

William Blair

July 2024

The Quarterly Rx: Q2 2024 U.S. Biopharma Recap



Q2 2024 U.S. Biopharma Market Summary – Key Takeaways

After a furious rally in Q1 2024, overall biopharma capital markets and meaningful public company M&A activity slowed in the second quarter as major sector indices ended flat. Entering the traditionally slower summer months, investors remain focused on Fed policy with expectations now set for only one rate cut in 2024



Uneven Bars in the Public Markets

- Despite a strong start to the year, the biopharma sector pulled back in Q2 2024 as meaningful public company M&A slowed and poor aftermarket performance of recent secondary financings tempered investor enthusiasm
- Biopharma sector performance remains bifurcated as major GLP-1 players LLY and NVO have outpaced major indices in H1 2024, while 82 small-cap companies are still trading below cash
- Following the annual Russell rebalance in June, biopharma saw an uptick in overall weighting which should boost passive/index fund activity; however, investors are also digesting recent changes to XBI constituent weightings which favored large-cap over small/mid-cap stocks



It's a Marathon, not a Sprint, for Crossover Activity

- While the private financing market remains selective, average deal size increased 27% to \$94.3 million in Q2 2024 compared to Q1 2024
- The pace of “crossover” rounds continues to increase, with 14 deals announced in Q2 2024 for total proceeds of \$2.0 billion, marking two consecutive quarters of double-digit activity (the first time since Q3 2021)
- Rolling average of last 20 “crossover” deals indicates extended timelines since “pre-crossover” round (from 523 days in January 2022 to 726 days now), underscoring the moving goalposts to justify these financings as well as the challenges in syndicating them



Wrestling with a Quiet IPO Market

- Three IPOs priced in Q2 2024, raising a total of \$534 million in proceeds – all priced in the range, however, 2 of the 3 downsized and closed below issue price on day 1; shift towards early clinical-stage stories with 2 of 3 for companies that recently completed Phase I trials
- As crossover activity increases, we expect an uptick in IPOs heading into Q3 as issuers look to preempt the U.S. Presidential Election in November
- Rebound in healthcare SPAC IPOs with Perceptive-backed vehicle pricing in June and three additional filings made to close out the quarter
- Pace of reverse mergers picked back up in Q2 2024, with five transactions announced; however, interest in the asset class likely to wane in the aftermath of new SEC regulations going effective this summer that will make this path to the public markets less attractive



Follow-on Market Continues to Carry the Torch

- While overall secondary activity (follow-ons, PIPEs, RDs) slowed compared to last quarter's peak, a total of 55 deals priced in Q2 2024 raising a total of \$9.4 billion in proceeds, with a median deal size of \$107.5 million
- PIPE frenzy calmed following Q1 2024's record breaking activity as regulatory scrutiny has increased and investor sentiment for the product has tempered, however Registered Direct activity remains elevated as investors continue to push for highly concentrated allocations
- Aftermarket performance of recent follow-ons was mixed, with a median return of (1.4%) and 72.7% of offerings breaking issue within a month
- Clinical catalysts continue to drive equity offerings, with 7 of the top 10 movers successfully raising follow-on or PIPE capital post-data



Private Company M&A Breaking the Mold

- Meaningful public company M&A activity softened with only three deals announced for >\$1 billion in deal value
- Private company M&A dominated activity in Q2 2024, accounting for 71% (12/17) of all M&A deals this quarter and 63% (5/8) of transactions >\$1 billion in deal value, as a growing number of “highly likely to IPO” candidates elect to pursue the M&A route
- Notably, mid-cap and non-traditional pharma emerging as the “next-generation” of consolidators in biopharma in Q2 2024, accounting for 60% of all deals >\$500 million in upfront value and all of the meaningful public company M&A



Steady Surf of Licensing and Collaboration Activity

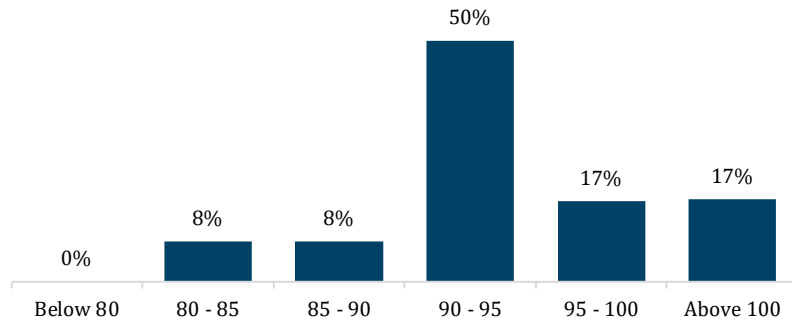
- Partnering activity remained largely in line with last quarter with 41 deals announced representing \$2.5 billion in upfront payments and \$40.1 billion in total deal value; 46% of these deals brought in over \$50 million in upfront
- Several late-stage co-development/co-commercialization deals announced, including Fulcrum/Sanofi and Gossamer/Chiesi
- Licensees are doubling down with existing partners, with 10% of all partnering deals this quarter representing an expansion or deepening of a prior relationship

2024 Mid-Year Investor Survey

Overall biopharma sentiment appears to have softened in recent months, but investors remain cautiously optimistic for the sector in H2 2024; Fed policy remains a key area of concern while few investors expect meaningful disruptions from the US Presidential Election barring any major shifts such as a change in nominee

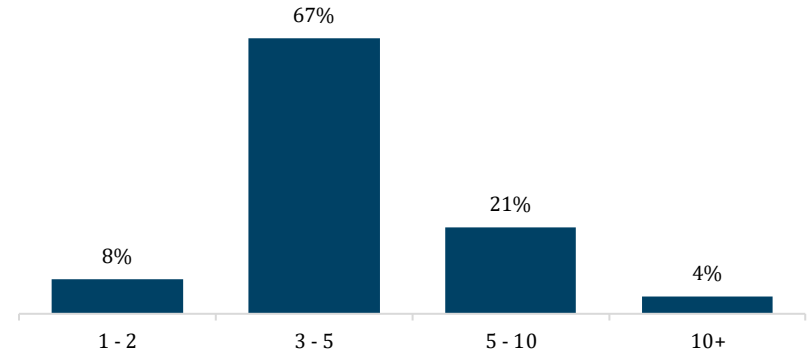
Majority Expect the XBI to Close the Year At or Above Current Levels

Where do you expect the XBI to end the year?



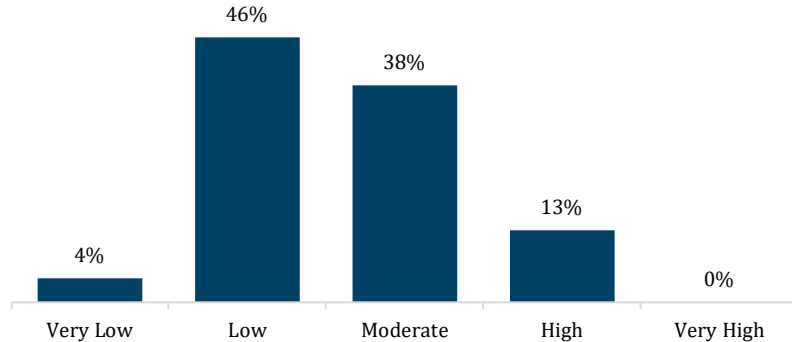
Low Expectations for Meaningful Public M&A in H2 2024

How many \$1B+ public biotech acquisitions do you anticipate in H2 2024?



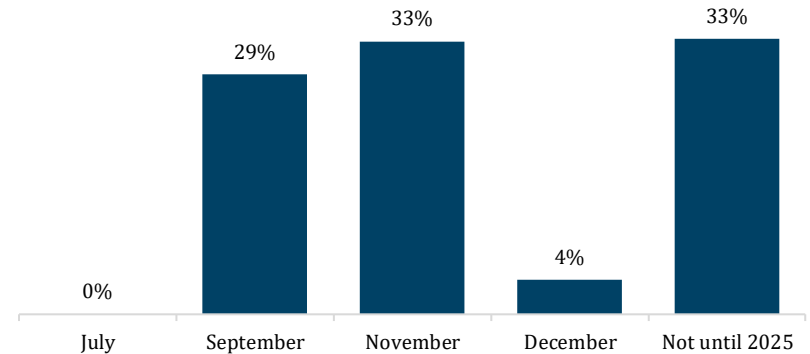
U.S. Presidential Election Not Viewed as Major Concern

What is your level of concern regarding the U.S. Presidential Election and its possible impact on biotech valuations?



Two-Thirds Still Expect the First Rate Cut from the Fed in H2 2024

When do you expect the first rate cut from the Fed?



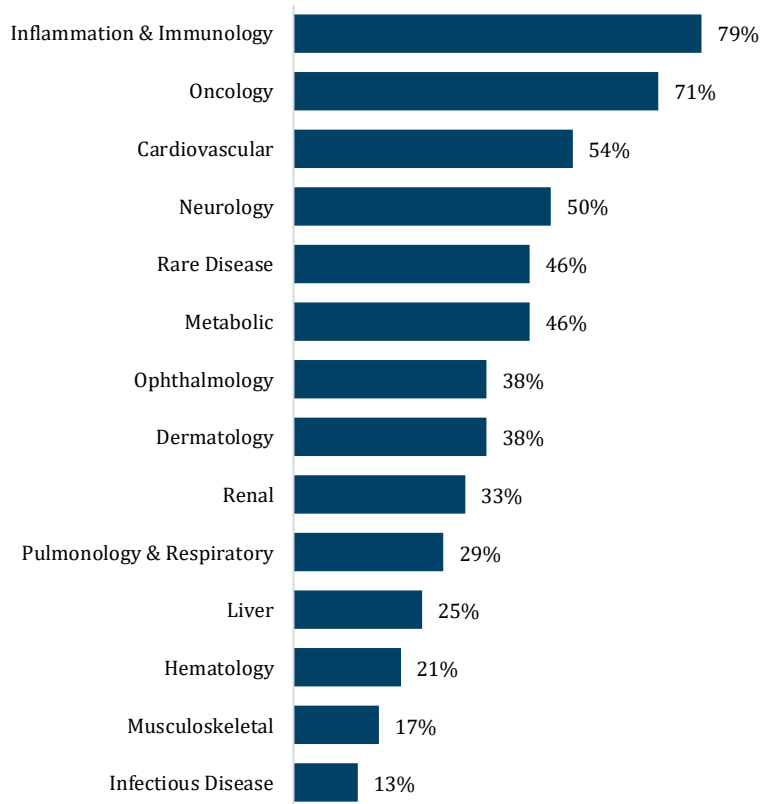
Note: Survey results based on responses gathered from individual investors at 24 unique funds which included mutual funds, long/short hedge funds, healthcare specialist funds, generalist long-only funds, and venture capital firms. Survey conducted in mid-June 2024.

2024 Mid-Year Investor Survey (cont'd)

Key areas of interest in biopharma have not changed materially as I&I and oncology remain center-stage along with novel approaches in ADCs and radiopharma; COVID-era hangover persists as infectious disease and vaccines generated less investor enthusiasm

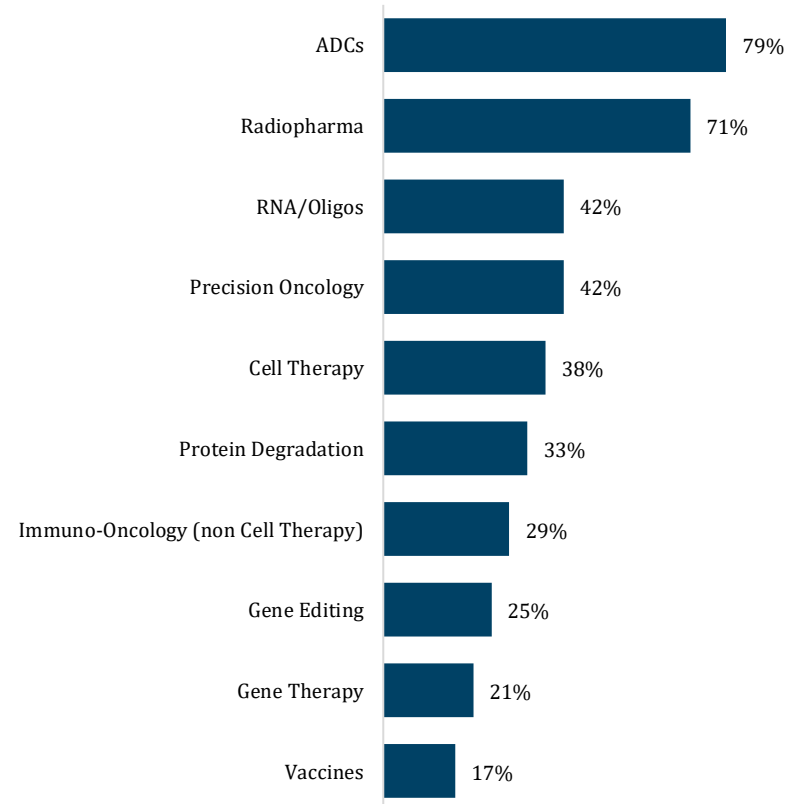
I&I and Oncology Remain Massively Favored While Interest in Infectious Disease Lags Post- COVID

% of respondents indicating high level of interest in select indication(s)



ADCs and Radiopharma Remain in Vogue While Caution Persists Around Gene Therapy/Editing

% of respondents indicating high level of interest in select modalities



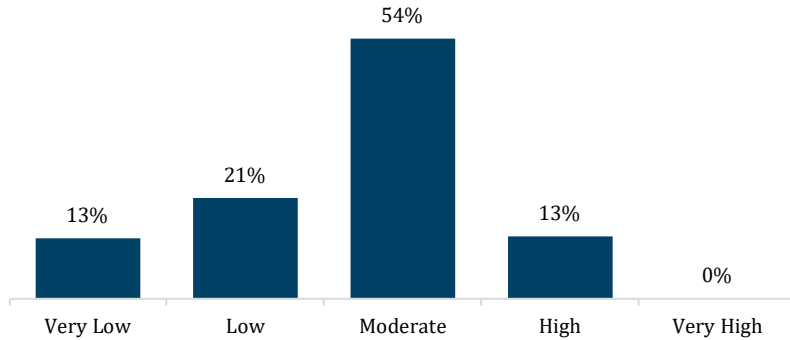
Note: Survey results based on responses gathered from individual investors at 24 unique funds which included mutual funds, long/short hedge funds, healthcare specialist funds, generalist long-only funds, and venture capital firms. Survey conducted in mid-June 2024.

2024 Mid-Year Investor Survey (cont'd)

Mixed performance of recent biopharma IPOs has tempered current appetite; however, enthusiasm for follow-on offerings (including PIPEs and registered directs) persists with investors emphasizing de-risked balance sheets (over half of respondents wanted companies to have 2+ years of runway following their next major catalyst)

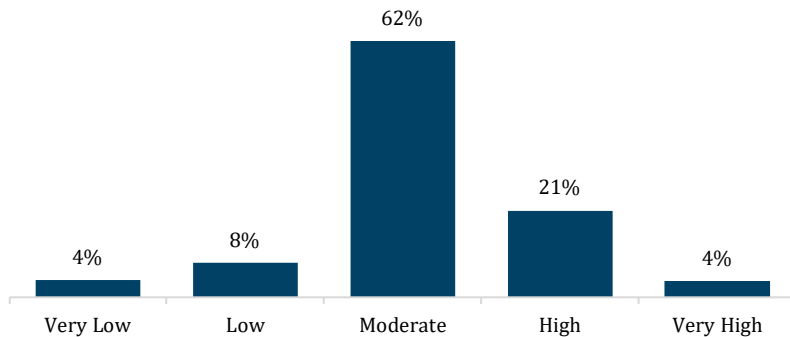
Interest in IPOs has Softened as Bar for Quality has Increased

What is your current appetite for biopharma IPOs?



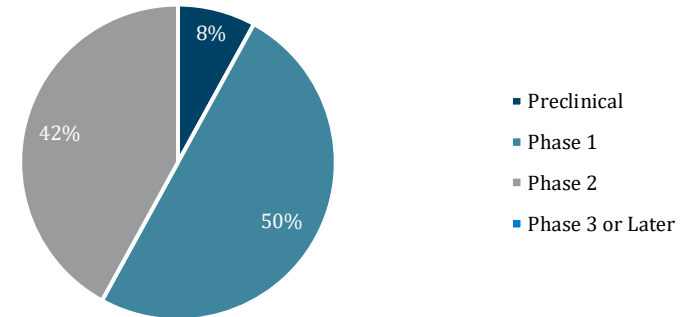
Continued Enthusiasm for Follow-Ons, with Majority (68%) Expecting Continued Elevated PIPE/RD Activity

What is your current appetite for biopharma follow-ons / registered directs / PIPEs?



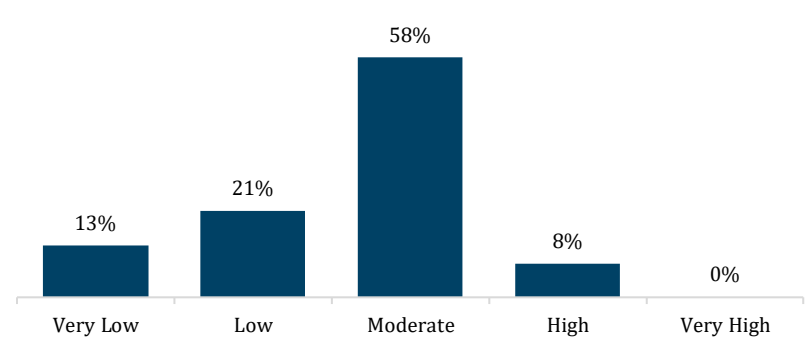
Strong Preference for IPO Candidates to Have a Clinical-Stage Program

What is the earliest stage lead asset you would be willing to invest in a biopharma IPO?



Crossover Appetite Muted as IPO Market Stalls

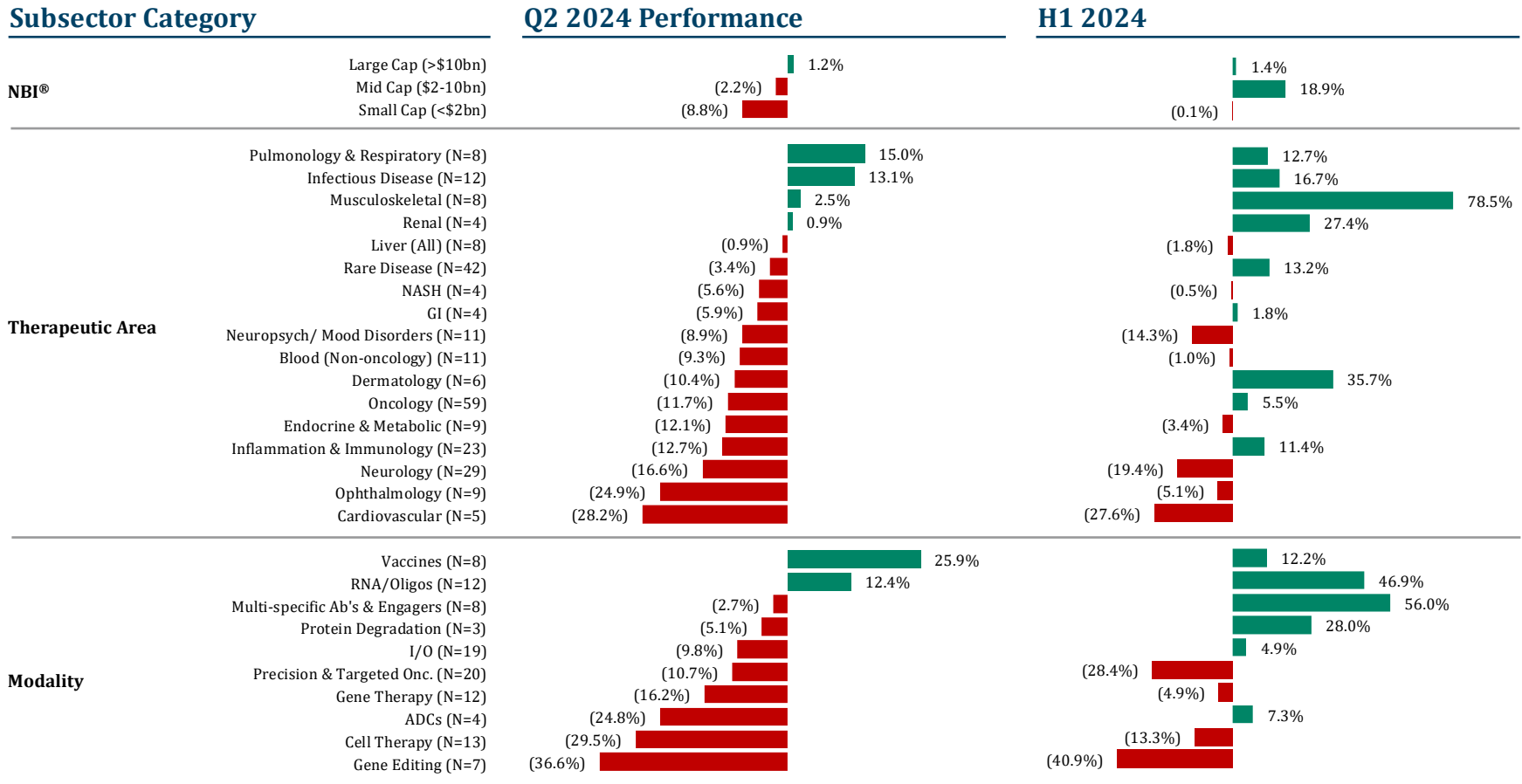
What is your current appetite for private biopharma crossover rounds?



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 in mid-June 2024.

NBI® Subsector Market Performance

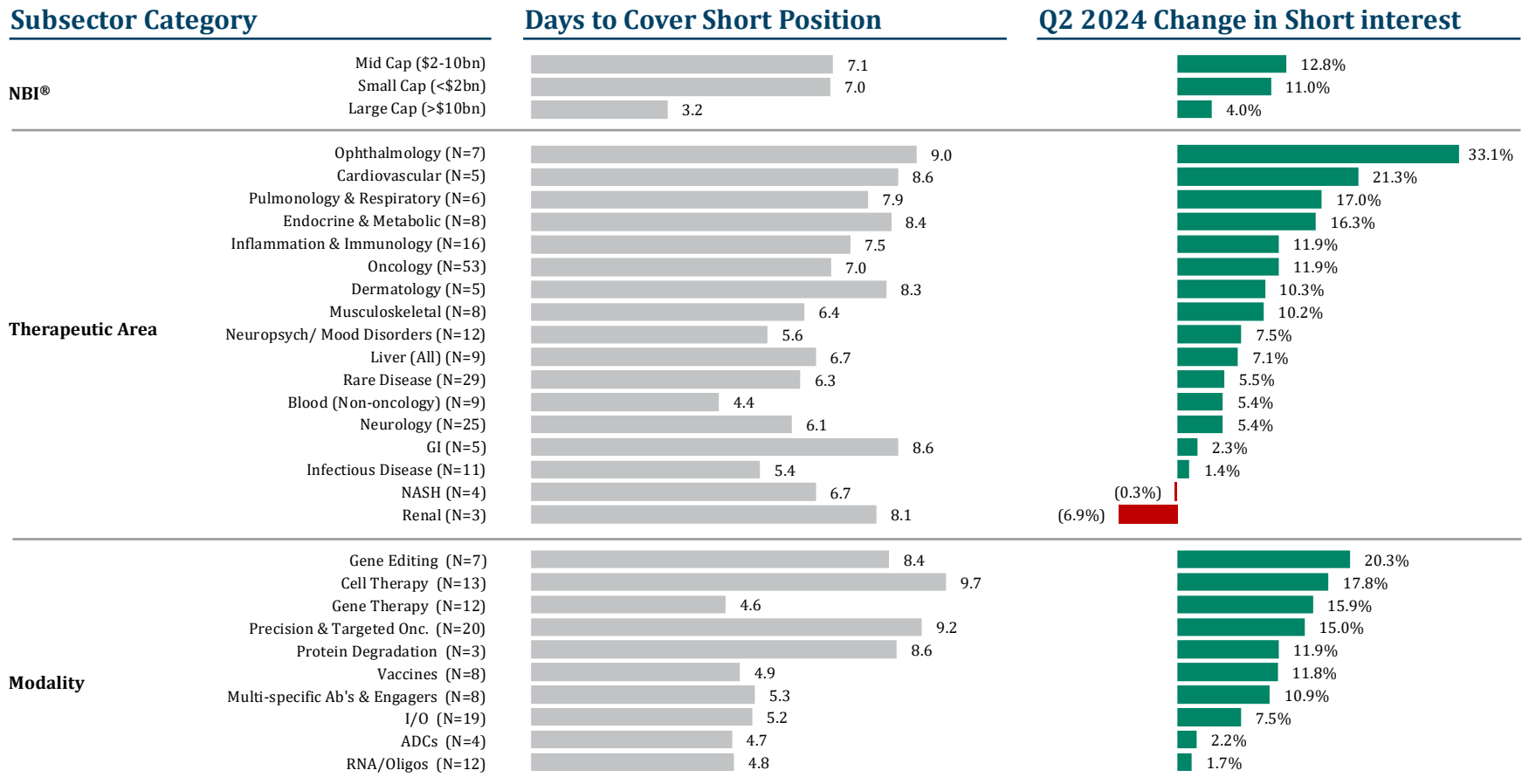
- After a Q1 2024 rally, biopharma pulled back in Q2 2024 across most market caps, therapeutic areas and modalities and the NBI® ended H1 2024 up 4.0%
- Pulmonology & respiratory and vaccines were the top performing therapeutic area and modality, respectively in Q2 2024; outperformance was driven by Insmed's Phase III trial results and Novavax's partnership with Sanofi



Note: Subsector indices are equally weighted and averaged. Includes NBI® constituents' as of June 30, 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 Q2 2024 Short Interest Trends

Investors looked to hedge their positions by increasing their short interest exposure in nearly all market caps, therapeutic areas and modalities in Q2 2024



Note: NBI® constituents are equally weighted and averaged. Includes NBI® constituents' as of June 30, 2024, and excludes non-therapeutic focused companies in the NBI®.

Days to cover short position calculated as total number of shares shorted / 30-day ADTV.

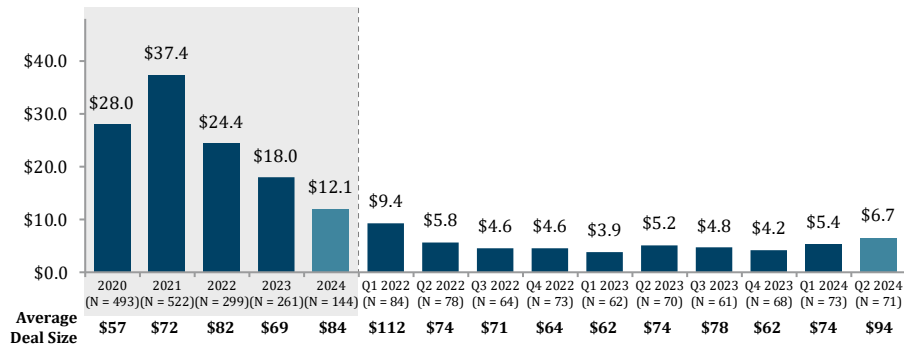
Source: FactSet, CapIQ, and William Blair internal reporting. Days to cover short position as of 6/15/24 settlement date. Short Interest change measured from 3/31/23 to 6/15/24 settlement dates.

Biopharma Private Financings Trends

- While the biopharma private financing market remains selective, there have been 71 transactions raising total proceeds of \$12.1 billion in H1 2024; average Q2 deal size jumped 27% to \$94.3 million, compared to Q1 2024
- Two consecutive quarters of double-digit crossover deal activity, the first time in over 2 years, expanding the pool of near-term IPO candidates

Total Proceeds and Deal Volume

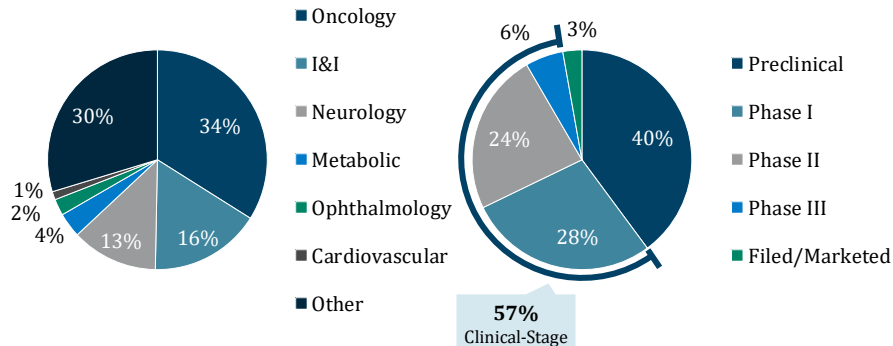
(\$ in billions)



H1 2024 Analysis by Therapeutic Area and Stage

Therapeutic Area

Stage of Development



Source: CapIQ, PitchBook Data, Inc., and SEC Filings as of June 30, 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.

(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).

Analysis by Series Round

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

Series Round	2022				2023				H1 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	\$47	152	11%	20%	\$38	115	25%	31%	\$57	53	21%	32%
Series B	\$69	93	13%	42%	\$51	93	26%	49%	\$51	49	33%	63%
Series C	\$90	37	8%	57%	\$90	33	12%	79%	\$53	30	30%	80%
Series D+	\$95	17	0%	88%	\$75	20	5%	85%	\$110	12	8%	83%
All Rounds	\$50	299	10%	36%	\$50	261	24%	49%	\$54	144	28%	57%

57% of financings for clinical-stage companies, demonstrating continued focus on de-risked assets

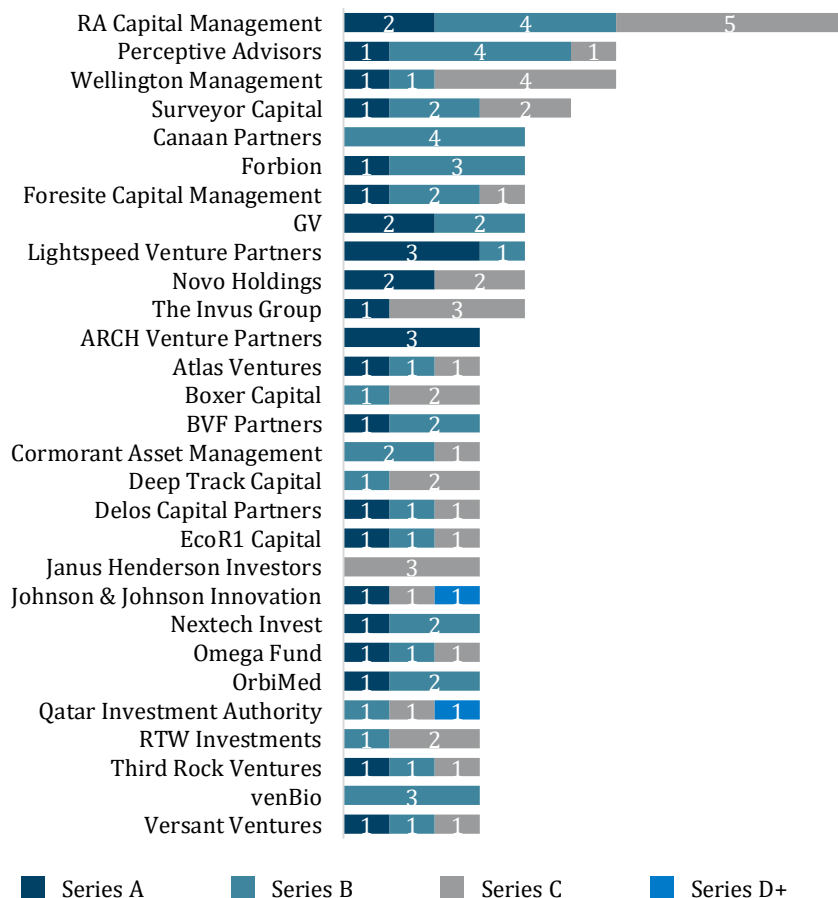
Crossover Deals Analysis⁽¹⁾

(\$ in millions)	Number of Deals	Median Deal Size	Median Pre-Money	Median Step-Up	Currently Public	Acquired
Q1 2021	33	\$106	\$226	2.1x	25	4
Q2 2021	19	\$125	\$250	2.2x	8	2
Q3 2021	21	\$100	\$260	1.7x	9	2
Q4 2021	8	\$120	\$150	3.1x	2	1
Q1 2022	11	\$115	\$350	1.6x	2	0
Q2 2022	7	\$125	\$145	1.8x	1	0
Q3 2022	5	\$133	\$370	1.2x	2	1
Q4 2022	4	\$135	\$129	2.0x	1	1
Q1 2023	9	\$135	\$161	1.3x	4	1
Q2 2023	6	\$150	\$480	1.7x	1	1
Q3 2023	12	\$164	\$260	1.3x	2	0
Q4 2023	7	\$101	\$184	1.0x	1	1
Q1 2024	11	\$145	\$313	1.0x	1	1
Q2 2024	14	\$145	\$213	1.4x	0	0

Q2 2024 Most Active Private Biopharma Investors and New Funds Closed

- Life sciences specialists continue to be the most active; notably, mutual funds have returned to the private markets, with Wellington and Janus leading the activity
- 26 new company launches in Q2 2024, including those funded by ARCH, GV, and F-Prime

Most Active Investors Across All Rounds



New Funds Closed

Investor Name	Fund Name	Close Date	Location	Fund Size (\$M)
FORESITE CAPITAL	Foresite Capital Fund VI	6/12/24	Larkspur, CA	\$900
SANDS CAPITAL	Life Sciences Pulse Fund III	5/14/24	Arlington, VA	\$555
J.P.Morgan ASSET MANAGEMENT	270 Life Sciences Private Capital Fund I	6/13/24	New York, NY	\$500
REGENERON	Regeneron Ventures Fund	4/15/24	Tarrytown, NY	\$500
Aditum Bio	Aditum Bio Fund III	5/31/24	Oakland, CA	\$400
Curie.Bio	Curie Bio Seed Fund I	6/26/24	Boston, MA	\$380
AMPLITUDE	Amplitude Ventures Biotech Fund	5/28/24	Montreal, Canada	\$192
BRANDON CAPITAL	Brandon Capital Fund VI	6/3/24	Melbourne, Australia	\$180
Canaan PARTNERS	Canaan XIII+ ⁽¹⁾	4/1/24	Menlo Park, CA	\$100

Source: PitchBook Data, Inc., and internal William Blair research as of June 30, 2024.

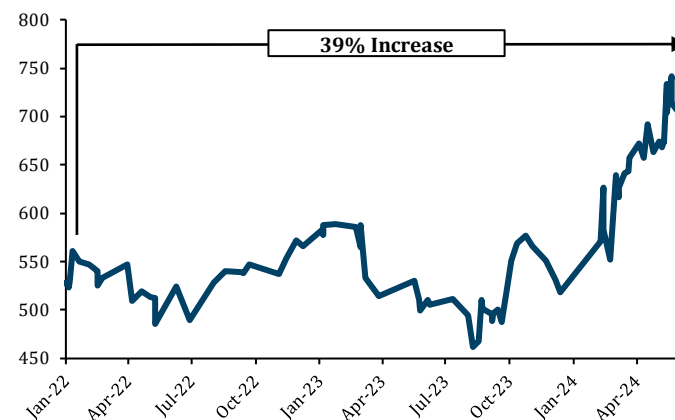
(1) Extension of previous Canaan XIII fund.

Q2 2024 Biopharma Crossover Financings

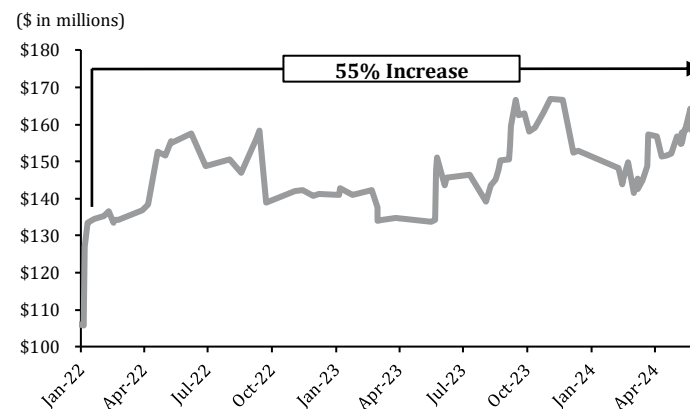
- Crossover financings have been primarily led by healthcare specialists, including TCGx and Goldman who both raised new funds in Q1 2024, with interest predominantly for clinical-stage companies; median deal size of \$145 million
- Since 2022, crossovers saw a 39% and 55% increase in days since prior round and average deal size, respectively

Deal Date	Company	Series	Deal Size	Lead Investors	Days Since Prior Round	Stage	Modality	Therapeutic Area
6/11/24	BRIGHT PEAK THERAPEUTICS	Series C	\$90	JGF	1,097	Preclinical	Antibody	Oncology
6/6/24	itm	Series D	\$204	TEMASEK	367	Phase III	Radiopharma	Oncology
5/21/24	ALTRUBIO	Series B	\$225	BVF PARTNERS L.P.	1,132	Phase IIa	Antibody	I&I
5/21/24	PHEON THERAPEUTICS	Series B	\$120	TCGX	601	Preclinical	ADC	Oncology
5/13/24	LYCIA	Series C	\$107	venrock	977	Preclinical	Protein Degradation	I&I
5/13/24	Ajax THERAPEUTICS	Series C	\$95	Goldman Sachs Asset Management	1,077	Preclinical	Small Molecule	Oncology / Hematology
5/9/24	Attovia	Series B	\$105	Goldman Sachs Asset Management	324	Preclinical	Antibody	I&I
5/9/24	Bluejay THERAPEUTICS	Series C	\$182	FRAZIER LIFE SCIENCES	632	Phase I/II	Antibody	Infectious Disease
5/7/24	Zenas BioPharma	Series C	\$200	DELOS CAPITAL NEA SR One NORWEST	547	Phase III	Antibody	I&I
5/2/24	bridgebio (Oncology)	Not Disclosed	\$200	Cormorant Asset Management OMEGA FUNDS	ND	Phase I	Small Molecule	Oncology
4/24/24	ENDEAVOR THERAPEUTICS	Series C	\$133	MATRIX CAPITAL MANAGEMENT	823	Phase IIa	Small Molecule	Fibrosis / Pulmonology
4/16/24	AsherBio	Series C	\$55	RACAPITAL	958	Phase Ia/Ib	Protein	Oncology
4/10/24	T ORL BIOTHERAPEUTICS	Series B – Extension	\$158	DEEP TRACK CAPITAL	363	Phase I	ADC	Oncology
4/3/24	OBSIDIAN THERAPEUTICS	Series C	\$161	WELLINGTON MANAGEMENT*	937	Phase I/II	TIL Cell Therapy	Oncology

Rolling Average of Last 20 Crossover Deals by... Days Since Prior Round



Average Deal Size

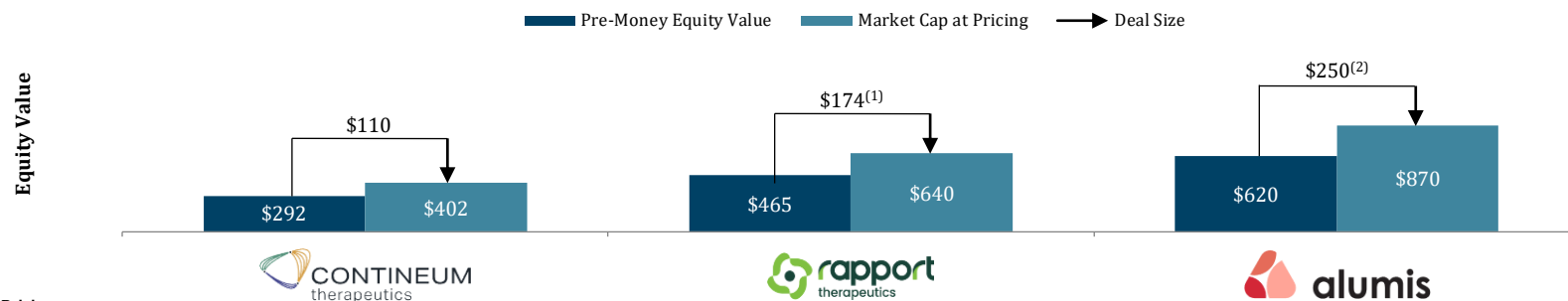


Note: Includes crossover rounds for companies that have completed an IPO as well as crossover rounds where the next round of financing will likely be an IPO: either a \$50M+ raise (Series B onwards) or a \$100M+ raise (Series A) with multiple crossover and/or large mutual funds in the syndicate). Lead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

Q2 2024 Biopharma IPOs

- As expected, slower IPO activity in Q2 2024 as companies navigated year-end financial staleness; all 3 IPOs priced in range; however, both Contineum and Alumis downsized and closed below issue price on day 1
- While bias for clinical stage stories remains, emerging interest in early-stage clinical assets, with two out of three of this quarter's IPOs for companies that completed Phase 1 trials and did not yet have clinical proof-of-concept data

(\$ in millions)



Deal Overview At Pricing

	CONTINEUM	rapport	alumis
Pricing Date	4/4/24	6/6/24	6/27/24
Offer Price	\$16.00	\$17.00	\$16.00
Enterprise Value	\$167	\$272	\$378
Step-Up	1.07x	1.18x	1.09x
Initial File/Offer vs. Range	In Range	In Range	In Range
Deal Value as % of Market Value	27.4%	27.3%	28.8%

Key Pre-IPO Investors

Baker Brothers, Perceptive, Samsara, **Sectoral**, Versant

ARCH, **Cormorant**, Fidelity, Johnson & Johnson, Sofinnova, T. Rowe, **Third Rock**

Baker Brothers, Cormorant, Nextech, **Matrix Capital**, **Foresite**, **Samsara**, **venBio**

Post-IPO Performance

Offer/1 Day	(3.8%)	22.4%	(16.9%)
Offer/Current	10.1%	36.8%	(16.9%)

Lead Asset at Pricing

	CONTINEUM	rapport	alumis
Name	PIPE-791	RAP-219	ESK-001
Phase	Phase I complete	Phase I complete	Phase II complete
Therapeutic Area	Fibrosis & I&I	Neurology	Immunology
Modality	Small molecule	Small molecule	Small molecule
Indication	IPF, PPMS/SPMS	Focal epilepsy, Bipolar disorder, Peripheral neuropathic pain	Psoriasis, Systemic lupus erythematosus
Next Major Catalyst (Months)	ND	12 to 15	18 to 30

Source: CapIQ, Dealogic, FactSet and SEC Filings as of June 30, 2024. ND = Not Disclosed. NA = Not Applicable.

Note: All valuations performed on basic share count basis. Includes U.S. IPOs only. Excludes best efforts IPOs and IPOs less than \$25 million in gross proceeds.

Lead investors of prior private financing rounds in bold.

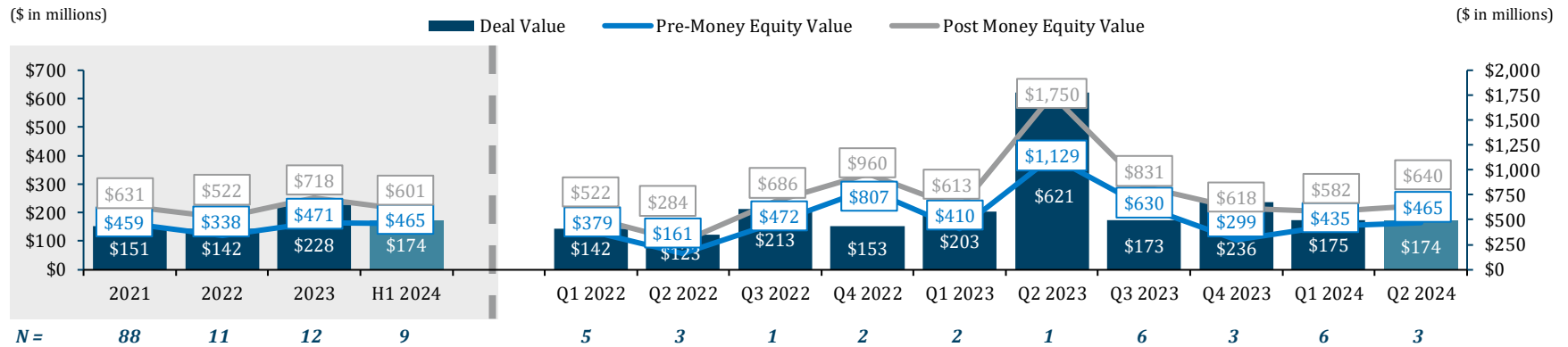
(1) Deal size includes proceeds from a concurrent PIPE in which 1,058,824 shares of common stock were sold at the public offering price of \$17.00.

(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.

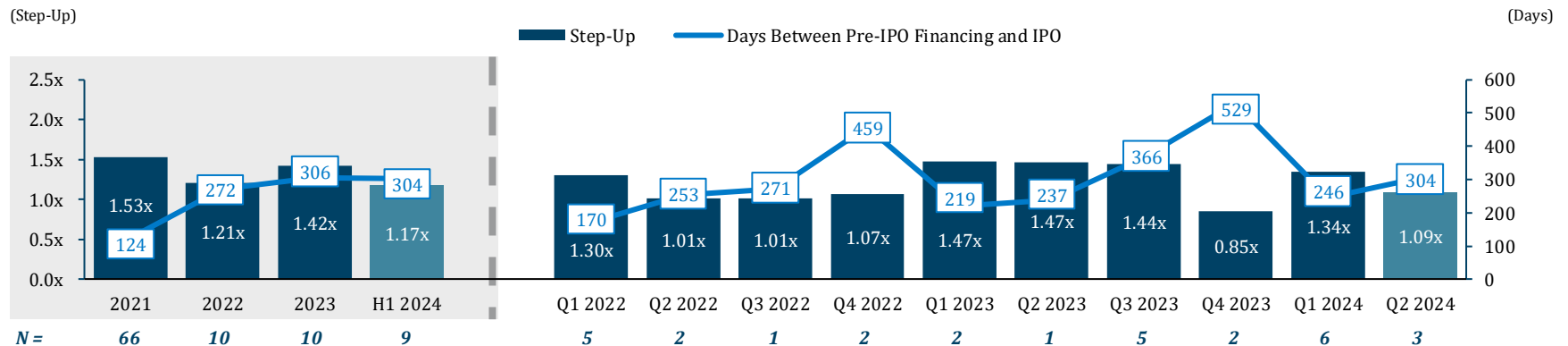
Biopharma IPO Trends

- Median IPO step-ups in Q2 2024 fell to 1.1x with days between pre-IPO financing to IPO increasingly slightly in line with 2023 levels
- Confidential IPO backlog continues to build with expectations for increasing number of public filings this summer as issuers position themselves for the pre-U.S. Presidential Election window

Deal Sizing and Valuation



Pre-IPO-Financing-to-IPO Metrics⁽¹⁾



Note: Represents median values. Includes U.S. IPOs only. Excludes best efforts IPOs. Excludes IPOs less than \$25 million in gross proceeds.

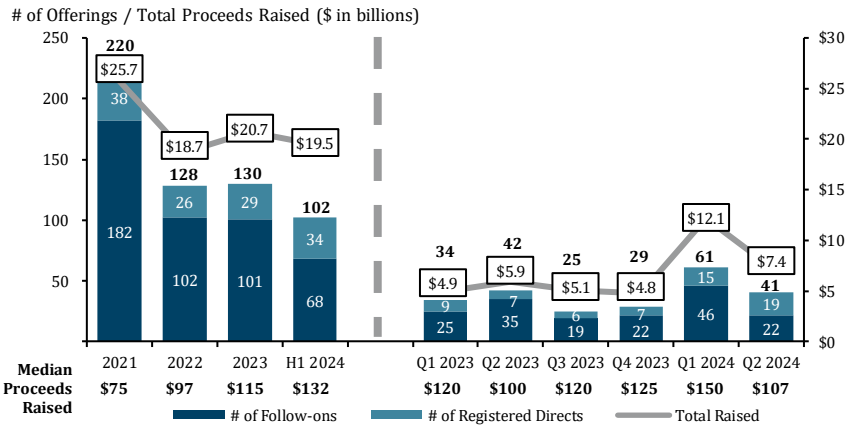
Source: CapIQ, Dealogic, FactSet, and SEC Filings as of June 30, 2024. Note: All valuations performed on basic share count basis.

(1) Pre-IPO-Financing rounds defined as pre-IPO financings completed with multiple crossover and/or large mutual funds in the syndicate.

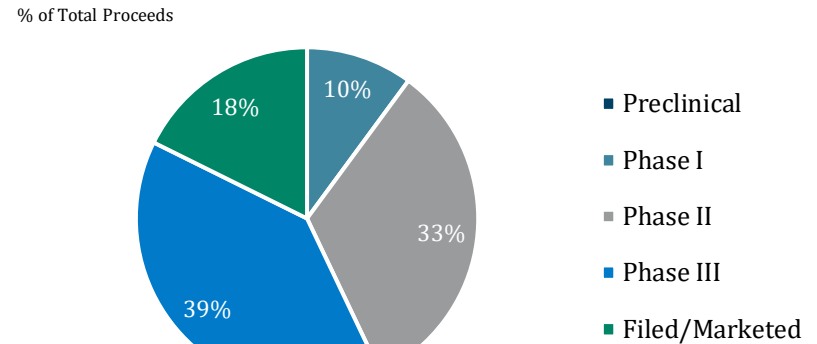
Biopharma Follow-on & Registered Direct Trends

- Follow-on and registered direct activity slowed in Q2 2024 from Q1 highs, with 41 deals raising \$7.4 billion
- Median proceeds raised fell to \$107.0 million in Q2 2024 from all time highs in Q1 2024 of \$150.0 million
- Issuers have increasingly elected to complete registered directs in H1 2024, as the financing strategy retains many of the benefits of a confidentially marketed follow-on while allowing for more tightly concentrated investor allocations

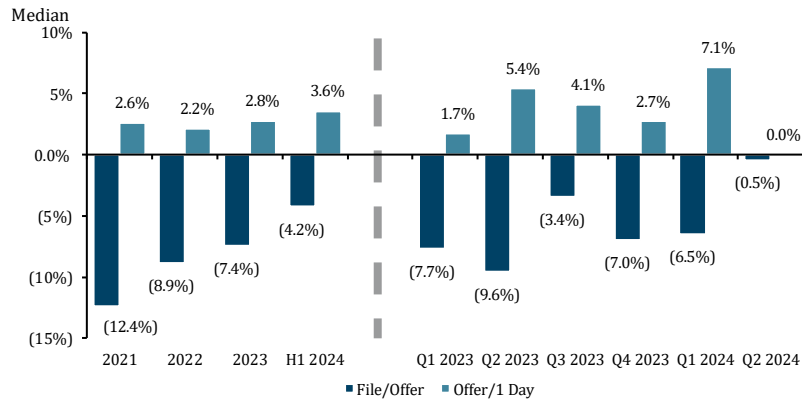
Deal Volume



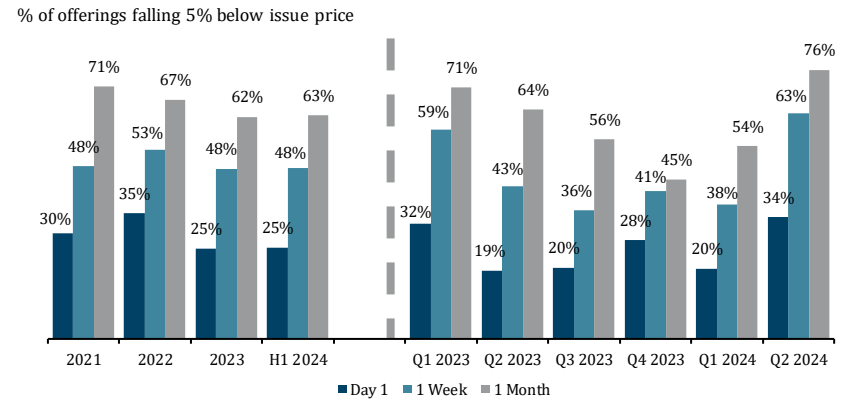
100% of Offerings for Clinical-Stage Companies



1-Day Performance has Fallen from Q1 Performance



A Significant % of Offerings Broke Issue Price in Q2 2024



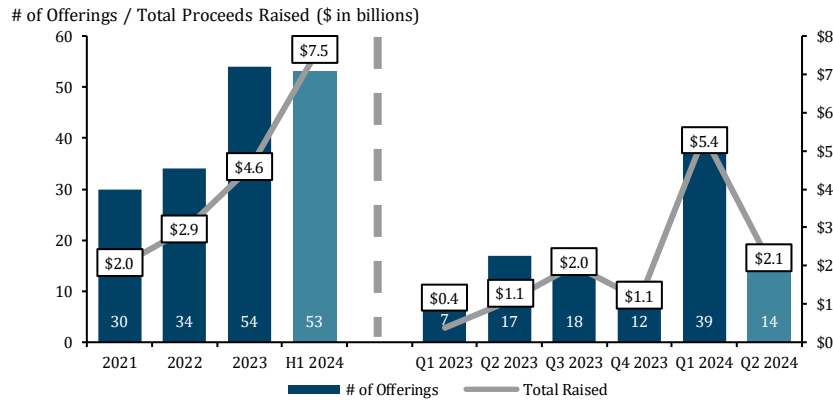
Note: Includes fully marketed follow-on offerings, confidentially marketed follow-on offerings, bought deals, and registered directs. Excludes PIPEs and offerings with gross proceeds below \$20 million. Median Pricing and Performance includes offerings with warrants.

Source: Dealogic as of June 30, 2024.

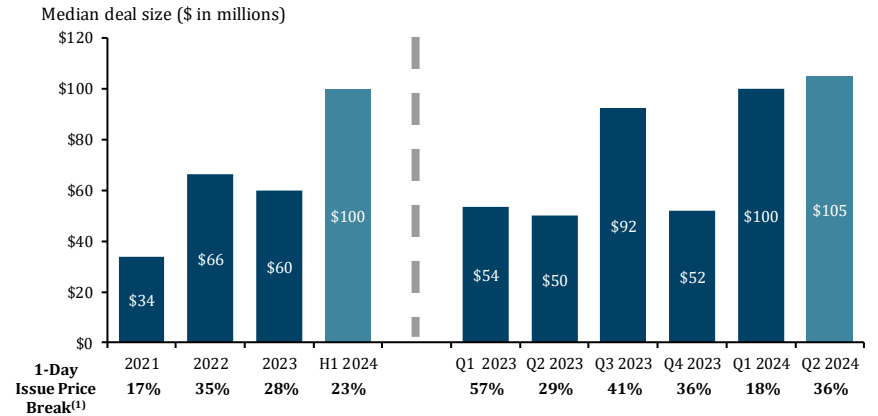
Biopharma PIPE Activity

- PIPE activity has steadily retreated from February/March 2024 highs
- This decrease is due to reduced capital returned to investors as public company M&A softened, coupled with increased regulatory scrutiny impacting the market

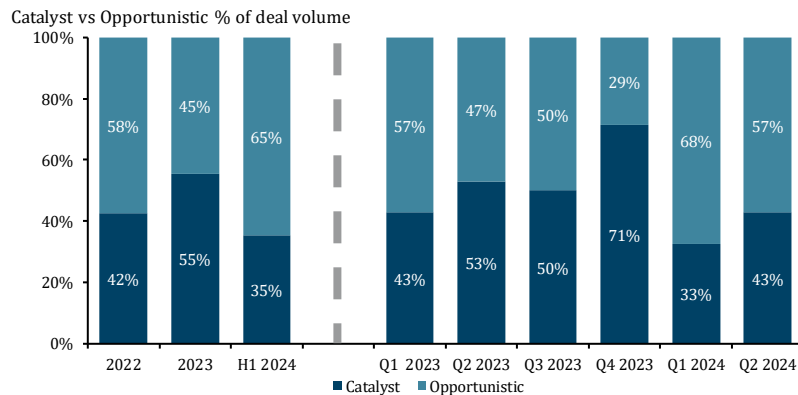
Deal Activity has Already Eclipsed Last Year's Total



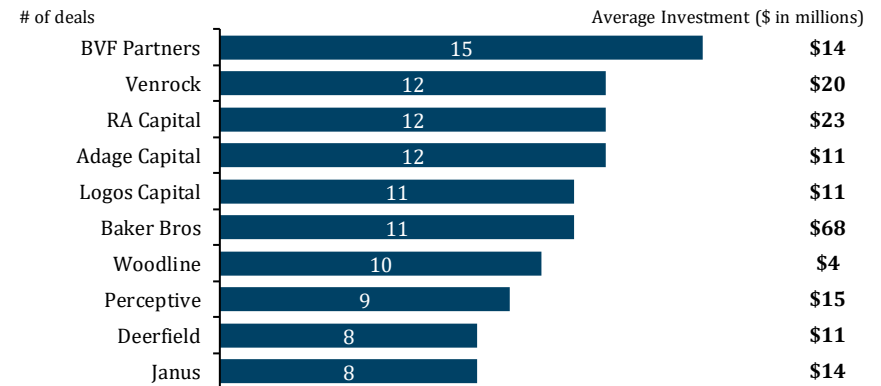
Offerings Remain Large; Aftermarket Performance Has Moderated



Investors are Reversing into Companies more Frequently



Top PIPE Investors in H1 2024⁽²⁾



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

Source: Dealogic and SEC filings as of June 30, 2024.

(1) Includes transactions where intra-day low fell more than 5.0% below offer price.

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

2023-2024 YTD Strategic Alternatives Outcomes

Q2 2024 experienced the highest rate of reverse merger activity since the start of 2023, along with a steady pace of company liquidations; appetite for reverse mergers likely to be impacted in light of new SEC regulations

Announced Outcome	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Total
Reverse Merger Traditional reverse mergers with private companies							20 Deals
Public-Public Merger Public-public mergers following strategic alternatives reviews							4 Deals
Acquisition Program or full company buyouts following strategic alternatives reviews							16 Deals
Chapter 11/ Closure/ Delisting Voluntary delisting/ liquidation/ dissolving							37 Co.'s
# of Outcomes	13	17	10	14	14	10	78

Source: SEC Filings, Company Press Releases, and William Blair analysis as of June 30, 2024. Note: outcomes are categorized by quarter of announcement.

- (1) Jounce entered into agreement to be acquired by Concentra Biosciences for \$1.85 per share, plus additional CVR consideration, after terminating merger agreement with Redx announced on February 23, 2023.
- (2) 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 and will focus exclusively on progressing its lead asset, Abecma.
- (3) On March 1, 2024, Kinnate entered into an asset purchase agreement with Pierre Fabre Laboratories for global rights to exafrenib and other pan-RAF program assets.
- (4) DMK Pharma reverse merged with Adamis in February 2023, prior to its liquidation.










Venture Debt in Biopharma

Venture debt⁽¹⁾ market looks to stay hot for the summer as lender competition remains strong for an increased number of borrowers seeking non-dilutive financing sources

Market Overview

- After a slowdown in 2023, the venture debt market is experiencing a much more active 2024
- With more stability in interest rates and a desire to minimize dilution, demand for venture debt in the second quarter was extremely strong
 - Cash interest rates for venture loans remained relatively stable in 2Q24
- 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
- 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 2024

H1 2024 Venture Debt⁽¹⁾ Financings for Public Biopharma Companies

Date	Company	Available at Close	Total Facility ⁽²⁾	Interest Rate	LTM at Close ⁽³⁾		Market Cap at Close	Debt / Mkt Cap	Facility / Mkt Cap	Phase of Development
					Revenue	EBITDA				
05/15/24	 Adaptimmune	\$25	\$125	9.65%	\$18	(\$184)	\$317	7.9%	39.4%	BLA Filed
05/14/24	Apellis	\$375	\$478	11.10%	\$524	(\$402)	\$5,000	7.5%	9.5%	Commercial
05/09/24	 Coherus	\$39	\$39	13.35%	\$302	(\$157)	\$243	15.9%	15.9%	Commercial
05/02/24	 Werewolf Pharmaceuticals	\$30	\$60	10.30%	\$16	(\$44)	\$264	11.4%	22.8%	Phase I
04/30/24	 Trisalus Therapeutics	\$25	\$50	13.83%	\$22	(\$55)	\$249	10.0%	20.1%	Phase I
04/23/24	 Tarsus	\$75	\$200	12.10%	\$43	(\$155)	\$1,264	5.9%	15.8%	Commercial
04/10/24	 ZEVRA Therapeutics	\$60	\$100	12.35%	\$28	(\$55)	\$206	29.1%	48.6%	Commercial
03/18/24	 bluebirdbio	\$75	\$175	12.40%	\$22	(\$132)	\$278	27.0%	63.1%	Commercial
01/08/24	 Abeona Therapeutics	\$20	\$50	13.50%	\$4	(\$44)	\$145	13.8%	34.6%	BLA Filed
01/02/24	 Verona Pharma	\$50	\$400	11.19%	\$0	(\$66)	\$1,617	3.1%	24.7%	NDA Filed
Mean (N=10)		\$77	\$168	11.98%	\$98	(\$129)	\$958	13.2%	29.5%	
Median		\$45	\$113	12.23%	\$22	(\$99)	\$271	10.7%	23.8%	
Minimum		\$20	\$39	9.65%	\$0	(\$402)	\$145	3.1%	9.5%	
Maximum		\$375	\$478	13.83%	\$524	(\$44)	\$5,000	29.1%	63.1%	

Source: CapIQ, PitchBook Data, Inc., and SEC filings as of June 30, 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.

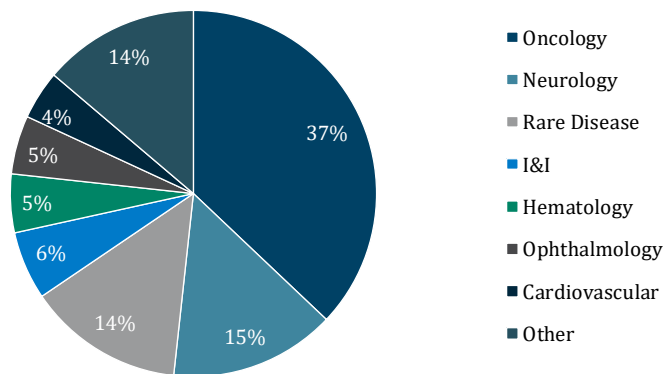
Q2 2024 Clinical Catalysts Analysis

- 7 of the top 10 movers successfully raised catalyst-driven follow-on offerings or PIPEs post-data
- Positive results from Alnylam's highly anticipated Phase III HELIOS-B trial provided a much needed win for the sector
- Two-thirds of clinical catalysts this quarter in oncology, neurology, and rare disease, with oncology leading the way driven by data at ASCO and other medical conferences

Key Takeaways

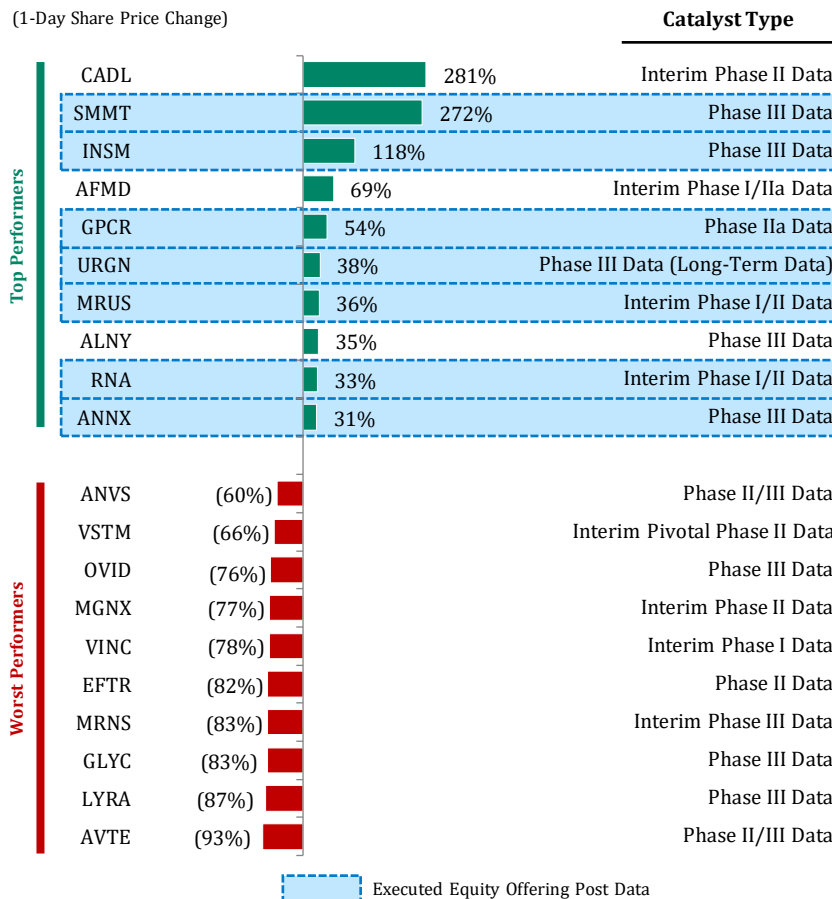
- William Blair analyzed 116 key clinical data readouts in Q2 2024 for U.S.-listed biopharma companies with a market cap between \$10M-\$30B
- Average stock price performance for "positive" clinical data (N=92):
 - 1-day performance: **+4.2%**
 - 1-week performance: **+1.5%**
- Average stock price performance for "negative" clinical data (N=24):
 - 1-day performance: **(44.9%)**
 - 1-week performance: **(46.3%)**
- 22 Phase III / pivotal trial readouts in Q2 2024 (of which 17 were positive)
- Despite overall muted average stock price performance for "positive" catalysts, **~\$18.0 billion in cumulative market cap gained** across all clinical catalysts, driven by key Phase III readouts by Alnylam Pharmaceuticals, Intra-Cellular Therapies, Insmed and Summit Therapeutics

Breakdown of Clinical Catalysts by Therapeutic Area



Top 10 Positive/Negative Movers

(1-Day Share Price Change)

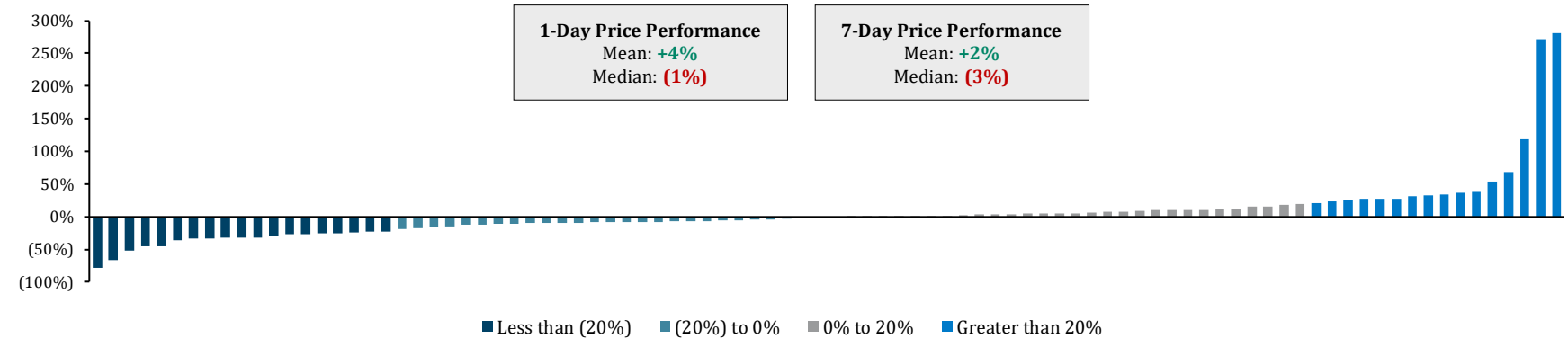


Q2 2024 Positive/Negative Clinical Catalyst Performance Detail

17% of positive clinical catalysts had a >20% one-day stock price movement, while 75% of negative clinical catalysts experienced a one-day price decline greater than 20%

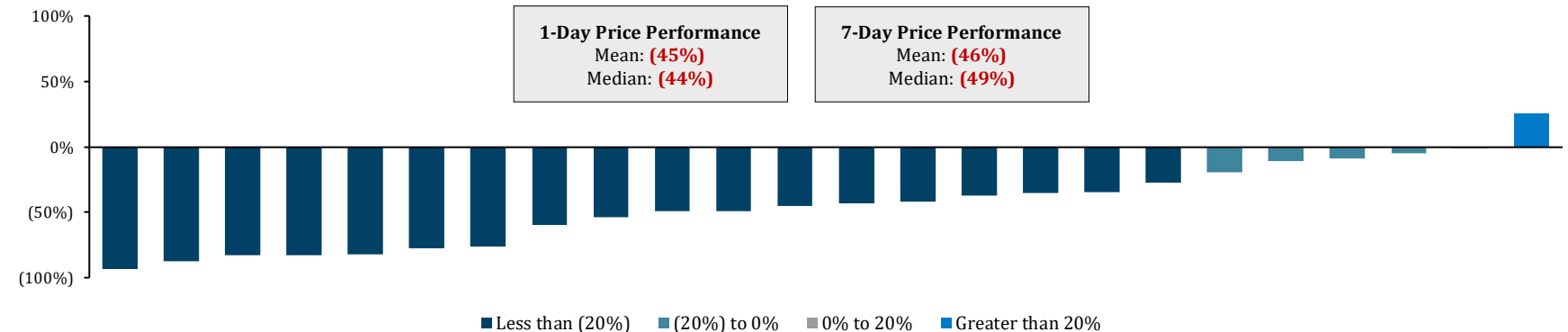
Performance Following a Positive Clinical Catalyst

1-Day Share Price Change (N=92)



Performance Following a Negative Clinical Catalyst

1-Day Share Price Change (N=24)



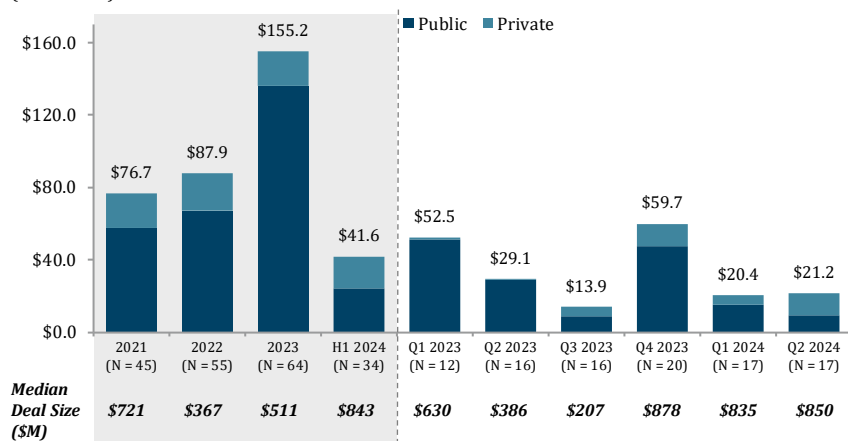
Note: Includes biopharma companies listed on major U.S. exchanges with market capitalization >\$10M and <\$30 billion at the time of catalyst. Positive/negative based on Company press releases.
Source: FactSet, Company press releases, SEC Filings and William Blair analysis as of June 30, 2024.

Q2 2024 Biopharma M&A Recap

- Continued strong pace of meaningful M&A as tuck-in acquisitions remain preferred, with 8 transactions announced in Q2 2024 for >\$1B in deal value; the majority (5/8) were of private companies
- Q2 saw continued interest in radiopharma, with Mariana Oncology representing the 6th transaction announced LTM
- Renal was a key area of interest for public M&A and Merck entered the ophtho space with its acquisition of EyeBio

Total Deal Value & Volume

(\$ in billions)



Key Takeaways

- Higher median Q2 2024 total deal values and upfront values compared to 2023:
 - Total Deal Value:** \$850M in Q2 2024 (vs. \$511M in 2023)
 - Upfront (Cash + Equity):** \$1,000M in Q2 2024 (vs. \$248M in 2023)
 - Milestones:** \$648M in Q2 2024 (vs. \$200M in 2023)
- Significant uptick in private company M&A, representing 71% (12/17) of deals in Q2 2024 (vs. 47% in Q1 2024), the highest proportion compared to any quarter in the last 3 years
- Fewer late-stage/commercial-stage acquisitions, with 29% (5/17) of deals in Q2 2024 involving lead assets in Phase III or later, continuing a trend seen in Q1 2024
 - Notably, 29% (5/17) of transactions were for preclinical stage companies
- Continued interest in renal, I&I and oncology focused companies across both public and private M&A from market leaders Abbvie, J&J, Merck, and Novartis, representing 71% (12/17) of all M&A deals this quarter
- J&J paid sizable upfronts in the acquisition of Yellow Jersey Therapeutics (\$1,250M) and Proteologix (\$850M) for two early-stage, bispecific antibody assets in the I&I space targeting IL4Rα x IL-31 and IL-13 x TSLP, respectively

Q2 2024 M&A Activity Detail

(\$ in millions)

Public Company Transactions

Date	Target	Acquiror	Total Deal Value	Total Upfront	Premium to Last Unaffected Date	Phase	Therapeutic Area	Modality
06/26/24	Agile Therapeutics	INSUD PHARMA	\$45	\$45	355%	Marketed	Women's Health	Drug Delivery
06/24/24	Alimera	ANI Pharmaceuticals Inc.	\$407	\$381	75%	Marketed	Ophthalmology	Small Molecule
05/28/24	Calliditas	Asahi KASEI	\$1,060	\$1,060	83%	Marketed	Renal, I&I	Small Molecule
04/29/24	Deciphera	ONO PHARMA	\$2,400	\$2,400	75%	Marketed	Oncology	Small Molecule
04/10/24	ALPINE Immune Sciences	VERTEX	\$4,900	\$4,900	67%	Phase II	Renal, I&I	Peptide

Private Company Transactions

Date	Target	Acquiror	Total Deal Value	Total Upfront	Phase	Therapeutic Area	Modality
06/27/24	CelsiUS	abbvie	\$250	\$250	Phase I	I&I	Monoclonal Antibody
06/06/24	elsie	GSK	\$50	ND	Preclinical	ND	Oligonucleotide
05/29/24	EyeBio	MERCK	\$3,000	\$1,300	Phase Ib/IIa	Ophthalmology	Trispecific Antibody
05/28/24	Yellow Jersey Therapeutics	J&J	\$1,250	\$1,250	Phase I	I&I	Bispecific Antibody
05/22/24	HI-Bio	Biogen	\$1,800	\$1,150	Phase II	Renal, I&I	Monoclonal Antibody
05/16/24	PROTEOLOGIX	J&J	\$850	\$850	Preclinical	I&I	Bispecific Antibody
05/02/24	Mariana Oncology	NOVARTIS	\$1,750	\$1,000	Preclinical	Oncology	Radiopharma
04/30/24	epygenix	H3 HARMONY	\$680	\$35	Phase III	Neurology	Small Molecule
04/23/24	escient	Incyte	\$750	\$750	Phase Ib/II	I&I	Small Molecule
04/11/24	CLADE Therapeutics	CENTURY	\$35	\$35	Preclinical	I&I, Oncology	Cell Therapy
04/05/24	Abceutics Inc	MERCK	\$208	ND	Preclinical	Oncology	ADC
04/03/24	ProfoundBio	Genmab	\$1,800	\$1,800	Phase II	Oncology	ADC

Increasing M&A Activity from “Next-Generation” Acquirers in Biopharma

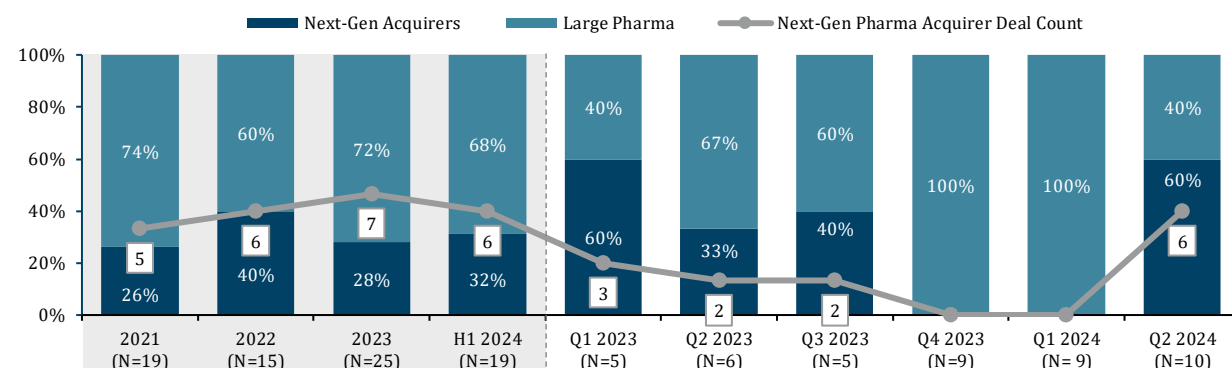
- Mid-cap and non-traditional pharma are emerging as the “next-generation” of consolidators in biopharma
- Activity from this cohort peaked in Q2 2024 compared to big pharma, representing 60% of transactions with \$500M-\$10B in upfront payments

Key Takeaways

- Next-generation acquirer activity hit a record high (in terms of deal value and count) compared to the prior 5 quarters for transactions that had upfront payments of \$500M-\$10B
- 100% (3/3) of public M&A deals in Q2 2024 for over \$500M in upfront payments were announced by this cohort:
 - **Asahi Kasei** acquired Calliditas in May 2024, its first acquisition in over four years
 - **Vertex** acquired Alpine Immune Sciences in April 2024, its largest M&A deal to-date
 - **ONO Pharmaceuticals** acquired its first company, Deciphera Pharmaceuticals, in April 2024
- 42% (3/7) of private M&A deals in Q2 2024 for over \$500M in upfront payments were announced by next-gen acquirers; including Biogen, Genmab and Incyte
- These emerging consolidators are sitting on meaningful cash reserves (average pro forma adjusted cash of \$3.8 billion), thus paving the way for further M&A and/or stock buybacks as these companies face shareholder pressure to deploy this capital (e.g. Incyte’s \$2.0 billion buyback in May 2024)
- We expect continued regulatory scrutiny of select biopharma M&A transactions, as evidenced by some of the actions in the past year, creating opportunity for this emerging cohort of consolidators

Activity Among Next-Gen Pharma Acquirers for Deals with \$500M - \$10B Upfront

Proportion of Activity by Deal Count



Select Next-Generation Emerging Acquirers

(\$ in billions)

Company	Market Cap	Current Cash ⁽¹⁾	LTM Revenue	Recent Select Acquisitions
VERTEX	\$121.0	\$10.2	\$10.2	ALPINE Immune Sciences
moderna	\$45.5	\$8.5	\$5.2	
Biogen	\$33.8	\$1.1	\$9.7	REATA HI-Bio
Alnylam	\$30.7	\$2.4	\$2.0	
UCB	\$28.1	\$0.9	\$5.7	
argenx	\$26.0	\$3.2	\$1.5	
BIONTECH	\$19.3	\$16.9	\$3.0	
Genmab	\$15.9	\$2.0	\$2.6	ProfoundBio
BIOMARIN	\$15.6	\$1.0	\$2.5	
BeiGene	\$15.1	\$2.8	\$2.8	
NEUROCRINE	\$13.9	\$1.2	\$2.0	
Incyte	\$13.6	\$1.4	\$3.8	escient
IPSEN	\$10.1	\$0.6	\$3.7	Albireo

Source: PitchBook Data, Inc. Company press releases and websites as of June 30, 2024.




Note: M&A activity in chart only includes biopharma deals with upfront deal values of \$500M-\$10B.

(1) Cash as of 3/31/2024 pro forma adjusted for any equity raises, M&A activity or share buybacks.

Summary of Investor Capital Returned from Q2 2024 Public Biopharma Acquisitions

Public biopharma acquisitions announced in Q2 2024 freed up an estimated \$5.2 billion in institutional investor capital⁽¹⁾

(\$ in millions)

#	Institution	Total Estimated Capital Returned to Fund ⁽²⁾			
1	Decheng Capital LLC	\$540.7	✓		
2	Avoro Capital Advisor LLC	\$375.4	✓		
3	Frazier Life Sciences Management LP	\$240.8	✓		✓
4	T. Rowe Price Associates, Inc.	\$196.8	✓		
5	Cormorant Asset Management LP	\$175.5	✓		
6	OrbiMed Advisors	\$174.2	✓		
7	Armistice Capital LLC	\$151.0			✓
8	Lynx1 Capital Management LP	\$146.5	✓		
9	Paradigm BioCapital Advisors LP	\$137.9	✓		
10	Redmile Group LLC	\$135.6			✓
11	Deerfield Management Co. LP	\$131.3			✓
12	Darwin Global Management Ltd.	\$128.8	✓		
13	Linc AB	\$117.2		✓	
14	BVF Partners LP	\$113.5		✓	
15	Commodore Capital LP	\$89.4	✓		
16	Polar Capital LLP	\$82.8		✓	✓
17	Octagon Capital Advisors LP	\$80.7	✓		
18	Morgan Stanley & Co. LLC	\$78.6	✓	✓	✓
19	Avidity Partners Management LP	\$76.4	✓		
20	Great Point Partners LLC	\$73.4	✓		
21	Franklin Advisers, Inc.	\$71.2	✓		✓
22	Goldman Sachs & Co. LLC	\$50.1	✓		✓
23	D. E. Shaw & Co. LP	\$40.8	✓		✓
24	Charles Schwab IM Inc.	\$35.6	✓		✓
25	Vivo Capital LLC	\$33.8	✓		
26	First Light Asset Management LLC	\$32.6	✓		
27	Janus Henderson Investors US LLC	\$28.2	✓		✓
28	Sofinnova Partners SAS	\$27.6		✓	
29	Emerald Advisers LLC	\$26.7			✓
30	Eventide Asset Management LLC	\$26.6	✓		

(1) Includes public biopharma acquisitions >\$500mm in upfront cash.

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

\$ value position calculated based on Q1 2024 publicly disclosed institutional ownership of target company multiplied by publicly disclosed latest announced per share acquisition price, excluding contingencies.

The following acquisitions were analyzed: Vertex Pharma acquires Alpine Immune Sciences for \$65.00/share, Asahi Kasei acquires Calliditas Therapeutics for \$19.66/share, and Ono Pharma acquires Deciphera Pharma for \$25.60/share.

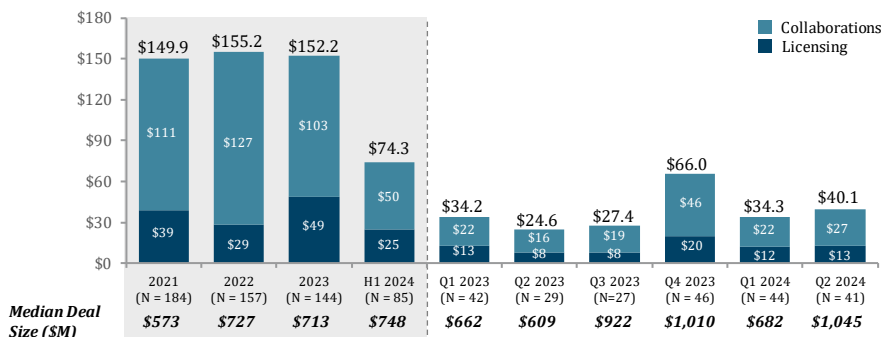
Source: FactSet and William Blair Analysis as of June 30, 2024. The analysis does not include index funds, private brokerages, retail, management, strategic investors, and non-filers.

Q2 2024 Biopharma Partnership Trends

- Overall activity remained in line with Q1 2024, with 41 deals announced for a total of over \$2.5 billion in upfront value
- 10% of all partnering deals this quarter were between companies with a prior / existing relationship
- Most active partner was Takeda (N=4), closely followed by Ipsen, AbbVie, and Sanofi (N=3)

Total Deal Value and Volume

(\$ in billions)



Key Takeaways

Licensings (N=15)

- Median deal terms for licensing agreements in Q2 2024:
 - **Total Deal Value:** \$1,075M in Q2 2024 (vs. \$680M in 2023)
 - **Upfront (Cash+Equity):** \$100M in Q2 2024 (vs. \$45M in 2023)
 - **Milestones:** \$955M in Q2 2024 (vs. \$95M in 2023)
- Later-stage deals comprised 27% of licensings in Q2 2024, up from 20% in 2023
- Neurology deals accounted for 20% of licensings in Q2 2024, an increase from 15% in 2023
- Vaccine-focused partnerships comprised 13% of licensings in Q2 2024, compared to just 2% in 2023

Collaborations (N=26)

- Median deal terms for collaborations in Q2 2024:
 - **Total Deal Value:** \$1,045M in Q2 2024 (vs. \$882M in 2023)
 - **Upfront (Cash+Equity):** \$50M in Q2 2024 (vs. \$55M in 2023)
 - **Milestones:** \$988M in Q2 2024 (vs. \$1,008M in 2023)
- Two later-stage, co-development and commercialization deals announced (Gossamer/Chiesi and Fulcrum/Sanofi), representing a total upfront of \$240M and nearly \$1.5B in cumulative total deal value
- Early-stage collaborations represented 73% of deals, bringing in a median upfront payment of ~\$45 million; these transactions continue to be a meaningful source of non-dilutive capital for biopharma companies

Source: Company press releases and SEC filings as of June 30, 2024.

Note: Excludes regional partnerships and partnerships with undisclosed deal terms. Later-stage defined as Phase II or later. NA= Not Applicable. ND = Not Disclosed.

Top Partnerships by Total Upfront in Q2 2024

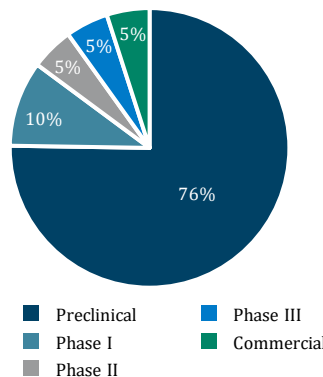
(\$ in millions)

Date	Licensor	Licensee	Total Deal Value	Total Upfront	Milestones	Phase	Therapeutic Area	Modality
5/10/24	novavax	sanofi	\$1,200	\$500	\$700	Commercial	Infectious Disease	Vaccine
4/30/24	PeptiDream	NOVARTIS	\$2,890	\$180	\$2,710	Discovery	Oncology	Radiopharma
5/06/24	gossamerbio	Chiesi	\$486	\$160	\$326	Phase III	Cardiovascular	Small Molecule
6/13/24	futureGen	abbvie	\$1,710	\$150	\$1,560	Preclinical	I&I	Monoclonal Antibody
5/10/24	242	SHIONOGI	ND	\$150	ND	Phase I	Rare Disease	Small Molecule
4/11/24	ARVINAS	NOVARTIS	\$1,160	\$150	\$1,010	Phase II, Preclinical	Oncology	Protein Degradation

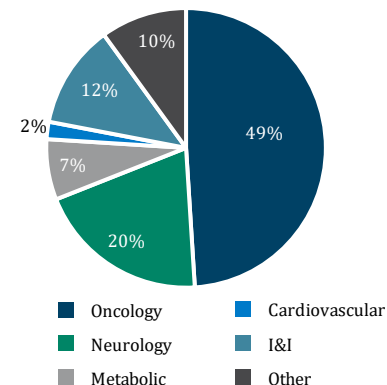
Breakdown of Partnerships in Q2 2024

(N=41)

Stage of Development



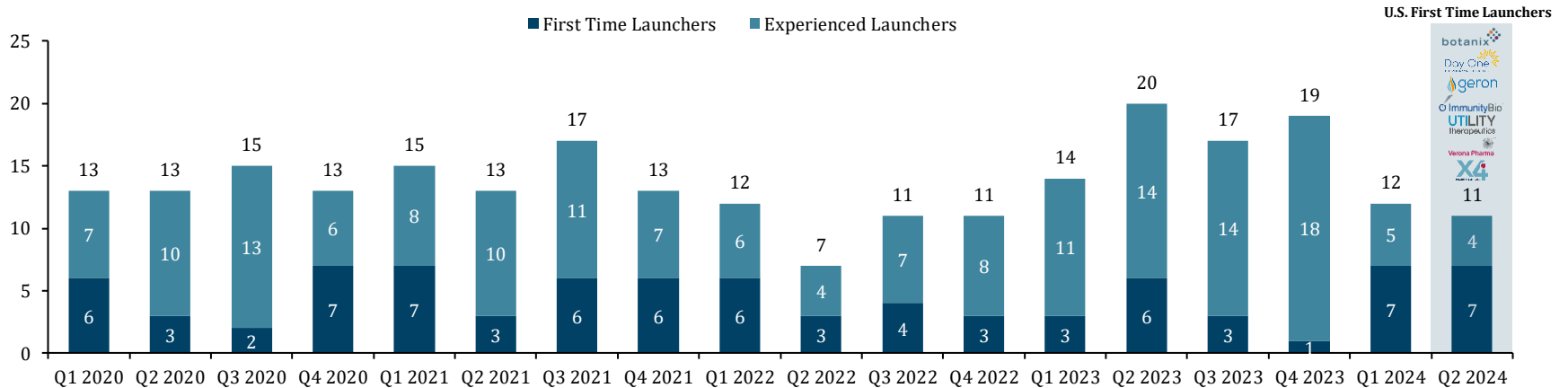
Therapeutic Area



FDA Approval Trends and Upcoming SMID-Cap PDUFA Dates

- Following a record year of approvals in 2023, the FDA has been judicious, approving only 23 products so far in 2024
- 18 upcoming PDUFAs for SMID-cap biopharma companies scheduled in 2024
- Both Abeona and Rocket Pharma received CRLs this quarter for manufacturing related matters

FDA Approvals by Quarter



Upcoming 2024 SMID-Cap PDUFA Dates

Company	Product	Indication	Modality	PDUFA Date
Alpha Cognition	ALPHA-1062	Alzheimer's disease	Small molecule	7/27/24
Adaptimmune	Afami-cel	Advanced synovial sarcoma	Cell therapy	8/4/24
Citius Pharma	Lymphir	r/r cutaneous T-cell lymphoma	Protein	8/13/24
Ascendis Pharma	Transcon PTH	Hypoparathyroidism	Peptide	8/14/24
Agios Pharma	Vorasidenib	IDH-mutant diffuse glioma	Small molecule	8/20/24
Incyte/Syndax	Axatilimab	Graft-versus-host-disease	Antibody	8/28/24
Vanda Pharma	Tradipitant	Gastroparesis	Small molecule	9/18/24
Zevra Therapeutics	Arimocloamol	Niemann-Pick Disease Type C	Small molecule	9/21/24
Syndax Pharma	Revumenib	r/r KMT-2Ar acute leukemia	Small molecule	9/26/24
ARS Pharma	Neffy	Anaphylaxis	Small molecule	10/2/24
Iterm Therapeutics	Sulopenem	Uncomplicated UTIs	Antibiotic	10/25/24
PTC Therapeutics	Upstaza	AADC deficiency	Gene Therapy	11/13/24
Autolus Therapeutics	Obe-cel	Adult B-cell acute lymphoblastic leukemia	Cell therapy	11/16/24
Applied Therapeutics	Govorestat	Classic galactosemia	Small molecule	11/28/24
BridgeBio Pharma	Acoramidis	Transthyretin amyloid cardiomyopathy	Small molecule	11/29/24
Jazz / Zymeworks	Zanidatamab	HER2-positive biliary tract cancer	Antibody	11/29/24
Ionis	Olezarsen	Familial chylomicronemia syndrome	Oligonucleotide	12/19/24
Zealand Pharma	Glepaglutide	Short-bowel syndrome	Peptide	12/22/24

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