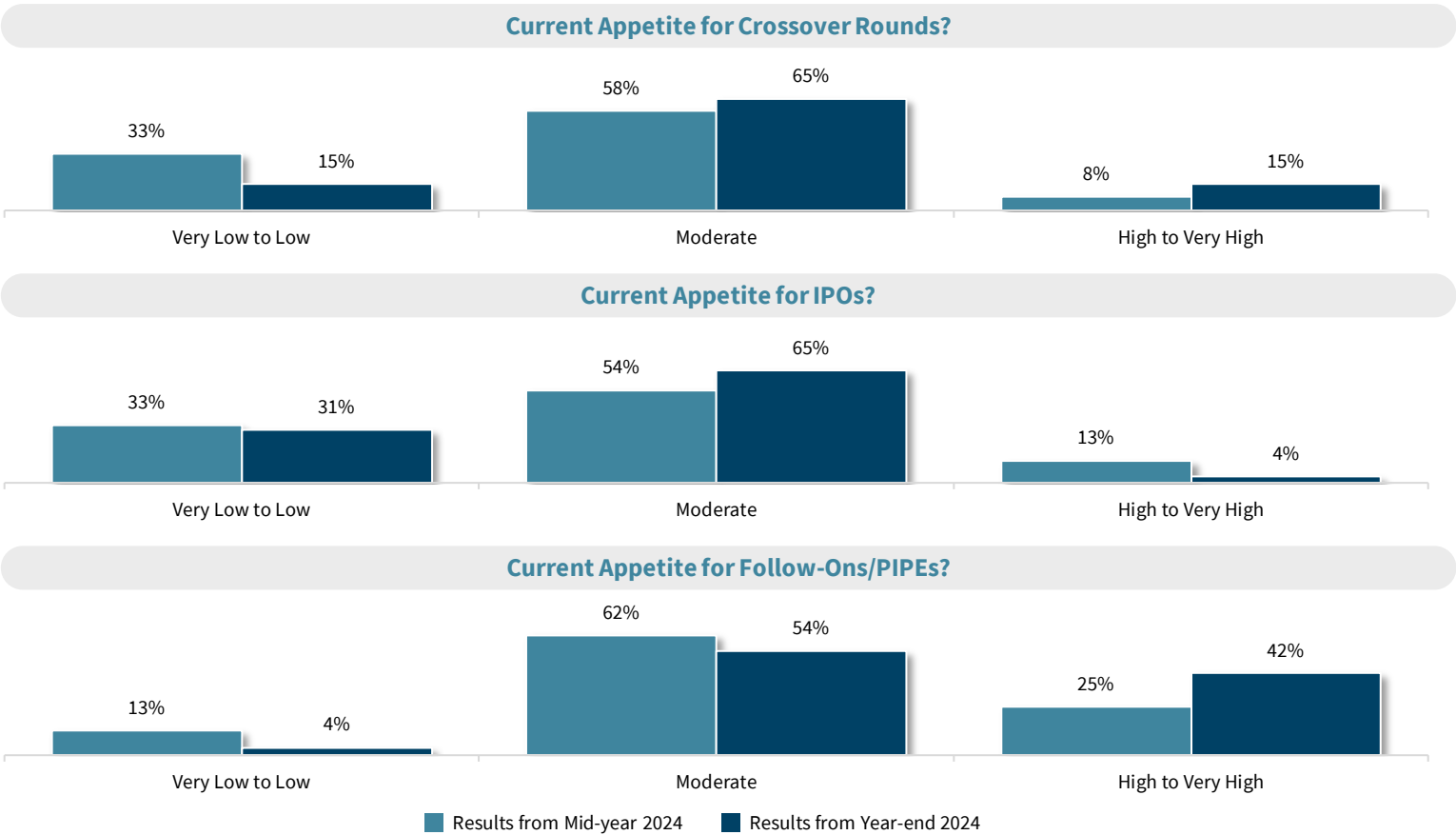


Note: Survey results based on responses gathered from individual investors at 24 unique funds which included mutual funds, long/short hedge funds, healthcare specialist funds, generalist long-only funds, and venture capital firms. Survey conducted the week of December 16<sup>th</sup>, 2024.

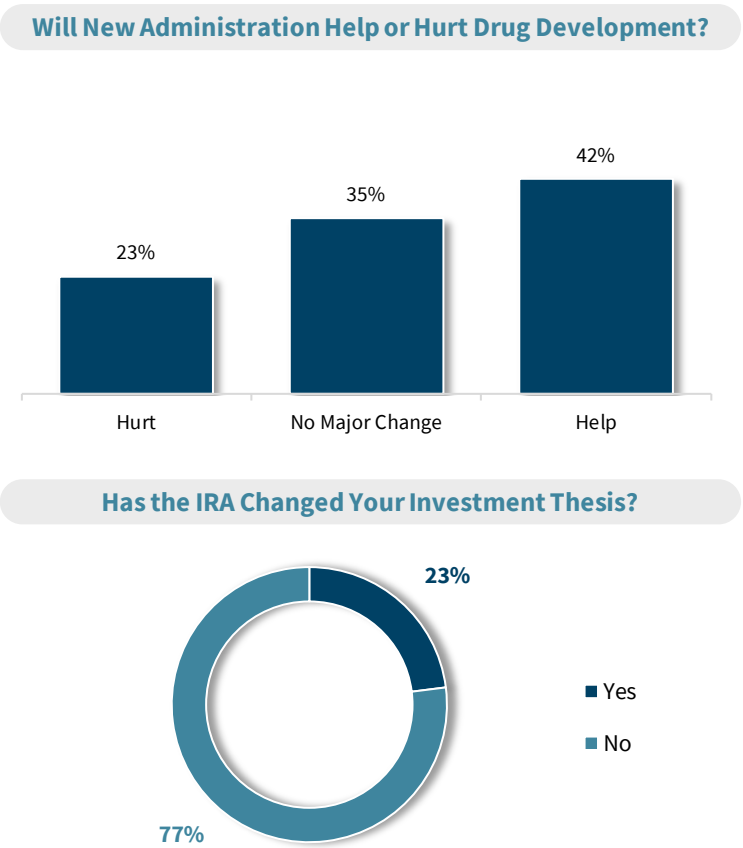
# 2024 Year-End Investor Survey (cont'd)

Despite macroeconomic headwinds and clinical setbacks to close out 2024, investors remain positively inclined regarding new financing opportunities, especially in the public markets

## Improving Investor Appetite for Crossovers and Continued Elevated Interest in Follow-on Financings, However Greater Investor Scrutiny Regarding IPOs Expected to Persist at Least through the First Half of 2025



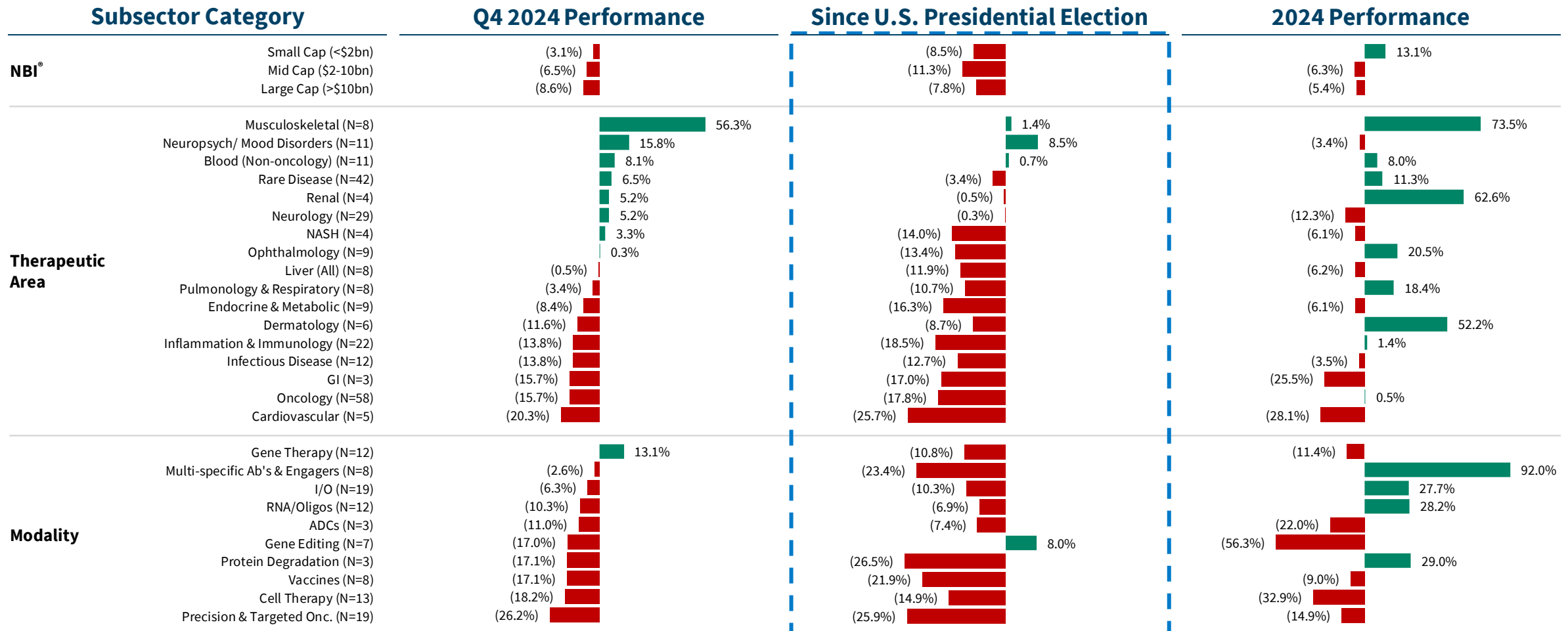
## No Major Concerns Regarding Political/Regulatory Headwinds to the Biopharma Sector





# NBI® Subsector Market Performance

- NBI® pulled back post U.S. presidential election, despite a strong start to quarter; small cap outperformed large cap in 2024
- Multi-specifics and musculoskeletal were the best-performing modality and therapeutic area, respectively, this year, driven by Avidity, Janux, and Summit's outperformance



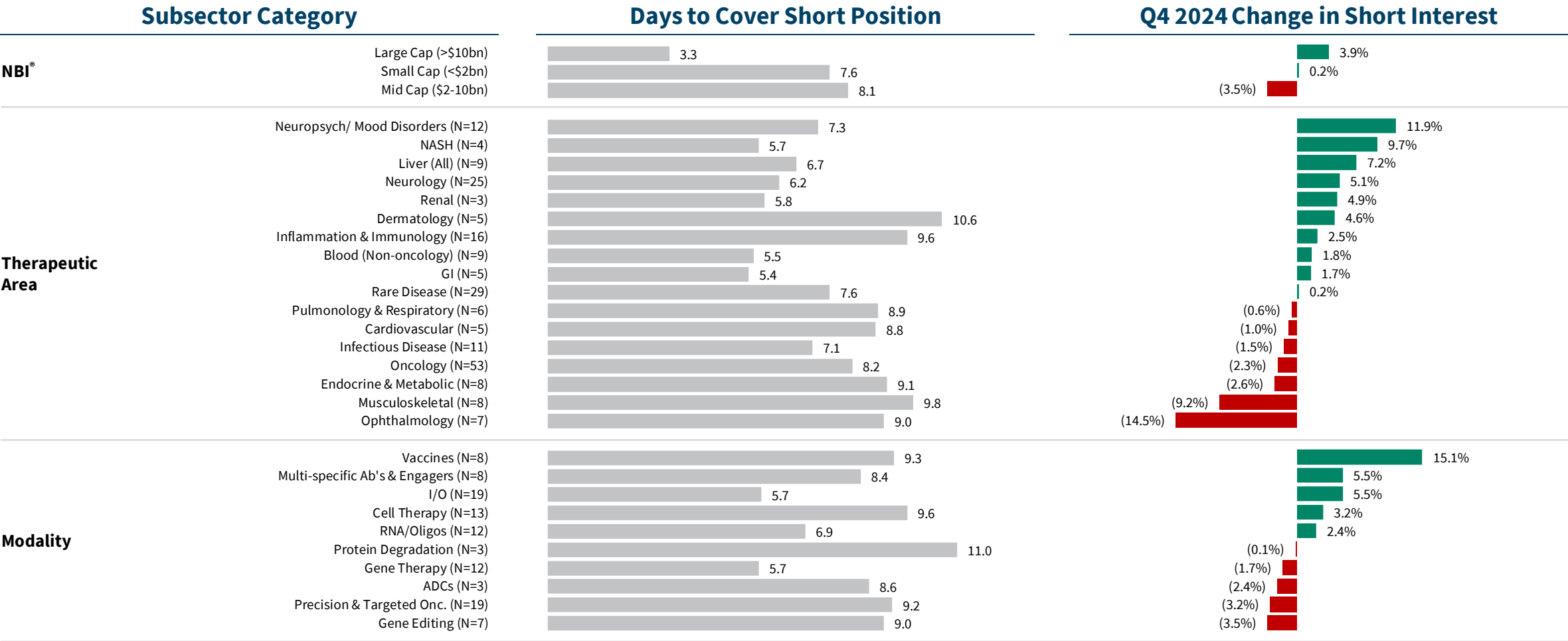
Note: Market capitalizations are as of the first trading day of each graph's performance period.

Subsector indices are equally weighted and averaged. Includes NBI® constituents' as of December 31, 2024, and excludes non-therapeutic focused companies in the NBI®.

Source: FactSet and William Blair internal reporting. Therapeutic area and modality based on William Blair analysis.

# NBI® Subsector Q4 2024 Short Interest Trends

Short interest changes were mixed across market caps and most therapeutic areas, but the significant uptick in short interest for vaccine companies underscores how investors are anticipating the potential impact of RFK as HHS Secretary

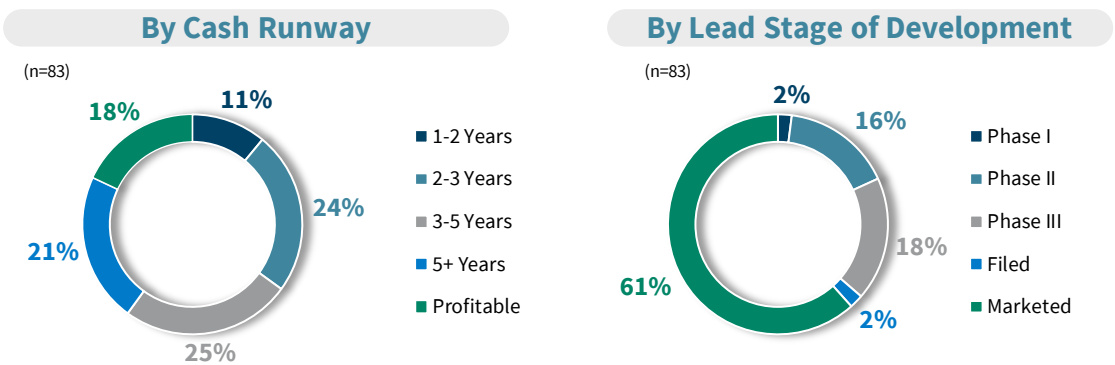


Note: NBI® constituents are equally weighted and averaged. Includes NBI® constituents' as of December 31, 2024, and excludes non-therapeutic focused companies in the NBI®. Market capitalizations are as of the first trading day of the quarter. Days to cover short position calculated as total number of shares shorted / 30-day ADTV. Source: FactSet, CapIQ, and William Blair internal reporting. Days to cover short position as of 12/15/24 settlement date. Short Interest change measured from 9/30/24 to 12/15/24 settlement dates.

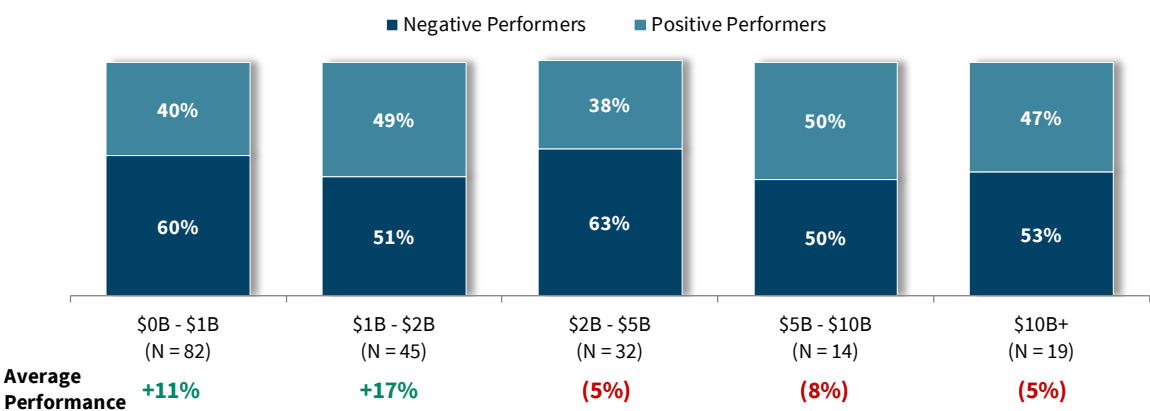
# Phenotype of Positive NBI® Performers in 2024

- In 2024, 43% (83/192) of biopharma companies in the NBI® ended the year in positive territory, driven by positive late-stage clinical catalysts and commercial successes from recent first-time launchers Arcutis, Tarsus, Harrow and Verona
- Standouts included bispecific leaders Summit and Janux, as well as Avidity and Wave with advancements in RNA therapies

## Breakdown of Positive Performers



## NBI® Performance by Market Cap<sup>(1)</sup>



## Top 15 Performers of the NBI®

| (\$ in millions)     |                              |                     |                    |                     |                      |                                 |
|----------------------|------------------------------|---------------------|--------------------|---------------------|----------------------|---------------------------------|
| Company              | Area of Focus                | 2024 Share Price %Δ | Current Market Cap | 2024 Market Cap \$Δ | Stage of Development | Modality                        |
| Summit Therapeutics  | Oncology                     | +584%               | \$13,160           | \$11,331            | Phase III            | Multi-specific Antibody/Engager |
| Janux                | Oncology                     | +399%               | \$2,810            | \$2,315             | Phase I/II           | Multi-specific Antibody/Engager |
| Arcutis              | Dermatology                  | +331%               | \$1,630            | \$1,326             | Marketed             | Small Molecule                  |
| ADMA Biologics       | Infectious Disease           | +279%               | \$4,054            | \$3,033             | Marketed             | Antibody                        |
| Avidity              | Musculoskeletal/Rare Disease | +221%               | \$3,470            | \$2,799             | Phase III            | Oligonucleotide                 |
| Harrow               | Ophthalmology                | +200%               | \$1,195            | \$802               | Marketed             | Small Molecule                  |
| vera therapeutics    | I&I/Renal                    | +175%               | \$2,678            | \$1,995             | Phase III            | Antibody                        |
| Tarsus               | Ophthalmology                | +173%               | \$2,117            | \$1,446             | Marketed             | Small Molecule                  |
| uniQure              | Hematology/Neurology         | +161%               | \$861              | \$537               | Marketed             | Gene Therapy                    |
| WAVE Life Sciences   | Neurology/Rare Disease       | +145%               | \$1,887            | \$1,285             | Phase II             | Oligonucleotide/RNA Editing     |
| Edgewise             | Musculoskeletal/Rare Disease | +144%               | \$2,528            | \$1,834             | Pivotal Phase II     | Small Molecule                  |
| aclaris therapeutics | I&I/Dermatology              | +136%               | \$265              | \$191               | Phase II             | Small Molecule                  |
| Verona Pharma        | Respiratory                  | +134%               | \$3,800            | \$2,092             | Marketed             | Small Molecule                  |
| Scholar Rock         | Musculoskeletal              | +130%               | \$4,046            | \$2,690             | Phase III            | Antibody                        |
| insmed               | Respiratory                  | +123%               | \$12,351           | \$7,918             | Marketed             | Small Molecule                  |

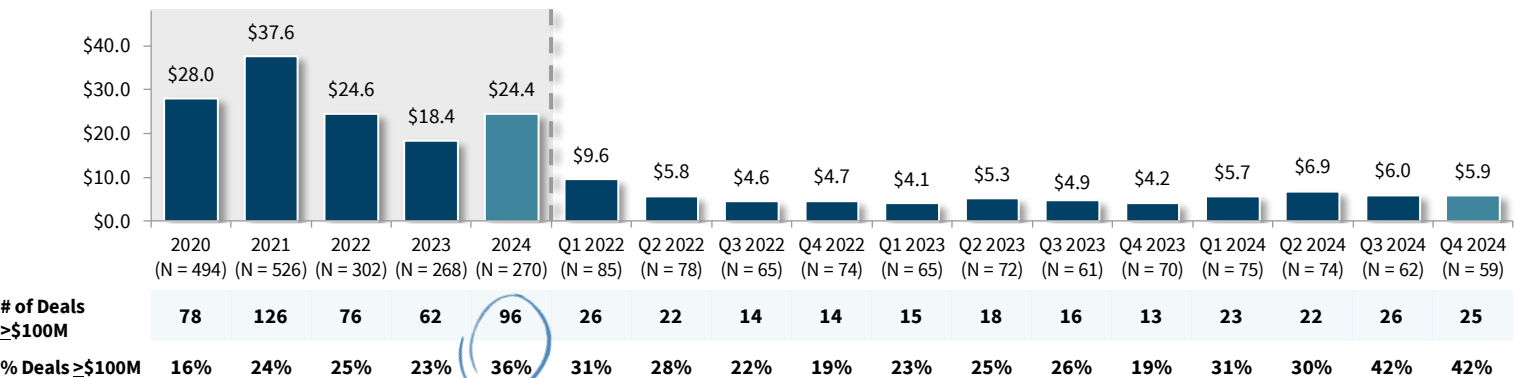
Source: CapIQ, PitchBook Data, Inc., FactSet, and SEC Filings as of December 31, 2024.  
Note: NBI® constituents are equally weighted. Includes NBI® constituents' as of December 19, 2024 prior to annual reconstitution and excludes non-therapeutic focused companies in the NBI®.  
(1) Market capitalization as of first trading day of 2024.

# Biopharma Private Financings Trends

- 270 transactions in 2024 raised total proceeds of over \$24 billion
- 36% of private financings raised \$100+ million in proceeds
- 70% (106/152) of Series B or later financings for clinical-stage companies

## Total Proceeds and Deal Volume

(\$ in billions)



“Fewer but larger” was the dominant theme in the private financing market in 2024

## Analysis by Series Round

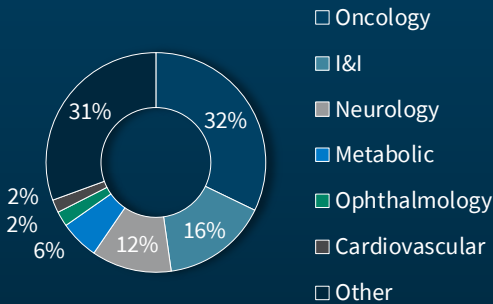
(\$ in millions, deal size represents mean, includes extension rounds)

| Series Round | 2022      |              |               |               | 2023      |              |               |               | 2024      |              |               |               |
|--------------|-----------|--------------|---------------|---------------|-----------|--------------|---------------|---------------|-----------|--------------|---------------|---------------|
|              | Deal Size | Series Count | % Ext. Rounds | % Clin. Stage | Deal Size | Series Count | % Ext. Rounds | % Clin. Stage | Deal Size | Series Count | % Ext. Rounds | % Clin. Stage |
| Series A     | \$74      | 155          | 10%           | 19%           | \$56      | 120          | 26%           | 32%           | \$89      | 118          | 20%           | 33%           |
| Series B     | \$82      | 93           | 12%           | 42%           | \$68      | 95           | 25%           | 48%           | \$82      | 86           | 27%           | 62%           |
| Series C     | \$100     | 37           | 8%            | 57%           | \$100     | 33           | 12%           | 79%           | \$96      | 45           | 9%            | 82%           |
| Series D+    | \$105     | 17           | 0%            | 82%           | \$90      | 20           | 5%            | 85%           | \$123     | 21           | 0%            | 76%           |
| All Rounds   | \$81      | 302          | 10%           | 34%           | \$68      | 268          | 22%           | 47%           | \$91      | 270          | 20%           | 54%           |

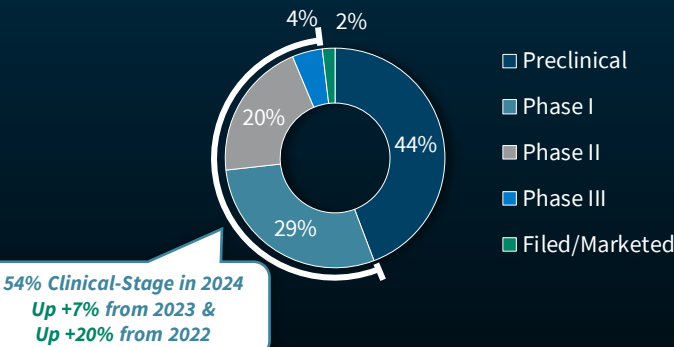
Source: CapIQ, PitchBook Data, Inc., and SEC Filings as of December 31, 2024.  
Note: Includes private financing deals and extension rounds with a minimum disclosed deal size of \$5M, involving at least one U.S./EU healthcare investor.  
Excludes seed rounds. Ext = Extensions.

## 2024 Analysis by Therapeutic Area and Stage

### Therapeutic Area



### Stage of Development
































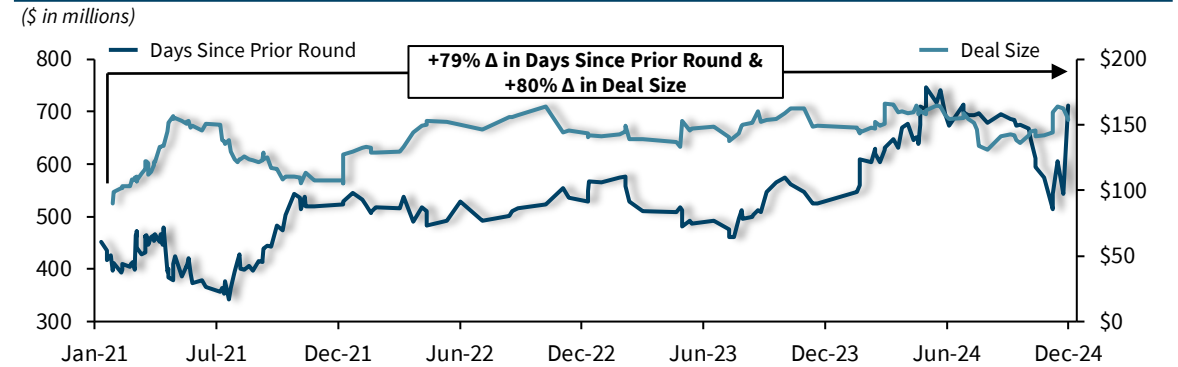
# Biopharma Crossover Financing Trends

Increased appetite from crossover funds to deploy capital as the IPO market reopens with every quarter in 2024 seeing double-digit “crossover” activity – 13 deals announced raising \$2.1 billion in Q4 2024, bringing 2024 to \$7.5 billion in total proceeds

## Top 10 Largest Crossovers of 2024

| Deal Date | Company  | Series   | Deal Size | Lead Investors  | Days Since Prior Round | Stage       | Modality                 | Therapeutic Area                     |
|-----------|--|----------|-----------|---|------------------------|-------------|--------------------------|--------------------------------------|
| 03/21/24  |  mirador THERAPEUTICS           | Series A | \$400     |  ARCH VENTURE PARTNERS   | NA                     | Preclinical | Multiple                 | I&I / Fibrosis                       |
| 09/09/24  |  Candi THERAPEUTICS             | Series A | \$370     |  FAIRMOUNT VENTURE<br> TCG<br> venBio<br> venrock | NA                     | Phase I     | Multi-specific / Engager | I&I                                  |
| 07/16/24  |  35:Pharma                      | Series C | \$350     |  FRAZIER LIFE SCIENCES   | 708                    | Preclinical | Small Molecule           | Pulmonary, Metabolic, Cardiovascular |
| 07/16/24  |  CARDURION PHARMA               | Series B | \$260     |  ASCENTA CAPITAL   | 370                    | Phase II    | Small Molecule           | Cardiovascular                       |
| 03/06/24  |  alumis                         | Series C | \$259     |  FORESITE CAPITAL<br> venBio<br> samsara   | 790                    | Phase II    | Small Molecule           | Dermatology / I&I                    |
| 10/21/24  |  SEAPORT THERAPEUTICS           | Series B | \$226     |  GENERAL ATLANTIC  | 195                    | Phase IIb   | Small Molecule           | Neurology                            |
| 05/21/24  |  ALTRUBIO                      | Series B | \$225     |  BVF PARTNERS L.P.  | 1,132                  | Phase IIa   | Antibody                 | I&I / Gastro-enterology              |
| 11/13/24  |  Metsera                      | Series B | \$215     |  venrock<br> WELLINGTON MANAGEMENT*   | 79                     | Phase II    | Protein                  | Metabolic                            |
| 06/06/24  |  itm<br>PASSION FOR PRECISION | Series D | \$204     |  TEMASEK   | 367                    | Phase III   | Radiopharma              | Oncology                             |
| 05/02/24  |  bridgebio Oncology           | Series A | \$200     |  Cormorant Asset Management<br> OMEGA FUNDS   | NA                     | Phase I     | Small Molecule           | Oncology                             |

## Rolling Average of Last 20 Crossover Deals by<sup>(1)</sup>



## Crossover Deals Analysis

| Quarter | Number of Deals | Median Deal Size | Median Pre-Money | Median Step-Up | Currently Public | Acquired |
|---------|-----------------|------------------|------------------|----------------|------------------|----------|
| Q1 2021 | 33              | \$106            | \$218            | 2.1x           | 26               | 5        |
| Q2 2021 | 19              | \$125            | \$250            | 2.2x           | 7                | 3        |
| Q3 2021 | 21              | \$100            | \$258            | 1.7x           | 9                | 2        |
| Q4 2021 | 8               | \$120            | \$150            | 3.1x           | 2                | 1        |
| Q1 2022 | 10              | \$113            | \$300            | 1.5x           | 2                | 1        |
| Q2 2022 | 7               | \$125            | \$145            | 1.8x           | 1                | 0        |
| Q3 2022 | 4               | \$146            | \$370            | 1.2x           | 2                | 1        |
| Q4 2022 | 3               | \$149            | \$129            | 2.1x           | 1                | 1        |
| Q1 2023 | 9               | \$135            | \$150            | 1.3x           | 4                | 2        |
| Q2 2023 | 6               | \$150            | \$389            | 1.7x           | 2                | 1        |
| Q3 2023 | 12              | \$153            | \$234            | 1.3x           | 4                | 1        |
| Q4 2023 | 6               | \$141            | \$195            | 0.9x           | 2                | 1        |
| Q1 2024 | 10              | \$160            | \$300            | 0.8x           | 2                | 1        |
| Q2 2024 | 16              | \$126            | \$206            | 1.3x           | 1                | 0        |
| Q3 2024 | 10              | \$135            | \$287            | 1.2x           | 1                | 0        |
| Q4 2024 | 13              | \$135            | \$360            | 1.4x           | 0                | 0        |

Source: CapIQ, PitchBook Data, Inc., and SEC Filings as of December 31, 2024.

Note: Includes crossover rounds for companies that have completed an IPO as well as crossover rounds where the next round of financing will likely be an IPO: either a \$50M+ raise (Series B onwards) or a \$100M+ raise (Series A) with multiple crossover and/or large mutual funds in the syndicate). Lead asset information shown.

(1) 20-deal rolling average of crossover 2021-2024 crossover deals.

# 2024 Biopharma Private Financings Most Active Investors

- Life science specialists ramped up investment, with 38 of the 45 most active investors increasing activity from 2023 to 2024
- Mutual fund interest in private financings rebounded, with Janus, Fidelity, Wellington, and T. Rowe more active this year

| Company                       | Deal Count | Series |    |    |    | Δ '23 Count | % Deals Led | Crossover Count <sup>(1)</sup> | Recent <sup>(2)</sup> Fundraise |
|-------------------------------|------------|--------|----|----|----|-------------|-------------|--------------------------------|---------------------------------|
|                               |            | A      | B  | C  | D+ |             |             |                                |                                 |
| RACAPITAL                     | 39         | 11     | 13 | 12 | 3  | +14         | 26%         | 20                             |                                 |
| orbimed                       | 25         | 8      | 8  | 7  | 2  | +1          | 16%         | 13                             | ✓                               |
| ARCH VENTURE PARTNERS         | 21         | 10     | 4  | 4  | 3  | +3          | 38%         | 7                              | ✓                               |
| NOVO                          | 20         | 10     | 3  | 5  | 2  | +3          | 60%         | 5                              |                                 |
| G/                            | 19         | 11     | 5  | 1  | 2  | +7          | 21%         | 6                              |                                 |
| Forbion.                      | 17         | 5      | 10 | 0  | 2  | +8          | 65%         | 2                              | ✓                               |
| FRAZIER LIFE SCIENCES         | 17         | 6      | 4  | 5  | 2  | +12         | 29%         | 8                              | ✓                               |
| SOFINNOVA INVESTMENTS         | 17         | 8      | 5  | 1  | 3  | (2)         | 47%         | 3                              | ✓                               |
| SURVEYOR                      | 16         | 3      | 8  | 5  | 0  | +6          | 0%          | 6                              |                                 |
| ATLAS VENTURE                 | 15         | 5      | 4  | 6  | 0  | +8          | 33%         | 5                              | ✓                               |
| COMMONWEALTH ASSET MANAGEMENT | 15         | 6      | 4  | 2  | 3  | +2          | 33%         | 8                              | ✓                               |
| DEEP TRACK CAPITAL            | 15         | 4      | 5  | 5  | 1  | +8          | 33%         | 11                             |                                 |
| FORESITE CAPITAL              | 15         | 6      | 4  | 3  | 2  | +10         | 33%         | 7                              | ✓                               |
| Janus Henderson INVESTORS     | 15         | 4      | 3  | 7  | 1  | +9          | 7%          | 13                             |                                 |
| INVUS                         | 15         | 4      | 4  | 5  | 2  | +3          | 7%          | 10                             |                                 |

| Company                | Deal Count | Series |   |   |    | Δ '23 Count | % Deals Led | Crossover Count <sup>(1)</sup> | Recent <sup>(2)</sup> Fundraise |
|------------------------|------------|--------|---|---|----|-------------|-------------|--------------------------------|---------------------------------|
|                        |            | A      | B | C | D+ |             |             |                                |                                 |
| Johnson & Johnson      | 13         | 2      | 3 | 4 | 4  | +5          | 38%         | 2                              |                                 |
| SAMSARA BIOCAPITAL     | 13         | 4      | 3 | 5 | 1  | -           | 15%         | 8                              |                                 |
| LOGOS CAPITAL          | 12         | 2      | 5 | 4 | 1  | +9          | 0%          | 10                             |                                 |
| nextechinvest          | 12         | 2      | 5 | 3 | 2  | +4          | 25%         | 8                              |                                 |
| rtw                    | 12         | 5      | 2 | 3 | 2  | +7          | 25%         | 8                              |                                 |
| venBio.                | 12         | 4      | 5 | 2 | 1  | +10         | 50%         | 6                              | ✓                               |
| PERCEPTIVE ADVISORS    | 11         | 2      | 7 | 2 | 0  | +3          | 18%         | 5                              |                                 |
| THE COLUMN GROUP       | 11         | 7      | 0 | 2 | 2  | +6          | 73%         | 1                              |                                 |
| WELLINGTON MANAGEMENT* | 11         | 2      | 2 | 7 | 0  | +4          | 18%         | 9                              |                                 |
| Fidelity               | 10         | 3      | 3 | 3 | 1  | +3          | 0%          | 10                             |                                 |
| F-PRIME                | 10         | 4      | 5 | 1 | 0  | (1)         | 20%         | 0                              |                                 |
| leaps                  | 10         | 2      | 6 | 0 | 2  | +2          | 10%         | 2                              |                                 |
| MARSHALL WACE          | 10         | 3      | 2 | 4 | 1  | +8          | 0%          | 9                              |                                 |
| NEA                    | 10         | 4      | 3 | 3 | 0  | +6          | 60%         | 3                              | ✓                               |
| sanofi ventures        | 10         | 3      | 5 | 0 | 2  | (3)         | 30%         | 2                              | ✓                               |

| Company                    | Deal Count | Series |   |   |    | Δ '23 Count | % Deals Led | Crossover Count <sup>(1)</sup> | Recent <sup>(2)</sup> Fundraise |
|----------------------------|------------|--------|---|---|----|-------------|-------------|--------------------------------|---------------------------------|
|                            |            | A      | B | C | D+ |             |             |                                |                                 |
| THIRD ROCK VENTURES        | 10         | 6      | 2 | 1 | 1  | +3          | 30%         | 4                              |                                 |
| VERSANT VENTURES           | 10         | 6      | 3 | 1 | 0  | +2          | 40%         | 1                              |                                 |
| andresen.horowitz          | 9          | 3      | 2 | 1 | 3  | +3          | 33%         | 4                              |                                 |
| BVF PARTNERS L.P.          | 9          | 4      | 2 | 3 | 0  | -           | 44%         | 5                              |                                 |
| CATALIO CAPITAL MANAGEMENT | 9          | 4      | 1 | 1 | 3  | (6)         | 22%         | 2                              |                                 |
| SR One                     | 9          | 4      | 0 | 4 | 1  | +2          | 44%         | 3                              | ✓                               |
| Canaan                     | 8          | 0      | 6 | 1 | 1  | -           | 25%         | 0                              | ✓                               |
| DELOSCAPITAL               | 8          | 3      | 3 | 2 | 0  | +7          | 38%         | 4                              |                                 |
| T.RowePrice*               | 8          | 2      | 3 | 3 | 0  | +2          | 0%          | 7                              |                                 |
| TCGX                       | 8          | 2      | 5 | 1 | 0  | +3          | 63%         | 7                              | ✓                               |
| venrock                    | 8          | 4      | 2 | 2 | 0  | +3          | 63%         | 7                              | ✓                               |
| Viking                     | 8          | 3      | 3 | 1 | 1  | +1          | 13%         | 5                              |                                 |
| WOODLINE PLATFORM          | 8          | 2      | 1 | 4 | 1  | +5          | 13%         | 6                              |                                 |
| OMEGA FUNDS                | 7          | 2      | 1 | 3 | 1  | +1          | 14%         | 4                              |                                 |
| VIDA ventures              | 7          | 3      | 3 | 1 | 0  | +2          | 29%         | 4                              |                                 |

Source: CapIQ, PitchBook Data, Inc., FactSet, and SEC Filings as of December 31, 2024.

Note: Includes private financing deals and extension rounds with a minimum disclosed deal size of \$5M, involving at least one U.S./EU healthcare investor. Excludes seed rounds.

(1) Includes crossover rounds for companies that have completed an IPO as well as crossover rounds where the next round of financing will likely be an IPO: either a \$50M+ raise (Series B onwards) or a \$100M+ raise (Series A) with multiple crossover and/or large mutual funds in the syndicate.

(2) Represents new fund raises announced in 2023 and 2024.

(3) Perceptive Advisors includes Xontogeny deals due to IC overlap.

# 2024 New Biopharma Funds Formation

Life sciences specialists continue to secure substantial capital, raising over \$21 billion in new funds this year, including four exceeding \$1 billion

| Investor Name   | Fund Name                                | Close Date | Location             | Fund Size (\$M) | Key Investments <sup>(1)</sup>  |
|---|--|------------|----------------------|-----------------|---|
|  ARCH VENTURE PARTNERS                      | ARCH Venture Fund XIII                   | 9/26/24    | Chicago, IL          | \$3,000+        |          |
|  Bain Capital Life Sciences                 | Bain Capital Life Sciences IV            | 9/11/24    | Boston, MA           | \$3,000         |          |
|  Flagship Pioneering                        | Flagship Pioneering Fund VIII            | 7/10/24    | Cambridge, MA        | \$2,600         |     |
|  Forbion.                                   | Forbion Growth Opportunities Fund III    | 10/15/24   | Naarden, Netherlands | \$1,300 (€1200) |     |
|   | Forbion Ventures Fund VII                | 10/15/24   | Naarden, Netherlands | \$963 (€890)    |    |
|  TCGX                                       | TCGX Fund II                             | 1/4/24     | Palo Alto, CA        | \$1,000         |          |
|  FORESITE CAPITAL                           | Foresite Capital Fund VI                 | 6/12/24    | Larkspur, CA         | \$900           |          |
|  Goldman Sachs Asset Management             | West Street Life Sciences I              | 1/3/24     | New York, NY         | \$650           |          |
|  FRAZIER LIFE SCIENCES                      | Frazier Life Sciences XI*                | 10/2/24    | Seattle, WA          | \$630           |          |
|  TPG  | TPG Life Sciences Innovation Fund        | 8/6/24     | Fort Worth, TX       | \$580           |          |
|  SANDS CAPITAL                             | Life Sciences Pulse Fund III             | 5/14/24    | Arlington, VA        | \$555           |       |
|  venBio.                                  | venBio Global Strategic Fund V           | 8/1/24     | San Francisco, CA    | \$528           |    |
|  Curie.Bio                                | Curie Bio Seed Fund I                    | 6/25/24    | Boston, MA           | \$520           |     |
|  DIMENSION                                | Dimension Capital II                     | 12/12/2024 | New York, NY         | \$500           |    |
|  J.P.Morgan Life Sciences Private Capital | 270 Life Sciences Private Capital Fund I | 6/13/24    | New York, NY         | \$500           |    |

| Investor Name  | Fund Name                                    | Close Date | Location             | Fund Size (\$M) | Key Investments <sup>(1)</sup>  |
|--|--|------------|----------------------|-----------------|---|
|  REGENERON                  | Regeneron Ventures Fund                      | 4/15/24    | Tarrytown, NY        | \$500           |          |
|  venrock                    | Venrock Healthcare Capital Partners XP       | 11/19/2024 | Palo Alto, CA        | \$500           |          |
|  ATLAS VENTURE              | Atlas Venture Fund XIV                       | 12/5/2024  | Cambridge, MA        | \$450           |          |
|  Aditum Bio                 | Aditum Bio Fund III                          | 5/31/2024  | Oakland, CA          | \$400           | -   |
|  CORMORANT ASSET MANAGEMENT | Cormorant Private Healthcare Fund V          | 8/7/2024   | Boston, MA           | \$400           |          |
|  DCVC                       | DCVC Bio III                                 | 9/30/2024  | Palo Alto, CA        | \$400           |          |
|  SCION LIFE SCIENCES        | Scion Life Sciences Fund                     | 2/7/2024   | New York, NY         | \$310           | -   |
|  ORI Capital                | ORI Healthcare Fund II                       | 2/22/2024  | Wanchai, Hong Kong   | \$260           | -   |
|  asabys                     | Asabys Health Innovation Investments II      | 9/26/2024  | Barcelona, Spain     | \$200           |    |
|  AMPLITUDE                  | Amplitude Ventures Biotech Fund              | 5/28/2024  | Montreal, Canada     | \$192           |     |
|  EARLYBIRD                 | Earlybird Health Fund II                     | 2/14/2024  | Berlin, Germany      | \$185 (€173)    |   |
|  BRANDON CAPITAL PARTNERS | Brandon Capital Fund VI                      | 6/3/2024   | Melbourne, Australia | \$180           |    |
|  Kurma Partners           | Kurma Biofund IV                             | 10/3/2024  | Paris, France        | \$154 (€140)    |    |
|  canaan                   | Canaan XIII+                                 | 4/1/2024   | Menlo Park, CA       | \$100           |    |
|  MIRAE ASSET              | Mirae Asset Capital Life Science Inception I | 1/18/2024  | Boston, MA           | \$50            |    |








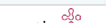
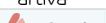








Source: PitchBook Data, Inc., and internal William Blair research as of December 31, 2024.

Note: \* Denotes investors with significant ex-US presence.

(1) Represent the largest three private financings by deal size that the investor participated in 2024.

# 2024 Biopharma IPOs

- Significant increase in IPO activity compared to 2023, with 17 IPOs in 2024 compared to 12 in 2023
- Sweet spot for biopharma IPOs continues to be for companies in Phase II or later, with select enthusiasm for earlier-stage Phase I companies with de-risked biology; investors favored metabolic/endocrine and I&I, which represented 59% of issuing companies

| (\$ in millions)    |  | At Pricing           |            |                        |         | Days from Pre-IPO Financing to IPO | Initial File/Offer vs. Range | Deal Value as % of Market Value | % Change Offer/ |         | Lead Product at Pricing |                                  |          | Next Major Catalyst (months)  | Select Pre-IPO Investors |
|---------------------|--|----------------------|------------|------------------------|---------|------------------------------------|------------------------------|---------------------------------|-----------------|---------|-------------------------|----------------------------------|----------|---|--------------------------|
| Pricing Date        | Issuer   | Deal Value           | Market Cap | Pre-Money Equity Value | Step-Up |                                    |                              |                                 | 1 Day           | Current | Phase                   | Therapeutic Area/Modality        |          |   |                          |
| 10/24/24            |  Septerna               | \$331                | \$799      | \$468                  | 1.70x   | 484                                | Above                        | 41%                             | +19%            | +27%    | Phase I                 | Endocrine / Small molecule       | 8 to 10  | BVF, Casdin, Catalio, Deep Track, Driehaus, Goldman Sachs, Invus, Logos, <b>RA</b> , Samsara, Soleus  |                          |
| 10/10/24            |  CAMP4                  | \$82                 | \$222      | \$140                  | 0.67x   | 846                                | Below                        | 37%                             | (3%)            | (53%)   | Phase I                 | Rare Metabolic / Oligonucleotide | 3 to 6   | 5AM, Andreessen, <b>Enavate</b> , Northpond, Polaris  |                          |
| 10/10/24            |  UpstreamBio            | \$293                | \$911      | \$618                  | 1.00x   | 490                                | In Range                     | 32%                             | +29%            | (3%)    | Phase II                | I&I / Antibody                   | 9 to 15  | Access Bio, Bain, Decheng, <b>Enavate</b> , HBM, Omega, OrbiMed, Samsara, TCGx, <b>Venrock</b> , Wellington   |                          |
| 9/25/24             |  BIOAGE                 | \$238 <sup>(1)</sup> | \$655      | \$417                  | 1.18x   | 237                                | In Range                     | 36%                             | +2%             | (68%)   | Phase II                | Metabolic / Small molecule       | 10 to 12 | Andreessen, Cormorant, Longitude, Orbimed, Pivotal, RA, RTW, Sands, <b>Sofinnova</b> , SV Health  |                          |
| 9/12/24             |  BICARA Therapeutics    | \$362                | \$979      | \$617                  | 1.41x   | 281                                | In Range                     | 37%                             | +30%            | (3%)    | Phase I/Ib              | Oncology / Antibody              | 6 to 15  | Aisling, <b>Braidwell</b> , Deerfield, Fairmount, Invus, Janus, Omega, RA, <b>TPG</b>   |                          |
| 9/12/24             |  MBX Biosciences        | \$188                | \$534      | \$346                  | 1.29x   | 41                                 | In Range                     | 35%                             | +48%            | +15%    | Phase II                | Endocrine / Peptide              | 9 to 12  | <b>Deep Track</b> , Driehaus, Frazier, NEA, Norwest, OrbiMed, RA, T. Rowe, Wellington   |                          |
| 9/12/24             |  Zenas BioPharma        | \$259                | \$710      | \$451                  | 1.14x   | 128                                | In Range                     | 36%                             | +7%             | (52%)   | Phase III               | I&I / Antibody                   | 12 to 15 | ArrowMark, <b>Delos</b> , Enavate, Fairmount, Longitude, <b>NEA</b> , <b>Norwest</b> , Pivotal, Rock Springs, <b>SR One</b> , Vivo, Wellington        |                          |
| 7/18/24             |  artiva                 | \$179                | \$291      | \$112                  | 0.25x   | 1,238                              | Below                        | 61%                             | 0%              | (16%)   | Phase I/II              | I&I & Oncology / Cell therapy    | 6 to 11  | 5AM, Acuta, Cormorant, EcoR1, Franklin, Janus, Logos, RA, RTW, Surveyor, venBio, <b>Venrock</b> , Wellington  |                          |
| 6/27/24             |  alumis                 | \$250 <sup>(2)</sup> | \$870      | \$620                  | 1.09x   | 115                                | In Range                     | 29%                             | (17%)           | (51%)   | Phase II                | I&I / Small molecule             | 18 to 30 | Ally Bridge, Cormorant, <b>Foresite</b> , HBM, Matrix, Nextech, Omega, <b>Samsara</b> , SR One, <b>venBio</b>   |                          |
| 6/6/24              |  rapport therapeutics   | \$174 <sup>(3)</sup> | \$640      | \$465                  | 1.18x   | 304                                | In Range                     | 27%                             | +22%            | +4%     | Phase I                 | Neurology / Small molecule       | 12 to 15 | ARCH, <b>Cormorant</b> , Fidelity, Goldman Sachs, Logos, Perceptive, Sofinnova, Surveyor, T. Rowe   |                          |
| 4/4/24              |  CONTINEUM Therapeutics | \$110                | \$402      | \$292                  | 1.07x   | 369                                | In Range                     | 27%                             | (4%)            | (8%)    | Phase I                 | Fibrosis & I&I / Small molecule  | ND       | Altium, Baker, Casdin, Franklin, Perceptive, Samsara, Sectoral, Versant   |                          |
| 3/27/24             |  BOUNDLESS BIO          | \$100                | \$356      | \$256                  | 1.17x   | 316                                | In Range                     | 28%                             | (11%)           | (82%)   | Phase I/II              | Oncology / Small molecule        | 2 to 8   | ARCH, <b>Fidelity</b> , Logos, Nextech, PFM, <b>RA</b> , Redmile, Sectoral, Surveyor, Wellington  |                          |
| 2/8/24              |  M Metagenomi           | \$94                 | \$563      | \$469                  | 0.61x   | 399                                | In Range                     | 17%                             | (31%)           | (76%)   | Preclinical             | Hematology / Gene editing        | ND       | <b>Catalio</b> , Deep Track, Eventide, <b>Farallon</b> , Frazier, Marshall Wace, Millenium, <b>Novo</b> , <b>PFM</b> , RA, Surveyor, <b>Symbiosis</b> |                          |
| 2/7/24              |  kyverna                | \$367                | \$946      | \$579                  | 2.58x   | 188                                | Above                        | 39%                             | +36%            | (83%)   | Phase I/II              | I&I / Cell therapy               | 4 to 10  | <b>Bain</b> , CAM, <b>GordonMD</b> , HealthCor, Insight, <b>Northpond</b> , RTW, Vida, Westlake   |                          |
| 2/1/24              |  ALTO Biosciences       | \$148                | \$428      | \$280                  | 1.51x   | 72                                 | In Range                     | 35%                             | +29%            | (74%)   | Phase IIb               | Neurology / Small molecule       | 4 to 10  | Alpha Wave, Franklin Templeton, <b>InVivium</b> , Point72   |                          |
| 1/25/24             |  ARRIVENT               | \$201                | \$601      | \$400                  | 1.13x   | 304                                | In Range                     | 33%                             | +11%            | +48%    | Phase III               | Oncology / Small molecule        | 12 to 24 | Catalio, <b>General Catalyst</b> , HBM, Octagon, Orbimed, <b>Sofinnova</b>  |                          |
| 1/24/24             |  CG Oncology           | \$437                | \$1,263    | \$826                  | 1.55x   | 175                                | Above                        | 35%                             | +96%            | +51%    | Phase III               | Oncology / Oncolytic vaccine     | 10 to 12 | Acorn, Ally Bridge, Avidity, BVF, Decheng, <b>Foresite</b> , Janus, Longitude, RA, <b>TCGx</b>  |                          |
| All                 | Mean (N=17)  | \$224                | \$657      | \$433                  | 1.21x   | 352                                |                              | 35%                             | +16%            | (25%)   |                         |                                  |          |   |                          |
|                     | Median   | \$201                | \$640      | \$451                  | 1.17x   | 304                                |                              | 35%                             | +11%            | (16%)   |                         |                                  |          |   |                          |
|                     | 75th Percentile  | \$293                | \$870      | \$579                  | 1.41x   | 399                                |                              | 37%                             | +29%            | +4%     |                         |                                  |          |   |                          |
|                     | 25th Percentile  | \$148                | \$428      | \$292                  | 1.07x   | 175                                |                              | 29%                             | (3%)            | (68%)   |                         |                                  |          |   |                          |
| Post-U.S. Labor Day | Mean (N=7)   | \$251                | \$687      | \$437                  | 1.20x   | 358                                |                              | 37%                             | +19%            | (19%)   |                         |                                  |          |   |                          |
|                     | Median   | \$259                | \$710      | \$451                  | 1.18x   | 281                                |                              | 36%                             | +19%            | (3%)    |                         |                                  |          |   |                          |
|                     | 75th Percentile  | \$312                | \$855      | \$542                  | 1.35x   | 487                                |                              | 37%                             | +30%            | +6%     |                         |                                  |          |   |                          |
|                     | 25th Percentile  | \$213                | \$595      | \$382                  | 1.07x   | 183                                |                              | 36%                             | +4%             | (52%)   |                         |                                  |          |   |                          |

Source: CapIQ, Dealogic, Factset and SEC Filings as of December 31, 2024.

Note: Includes U.S. IPOs only. Excludes best efforts IPOs. Excludes IPOs less than \$25 million in gross proceeds. All valuations performed on a basic share count basis. Lead investors in bold. ND = Not Disclosed. NA = Not Applicable.

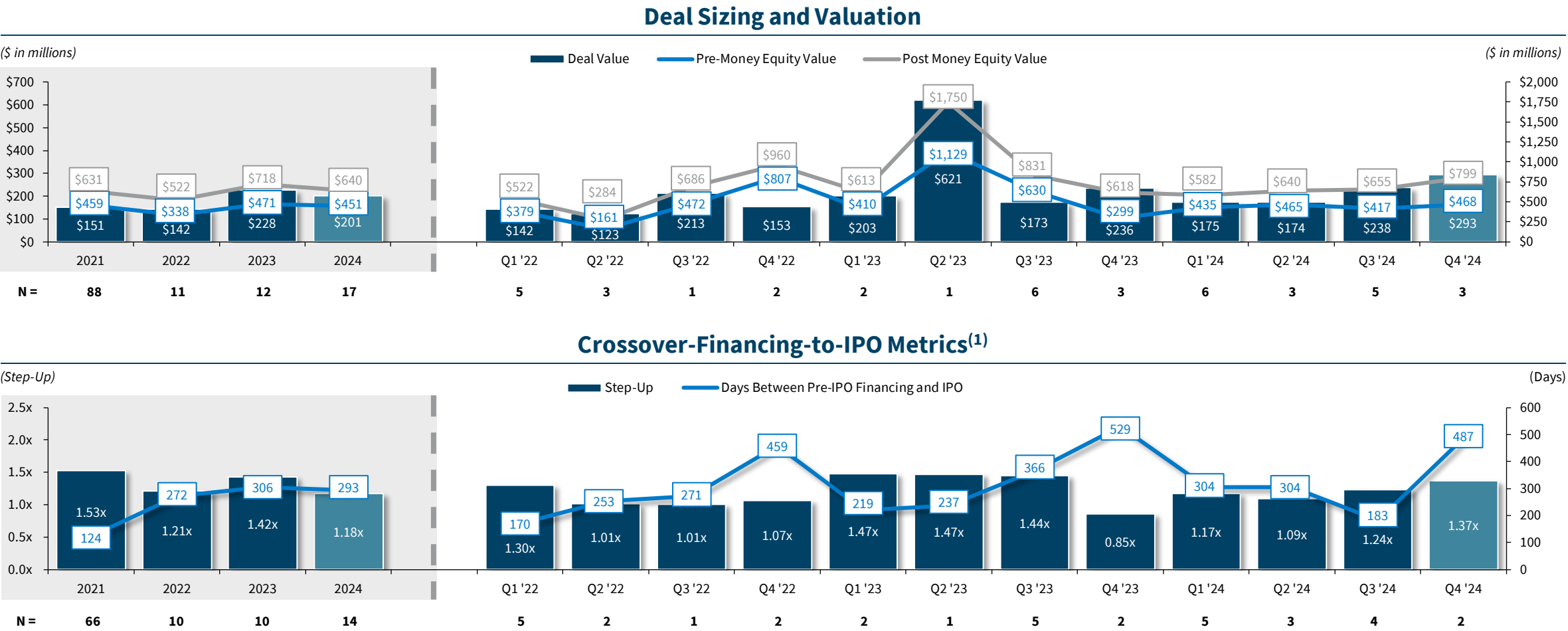
(1) Deal size includes proceeds from a concurrent PIPE in which 588,888 shares of common stock were sold at the public offering price of \$18.00.

(2) Deal size includes proceeds from a concurrent PIPE in which 2,500,000 shares of common stock were sold at the public offering price of \$16.00.

(3) Deal size includes proceeds from a concurrent PIPE in which 1,058,824 shares of common stock were sold at the public offering price of \$17.00.

# Biopharma IPO Trends

2024 saw median pre-money IPO valuations of ~\$450 million and days between crossover and IPO of ~300, largely in line with 2023, while IPO step-ups ticked down to 1.18x



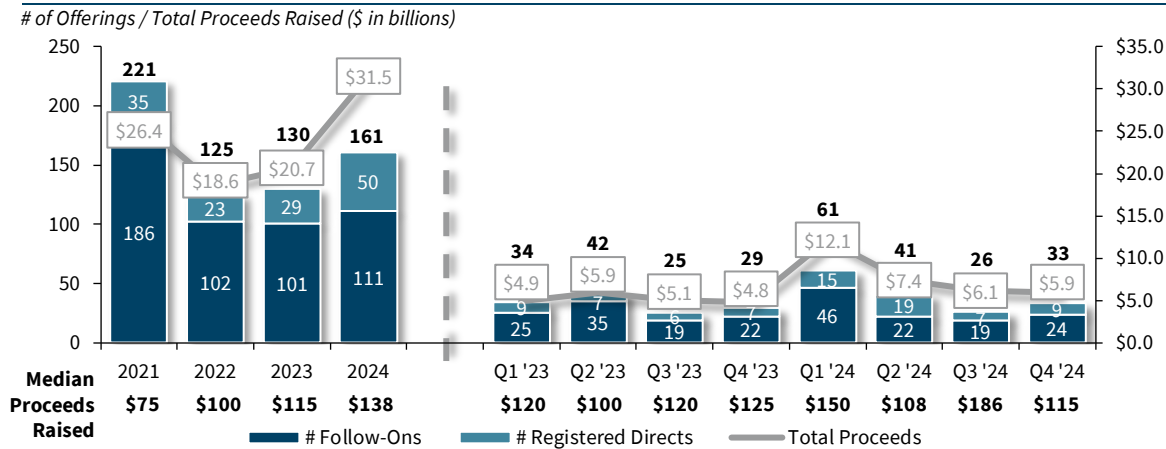
Note: Represents median values. Includes U.S. IPOs only. Excludes best efforts IPOs. Excludes IPOs less than \$25 million in gross proceeds.  
Source: CapIQ, Dealogic, FactSet, and SEC Filings as of December 31, 2024. Note: All valuations performed on basic share count basis.  
(1) Crossover-Financing rounds defined as pre-IPO financings completed that included multiple crossover and/or large mutual funds in the investor syndicate.



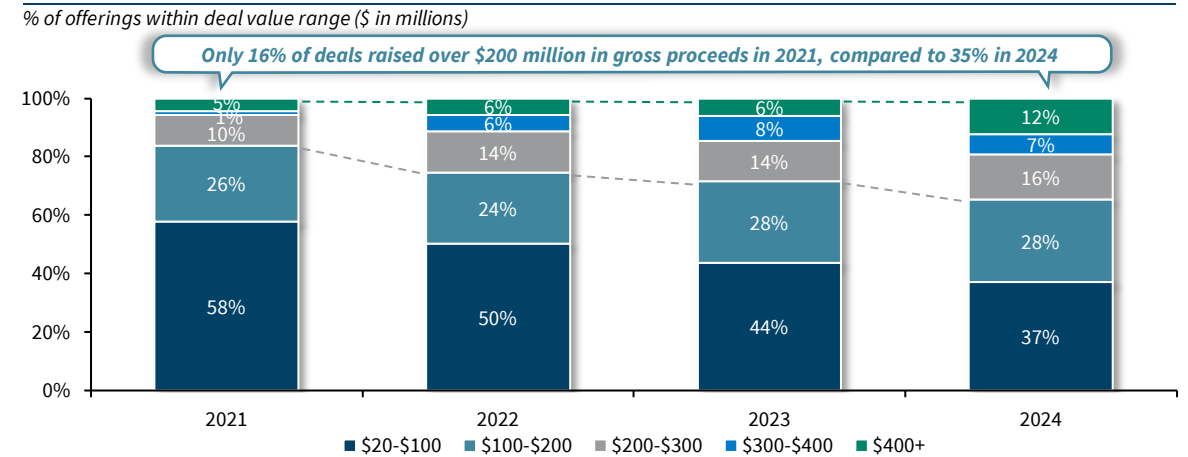
# Biopharma Follow-on & Registered Direct Trends

Robust secondary activity in 2024, with proceeds raised of \$31.5 billion, surpassing 2021 levels. While Q1 2024 marked the most active quarter, the remainder of the year saw normalized issuance levels

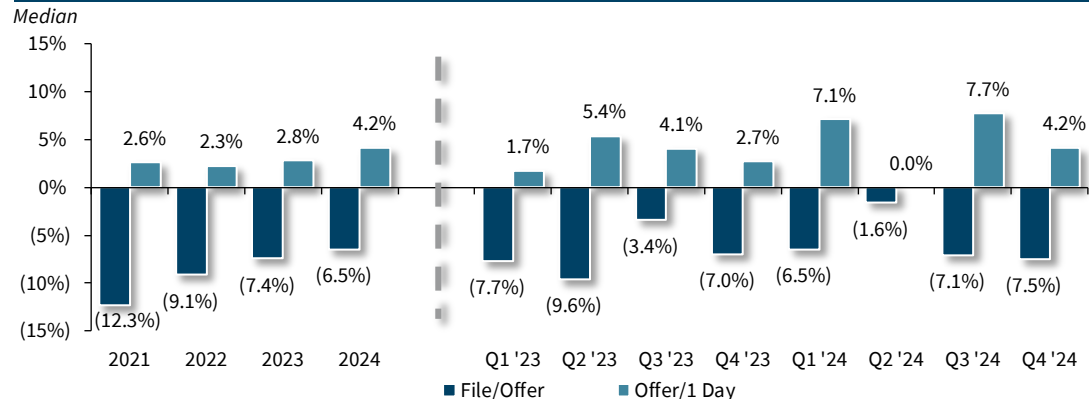
## Deal Volume and Proceeds



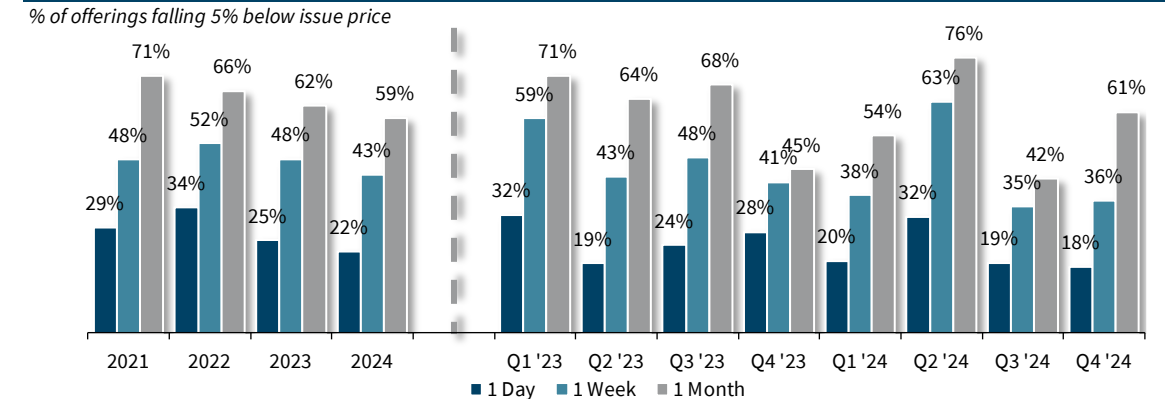
## Offerings Push Over \$400M Deal Value More Frequently



## 1-Day Performance and Discounts Remain Consistent...



## ...And Less Offerings Break Issue Price



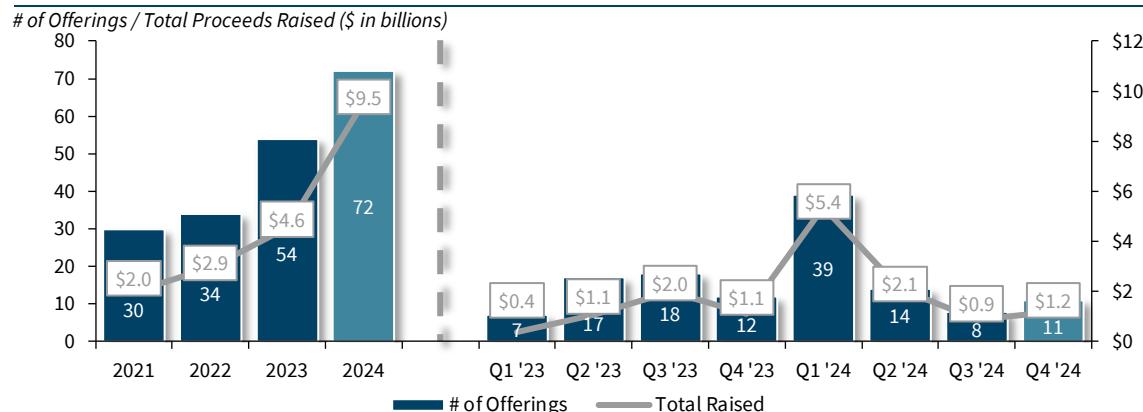
Source: Dealogic as of December 31, 2024.

Note: Includes fully marketed follow-on offerings, confidentially marketed follow-on offerings, bought deals, and registered directs. Excludes offerings with gross proceeds below \$20 million. Median Pricing and Performance includes offerings with warrants.

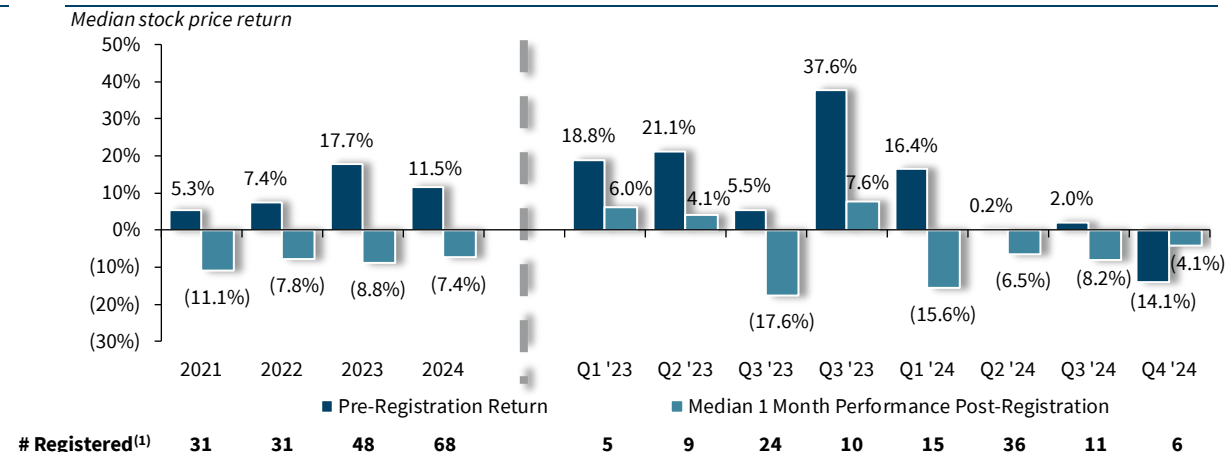
# Biopharma PIPE Trends

2024 marked the most active PIPE market on both a volume and proceeds basis of all-time, largely driven by Q1's historic issuance. Post-offering performance was strong although weakness was seen following share resale registration

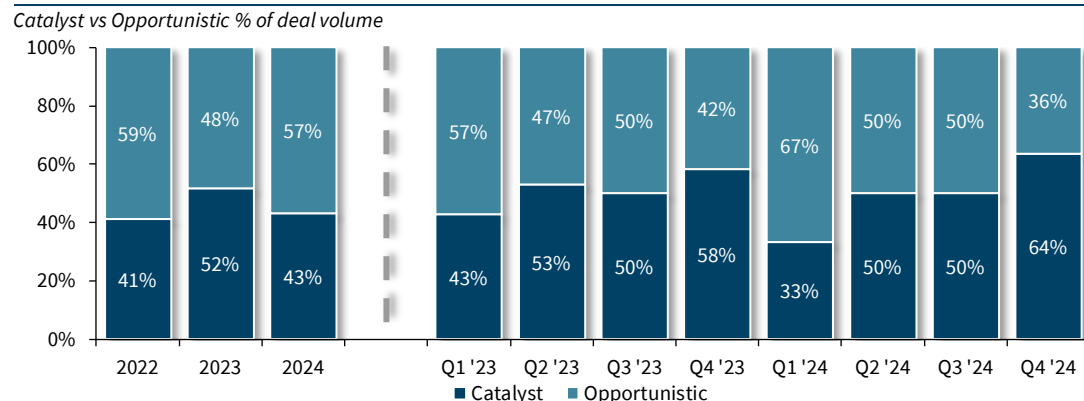
## Deal Volume and Proceeds



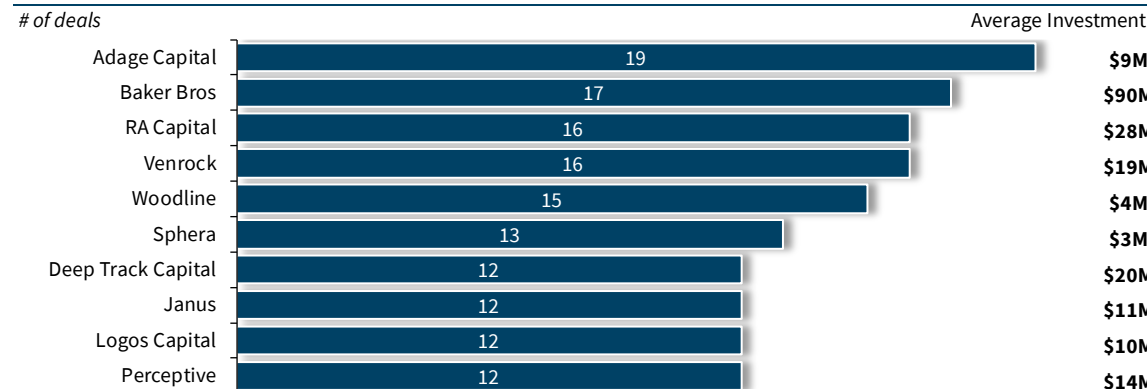
## Inline with Prior Years, Issuers Experience Stock Price Performance Disruption Post-Registration



## Except for Q1, Recent PIPE Offerings Are Largely Catalyst-Driven



## Top PIPE Investors in 2024<sup>(2)</sup>



Note: Excludes offerings with gross proceeds below \$20 million.

Source: Dealogic as of December 31, 2024.

(1) Date of effectiveness is as of filing of the Notice of Effectiveness, S3-ASR, or 424B.

(2) Includes disclosed participants only. Average investment based on publicly available data from SEC filings.

# 2024 Strategic Alternatives Outcomes and Restructurings

Biopharma restructurings have been rampant in 2024, corresponding with subsequent strategic alternatives processes and outcomes throughout the year

| Strategic Alternatives Outcome  | Q1 2024  | Q2 2024   | Q3 2024   | Q4 2024   | Total    |
|---|--|---|---|---|----------|
| <b>Reverse Merger</b><br>Traditional reverse mergers with private companies   |  /   |  /   /  |  /   /  |  /   /  | 16 Deals |
| <b>Other Strategic Outcomes</b><br>Includes program or full company buyouts and/or in-licensing following strategic alternatives review |  <sup>(1)</sup> /   /  |  /    |   |  /   /  | 13 Deals |
| <b>Chapter 11/ Closure/Delisting</b><br>Voluntary delisting/ liquidation/ dissolving  |                        |      |     |     | 23 Co.'s |
| # of Outcomes   | 16   | 10  | 8   | 18  | 52       |

## 2024 Biopharma Restructurings, Strategic Alternatives, and/or Portfolio Prioritization Announcements (N=112)

| Q1 2024   | Q2 2024  | Q3 2024   | Q4 2024   |
|---|--|---|---|
|      |      |      |      |
|      |      |       |      |
|      |      |      |      |
|      |      |       |      |
|      |      |      |      |
|      |  |      |      |

Source: SEC Filings, Company Press Releases, and William Blair analysis as of December 31, 2024.

Note: Restructuring announcements only include U.S.-listed SMID-cap biopharmas. "\*" denotes companies which publicly announced strategic alternatives processes in 2024.

(1) 2Seventy Bio entered into an asset purchase agreement with Regeneron to sell the its oncology and autoimmune research and development programs, clinical manufacturing capabilities, and related platform technologies on January 30, 2024. 2Seventy remains operational.

# Venture Debt in Biopharma

With support from non-bank lenders, the venture debt<sup>(1)</sup> market was highly active in 2024. Total deal value was on par with 2021 & 2022 levels, and the momentum is expected to continue in 2025

## Market Overview

- 2024 was an active year for the venture debt market, supported by direct lenders in an environment where commercial banks are facing increasing regulatory pressures
- An uptick in the number of venture debt lenders has also led to a more competitive market with improved structures and terms
- However, the borrower-friendly environment has so far been limited to higher-quality, performing companies
- The most favorable terms are being reserved for more established borrowers and those that recently raised equity
- Companies facing growth headwinds and those without a recent equity raise to tout are not getting the same looks as their high-performing counterparts
- Lenders are patiently picking their spots, waiting for high-quality deals to emerge before deploying capital
- With a significant amount of dry powder available and its minimally dilutive nature, venture debt will continue to be an attractive source of capital in 2025 and beyond

## 2024 Venture Debt<sup>(1)</sup> Financings for Public Biopharma Companies

|             |                                 | (\$ in millions)   |                               |               |                             |         |                     |                |                    |                |
|-------------|---------------------------------|--------------------|-------------------------------|---------------|-----------------------------|---------|---------------------|----------------|--------------------|----------------|
| Date        | Company                         | Available at Close | Total Facility <sup>(2)</sup> | Interest Rate | LTM at Close <sup>(3)</sup> |         | Market Cap at Close | Debt / Mkt Cap | Facility / Mkt Cap | Phase at Close |
|             |                                 |                    |                               |               | Revenue                     | EBITDA  |                     |                |                    |                |
| 12/30/24    | Centessa Pharmaceuticals plc    | \$110              | \$200                         | 9.33%         | \$7                         | (\$161) | \$2,160             | 5.1%           | 9.3%               | Phase II       |
| 12/23/24    | TScan Therapeutics, Inc.        | \$33               | \$53                          | 7.00%         | \$9                         | (\$115) | \$170               | 19.1%          | 30.9%              | Phase I        |
| 11/14/24    | Alector, Inc.                   | \$25               | \$50                          | 8.55%         | \$62                        | (\$177) | \$481               | 5.2%           | 10.4%              | Phase III      |
| 11/07/24    | Geron Corporation               | \$125              | \$250                         | 10.06%        | \$29                        | (\$207) | \$2,593             | 4.8%           | 9.6%               | Commercial     |
| 11/07/24    | Ocugen, Inc.                    | \$30               | \$30                          | 11.75%        | \$5                         | (\$51)  | \$311               | 9.6%           | 9.6%               | Phase III      |
| 10/02/24    | Emergent BioSolutions Inc.      | \$125              | \$125                         | 6.56%         | \$1,126                     | (\$5)   | \$496               | 25.2%          | 25.2%              | Commercial     |
| 09/03/24    | Emergent BioSolutions Inc.      | \$250              | \$250                         | 12.56%        | \$1,102                     | (\$79)  | \$391               | 63.9%          | 63.9%              | Commercial     |
| 08/27/24    | Arcus Biosciences, Inc.         | \$50               | \$250                         | 10.45%        | \$247                       | (\$264) | \$1,599             | 3.1%           | 15.6%              | Phase III      |
| 08/08/24    | Arrowhead Pharmaceuticals, Inc. | \$400              | \$500                         | 15.00%        | \$20                        | (\$530) | \$3,214             | 12.4%          | 15.6%              | Phase III      |
| 07/25/24    | Fortress Biotech, Inc.          | \$35               | \$50                          | 11.93%        | \$83                        | (\$90)  | \$58                | 60.0%          | 85.7%              | Commercial     |
| 05/15/24    | Adaptimmune Therapeutics plc    | \$25               | \$125                         | 9.65%         | \$18                        | (\$184) | \$317               | 7.9%           | 39.4%              | BLA Filed      |
| 05/14/24    | Apellis Pharmaceuticals, Inc.   | \$375              | \$475                         | 10.06%        | \$524                       | (\$402) | \$5,000             | 7.5%           | 9.5%               | Commercial     |
| 05/09/24    | Coherus BioSciences, Inc.       | \$39               | \$39                          | 12.31%        | \$302                       | (\$157) | \$243               | 15.9%          | 15.9%              | Commercial     |
| 05/02/24    | Werewolf Therapeutics, Inc.     | \$30               | \$60                          | 10.30%        | \$16                        | (\$44)  | \$264               | 11.4%          | 22.8%              | Phase I        |
| 04/30/24    | TriSalus Life Sciences, Inc.    | \$25               | \$50                          | 12.83%        | \$22                        | (\$55)  | \$249               | 10.0%          | 20.1%              | Phase I        |
| 04/23/24    | Tarsus Pharmaceuticals, Inc.    | \$75               | \$200                         | 11.06%        | \$43                        | (\$155) | \$1,264             | 5.9%           | 15.8%              | Commercial     |
| 04/10/24    | Zevra Therapeutics, Inc.        | \$60               | \$100                         | 11.31%        | \$28                        | (\$55)  | \$206               | 29.1%          | 48.6%              | Commercial     |
| 03/18/24    | bluebird bio, Inc.              | \$75               | \$175                         | 12.40%        | \$29                        | (\$216) | \$278               | 27.0%          | 63.1%              | Approved       |
| 01/08/24    | Abeona Therapeutics Inc.        | \$20               | \$50                          | 13.50%        | \$4                         | (\$46)  | \$145               | 13.8%          | 34.6%              | BLA Filed      |
| 01/02/24    | Verona Pharma plc               | \$50               | \$400                         | 11.19%        | \$6                         | (\$66)  | \$1,617             | 3.1%           | 24.7%              | NDA Filed      |
| Mean (N=20) |                                 | \$98               | \$172                         | 10.89%        | \$184                       | (\$153) | \$1,053             | 17.0%          | 28.5%              |                |
| Median      |                                 | \$50               | \$125                         | 11.12%        | \$29                        | (\$135) | \$354               | 10.7%          | 21.4%              |                |
| Minimum     |                                 | \$20               | \$30                          | 6.56%         | \$4                         | (\$530) | \$58                | 3.1%           | 9.3%               |                |
| Maximum     |                                 | \$400              | \$500                         | 15.00%        | \$1,126                     | (\$5)   | \$5,000             | 63.9%          | 85.7%              |                |

Source: CapIQ, PitchBook Data, Inc., and SEC filings as of December 31, 2024.

(1) "Venture debt" defined here as debt to borrowers who do not yet have positive cash flow.

(2) Represents total commitment and includes undrawn revolvers and additional tranches of debt / delayed draw facilities.

(3) LTM financials at time of close are as calculated by CapIQ.

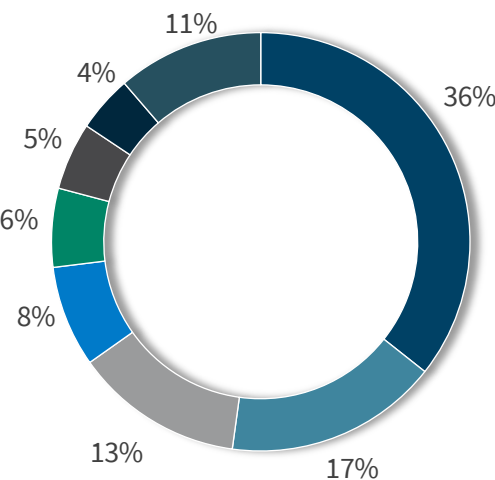
# Q4 2024 SMID-Cap Clinical Catalysts Analysis

- Several unexpected negative SMID-cap clinical updates to close out the quarter, including Keros and BioAge
- 8 of the top 10 movers successfully raised catalyst-driven equity offerings concurrent with or post-data
- Only quarter in 2024 with total cumulative market cap lost across all SMID-cap clinical catalysts, further exacerbated by underwhelming large-cap data from Vertex (Phase II Nav 1.8 data) and Novo (Phase III CagriSema data) to close out the year

## Key Takeaways

- William Blair analyzed 115 key clinical data readouts in Q4 2024 for U.S.-listed biopharma companies with a market cap between \$25M-\$30B
- Average stock price performance for “positive” clinical data (N=86):
  - 1-day performance: **+3.5%**
  - 1-week performance: **(1.0%)**
- Average stock price performance for “negative” clinical data (N=29):
  - 1-day performance: **(38.5%)**
  - 1-week performance: **(40.3%)**
- 19 pivotal / Phase III trial readouts – 11 were positive and 8 were negative
- ~\$6.9 billion in cumulative 1-day market cap **lost** across all SMID-cap clinical catalysts, driven by Phase II trial halts by Keros, Incyte and BioAge, as well as negative data from Cassava

## Breakdown by Therapeutic Area



■ Oncology ■ Neurology  
■ I&I ■ Rare Disease  
■ Cardiovascular ■ Pulmonary  
■ Hematology ■ Other

## Top 10 Positive/Negative Movers

(1-Day Share Price Change)

### Top Performers

| Catalyst Type      |                                 |
|--------------------|---------------------------------|
| SRRK               | 362% Phase III Data             |
| WVE <sup>(1)</sup> | 74% Interim Phase I/II Data     |
| TARA               | 70% Interim Phase II Data       |
| CADL               | 68% Phase III Data              |
| CRDF               | 55% Interim Phase II Data       |
| JANX               | 49% Interim Phase Ia Data       |
| TRVI               | 45% Phase IIb Futility Analysis |
| NAMS               | 41% Phase III Data              |
| OMER               | 37% Phase III Data              |
| EYPT               | 28% Interim Phase II Data       |

Executed Equity Offering Post or Concurrent With Data

### Worst Performers

| Catalyst Type |                           |
|---------------|---------------------------|
| EYEN          | (70%) Phase III Data      |
| EPIX          | (73%) Phase II Data       |
| KROS          | (73%) Phase II Trial Halt |
| QTTB          | (76%) Phase IIa Data      |
| BIOA          | (77%) Phase II Trial Halt |
| RLMD          | (77%) Phase III Data      |
| CRVO          | (79%) Phase IIb Data      |
| MRNS          | (82%) Phase III Data      |
| SAVA          | (84%) Phase III Data      |
| SYRS          | (87%) Phase III Data      |

Source: FactSet, Company press releases, SEC Filings and William Blair analysis as of December 31, 2024.

Note: Includes biopharma companies listed on major U.S. exchanges with market capitalization >\$25M and <\$30 billion at the time of catalyst. Positive/negative based on Company press releases.














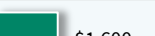


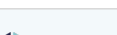

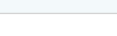
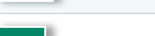
(1) Wave Life Sciences raised a \$200M follow-on three weeks prior to announcing initial RNA-editing data in AATD.



# 2024 Clinical Catalysts – Top Winners and Losers (By Market Cap)



















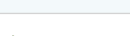

- Phase II or Phase III readouts comprise 80% of top 10 winners and 80% of top 10 losers
- 6 of the top 10 negative movers were driven by “positive” clinical data; 5 were still positive performers in 2024
- Alnylam leads the way on both sides of the equation with their HELIOS-B topline and full data readouts this year
- In 2024, there has been a net ~\$17B increase in 1-day market cap change for the top 10 winners and losers

## Top 10 Winners by Market Cap

| #  | Company  | TA                 | Asset                  | Catalyst Type           | Catalyst Date | 1-Day Market Cap Change  | 2024 Performance |
|----|--|--------------------|------------------------|-------------------------|---------------|--|------------------|
| 1  |  Alnylam                    | Cardiovascular     | Vutrisiran             | Phase III Data          | 6/24/24       |  \$7,235   | +23%             |
| 2  |  Summit Therapeutics        | Oncology           | Ivonescimab            | Phase III Data          | 5/30/24       |  \$5,605   | +584%            |
| 3  |  VIKING THERAPEUTICS        | Metabolic          | VK2735                 | Phase II Data           | 2/27/24       |  \$4,680   | +116%            |
| 4  |  insmed                     | Respiratory        | Brensocatib            | Phase III Data          | 5/28/24       |  \$3,873   | +123%            |
| 5  |  VAXCYTE                    | Infectious Disease | VAX-31                 | Phase I/II Data         | 9/3/24        |  \$3,280   | +30%             |
| 6  |  Scholar Rock               | Musculoskeletal    | Apitegromab            | Phase III Data          | 10/7/24       |  \$2,150   | +130%            |
| 7  |  Janux                      | Oncology           | JANX008                | Interim Phase I Data    | 2/26/24       |  \$1,600   | +399%            |
| 8  |  Intra-Cellular THERAPIES | Neurology          | Lumateperone           | Phase III Data          | 4/16/24       |  \$1,470 | +17%             |
| 9  |  Nuvalent                 | Oncology           | Zidesamtinib & NVL-655 | Interim Phase I/II Data | 9/16/24       |  \$1,467 | +6%              |
| 10 |  VIKING THERAPEUTICS      | Metabolic          | VK2735 Oral            | Phase I Data            | 3/26/24       |  \$1,273 | +116%            |

Total: \$33B

## Top 10 Losers by Market Cap

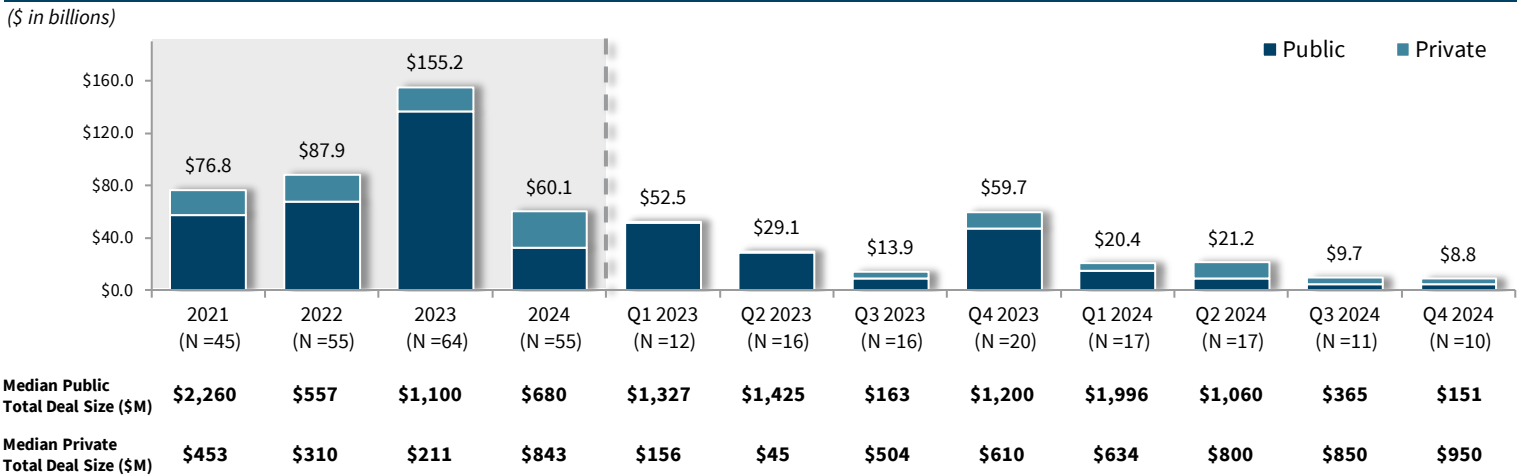
| #  | Company  | TA               | Asset                  | Catalyst Type           | Catalyst Date | 1-Day Market Cap Change   | 2024 Performance |
|----|--|------------------|------------------------|-------------------------|---------------|---|------------------|
| 1  |  Alnylam                | Cardiovascular   | Vutrisiran             | Phase III Data          | 8/30/24       |  (\$3,122)   | +23%             |
| 2  |  NEUROCRINE BIOSCIENCES | Neurology        | NBI-1117568            | Phase II Data           | 8/28/24       |  (\$2,907)   | +4%              |
| 3  |  KEROS THERAPEUTICS     | Pulmonary        | Ciboterccept (KER-012) | Phase II Trial Halt     | 12/12/24      |  (\$2,034)   | (60%)            |
| 4  |  Dyne                   | Musculoskeletal  | DYNE-251               | Interim Phase I/II Data | 9/3/24        |  (\$1,421)   | +77%             |
| 5  |  Incyte                 | I&I              | INCB000262 (EP262)     | Phase II Trial Halt     | 11/18/24      |  (\$1,235)   | +10%             |
| 6  |  VIKING THERAPEUTICS    | Metabolic        | VK2735 Oral            | Phase I Data            | 11/4/24       |  (\$1,085)   | +116%            |
| 7  |  CASSAVA sciences       | Neurology        | Simufilam              | Phase III Data          | 11/25/24      |  (\$1,067)   | (90%)            |
| 8  |  AMYLYX               | Neurology        | AMX0035                | Phase III Data          | 3/8/24        |  (\$1,058) | (74%)            |
| 9  |  Revolution Medicines | Oncology         | RMC-6236               | Interim Phase I Data    | 12/2/24       |  (\$1,018) | +53%             |
| 10 |  Ironwood             | Gastrointestinal | Apraglutide            | Phase III Data          | 2/29/24       |  (\$891)   | (61%)            |

Total: (\$16B)

# 2024 Biopharma M&A Trends

- M&A slowed once again in Q4, with only 10 deals announced, adding to the overall pullback in M&A seen in 2024
- Over 2024, activity in M&A was driven on the private side, accounting for 46% of deal value and 58% of volume

Total Deal Value and Volume



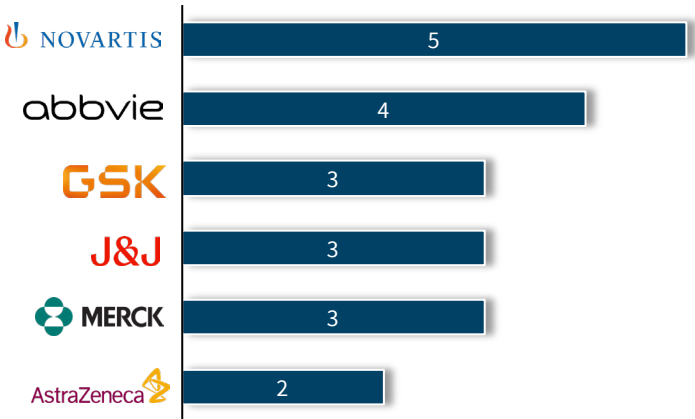
Top 5 M&A Transactions by Total Deal Size in 2024

| Private Company Transactions |                  |          |                  |               |              |               |                      | Public Company Transactions |                        |          |                  |               |           |            |                |
|------------------------------|------------------|----------|------------------|---------------|--------------|---------------|----------------------|-----------------------------|------------------------|----------|------------------|---------------|-----------|------------|----------------|
| Date                         | Target           | Acquiror | Total Deal Value | Total Upfront | Phase        | TA            | Modality             | Date                        | Target                 | Acquiror | Total Deal Value | Total Upfront | Phase     | TA         | Modality       |
| 05/29                        | EyeBio           | MERCK    | \$3,000          | \$1,300       | Phase Ib/Ila | Ophthalmology | Trispecific Antibody | 04/10                       | ALPINE Immune Sciences | VERTEX   | \$4,900          | \$4,900       | Phase II  | Renal, I&I | Peptide        |
| 05/22                        | HI-Bio           | Biogen   | \$1,800          | \$1,150       | Phase II     | Renal, I&I    | Antibody             | 02/12                       | CYMABAY                | GILEAD   | \$4,300          | \$4,300       | Filed     | Hepatology | Small Molecule |
| 04/03                        | ProfoundBio      | Genmab   | \$1,800          | \$1,800       | Phase II     | Oncology      | ADC                  | 07/08                       | MORPHIC                | Lilly    | \$3,200          | \$3,200       | Phase II  | I&I        | Small Molecule |
| 05/02                        | Mariana Oncology | NOVARTIS | \$1,750          | \$1,000       | Preclinical  | Oncology      | Radiopharma          | 02/05                       | Morphosys              | NOVARTIS | \$2,900          | \$2,900       | Phase III | Oncology   | Small Molecule |
| 10/29                        | ALIADA           | abbvie   | \$1,400          | \$1,400       | Phase I      | Neurology     | Antibody             | 10/14                       | Longboard Therapeutics | Novartis | \$2,600          | \$2,600       | Phase III | Neurology  | Small Molecule |

## Key Takeaways

- Overall M&A total deal value (TDV) and volume significantly pulled back in 2024 compared to 2023; however, median TDV and milestones increased for second year in a row, driven by larger private acquisitions
  - **Total Deal Value:** \$835M in 2024 (vs. \$511M in 2023)
  - **Upfront Payments:** \$684M in 2024 (vs. \$248M in 2023)
  - **Milestones:** \$311M in 2024 (vs. \$200M in 2023)
- Private company M&A was a major driver of overall transaction volume in 2023, increasing to 32 deals (vs. 23 in 2023) while public company M&A volume decreased to 23 deals (vs. 41 in 2023)
  - Large M&A deals (TDV >\$1B) remained elevated at 23 (in line with 25 deals in 2023), compared to high-teen levels seen in 2021/2022, however just over half of this year's deals were for private companies
- Shift towards early and mid-clinical stage acquisition (Phase I and II), represented nearly 50% (27/55) of deals compared to 33% in 2023
- Take-privates of distressed/negative enterprise value companies continued in 2024, including Lumos, NGM, and Kinnate

## Top Acquirors in 2024



Source: CapIQ, PitchBook Data, Inc., and SEC Filings as of December 31, 2024.  
Note: Includes biopharma M&A with disclosed total deal value of \$20M+. Excludes M&A with undisclosed deal terms.

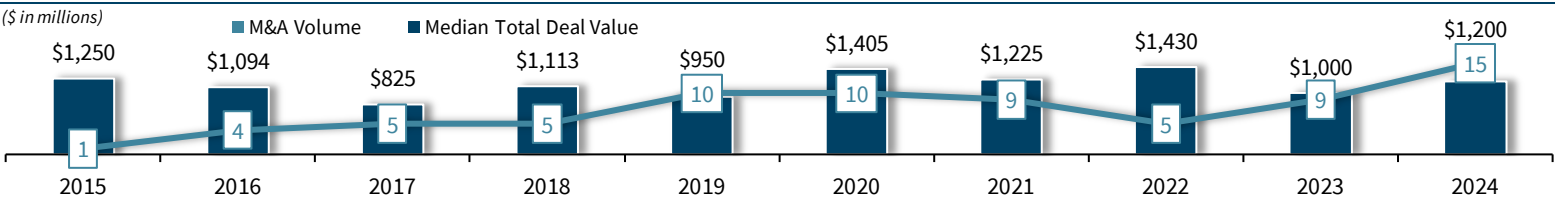
# 2024 Private Company M&A Deep Dive

15 private M&A deals in 2024 for over \$500M with a median deal size of \$1.2B, representing a median step-up of 3.0x from last post-money valuation, as dual-track financing and strategic processes become the norm

## 2024 Private M&A Transactions Over \$500M in TDV

| (\$ in millions)            |             |                      |               |                  | Target Company Last Round Prior to Acquisition |         |           |            |                        |
|-----------------------------|-------------|----------------------|---------------|------------------|--|---------|-----------|------------|------------------------|
| Date                        | Target      | Acquirer             | Total Upfront | Total Deal Value | Date   | Series  | Deal Size | Post-Money | Step-up <sup>(1)</sup> |
| 11/22/24                    | KATE        | NOVARTIS             | ND            | \$1,100          | 03/03/21                                       | B       | \$22      | \$126      | ND                     |
| 11/13/24                    | BIOHEUS     | BIONTECH             | \$800         | \$950            | 03/03/21                                       | C       | \$100+    | ND         | ND                     |
| 10/29/24                    | ALIADA      | abbvie               | \$1,400       | \$1,400          | 12/30/22                                       | A       | \$32      | \$82       | 17.1x                  |
| 09/18/24                    | dermavant   | ORGANON              | \$175         | \$1,200          | 06/07/21                                       | B       | \$200     | ND         | ND                     |
| 08/01/24                    | jnana       | Otsuka               | \$800         | \$1,125          | 11/15/22                                       | C       | \$107     | \$295      | 2.7x                   |
| 07/29/24                    | NERIO       | Boehringer Ingelheim | ND            | \$1,300          | 10/07/21                                       | A       | \$4       | ND         | ND                     |
| 07/29/24                    | IRONSHORE   | Collegium            | \$525         | \$550            | 06/25/15                                       | A - Ext | \$50      | ND         | ND                     |
| 05/29/24                    | EyeBio      | MERCK                | \$1,300       | \$3,000          | 11/14/23                                       | A - Ext | \$65      | ND         | ND                     |
| 05/22/24                    | Hi-Bio      | Biogen               | \$1,150       | \$1,800          | 01/04/24                                       | B       | \$95      | \$300      | 3.8x                   |
| 05/02/24                    | CONCEPT     | NOVARTIS             | \$1,000       | \$1,750          | 09/07/23                                       | B       | \$174     | \$314      | 3.2x                   |
| 04/23/24                    | escient     | Incyte               | \$750         | \$750            | 11/28/22                                       | C       | \$120     | \$250      | 3.0x                   |
| 04/03/24                    | ProfoundBio | Genmab               | \$1,800       | \$1,800          | 02/13/24                                       | B       | \$112     | ND         | ND                     |
| 03/25/24                    | Cardior     | Novartis             | ND            | \$1,111          | 08/25/21                                       | B       | \$75      | ND         | ND                     |
| 03/14/24                    | AMOLYT      | AstraZeneca          | \$800         | \$1,050          | 01/06/23                                       | C       | \$138     | \$310      | 2.6x                   |
| 01/09/24                    | AIOLOS BIO  | GSK                  | \$1,000       | \$1,400          | 10/24/23                                       | A       | \$245     | \$440      | 2.3x                   |
| Mean (N=15)                 |             |                      | \$958         | \$1,352          |  |         | \$103     | \$265      | 5.0x                   |
| Median                      |             |                      | \$900         | \$1,200          |  |         | \$101     | \$298      | 3.0x                   |
| 75 <sup>th</sup> Percentile |             |                      | \$1,263       | \$1,750          |  |         | \$147     | \$313      | 3.8x                   |
| 25 <sup>th</sup> Percentile |             |                      | \$763         | \$1,050          |  |         | \$46      | \$157      | 2.6x                   |

## Number of Sizable Private Company M&A Exits Has Been Trending Upward

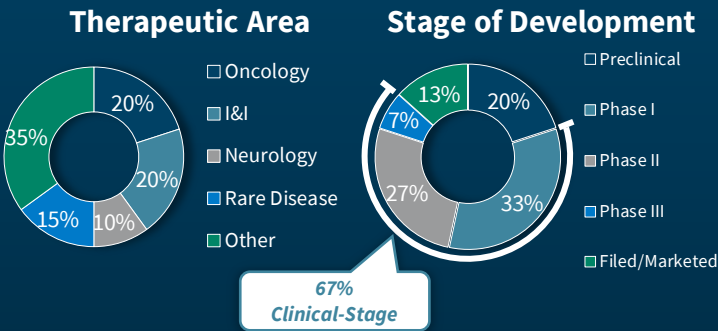


Source: PitchBook Data, Inc., Company press releases and websites as of December 31, 2024.

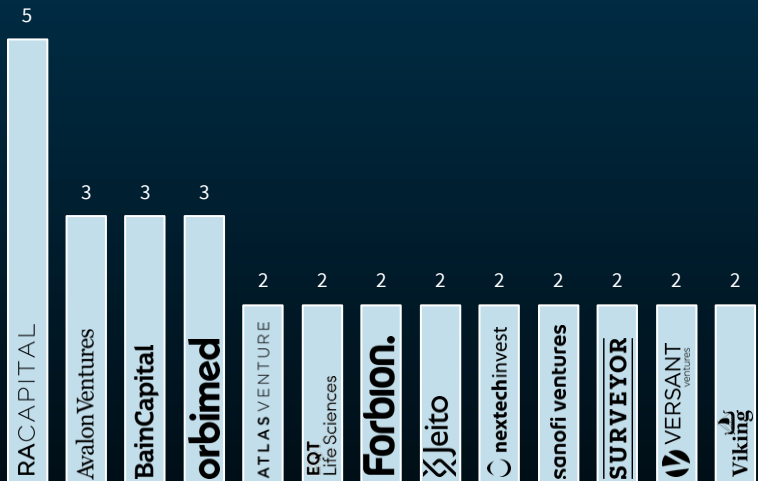
Note: M&A activity includes private biopharma M&A with disclosed total deal value of \$500M+, excluding asset sales, spinouts, and those that did not raise a Series A. ND = Not Disclosed.

(1) Based on step-up from last post-money to total upfront value.

## Analysis by Therapeutic Area and Stage



## Top Investors by Number of Exits



# 2024 Public Company M&A Deep Dive

- William Blair analyzed 11 public company M&A deals announced in 2024 with deal values greater than \$1 billion
- Typical public company M&A target phenotype: clinical-stage with unencumbered U.S. commercial rights
- First time since 2012 that biopharma has not had a \$10B+ buyout and the first year since before 2000 without a \$5b+ deal

## Key Takeaways

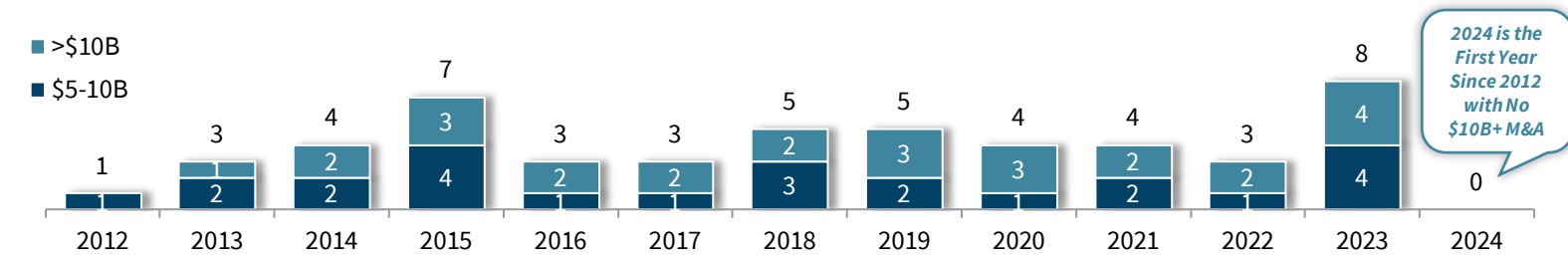
### Public M&A Target Phenotype

- Median total deal value of \$2.4 billion (100% cash)
- Median 77% premium to the last unaffected trade price
- Continued strong preference for wholly-owned assets, with 64% of lead assets unpartnered at announcement
- Demand for early clinical-stage assets grew, with 55% (6/11) being Phase II or earlier, a notable increase from 24% in 2023
- Top therapeutic areas were oncology (45%) and I&I (15%)
- High interest remains in small molecules as a modality, representing 55% of deals
- Three acquisitions consummated with existing partners (Posieda, Fusion, MorphoSys)

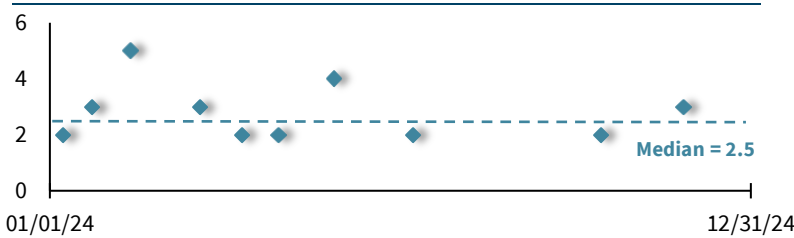
### Bid/Process Dynamics

- 80% of deals analyzed were catalyzed by unsolicited bids (down from 100% in 2023)
- Continued use of CVR structures in public company M&A, with 27% (3 of 11) of deals using a CVR
  - 1/3 of deals in 2023 also utilized CVRs, however, these structures were relatively absent from 2020–2022
- Median total parties engaged in outreach was 2.5, with 45% of transactions having 1+ bidders beyond the acquiror
- 100% of deals experienced an increase in offer price from initial IOI, with a median increase of 22%
- Relatively quick timeline to consummation post-IOI, with a median time of 2.5 months between IOI and the announcement of the acquisition, though this is up from 1.7 months in 2023

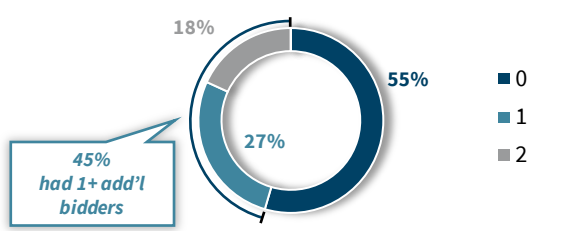
## Public M&A Volume Trends



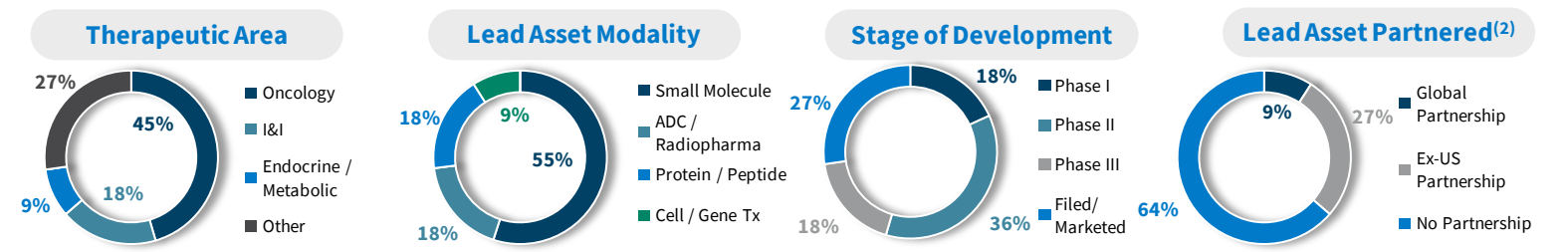
### Number of Total Parties Engaged



### Number of Parties That Bid (Ex-Acquiror)



## Target Phenotype



Source: CapIQ, Company Press Releases as of December 31, 2024. Includes strategic acquisitions with a public biotech target for greater than \$1 billion in total deal value since the start of 2024.



(1) Bid dynamics based on transactions where relevant SEC documentation (Schedule 14D-9 / Schedule 14A) was available as of December 31, 2024.

(2) Lead asset partnerships include development/commercialization licenses and co-promotion agreements. Excludes clinical trial collaborations, supply/distribution agreements, and academic collaborations.

# Summary of Investor Capital Returned from Q4 2024 Public Biopharma Acquisitions

Public biopharma acquisitions announced in Q4 2024 freed up an estimated \$2.2 billion in institutional investor capital

(\$ in millions)

| #  | Institution                                  | Total Estimated Capital Returned to Fund <sup>(1)</sup> |  |  |
|----|--|---|---|---|
| 1  | Farallon Capital Management LLC              | \$189.1   | ✓   |   |
| 2  | BlackRock Fund Advisors                      | \$172.2   | ✓   | ✓   |
| 3  | T. Rowe Price Associates, Inc.               | \$171.4   | ✓   |   |
| 4  | Cormorant Asset Management LP                | \$167.4   | ✓   |   |
| 5  | Fidelity Management & Research Co. LLC       | \$163.6   | ✓   | ✓   |
| 6  | Viking Global Investors LP                   | \$118.1   | ✓   |   |
| 7  | Wellington Management Co. LLP                | \$92.7  | ✓   | ✓   |
| 8  | Pentwater Capital Management LP              | \$77.6  |   | ✓   |
| 9  | Polar Capital LLP                            | \$66.2  | ✓   |   |
| 10 | Woodline Partners LP                         | \$64.6  | ✓   | ✓   |
| 11 | Goldman Sachs & Co. LLC                      | \$61.2  | ✓   | ✓   |
| 12 | Pictet Asset Management SA                   | \$55.1  | ✓   |   |
| 13 | Jennison Associates LLC                      | \$55.1  | ✓   |   |
| 14 | Driehaus Capital Management LLC              | \$43.8  | ✓   |   |
| 15 | Emerald Advisers LLC                         | \$41.0  | ✓   |   |
| 16 | SilverArc Capital Management LLC             | \$40.6  | ✓   | ✓   |
| 17 | Lord, Abbett & Co. LLC                       | \$37.6  | ✓   |   |
| 18 | American Century Investment Management, Inc. | \$34.5  | ✓   | ✓   |
| 19 | Marshall Wace LLP                            | \$30.8  | ✓   | ✓   |
| 20 | Parkman Healthcare Partners LLC              | \$29.5  | ✓   |   |
| 21 | BlackRock Advisors LLC                       | \$27.3  | ✓   | ✓   |
| 22 | Emerald Mutual Fund Advisers Trust           | \$25.2  | ✓   |   |
| 23 | Millennium Management LLC                    | \$23.1  | ✓   | ✓   |
| 24 | Morgan Stanley & Co. LLC                     | \$22.9  | ✓   | ✓   |
| 25 | Candriam Belgium SA                          | \$21.6  | ✓   |   |
| 26 | CIBC Asset Management, Inc.                  | \$20.6  | ✓   |   |
| 27 | Soleus Capital Management LP                 | \$19.1  | ✓   |   |
| 28 | Stacey Braun Associates, Inc.                | \$17.9  | ✓   |   |
| 29 | Teachers Advisors LLC                        | \$15.0  | ✓   | ✓   |
| 30 | TD Asset Management, Inc.                    | \$11.3  | ✓   |   |

Source: FactSet and William Blair Analysis as of December 31, 2024.

Note: The analysis does not include index funds, private brokerages, retail, management, strategic investors, and non-filers. \$ value position calculated based on Q3 2024 publicly disclosed institutional ownership of target company multiplied by announced per share acquisition price, excluding contingencies. Excludes deals <\$100 million.

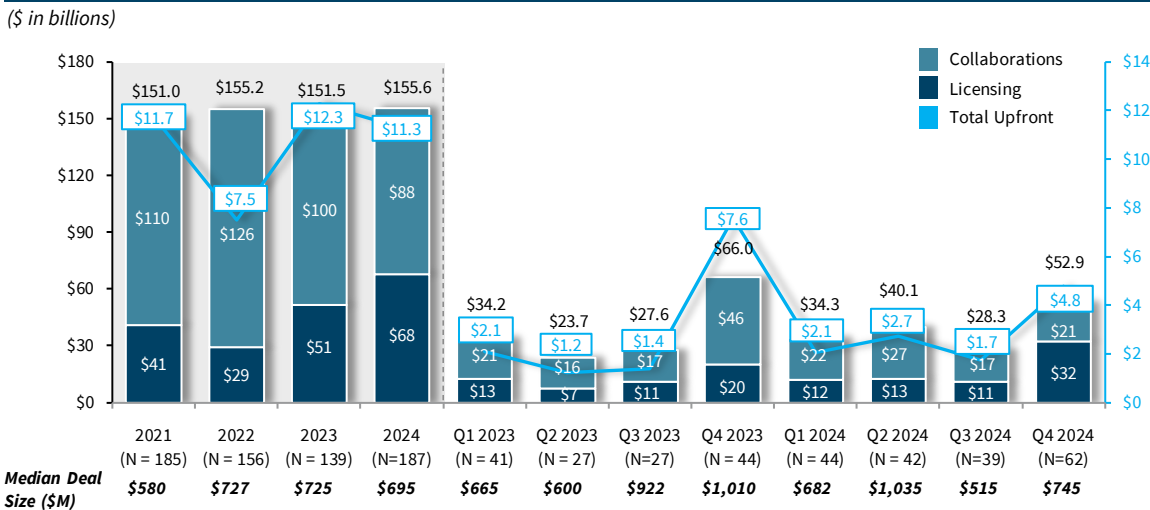
(1) Total estimated capital in millions returned to fund based on the cumulative \$ value position of all target companies for shareholders on all exchanges.



# 2024 Biopharma Partnership Trends

Overall activity rebounded in 2024 as pharma moved toward partnering (vs. M&A), with 187 deals announced totaling ~\$11.3 billion in upfront value. While the number of partnerships in 2024 is the highest since 2020, total upfront has fallen slightly since 2023

## Total Deal Value and Volume



## Key Takeaways

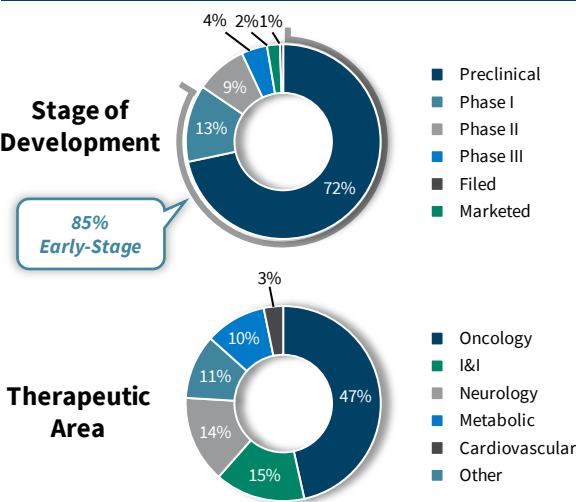
### Licensing (N=87)

- Median deal terms for licensing agreements in 2024:
  - Total Deal Value:** \$610M in 2024 (vs. \$680M in 2023)
  - Upfront (Cash+Equity):** \$45M in 2024 (vs. \$45M in 2023)
  - Milestones:** \$673M in 2024 (vs. \$595M in 2023)
- Continued interest in licensing assets from China, representing 31% of licensing in 2024, up from 23% in 2023
- Genetic medicine comprised 9% of partnerships in 2024, down from 24% in 2023

### Collaborations (N=100)

- Median deal terms for collaborations in 2024:
  - Total Deal Value:** \$755M in 2024 (vs. \$882M in 2023)
  - Upfront (Cash+Equity):** \$46M in 2024 (vs. \$55M in 2023)
  - Milestones:** \$810M in 2024 (vs. \$1,000M in 2023)
- RNA/oligo-focused deals represented 12% of transactions in 2024, up from 7% in 2023
- Early-stage collaborations totaled at 89 deals (89% of collaborations) this year with a median upfront of \$41M, the lowest level of activity since 2021

## Breakdown of Partnerships in 2024



## Most Active Partners in 2024

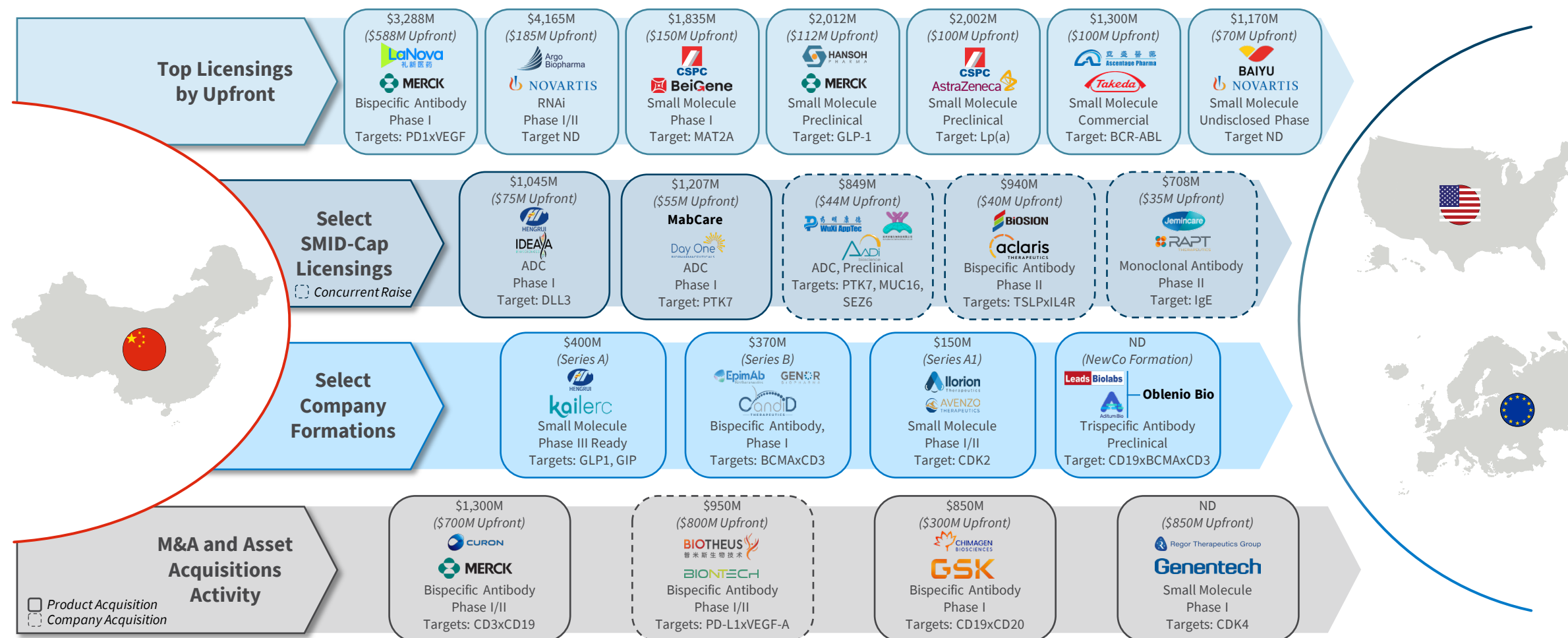
|                      |    | Median Upfront | Median TDV |
|----------------------|----|----------------|------------|
| NOVARTIS             | 15 | \$125          | \$1,238    |
| abbvie               | 9  | \$56           | \$1,453    |
| novo nordisk         | 8  | \$10           | \$531      |
| Boehringer Ingelheim | 7  | \$25           | \$607      |
| Lilly                | 6  | \$53           | \$1,070    |
| GSK                  | 6  | \$46           | \$1,005    |
| Roche                | 6  | \$50           | \$1,446    |
| Takeda               | 6  | \$130          | \$1,300    |

## Top 5 Partnerships by Total Upfront in 2024

| Date     | Licensor                  | Licensee             | Total Deal Value | Total Upfront | Milestones | Phase      | Therapeutic Area                     | Modality            | Target(s)  |
|----------|---------------------------|----------------------|------------------|---------------|------------|------------|--------------------------------------|---------------------|------------|
| 12/2/24  | PTC THERAPEUTICS          | NOVARTIS             | \$2,900          | \$1,000       | \$1,900    | Phase II   | Neurology                            | Small Molecule      | Huntingtin |
| 11/26/24 | arrowhead pharmaceuticals | SAREPTA THERAPEUTICS | \$1,025          | \$825         | \$250      | Phase I/II | Musculoskeletal, Neurology, Fibrosis | RNAi                | Multiple   |
| 11/14/24 | LaNova 礼新医药               | MERCK                | \$3,288          | \$588         | \$2,700    | Phase I    | Oncology                             | Bispecific Antibody | PD-1xVEGF  |
| 5/10/24  | novavax                   | sanofi               | \$1,200          | \$500         | \$700      | Commercial | Infectious Disease                   | Vaccine             | NA         |
| 7/2/24   | CUREVAC                   | GSK                  | \$1,558          | \$430         | \$1,128    | Phase II   | Infectious Disease                   | Vaccine             | NA         |

# China's Growing Role as an Important Innovation Engine for the West

- China-developed drugs drove over \$4.5 billion in upfront value in 2024 as large and small biopharma companies increasingly look towards the East for assets<sup>(1)</sup>
- Majority of activity focused on fast follower / best-in-class programs for validated targets



Source: Company press releases and websites, PitchBook Data, Inc., and SEC filings as of December 31, 2024.









































Note: Licensing transactions ordered by upfront payment size. M&A Activity and Select Company Formations shown in order of deal size. ND = Not Disclosed.

(1) Includes upfront payments from licensing and M&A deals occurred in 2024.

# Recap of Large Pharma Disruption and Deal Activity in 2024

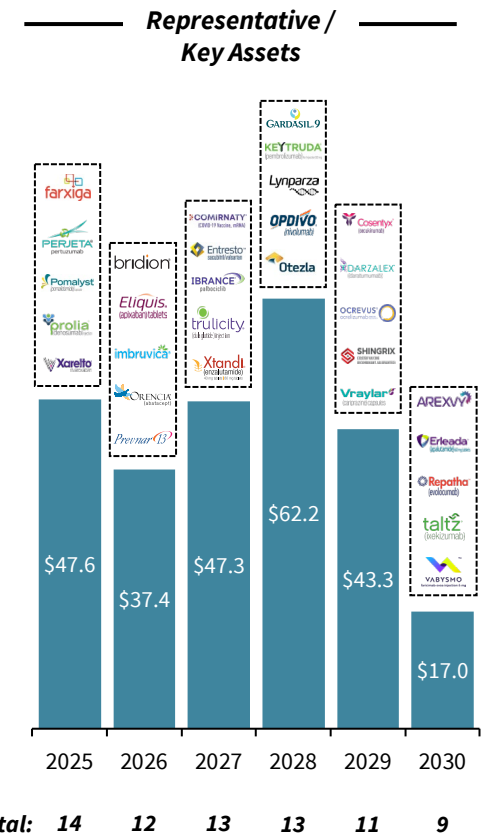
Most large pharmas saw significant disruption and changes during 2024, with approximately 2/3 having undergone a major restructuring, leadership change, and/or R&D strategy shift

## Summary of Recent Disruption, Deal Activity, and Upcoming LOEs by Large Pharma

| (\$ in millions)  |                    |          |                    |                     |   |  |   |   |   |   |
|---|--------------------|----------|--------------------|---------------------|---|--|---|---|---|---|
| Company   | Current Market Cap | Cash     | 2024 Market Cap Δ% | Major Restructuring | Major C-Suite Changes   | Key R&D Strategy Shifts  | 2024 M&A and Licensing Activity with \$500M+ Upfront                                  |   |   |   |
|   |                    |          |                    |                     |   |  | Q1  | Q2  | Q3  | Q4  |
|   |                    |          |                    |                     |   |  |   |   |   |   |
|    | \$695,134          | \$3,518  | +33%               |                     |   |  |   |   |  |   |
|    | \$383,380          | \$11,199 | (17%)              |                     |   |  |    |   |   |   |
|    | \$348,190          | \$20,297 | (8%)               | ✓                   |   |  |    |    |  |   |
|    | \$314,021          | \$7,285  | +15%               |                     | Appointed Rob Michael as CEO, Roopal Thakkar as CSO (July)      |  |   |   |  |   |
|    | \$251,648          | \$14,593 | (9%)               |                     |   |  |    |    |  |  |
|    | \$226,435          | \$9,809  | (3%)               | ✓                   | Departure of Ira Mellman, VP of Cancer Immunology (Aug.)        | Closing of Cancer Immunology research group  |   |   |  |  |
|    | \$203,167          | \$4,930  | (3%)               |                     |   |  |    |   |   |   |
|    | \$195,695          | \$13,851 | (6%)               | ✓                   |   |  |    |    |   |  |
|    | \$150,345          | \$9,953  | (8%)               | ✓                   | Appointed Chris Boshoff as CSO, amidst activist pressure (Nov.) | Expected to name a new head of R&D   |   |   |   |   |
|    | \$140,103          | \$9,011  | (9%)               |                     | Appointed Howard Chang as CSO (Nov.)                            |  |   |   |   |   |
|    | \$121,660          | \$7,579  | (2%)               | ✓                   | Departure of Franke Nestle, CSO & Head of Research (May)        | Immunology and pipeline prioritization under new R&D head Houman Ashrafian; ongoing C&R business divestiture |    |    |   |   |
|    | \$115,118          | \$6,697  | +14%               |                     | Appointed Dietmar Berger, previously at Sanofi, as CMO (Dec.)   |  |    |   |   |   |
|   | \$114,714          | \$8,094  | +10%               | ✓                   |   |  |   |   |   |   |
|  | \$76,639           | \$9,797  | (18%)              |                     |   |  |   |   |   |   |
|  | \$68,786           | \$4,305  | (9%)               |                     |   |  |  |   |   |   |
|  | \$42,155           | \$5,996  | (7%)               | ✓                   |   |  |   |   |   |   |
|  | \$22,283           | \$1,699  | (41%)              |                     |   |  |   |  |   |   |
|  | \$19,644           | \$7,070  | (46%)              | ✓                   | Christine Roth to lead new Global Commercialization org. (May)  |  |   |   |   |   |
|  | \$17,472           | \$2,045  | (19%)              | ✓                   |   |  |   |   |   |   |

## Value of Drug LOEs by Year

Represents 2023A Sales of Big Pharma Drugs Facing LOE from 2025-2030<sup>(2)</sup>  
(\$ in billions)



Source: PitchBook Data, Inc., CapIQ, Company filings, press releases and websites as of December 31, 2024.

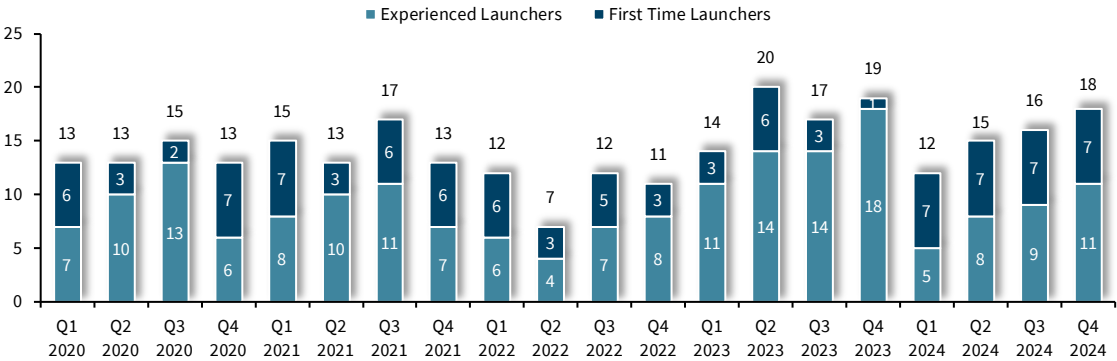
Note: LOE = Loss-of-exclusivity. LOE refers to first commercially significant patent expiry. Analysis includes products with >\$500 million in 2023 sales which face patent expiry between 2025 and 2030.

(1) Includes upfront payments from all M&A and licensing/collaboration activity during 2024. | (2) LOE based on 2023A sales figures of drugs with expected patent expiry from 2025-2030.

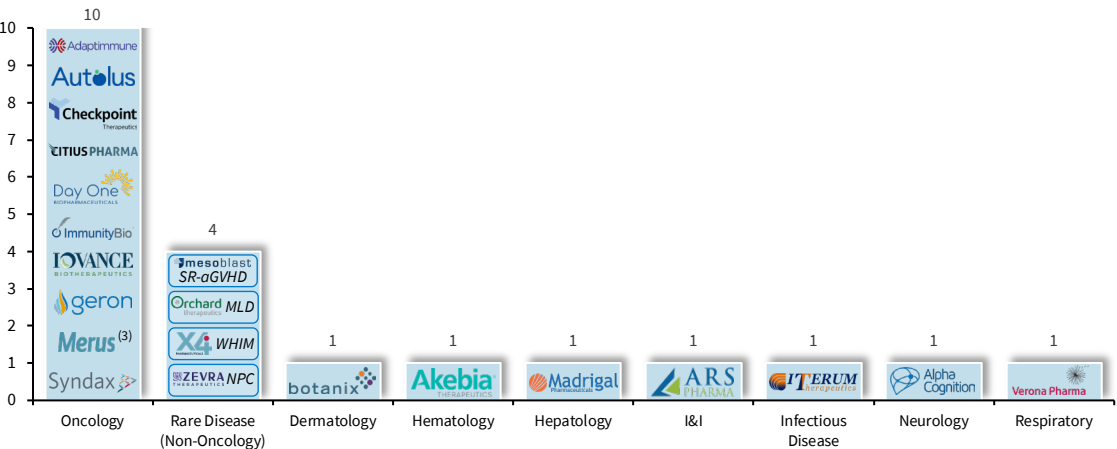
# FDA Approval and First-Time Launcher Trends

- 46% (28 out of 61) of the 2024 approvals are for first-time launching companies (FTLs); a significant increase compared to the 30% average over the past five years, representing on average 16 FTLs/year
- 19 upcoming key PDUFAs for SMID-cap biopharma companies in 2025

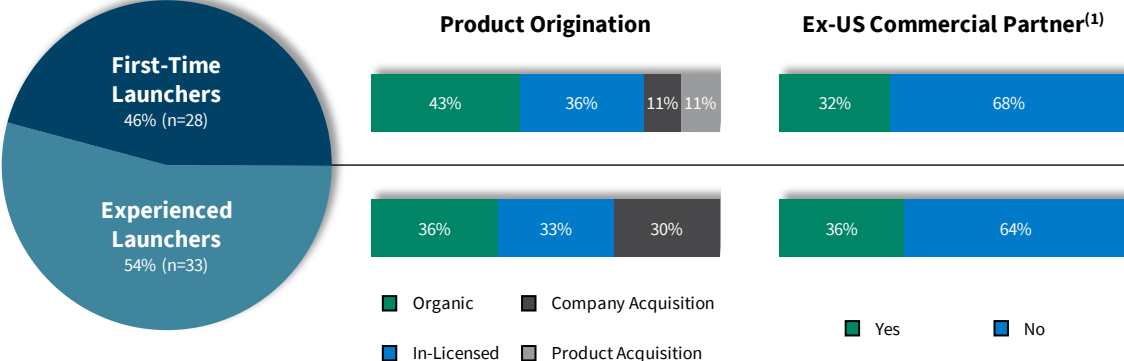
FDA Approvals by Quarter



Therapeutic Area Breakdown of 2024 SMID-Cap FTLs<sup>(2)</sup>



2024 Development and Commercialization Strategy Overview



Select Upcoming 2025 SMID-Cap PDUFA Dates

| Company      | Product                 | Indication                                 | Modality        | PDUFA Date |
|--------------|-------------------------|--|-----------------|------------|
| Atara        | Tab-cel                 | Epstein-Barr virus                         | Cell Therapy    | 1/15/2025  |
| Axsome       | AXS-07                  | Acute migraine                             | Small Molecule  | 1/31/2025  |
| Supernus     | SPN-830                 | Motor fluctuations in Parkinson's disease  | Small Molecule  | 2/1/2025   |
| SpringWorks  | Mirdametnib             | NF1-PN                                     | Small Molecule  | 2/28/2025  |
| Elevar       | Rivoceranib             | AMHC                                       | Small Molecule  | 3/20/2025  |
| Soleno       | Diazoxide choline       | Prader-Willi syndrome                      | Small Molecule  | 3/27/2025  |
| Milestone    | Etripamil               | Paroxysmal supraventricular tachycardia    | Small Molecule  | 3/27/2025  |
| Aldeyra      | Reproxalap              | Dry eye disease                            | Small Molecule  | 4/2/2025   |
| Abeona       | Pz-cel                  | Recessive dystrophic epidermolysis bullosa | Cell Therapy    | 4/29/2025  |
| Urogen       | Mitomycin               | Low-grade intermediate-risk NMIBC          | Small Molecule  | 6/13/2025  |
| KalVista     | Sebetralstat            | Hereditary angioedema                      | Small Molecule  | 6/17/2025  |
| Nuvation     | Taletrectinib           | Advanced ROS1+ NSCLC                       | Small Molecule  | 6/25/2025  |
| Unicycive    | OLC                     | Hyperphosphatemia in CKD                   | Small Molecule  | 6/28/2025  |
| Verastem     | Avutometinib+Defactinib | KRAS-mutant LGSOC                          | Small Molecule  | 6/30/2025  |
| PTC          | Sepiapterin             | Phenylketonuria                            | Small Molecule  | 7/29/2025  |
| Lenz         | Aceclidine              | Presbyopia                                 | Small Molecule  | 8/8/2025   |
| Ionis        | Donidalorsen            | Hereditary angioedema                      | Oligonucleotide | 8/21/2025  |
| Crinetics    | Paltusotine             | Acromegaly                                 | Small Molecule  | 9/25/2025  |
| Cytokinetics | Aficamten               | Obtrusive hypertrophic cardiomyopathy      | Small Molecule  | 9/26/2025  |

Source: FDA.gov, Company press releases, SEC Filings, and William Blair analysis as of December 31, 2024.  
Note: Reflects approvals and PDUFAs of NCEs/NMEs that are submitted via BLA/NDA (excluding diagnostics, biosimilars, generics, source plasma and 505b2s without clinical trial data). PDUFAs do not include label extensions or supplemental applications.  
(1) Representative of companies that have an ex-US commercial partner at time of launch.  
(2) Excludes private FTLs.  
(3) On December 2, 2024, Merus and Partner Therapeutics announced a license agreement for the commercialization of Zenocutuzumab in the US.

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## Healthcare Leveraged Finance



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